

**EXPLORING THE INFLUENCE OF DIFFERENT FACTORS
IN DESIGNING A GAMIFIED ONLINE COMMUNITY FOR GIRLS**

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By

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ABSTRACT

In this thesis, an improved framework is proposed for categorizing existing gamified systems. Related works and real world examples of gamification are discussed and some areas where insufficient research exists. In order to address the identified research problems, an experimental gamified system was designed and implemented for sharing articles related to different aspects of life. The participants of the study were recruited among the users of an existing Iranian lifestyle site for female users. Therefore, the gender of the users was considered in the design. A wide range of gamification elements were implemented in the system to test the effectiveness of specific design features and gamification elements' parameters in increasing user motivation, for example, the contingency of rewards and the use of sound and animation in badges. A detailed questionnaire was used to answer the research questions. The results suggest specific combinations of gamification elements and their parameters that can be successfully applied by designers of social sites for similar audience.

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CHAPTER 1

Introduction

Gamification, as a research area, did not start from a theoretical basis; it has been shaped by the successful application of game elements in non-game systems. The area has been growing enormously in recent years and more and more systems started adopting the idea of gamification in their design to motivate users to participate more. There are many successful examples of gamified websites such as Foursquare [17], Fold it [16] and Stack Overflow [42], which successfully engage their users in productive behaviors to contribute. This leads to an increase in user commitment to the site, since users are usually more committed to systems, in which they have invested their time to make contributions. The reason behind that is the sense of ownership; it forms a connection between the user as owner and his/her content on the website. The sense of ownership makes users feel their belongings (his/her content on the website) are more valuable [1]. By building game elements in websites, users experience rewards when they contribute to the site, either in terms of feeling of achievement, or pride in their work, in terms of reputation, and collectible virtual items, such as points, badges, and status. This helps to engage the users in continuous contributions and builds a strong community around the website which is beneficial for the success of the site, since the contributed new content and the social features attract more users because of the network effect [49].

In the present thesis, the major goal is to explore the key parameters that contribute to the success of a gamified system. In Chapter 2 the theoretical background of gamification in psychology is investigated. In Chapter 3 some popular real world examples of gamified systems are investigated and analyzed. The analysis of successful gamified websites sheds a light on the lack of a comprehensive framework for categorizing gamified systems. Consequently, we

propose a framework for categorizing these gamified systems that is more comprehensive than the previous framework.

Throughout our literature review and analysis of previous systems, we came across six major areas where the existing research is insufficient:

1. Comparing Gamification Elements
2. The Influence of Contingency
3. Points Vs. Reputation
4. Comparing Different Types of Leaderboards
5. The Influence of Sound and Animation
6. Expected Vs. Unexpected Rewards

To explore these areas, a new social website called “Happy-Ladies” was built and launched. In order to avoid having to populate an entire new site, which is a very difficult task, we recruited users from an existing Persian website (called “Rangi Rangi”) for lifestyle news with predominantly female audience. In contrast to the existing site, where users are just viewers of information, our site “Happy-Ladies” allows users to share useful information in areas such as popular psychology, interior design, crafts and cooking. The major goal of Happy-Ladies is, through the application of gamification techniques, to engage users in contributing content and to evaluate the relative effect of different game elements and techniques on user participation and engagement in the site. In Chapter 4 the details of the design of Happy-Ladies is described. Moreover, to find answers for the aforementioned questions, the users of Happy-Ladies were provided with a specific and comprehensive questionnaire. In Chapter 5 the obtained results are provided and discussed.

CHAPTER 2

Related Work

In this chapter, I first introduce the term “Gamification”, and the main Gamification Elements. Then I discuss existing psychological theories of motivation, following by Reward structures. Finally, Werbach and Hunter framework for classifying gamification elements is introduced.

2.1 Gamification and Gamification Elements

Gamification is defined as using game-design elements in non-gaming contexts [12]. The goal of gamification is making the system more fun and engaging and to motivate participation and contributions by users. The initial gamification approaches evolved from the area of “Customer Relationship Management” where airlines and retail chain stores award users points for purchases or miles flown which can be cashed into prizes to both keep track of user behavior and to motivate users to fly / purchase more. This design pattern got more and more popular; systems with different goals (educational, social, commercial ...) have started using gamification. Now gamified systems use different strategies, techniques, and elements in their design. Although this area has grown enormously, not all the systems were successful in using gamification. According to Gartner, “By 2014, 80 percent of current gamified applications will fail to meet business objectives primarily due to poor design.” [19]. Therefore, learning from successful systems is required for designing a gamified system.

According to Werbach et al. [49], gamification elements can be categorized into three main categories, from low to high level: components, mechanics and dynamics. Figure 2-1 represents the elements of each level.

The Components level is the lowest level of the hierarchy and contains the basic game elements, such as points, levels, badges, and leaderboards. Although the components are the most easy distinguishable (usually they are mapped directly into interface widgets) and well-

known gamification elements, they would be meaningless without being supported by the higher-level gamification elements.

Mechanics are the processes that move actions forward and usually are attached to a set of components. Challenges, competition and cooperation, rewards and feedback are the most well-known mechanics of gamification.

Dynamics is the highest level of hierarchy that depicts a big picture and the goals of the system and contains conceptual aspect of a gamified system. The Dynamics-level elements are hidden and implicit structures that make the user experience with the system coherent.



Figure 2-1 Werbatch hierarchy of gamification elements

2.2 Common Gamification Elements

In this section, game elements which are widely-used in the gamified systems are briefly introduced. Game elements are mainly features of video games that could be used in gamified systems. The most common gamification elements are points, badges, levels and leaderboards.

2.2.1 Points

Points are the most basic element of video games and gamified systems for keeping a record of how well somebody plays. Usually the player with a better point score wins in a real

world game. Points could be used as an input for some other game elements such as levels, progression visualizations, and leaderboards.

2.2.2 Levels

Levels represent the user's progression in terms of experience or achievement (point score) and it is widely used in real world games. Amy Jo Kim [23] has introduced the following basic levels in the players' journey in a game or gamified system:

- Newbie: Players who have recently started playing.
- Regular: Players who are familiar with the game, they know the rules and are building habits in the game.
- Enthusiastic: Players who are at the mastery level and usually have a good experience in the game.

In order to keep users progressing through the levels, the difficulty of reaching the next level should get gradually harder. The amount of effort should match the user's skills and situation to keep them motivated as shown in figure 2-2.

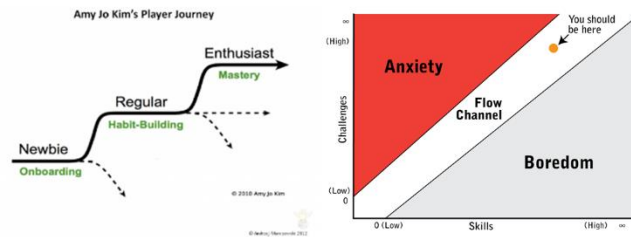


Figure 2-2 Player journey and flow channel

2.2.3 Badges

Badges visually present and indicate player's achievements. Badges can be presented in the form of a medal, trophies, crowns, and any other visual symbols. There are no pre-defined rules for awarding players with badges; it depends on the game designer. They could be awarded when a certain goal is achieved or a first time player experiments with something new or for

performing some special actions, or just from time to time as a surprise, to keep the player motivated and coming back. Awarded badges can usually be attached to the player's profile so they are visible to the other players. Badges generally present a credential of user's achievements or longevity in the game.

2.2.4 Leaderboards

In the game industry leaderboards are usually used if the game is competitive. Leaderboards list /rank players according to their scores and they encourage players to compare and compete with each other. Using a leaderboard could be demotivating, if it is not used in a proper situation [19]. For example, if a new entrant sees himself at the bottom of a long list of players he may think that the goal is not achievable and lose interest in playing. Therefore, more research on different types of leaderboards would be very helpful to avoid demotivating users.

One way to cope with this problem, "personalized leaderboards" are introduced [37]. Personalized leaderboards do not show all the competitors, but adopt different strategies; for example, comparing the player with his own friends instead of all players, or showing the player in the middle of leaderboard with a couple of people who have better ranks and some with worse ranks.

2.3 Related Psychology Theories

Gamification aims to make non-game systems fun and engaging. In other words by using gamification techniques we want to make normal tasks feel more enjoyable. In this section we review some psychological theories that are beneficial for understanding fundamental terms such as Fun, Flow channel and motivation.

2.3.1 Positive Psychology

Martin Seligman [40] argues that psychology not only can help curing serious mental problems; but also can help normal people progress and have better and happier lives. Their team

has surveyed successful people in a variety of areas such as arts, sports, science, etc. about their experience, times of being happy, productive and being in a good relationship. Seligman has presented the PERMA model in his book Flourish [40], which is about five essential elements contributing to our ability to flourish and required for experiencing lasting well-being.

1. Positive Emotion (P)

Enjoying presence is crucial for positive emotion. Sensation, Fantasy, Narrative, Challenge, Fellowship, Discovery, Expression are examples of it.

2. Engagement (E)

Being truly engaged in a situation, task, or project could help in experiencing well-being.

3. Positive Relationships (R)

Humans are naturally "social beings", and good relationships are core to our well-being. People with positive relationships are happier.

4. Meaning (M)

Serving a cause bigger than the individual. God or religion, or serving humanity.

5. Accomplishment/Achievement (A)

Progress, master a skill, achieve a valuable goal, or win in some competitive event.

2.3.2 Flow

Mihaly Csikszentmihalyi who is Martin Seligman's colleague, introduced the notion of "flow" in his book "Finding Flow", published in 1997 [9].

The main idea is that the difficulty level of challenges should fit the player's skill in that stage; otherwise if it were too difficult he would feel anxious and if it were too easy for him, he would feel bored. (Right part of Figure 2-2).

2.3.3 Fun

Nicole Lazzaro's [27], based on a study of 60 people playing their favorite games, found that fun is not necessarily something easy and casual. She categorized Fun into the following four main categories:

1. Hard fun: overcoming challenges and obstacles, problem solving, mastery and having strategies for gaining goals.

2. Easy fun: Exploring, being creative or simply enjoying the control of game and fantasy imagination.

3. Serious fun: Works that are performed because they have purposes bigger than an individual. It could benefit the planet, family or friends.

4. People fun: Humans are social creatures, therefore interacting with friends and other team members makes the experience more pleasant. [27]

2.3.4 Self-determination theory

Self-determination theory, proposed by Edward Lewis Deci, Richard M. Ryan [10] identifies three human needs: Competence, Autonomy, and Relatedness. This theory argues that satisfying these three needs will provide an optimal situation for an individual to progress.

- Competence is a sense of ability and being able to achieve something in the activity
- Autonomy is a feeling of freedom in choosing
- Relatedness is social aspect of a human being. Feeling connected to other people can satisfy this need.

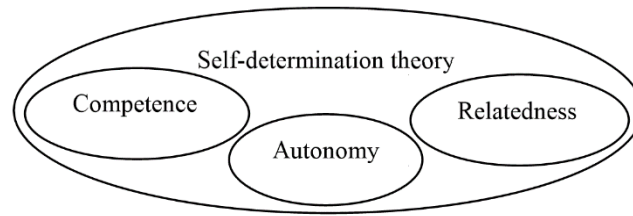


Figure 2-3 Self-determination theory

2.3.5 Motivation Types

Generally, there are two types of motivations: intrinsic and extrinsic. Intrinsic motivations are not for an external reward; for example, when someone does something just because it's fun and interesting, the motivation is intrinsic. Seligman, Czigszentmihalyi and Lazzaro, and their concepts of PERMA, flow and fun, discuss different sources and forms of intrinsic motivation. On the other hand, when the actions are done with the expectation of a specific reward, the motivation is extrinsic. Studies [25, 37] compare the effects of using intrinsic and extrinsic rewards indicate that the contributions of the user in the system are more sustainable if they are driven by intrinsic motivation.

2.4 Reward Structure

Richard Ryan and Ed Deci have proposed three ways for categorizing rewards in their work [11]; these categorizations are on the basis of different characteristics of rewards. In the following their reward structures are discussed.

2.4.1 Tangible and intangible rewards

Tangible rewards are physical rewards, like money or bonus and intangible rewards are virtual rewards, like badges or verbal compliments. For example, Foursquare [17] awards a badge if the user checks-in for the first time in a café like Starbucks. This badge is an intangible reward. But if a user checks in that place more than everyone else, Foursquare would award her

the badge of “mayor” of that place, which is also an intangible reward. However, Starbucks offer users with a mayor badge a free coffee, which is a tangible reward, i.e. the user can “cash” the intangible award into a tangible one.

2.4.2 Expected and unexpected rewards

A reward is expected if the user knows that the result of his action is going to be rewarded. Otherwise if it is awarded by chance or surprise, it would be an unexpected reward.

2.4.3 Contingency

Contingency clarifies what kind of actions are required for receiving rewards. According to contingency, rewards are categorized into 4 groups:

- Task non-contingent: this group of rewards is awarded without any reason.
- Engagement-contingent: this group of rewards is awarded when the reward depends on contributing, no matter what the outcome is.
- Completion-contingent: Awarding this group of rewards depend on finishing the task successfully.
- Performance-contingent: Receiving this group of rewards requires doing the task well.

Currently there is a lack of research on the effectiveness of each type of reward. More research in this area would be helpful for designing successful gamified websites.

2.5 Gamified Systems Categorization

One way of classifying gamified systems is according to the purpose they serve. Werbach and Hunter [49] categorized gamification systems into three main categories: internal, external, and behavior change (see Figure 2-4).

Relationship between Different Gamification Categories

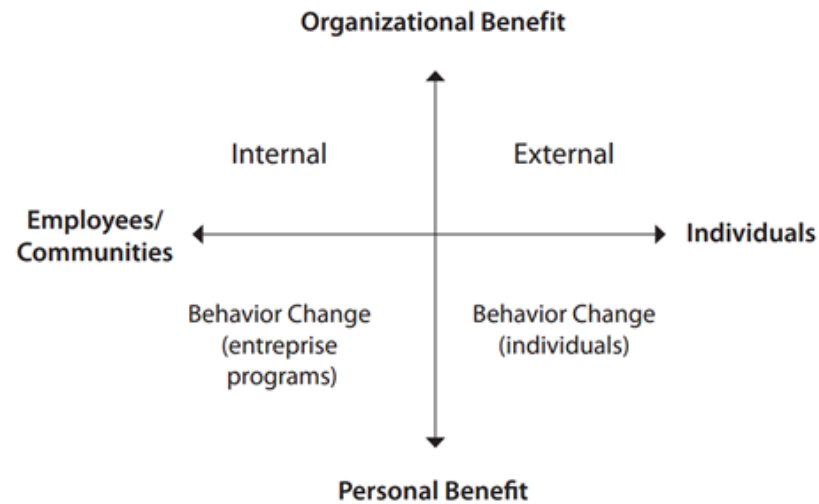


Figure 2-4 The categorization of gamification by Werbach and Hunter [49].

2.5.1 External

External gamified systems are usually targeting customers or potential customers of a company. Thus, they usually contain marketing strategies. Their main purpose is to improve the relation between a company and its customers. Loyalty programs belong to this category. They aim to improve customer motivation to buy more or be loyal to the company.

2.5.2 Internal

Internal gamified systems are mainly used for employees of an enterprise or a part of company like human resources or customer service department. Two distinguishing attributes are mentioned for these systems:

- First, the players are already part of a defined community: the company.
- Second, the company knows who they are, and they interact with each other on a regular basis [49].

2.5.3 Behavior change

Habit making is the main purpose of systems in this category. For instance, the users know that they should go to a gym more often but it is difficult for them to actually do this. Keas is the example that is mentioned for this category [49].

Werbach argued that when the user appreciates the value of doing something but needs more motivation to perform the action, the gamified system that motivates this sort of behavior also belongs to this category.

This framework is beneficial for a general overview of gamified systems, but there are some systems that do not fit into this framework. ‘Waze’ is a gamified website for people to report road problems. For instance, if the road is closed, other users can find an alternative way beforehand and save some time. Waze [48] does not match the definition of any categories of Werbach and Hunter framework. Since the applications of gamification of websites and systems have had an explosive growth since 2011, the existing framework is not able to comprehensively classify the wide range of gamified systems and a more comprehensive framework for classifying gamified systems is required. We proposed a new framework in the next chapter of this thesis.

2.6 Chapter Summary

We started this chapter by introducing gamification and we described some of the most important gamification elements. It was followed by psychological theories related to gamification that are influential on the success of a gamified system. Then three different ways to classify rewards according to Richard Ryan and Ed Deci were discussed. In the last section of this chapter the only available framework for categorizing gamified systems by Werbach and Hunter [49] was described and its weak points were mentioned. In the next chapter a more

comprehensive framework for categorizing gamified systems is proposed and compared with the current framework.

In addition, there are 4 research questions arising out of this chapter that will be addressed during the study in chapters 4 and 5. Here is a summary of them:

1. As we learned in section 2.2.4 leaderboards are very influential for the satisfaction of users. Therefore, more research on different types of leaderboards could be very helpful for new gamification designers.
2. Rewards are a very critical part of every gamified website and have many different types as mentioned in section 2.4. In order to help gamification designers, to make a better choice about the type of rewards that they use in a system.
3. In addition to comparing reward types according to contingency, we will compare them according to whether they are expected or unexpected. There are a few questions regarding this area that we want to cover; are expected rewards more motivational or unexpected rewards? Which type of reward are more valuable for users?
4. The last open question in this chapter is related to making a gamified system more game-like by using animation and sound. Jon Radoff [35] believed that the power of games is not in the game elements, but in being able to pull the user into the interactive story of the game. Sounds and animation are helpful for providing the user with an interactive game-like behavior. However, how to weave them into the design without crowding it and overwhelming the user is not clear.

In order to address these four questions and the two new questions raised out of chapter 3, a gamified website with a variety of gamification elements is designed and discussed in Chapter 4.

CHAPTER 3

Analyzing Well-known Gamified Systems

Gamification was started by usage of real world game elements in non-game systems. These systems have attracted considerable attention owing to their promising results in encouraging users. However, the research in this field suffers from the lack of a comprehensive survey of the implemented gamified systems that could shed light on the detail of these systems and how various factors may contribute to their success or failure. The only framework for categorizing gamified systems is provided by Werbach and Hunter [49]. This is a simple framework which may not be as comprehensive as required for classifying the vast number of available gamified systems.

The goal of this study is to survey the most well-known 23 existing gamified systems to provide a comprehensive framework for classifying gamified systems. This survey can also be beneficial for finding common trends in designing gamified systems and recognizing some possible opportunities. Furthermore, by comparison and analyzing these 23 gamified systems, some patterns that are based on the similarities of gamified systems and some untouched areas that could provide some potential opportunities for designing novel systems were discovered.

The gamified websites are listed in Table 3-1 and their domains are indicated on the right hand side. Nine major domains (i.e., Health, Finance, Energy & Resources, Education, Info-Exchange, Traffic, Charity, Hygiene, and Science) were found for the surveyed systems. It should be noted that during the time of writing there might have appeared other domains in which gamified systems are used. The top three domains which use the gamified systems are “Finance”, “Info-Exchange”, and “Energy & Resources”.

Table 3-1 Categorizing gamified systems according to their domain

Domain									
Gamified website	Health	Finance	Energy & Resources	Education	Info-Exchange	Traffic	Charity	Hygiene	Science
Nike +	1								
Zamzee	1								
Mint		1							
KhanAcademy				1					
SuperBetter	1								
Practically Green			1						
Recycle Bank			1						
Pain Squad									1
fold.it									1
Opower			1						
Kukui Cup			1						
Foursquare					1				
Stack Overflow					1				1
Waze					1				
CAPRI						1			
Free Rice				1			1		
Paani								1	
CrowRise							1		
StarBucks		1							
Samsung Nations		1			1				
Ebay		1							
Trip Advisor		1			1				
Sale Force	1								
Total	3	5	4	2	5	1	2	1	3

3.1 The Proposed Classification framework

The first dimension for classification is called “Target” and answers the question “who is benefiting from the gamified system”. Different categories considered in section of the proposed framework are including “individual”, “team/group”, “enterprise”, “commercial”, and “social systems”.

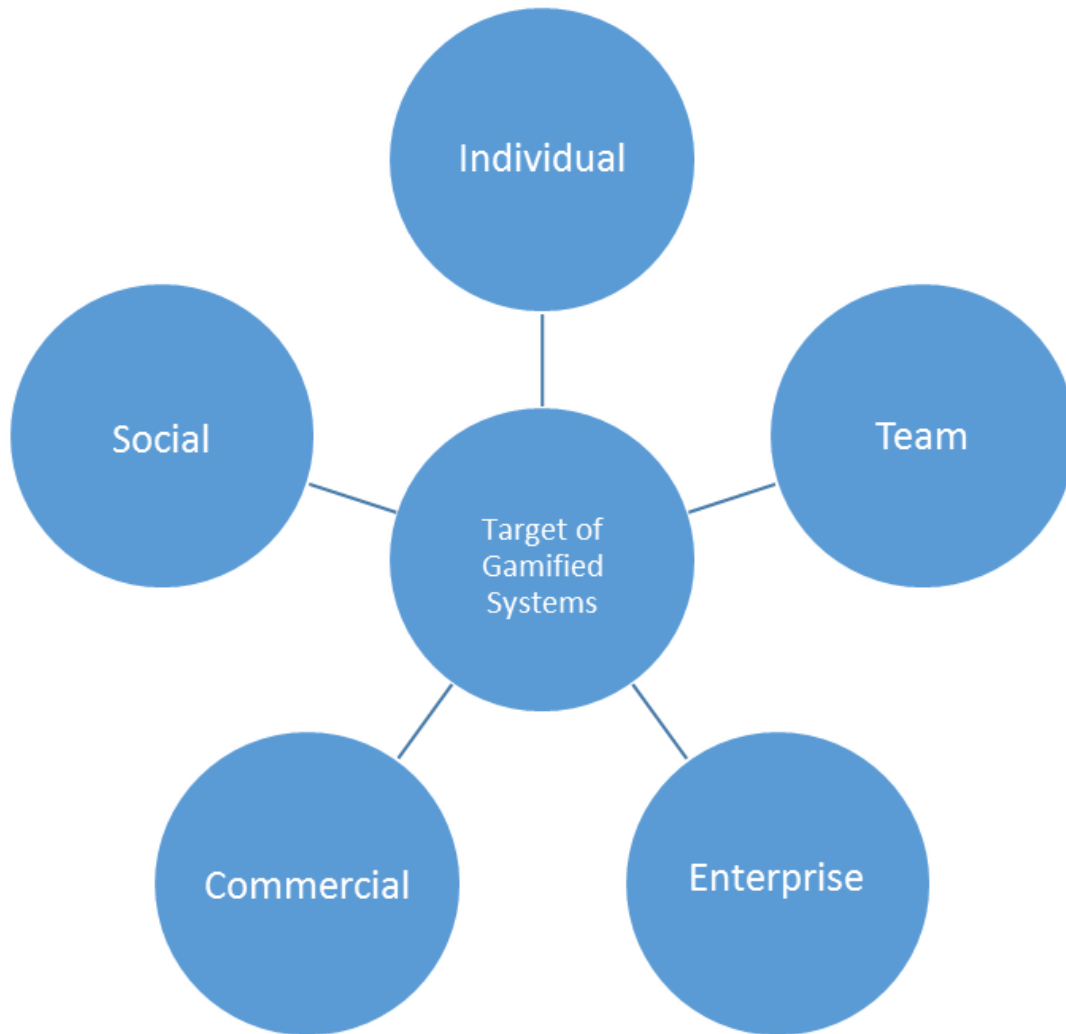


Figure 3-1 Framework for categorizing gamified systems

3.1.1 Individual gamified system

If the contribution of the user or the user's behavior change is only for his/her own benefit, then the system is considered as individual-based system. For example, in "Nike +" [30] system users gain points (in this system the points are called "Nike fuel") for their physical activity which improves their physical health conditions. In other words, there is no direct commercial or social benefit as a result of this activity and this system mainly targets individuals. Users are usually encouraged to improve their own physical, financial or mental situation. Other examples

of this category are Mint [21] and SupperBetter [44]. Mint helps individuals reach their financial goals, such as buying a house, car or saving for an expensive trip and SuperBetter helps the individual to recover from a disease by increasing user personal resilience.

3.1.2 Team gamified system

When the user contribution or behavior is for the benefit of a specific group or team then the system is classified as team-based system.

Sense of belonging to a team gives deeper meaning to the user's contributions in the system. In this sort of gamified systems users show commitment to their teams and this makes this games more sustainable. Now multiplayer games are very popular and this is a popular pattern in designing games to form teams. But there are very few gamified systems that provide the team-based features for their members.

Foldit [16] is a system developed at the University of Washington designed to engage users in solving puzzles, which in fact present protein folding problems and thus solve hard real world computational problems. In 2011 a team of players in this system successfully unlocked the secrets of a key protein in the fight against HIV. What had stumped scientists for 15 years was solved in 10 days by a team of players who were not professionals in this area.

3.1.3 Enterprise gamified systems

The systems that are used for motivating a company's employees to engage in beneficial behaviors for the company are classified as Enterprise systems. These systems are used to pursue the company's goals by making the company's environment more exciting and game-like and also provide the employees with an opportunity to be recognized in the company for their excellent work. A good example of systems used for this purpose is the Salesforce [38] system with Badgeville extension. Badgeville provides different gamification elements such as points,

levels and progression visualization.

3.1.4 Commercial gamified systems

The systems that target a company's customers to change their behavior or engage them in contribution to the company's site are classified as commercial gamified systems. This sort of systems encourages the customers to use their services more often to gain more points. These points may later be used as virtual money in the future purchases. Moreover, these systems make the process of evaluation of company's services easier, thus encouraging the customers to share their opinion about the services and productions with the company. One example of successful gamification systems used for commercial purposes is a mobile app developed for Starbucks Coffee chain that rewards the customer with one star for each coffee purchased. The stars are collected in a cup shown on the mobile app screen. The customer will receive a free coffee as soon as the cup fills up with the stars.

3.1.5 Social gamified systems

The systems that address problems of society such as recycling, clean water, traffic jams, and hunger are categorized as "social systems". The gamified systems in this area usually try to use creative ways to encourage the users to take a step for solving these issues, by, for example, providing visual feedback of fuel consumption while driving in some cars, or engaging neighborhoods in recycling competitions by providing information about the amount of recyclable materials collected per household, apartment building, street, etc.

The classification of the 23 reviewed gamified systems according to the target is illustrated in Figure 3-2. The different reviewed gamified systems are classified with respect to their target in Table 3-2. As can be seen, the majority of successful and famous gamified systems (56%) target society as a whole. However, interestingly, the game mechanics and elements they use are not

multi-player based. Gamification systems still rarely have multiplayer strategies. This may provide a good opportunity for future gamified systems.

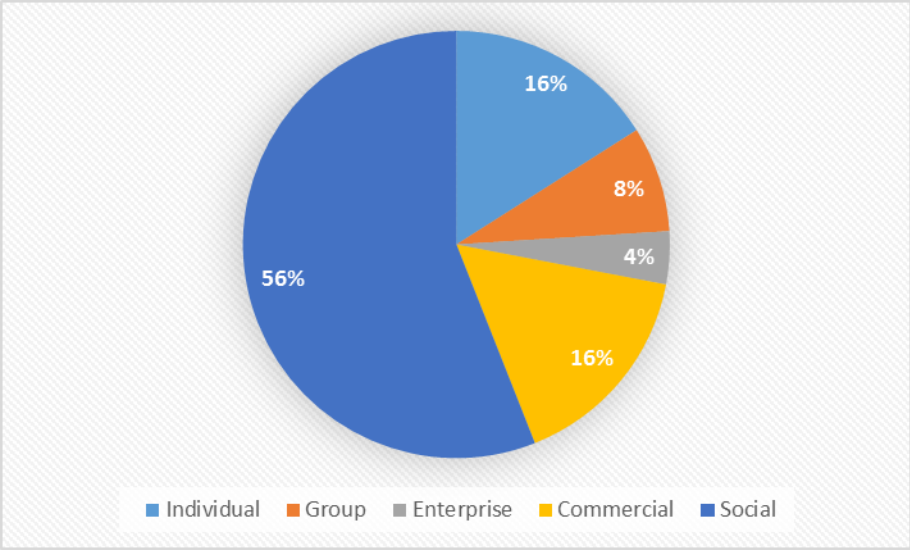


Figure 3-2 The share of each target type in gamification

Table 3-2. Comparison of different systems based on their target society

Size					
Name	Individual	Team	Enterprise	Commercial	Social
Nike +	1				
Zamzee	1				
Mint	1				
KhanAcademy	1				
SuperBetter					1
Practicaly Green					1
Recycle Bank					1
Pain Squad					1
fold.it		1			1
Opower					1
Kukui Cup					1
Foursquare					1
Stack Overflow					1
Waze					1
CAPRI					1
Free Rice		1			1
m.Paani					1
CrowdRise					1
StarBucks				1	
Samsung Nations				1	
Ebay				1	
Trip Advisor				1	
Sale Force			1		

While we were surveying these gamified websites we noticed that some have more than 1 target. For example “Fold.it” and “Free Rice” both serve social benefits but they have team strategies as well. In these gamified websites users try to collaborate with their team members to have better scores when compare to other teams. Thus we need to categorize them in both categories. That is because in real world scenarios goals and targets are not completely distinct

and they may have overlaps. Among 23 websites that we surveyed there are some other systems that can fit into 2 or even more categories. For example all the commercial and enterprise systems try to have individual benefits as well to encourage users to use their systems (see Table 3-3).

Table 3-3 In depth comparison of different systems based on their target society

Size					
Name	Individual	Team	Enterprise	Commercial	Social
Nike +	1				
Zamzee	1				
Mint	1				
KhanAcademy	1				
SuperBetter					1
Practicaly Green					1
Recycle Bank					1
Pain Squad					1
***fold.it		1			1
Opower					1
Kukui Cup					1
Foursquare	1				1
Stack Overflow	1				1
Waze					1
CAPRI					1
Free Rice	1	1			1
m.Paani					1
CrowdRise					1
***StarBucks	1			1	
Samsung Nations	1			1	1
***Ebay	1			1	
**Trip Advisor	1			1	
**Sale Force	1		1		

Therefore the framework needs to be updated to reflect the overlaps of the categories. It need to cover gamified systems which belong to more than one categories. The following is a symbolic visualisation of the proposed framework.

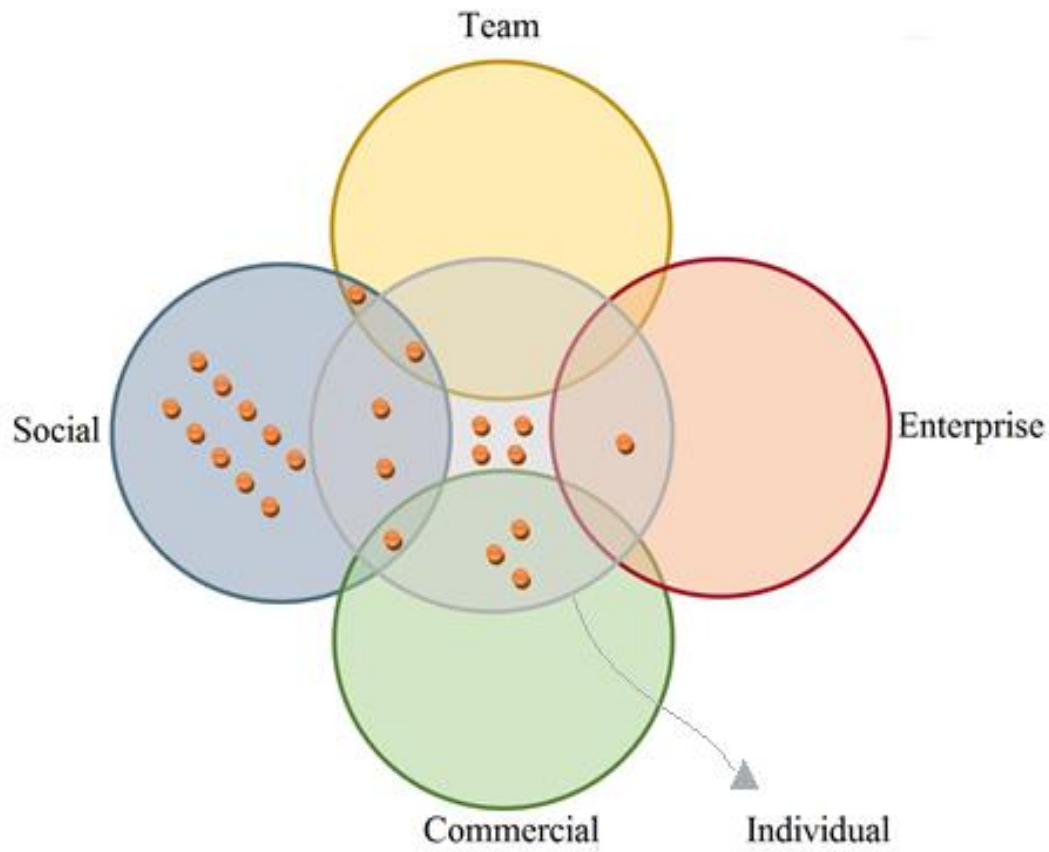


Figure 3-3 Updated version of framework for categorizing gamified systems

3.2 Comparing the comprehensiveness of the two frameworks

Twelve (12) websites out of 23 surveyed can fit into one of categories of Werbach & Hunter framework 2.5); (about 52%). However, some of these websites actually belong to more than one categories and their framework fails to cover such websites. Therefore, the actual comprehensiveness of their framework over the 23 websites is even less than 52%.

In Table 3-4 abbreviations of target categories are used for specifying the category (or category) that the gamified system belongs to. Moreover two other techniques are used for providing more details about where each gamified website is placed in the proposed framework; order of the abbreviations letters and their capitalisations. As an example in Table 3-4 “Samsung Nations” [39] is declared as “CIs” which means mainly it belongs to commercial category; Secondly it has individual benefits for users (such as coupons); and third (and less focused) is its social benefits as it is an info-exchange website and the reviews and comments can help other customers who may want to buy a product decide better.

Table 3-4 Abbreviations for target categories

Target	Major	Minor
Individual	I	i
Group	G	g
Enterprise	E	e
Commercial	C	c
Social	S	s

Our new framework is able to cover 100% of the websites that we surveyed and has a way to cover gamified systems which belong to more than one categories.

Table 3-5 Comparing the comprehensiveness of the two frameworks

Name	Category in Werbach Framework	Category in proposed framework
Nike +	Behavior Change	I
Zamzee	Behavior Change	I
Mint	Behavior Change	I
KhanAcademy		I
SuperBetter	Behavior Change	I
Practically Green	Behavior Change (enterprise)	IEg
Recycle Bank	Behavior Change (enterprise)	SI
Pain Squad		S
fold.it		SG
Opower	Behavior Change (enterprise)	S
Kukui Cup		S
Foursquare		SI
Stack Overflow		SI
Waze		Si
CAPRI		S
Free Rice		S
m.Paani		S
CrowdRise		S
StarBucks	External	CI
Samsung Nations	External	CI _s
Ebay	External	CI
Trip Advisor	External	CI
Sale Force	Internal	EI

3.3 Gamification elements

The common gamification elements are described in Section 1. The gamification elements used in the 23 reviewed systems are tabulated in Table 3-6. As can be seen, different systems are using various types of gamification elements. The table is sorted according to the sum of each column and row therefore on the top left corner of the table the gamified systems that use most game mechanics and the most used game mechanics are placed.

Table 3-6 Gamified systems sorted according to the number of gamification elements

	Points	Progression	Levels	Badges	Quests	Competition	Status	Social tool	Prizes	Leader Board	Access	Chance	Hints	Priority	Coupon	
CrowdRise	1	1	1	1	1	1	1	1		1						9
fold.it	1	1	1		1	1		1		1			1			8
Nike +	1	1		1	1		1						1			6
Sale Force	1	1	1	1	1			1								6
SuperBetter	1	1	1		1			1		1						6
Practicaly Green	1		1	1			1			1	1					6
CAPRI	1	1				1		1	1			1				6
Zamzee	1		1	1					1					1		5
Foursquare	1		1	1					1	1						5
StarBucks		1	1		1		1		1							5
Pain Squad		1	1	1	1											4
KhanAcademy	1	1		1							1					4
Ebay		1	1			1	1									4
Kukui Cup	1		1	1		1										4
Stack Overflow	1			1			1				1					4
Waze	1						1	1			1					4
Trip Advisor				1		1	1	1								4
Free Rice	1	1				1				1						4
m.Paani	1				1				1			1				4
Opower		1				1				1						3
Samsung Nations	1								1					1		3
Recycle Bank	1								1						1	3
Mint		1	1													2
	17	13	12	11	8	8	8	7	7	7	4	2	2	2	1	

Error! Reference source not found. sorts different gamification systems based on the number of elements used in each system. In this survey, “CrowdRise” [8] with 9 elements has the highest number of elements and “Mint” with only two elements has the lowest number of elements. An average of 4.7 elements is used in the 23 systems surveyed in this study.

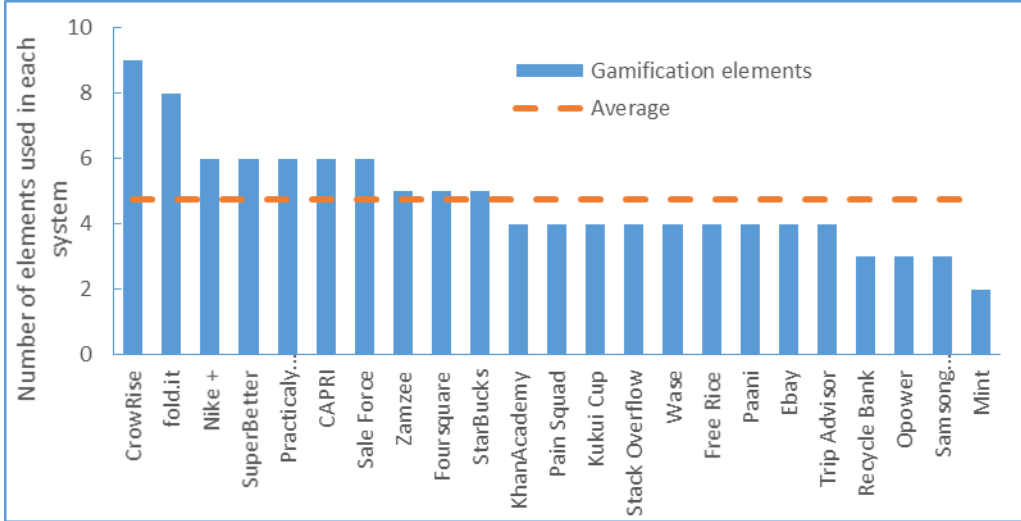


Figure 3-4 The number of gamification elements used in each gamified system.

To gauge the popularity of each gamification element the share of each element in systems is surveyed. here is illustrated in **Error! Reference source not found.**4 As indicated by results, “Points”, “Progression”, “Levels”, “Badges”, “Competition”, and “Leaderboards” have the most popularity in the surveyed systems and “Coupon”, “Chance” and “Priority” have the least popularity. The average number of elements used in surveyed gamified systems is 4.7 elements per system, which is indicated with orange dashed line in Figure 3-4.

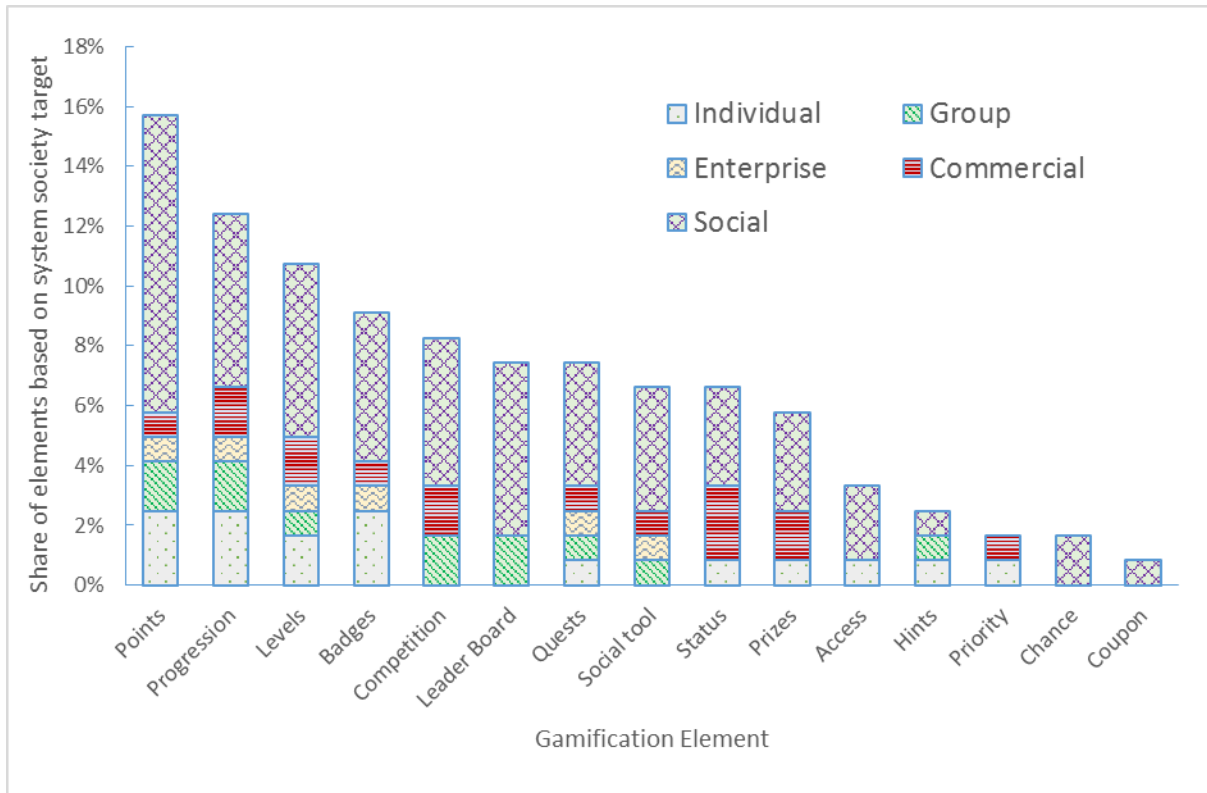


Figure 3-5 The usage percentage of each gamification element in the selected systems and their correlations with the target society of each system

Error! Reference source not found. also indicates the correlation between the share of each element in different systems and the target society of each system. In individual based and enterprise based systems the first four popular elements (i.e., points, progression, levels, badges, competition, and leaderboards) have the most contribution, but status, prizes, access and the remaining game elements are less popular. This may indicate that present enterprise based systems they mostly encourage the employees who are intrinsically motivated to grow their individual level or skill (through rewarding them with points, progression levels and badges), and some do encourage teams (through Social Tools and Quests). In systems targeting society and groups, “Points”, “Progression”, “Competition” and “Leader Board” are dominant gamification elements. In commercial and social based systems different

gamification elements are rather equally utilized. This may stem from the fact that the number of commercial and social based systems in this survey is large.

Table 3-7 presents the number of gamification elements that two specific systems have in common. By looking at this table it can be concluded which systems are more similar on the basis of gamification elements they use. “Fold.it” and “CrowRise” with 7 common gamification elements have the most similarity. There are several systems that have no elements in common or only one common element.

Table 3-7. The number of common gamification elements between different gamification systems

	Nike +	Zamzee	Mint	KhanAcademy	SuperBetter	Practically Green	Recycle Bank	Pain Squad	fold.it	Opower	Kukui Cup	Foursquare	Stack Overflow	Waze	CAPRI	Free Rice	m.Paani	CrowdRise	StarBucks	Samsung Nations	EBay	Trip Advisor	Sale Force
Nike +		2	1	3	3	3	1	3	4	1	2	2	3	2	2	2	2	5	3	1	2	2	4
Zamzee			1	2	2	3	2	2	2	-	3	4	2	1	2	1	2	3	2	3	1	1	3
Mint				1	2	1	-	2	2	1	1	1	-	-	1	1	-	2	2	-	2	-	2
KhanAcademy					2	3	1	2	2	1	2	2	3	2	2	2	1	3	1	1	1	1	3
SuperBetter						3	1	3	6	2	2	3	1	2	3	3	2	6	3	1	2	1	5
Practically Green							1	2	3	1	3	4	4	3	1	2	1	5	2	1	2	2	3
Recycle Bank								-	1	-	1	2	1	1	2	1	2	1	1	2	-	-	1
Pain Squad									3	1	2	2	1		1	1	1	4	3	-	2	1	4
fold.it										3	3	3	1	2	4	4	2	7	3	1	3	2	5
Opower											1	1	-	-	2	3	-	3	1	-	2	1	1
Kukui Cup												3	2	1	2	2	1	4	1	1	2	2	3
Foursquare													2	1	2	2	2	4	2	2	1	1	3
Stack Overflow														3	1	1	1	3	1	1	1	2	2
Waze															2	1	1	3	1	1	1	2	2
CAPRI																3	3	4	2	2	2	2	3
Free Rice																	1	4	1	1	2	1	2
m.Paani																		2	2	2	-	-	2
CrowdRise																			4	1	4	4	6
StarBucks																				1	3	1	3
Samsung Nations																					-	-	1
EBay																						2	2
Trip Advisor																							2
Sale Force																							

Table 3-8. The number of gamification systems that used two specific gamification elements

	Points	Leader Board	Badges	Levels	Progression	Quests	Social tool	Priority	Coupon	Chance	Prizes	Status	Access	Competition	Hints
Points		6	9	8	8	6	6	2	1	2	6	5	4	5	2
Leader Board			3	5	5	3	3	-	-	-	1	2	1	4	1
Badges				7	5	4	3	1	-	-	2	5	3	3	1
Levels					8	6	4	1	-	-	3	4	1	4	1
Progression						7	5	-	-	1	2	4	1	6	2
Quests							4	-	-	1	2	3		2	2
Social tool								-	-	1	1	3	1	4	1
Priority									-	-	2	-	-	-	-
Coupon										-	1	-	-	-	-
Chance											2	-	-	1	-
Prizes												1	-	1	-
Status													3	3	1
Access														-	-
Competition															1
Hints															

In order to find out whether there is a relation between gamification elements with each other the number of times each two elements were used together in a specific system is presented in Table 3-8. Since points are the most common gamification element and that increases the chance of being concurrently used in a system with other elements it is eliminated from analysis. Thus, the most concomitant elements are “Levels and Badges”, “Progression and Quest”, “Levels and Progression”. In addition,

Table 3-8 indicates that which elements never been used concurrently in the surveyed systems. Examples are “Leader Board” and “Chance” or “Badges” and “Prizes”. It is also noteworthy that lack of concurrent usage of some elements can indicate two possibilities: (1) the concurrent usage of those elements would not result in a successful system owing to the nature of elements (2) the designers of surveyed systems did not think of using these two elements in the system. The latter case could provide the future designer with the opportunity to explore different combinations of elements and propose new strategies for gamified systems. For instance, the two elements of “Chance” and “Badges” are used in the gamified website designed for the experiment as a part of present thesis.

3.4 Quality Estimation

Generally, there are two ways to evaluate the user activity and contribution, and accordingly administer the rewards (e.g., points and badges):

- ✚ **Evaluating the amount of contributions (Quantitative):** In this type of evaluation, the users are assessed according to the number of their posts they write, number of comments that the user writes for others' posts, amount of time that is spent in the website, etc.
- ✚ **Evaluating the quality of contributions (Qualitative):** In this type of evaluation, the users are typically assessed by human beings, which is conducted either by admins of the website or using other users' feedback. For example, the number of “likes” a post receives, can reflect the quality of that post. How many times a post is shared by others is another means for evaluating the quality of contributions (qualitative measurement).

As can be seen, about 78% of the surveyed websites do not have a qualitative measurement system. However, we believe that qualitative measurement is very influential on the success of a gamified system. Therefore, we examine this in our experimental system.

3.5 Chapter Summary

In this chapter a new framework was proposed for classifying gamified systems. The capability of the proposed framework in classifying a large number of gamified systems is assessed versus the existing framework (Werbach and Hunter framework) that was introduced in the previous chapter. As a result of the comparison, the existing framework was able to cover less than 52% of the gamified systems. The proposed framework was able to cover 100% of the gamified systems that we surveyed.

Table 3-9 Quality evaluation methods in gamified websites

Name	Quantitative	Qualitative
Nike +	1	
Zamzee	1	
Mint	1	
KhanAcademy	1	
SuperBetter	1	
Practically Green	1	
Recycle Bank	1	
Pain Squad	1	
fold.it	1	1
Opower	1	
Kukui Cup	1	
Foursquare	1	
Stack Overflow	1	1
Waze	1	
CAPRI	1	
Free Rice	1	
m.Paani	1	
CrowdRise	1	
StarBucks	1	
Samsung Nations	1	
Ebay	1	1
Trip Advisor	1	1
Sale Force	1	1

Besides, we looked for patterns and correlations that may exist between the systems that are using similar elements and see how their goal is related to the elements that they have used. In table 3-8 the relation between gamification elements was discussed. We learned that some elements are usually used together and some are never used with each other. For example “Levels and Progression” are usually used together in a gamified system but “Chance” and “Badges” have not been used concurrently in the surveyed systems. When two gamification elements are never used with each other; it could provide the future designer with the

opportunity to explore it and propose new strategies for gamified systems. In the next chapter we describe a social site called Happy-Ladies where we implement both “Chance” and “Badges”.

In Table 3-7 we counted the number of different gamification elements used in the systems. CrowdRise has used the highest number of gamification elements and Mint has used the least number of gamification elements. Points is the most frequent gamification element and 17 out of 23 gamified systems are using it. On the other hand, coupon is only used in 1 gamified system. An average of 4.7 elements is used in the 23 systems surveyed in this study.

In Table 3-8 Similarities of the systems on the basis of gamification elements they used were surveyed. Accordingly, “Fold.it” and “CrowRise” with 7 common gamification elements are the most similar systems.

In addition, we had some more findings during the study of gamified systems that requires further analysis that will be discussed in chapter 4 and 5:

1. We learned that the most popular gamification elements are: “Points”, “Progression”, “Levels”, “badges”, “Competition”, and “Leaderboards”.

“Progression” is usually visualized by “Levels” in these systems and “Competition” is usually represented by “Leaderboards”. Therefore, we can combine them and conclude that the most popular elements are “Points”, “Levels”, “Badges”, and “Leaderboards”. We will implement these four gamification elements in our system and compare them according to different aspects.

2. In section 3.4 we learned that 78% of the surveyed websites do not have a qualitative measurement system. In this study one of our goals is showing that having qualitative measurement can be useful. Therefore, both evaluation systems need to be implemented in the gamified system which is designed for this study to compare the feedback of users about them.

In the next chapter an architecture of the gamified system is proposed, which is designed to answer these two research problems and also 4 other open problems brought up in chapter 2.

CHAPTER 4 SYSTEM DESIGN AND ARCHITECTURE

In the two previous chapters, the background of gamification was discussed, and 23 well-known gamification systems was analyzed and compared. Both chapters ended with some open questions. In order to address the research questions that raised in the two previous chapters we designed a gamified system capable of covering all 6 questions. Here are the 6 research questions raised out of Chapters 2 and 3.

1. As we discussed in 2.2.4 leaderboards could be demotivating especially for non-competitive users. Therefore, it would be helpful to compare different types of leaderboards to find the type of leaderboard that is most effective in motivating users. In order to address this issue we will design and compare different types of leaderboards in our system: general leaderboard, and timed leaderboard; top-user leaderboard and top-article leaderboard.
2. In gamified systems rewards aim to motivate users to do desired actions in the system. As we saw in section 2.4.3, gamification elements can have different motivations; we want to survey the influence of the contingency of rewards. For example, we want to see how users would compare a performance-contingent reward with a completion-contingent reward. In order to reach this goal, we need to implement different types of rewards (with different contingency types) in our system and then address them in our questionnaires. We expect performance-contingency rewards to be the most popular type of rewards as they appreciate the quality of efforts and the contribution need to have high quality to get this type of reward.
3. The next research question that we will address is how the effect of expected rewards is different from unexpected rewards. There was a simple definition of these two

- types of rewards provided in 2.4.2; this is an important practical decision to make when designing a reward mechanism, and therefore an important research question that we will address.
4. The effect of using sound and animation in grabbing the user's attention and making the interactions more game-like is the last research question raised out of chapter 2. It is close to Immersion; the phenomenon that is mentioned in [35]. Jon Radoff believes that the power of games is in being able to drown the user in the interactive story of the game. Therefore, game-like animation and sound could be beneficial in giving the user of the system the feeling of a game player. We will implement animation for a group of badges in our system and compare the popularity of that group of badges with other badges.
 5. In chapter 3 we learned that Points, Badges, Leaderboards and Levels are the most commonly used gamification elements across gamified websites with different domains and purposes. We implemented all four of them in our experimental system. We want to compare them from different aspects such as their popularity, their view count, login rate and sharing rate. Moreover, we want to see what type of measurement is a better representation of the popularity of gamification elements.
 6. Most of the websites surveyed in chapter 3 do not have a quality measurement tool and their rewards are according to quantitative measurement. In the system designed for this experiment we will use "Points" as a quantity measurement tool and we will use "Ratings" as a quality measurement tool. We will compare them in the questionnaire to user perspectives about the influence of these two methods. We

expect users to prefer a qualitative-measurement tool to a quantitative-measurement tool.

In order to survey this six questions a gamified website is designed with different gamification elements and rewards. This chapter aims to describe the designed website. It starts with a general description of the website continued by introducing the different parts of the system. In the last section gamification elements used in the system are described.

4.1 General Overview of the Website

The Happy-Ladies website has the mission to enhance the positive quality and development of individual, family, and community life by sharing informational content in multiple categories that are usually interesting for women and cover different aspects of life including health, technology, cooking, relationships, design, crafts, writing and entertainment. In order to engage the users of the website and also improve the quality of the content, Happy-Ladies attempts to form a community for its users to share and discuss contents and ideas related to each category of the website.

It is worthwhile to mention that at the beginning of the experiment, in order to have more users, the website was supposed to be a part of a well-known Persian website for women, called *Rangi Rangi*. The site is like a life-style magazine allowing users to browse and search articles in several categories. However, because of lack of control over the user data with *Rangi Rangi*'s, we decided to make an independent website from *Rangi Rangi* as our experimental tool, and use *Rangi Rangi* just for recruiting participants. 84 female users from *Rangi Rangi* joined and started using Happy-Ladies.

Happy-Ladies is a community where users are able to register, create new posts, share their articles with other users, rate the articles proposed by other users, in addition to commenting on the existing content of the website.

4.2 Architecture of the Website and Components

The system uses the WordPress engine and all the core and optional features are written in PHP for the server side, HTML, CSS and JavaScript for the client side and MySQL database is used for storing data of the system. We decided to use WordPress because WordPress is a well-developed and well-documented CMS for making social websites and basic features that we required for our system (such as our user registration, posting articles and allowing comments) is pre build in WordPress and we were able to focus on gamification features of the website. In addition to the core Wordpress, a number of plugins, parts and technologies are used for building up the system, including Achievements, Bbpress, Buddypress, GD Star Rating, Mycred, Open Badge Designer, and WP Favorite Posts.

4.2.1 Home Page Design

The home page of the Happy-Ladies website contains three main parts. The first includes a banner and three sample users with short introductions about each of them. There is also a link to another webpage that contains detailed info about the website and how different features works. Second, a leaderboard of top rank users appears on the bottom left corner. Third, the latest six articles submitted by users in each category appear in tabs on the bottom right corner of the webpage. To make it more user friendly and easier to distinguish one category from others, each category has a special picture in the main menu and header of the related tab.

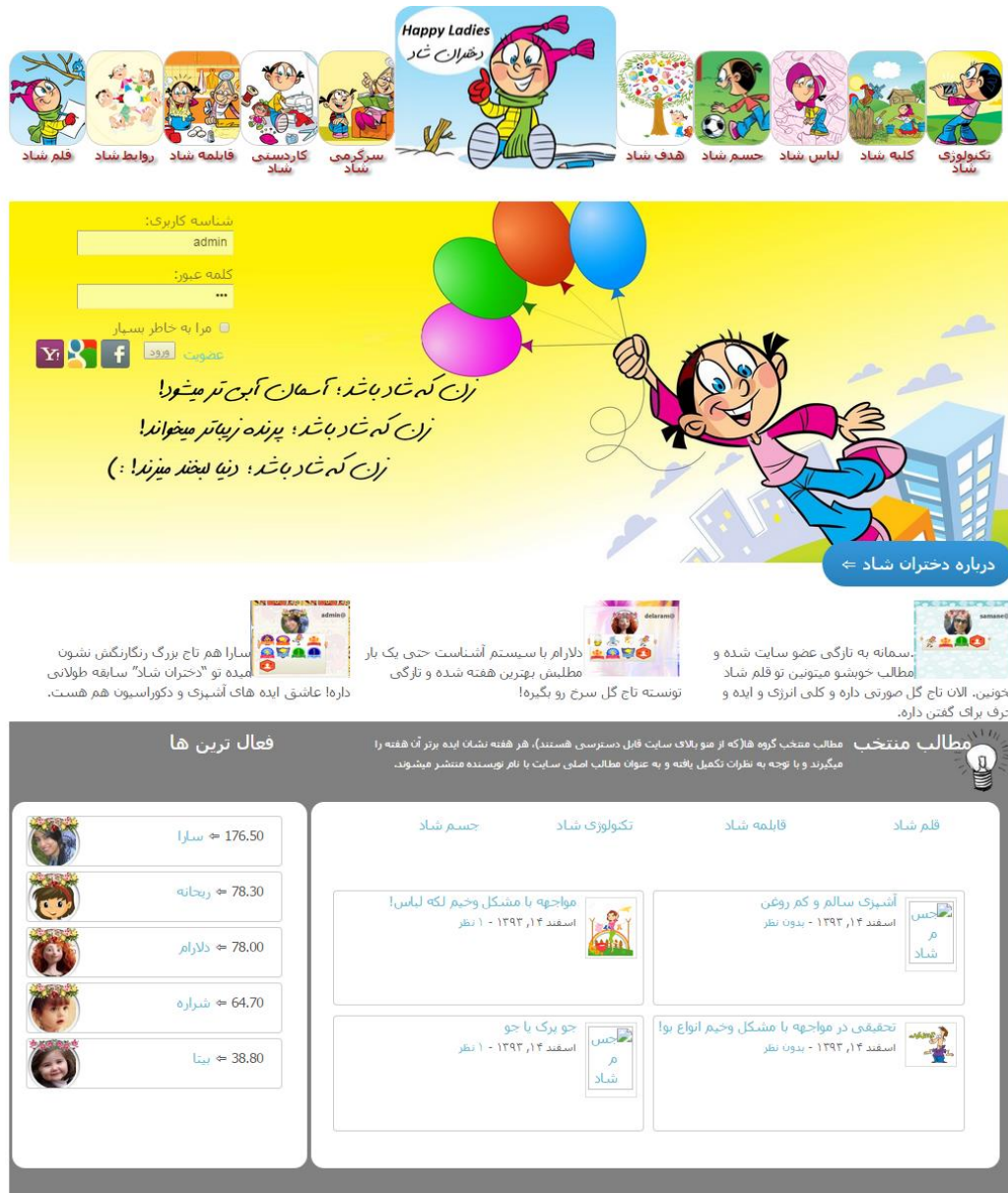


Figure 4-1 Homepage

4.2.2 Social Aspect

Our website relies on community contributions and users are the main asset of the system. They submit articles, and rate other users' articles. This is the main functionality of the website and it depends heavily on the users' contributions. Users are encouraged to participate more and with higher quality by using the following features: Personalized Profile (Avatar/Background/Favorite

list), Gamification Techniques such as Rating, Points, Leaderboard, Levels and Badges as we will explain in section 4.3

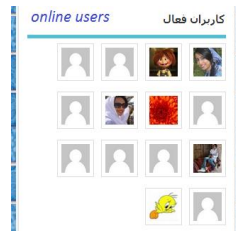


Figure 4-2 Online users- one of the social widgets

4.2.3 Login

The website provides two ways for authentication. Users can make accounts directly in the website or they can use third party authentication mechanism such as Google, Facebook, and Yahoo accounts to login to the system.



Figure 4-3 User registration

4.2.4 Rating

Rating is one of the core features of Happy-Ladies. It embodies a social mechanism for recognizing high quality articles and content which is one of the most important goals of the system; in order to do so the system relies on the data provided by users' rating. All the registered users and unregistered visitors to the website can rate the articles and content of the website, although each visitor can rate each article only once and users cannot vote on their own

content. Our rating system uses the scale of 1-star to 5-stars: articles with 5-stars are considered to have much above average quality whereas 1 star are considered to have quality much below average.

4.2.5 Commenting

Comments are a powerful tool for discussing articles and developing them. Users may come up with new articles or relevant sources when they read previous articles. To prevent spam and give credits to users of our site, only registered and logged in users are able to comment and participate in discussions about articles.

4.2.6 Tagging

Tagging allows users to attach semantic annotations to the content of articles, and it makes this content computer-understandable. Tags could be helpful in searching and also for recommending related content. When filling up the form for submitting an article, users can define some tags or keywords describing the subject or content of the article.

4.2.7 Personalized Avatar and Background

This feature gives opportunity to the users to personalize their profile page and to build up a sense of ownership in them. The main idea of the website is sharing useful articles; thus creativity plays a critical role in this community culture. Users can express their artistic sense through their chosen background and avatar.

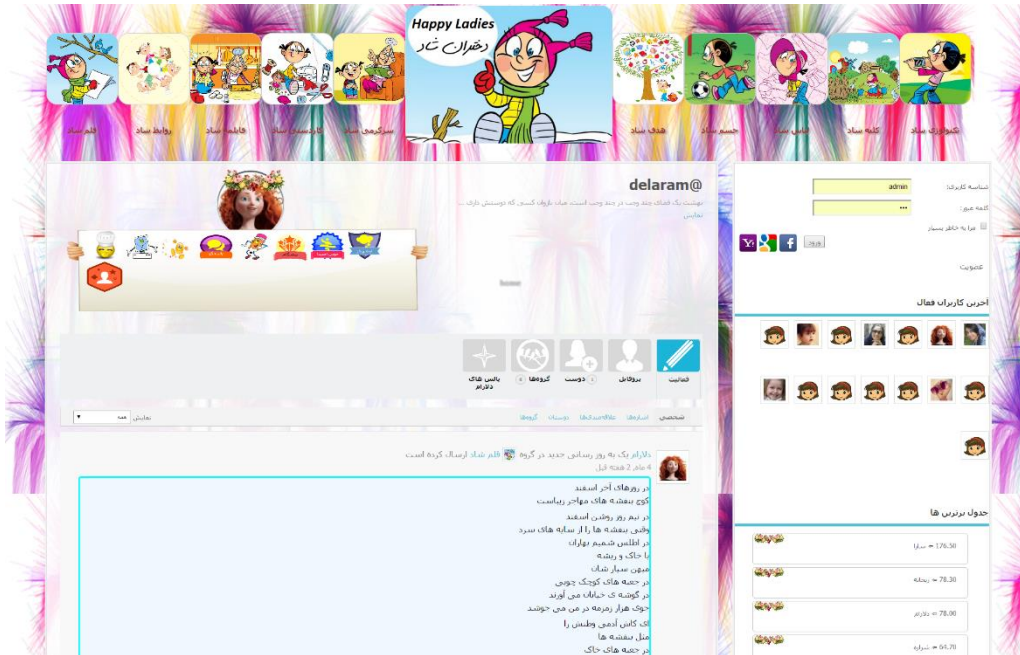


Figure 4-4 Personalized profile

4.2.8 Favorite Collections

Girls generally like collecting things and owning a collection of their favorite stuff [23] for archiving purpose or for showing to others. Since our target users are women, in order to make the site experience more pleasant for them, we allow users to make a collection of their favorite posts. To facilitate the feature, there is a heart button below each article, and by pressing that button, the article will be added to the user's favorite list.



Figure 4-5 Favorite articles collection

4.3 Gamification Elements

In this section we will introduce gamification elements that are used in Happy-Ladies to engage users on the basis of the hierarchy of gamification elements which is introduced in section 2.1.

- At the lowest level, (gamification components), these following elements are used in our system: achievements, avatars, badges, collections, leaderboards, levels, points, social graph and team.
- At the middle level, (gamification mechanics), challenges, competition, cooperation, feedback, resource acquisition, rewards, turns and win states are used.
- Finally at the highest level, (gamification dynamics and structured gamification system), we focus on progression, narrative and relationships.

4.3.1 Points (Positive Pulse)

Points help giving instant feedback to user's actions as defined by system administrator. Points can also be used to motivate users to achieve a specific task by adjusting the number of points awarded for that task. Users' points are calculated using multiple metrics, such as submitting content, commenting on other articles, and rating other users' articles, etc. The weight of each metric for calculating the final number of points is based on the importance of the action. The number of points assigned to each task is fully customizable by the administrator, and thus, the administrator can set appropriate awards to drive the users to perform the desired actions. Points are awarded to the following desired actions: registering, daily login, submitting articles, voting on other articles, commenting, completing profile, uploading avatar, participating in polls, adding to favorites, joining groups, sharing links in the group.

4.3.2 Levels

Levels are depicted by colorful flower crowns on the user's profile page. To keep users in a state of "flow", the challenge needs to adapt to the increasing skills of users. That is why the required number of points for reaching the next level gradually increases in order to keep users motivated to progress. Reaching the first level requires just 20 points, which can be gathered by registering, one article submission and one comment. When users taste the sense of accomplishment once, they are more likely to try to reach the higher levels.



Figure 4-6 Levels

4.3.3 Badges

Badges are visual representations of accomplishments shown on a user's profile page. In our system we have expected and unexpected badges. A notification with a congratulatory message will be shown to the user to praise her effort on a specific context or occasion.



Figure 4-7 Badges

4.3.4 Leaderboards

Leaderboards are a standard tool for any competition; however, it is challenging to use this element properly in an online community. If used inappropriately, a leaderboard could be

demotivating since the users may feel frustrated by standing too far behind the top users and may give up. In contrast, the top users may feel bored by achieving the top spots too easily.

Two leaderboards were designed to evaluate which one will work better in this community. Through polls and questionnaires user input was solicited about each of the leaderboards. The two types of leaderboards used in our experiment are presented below.

4.3.4.1 Top users leaderboard

The top five users based on their number of points will appear in this leaderboard.

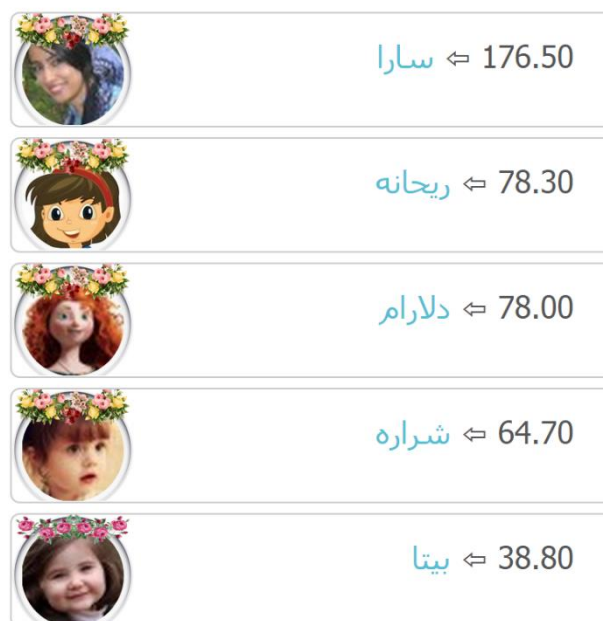


Figure 4-8 Top users leaderboard

4.3.4.2 Top articles leaderboard

The top five articles based on the ranking of articles is determined by the average rating of the article given by other users. A minimal number of ratings (currently 3) is required for an article to be eligible for showing up on this leaderboard.

4.3.4.3 Timed leaderboards (Weekly/ Monthly)

A timed leaderboard is similar to the normal top users' leaderboard but it resets weekly. This feature is added to the system based on the feedback of newbies to give them the same opportunity as other users.

رتبه	ایده	تعدادرای	ستاره ها
1	آشپزی رنگی : برنج با هویج و نعنا	3	★★★★★
2	نوار چسب طرح دار درست کنیم	7	★★★★★
3	میگو و سیر	4	★★★★★
4	یک کتاب برای سیر در آوردن از فلسفه - فلسفه در سی روز	5	★★★★☆
5	رادیو رنگی رنگی - قسمت چهل و نهم - پروژه خوشحال سازی	4	★★★★☆
6	رادیو رنگی رنگی - قسمت پنجاه - والت دیزنی	3	★★★★☆

Figure 4-9 Top articles

4.4 Chapter Summary

In order to be able to survey the questions mentioned in the beginning of this chapter we designed a gamified website called “Happy-Ladies”. In this chapter we discussed different parts of this system. In the following the link between each design feature and related question will be discussed.

1. As mentioned in Section 2.2.4 a leaderboard could be demotivating; therefore we designed Different types of leaderboards in this system to compare them and find the best scenario for leaderboards.
2. Rewards can be categorized into 4 groups based on their contingencies. In order to compare rewards with different contingencies, we designed different rewards for each of these 4 groups.
3. As mentioned in Section 4.2.3 both expected and unexpected rewards are designed in Happy-Ladies in order to compare them in this study.

4. In order to survey the effect of using sound and animation, one special type of badge, designed for joining groups, is animated.
5. Points, Badges, Leaderboards and Levels are the most commonly used gamification elements mentioned in chapter 3. We implemented all of these gamification elements in Happy-Ladies.
6. We designed Points and Ratings (Votes) in Happy-Ladies to be able to compare the quality measurement tools using a quantitative-measurement tool.

CHAPTER 5

Experiment and results

The present chapter elaborates the results of the experiment and the users' feedback about their experience. After announcing Happy-Ladies in a well-known Persian website for girls, about 84 users registered in the website. We designed a questionnaire (see Appendix A) with a series of questions about the six main questions that we mentioned in the beginning of this section in order to address our main research goals and we asked the participants to fill it up 3 weeks after their registration.

In total, sixty users participated in the survey. It should be noted that given the website nature, all the participants were female users. In this chapter the results obtained for each question in the questionnaire will be discussed in detail.

5.1 Comparing gamification elements

The first four questions aim to compare 4 main gamification elements of the developed system including levels, badges, leader-boards, and points according to different metrics.

5.1.1 Which gamification element is the most interesting for you? (Your favorite in general.)

Table 5-1 Popularity of Gamification Elements

Gamification Element	Levels	Badges	Leaderboards	Points
Popularity	19	14	18	9

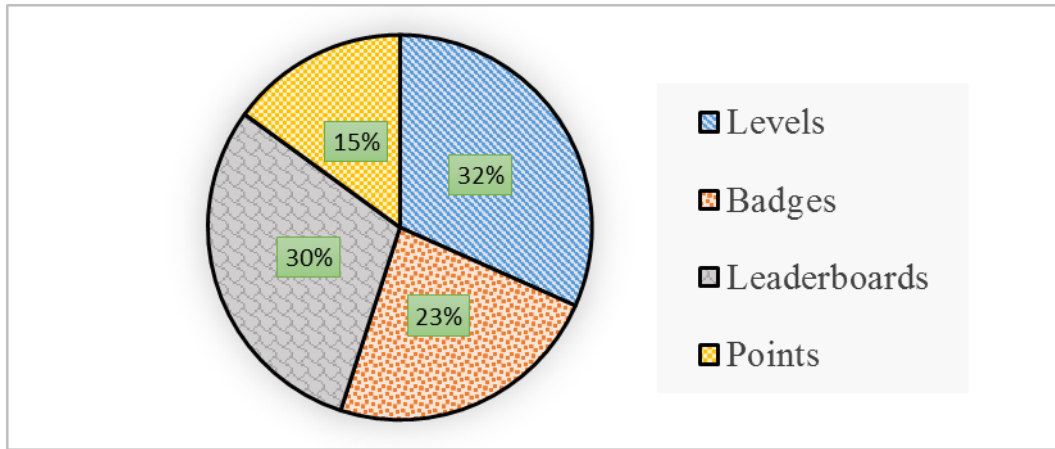


Figure 5-1 Popularity percentage of gamification elements

Participants were asked to choose their favorite element. The answer to this question provided them a way to consider all the factors that matters to them and then choose their priorities.

According to the results of this experiment “levels” was the most popular gamification element. In the designed system in this thesis, levels were calculated based on the user points and were represented by flower crowns on their avatar. The reasons that the participant mentioned in the survey for choosing “levels” as their favorite game element can be categorized into three main groups which are described in the following.

“It is the result of all my efforts in the website. All my posts, comments, rates and etc. I tried a lot to improve my crown from normal pink to the bigger colorful one” a participant mentioned.

Levels are given based on the points gathered by different participations in the website and when points reaches a certain amount the user will be promoted to the next level and will get a new more colorful and fancy flower crown.

“I like my flower crown very much as I can see it on top of my profile picture, it belongs to me and it suits me!” one of the participants mentioned. Therefore, the representation and the fact that they could always see the crown on their profile picture was influential in making the sense of ownership.

“This website is for girls and the crowns are not like golden crowns in other websites; I like it because it is girlish.” Another Participant mentioned. It indicates that the feminine aspect of the reward made it kind of personalized for our target audience.

As can be seen from survey results, when we sort elements according to their popularity “levels” (which is represented by flower crowns) and “leaderboards” are the most popular ones but “points” is the least popular one. It is a very interesting results because levels and leaderboards are both directly related to the points. We can conclude that although “points” is not very popular by itself, it is a necessary tool for the system and other gamification elements. A similar comparison in real life can be drawn with money as people usually do not like the money itself but they like the opportunities that it provides.

The website admins do not always have the chance to ask the priorities of all of the users especially in non-experimental systems. Therefore, websites usually use other countable metrics to predict the popularity of their services. View count, login rate, and sharing rate are three countable metrics which are normally used for measuring popularity. In the following three questions were used to find out the one that is closest to this chart.

5.1.2 Which gamification element have you checked more often to see if it is updated or not?

Table 5-2 View count of gamification elements

Gamification Element	Levels	Badges	Leaderboards	Points
Popularity	18	12	17	13

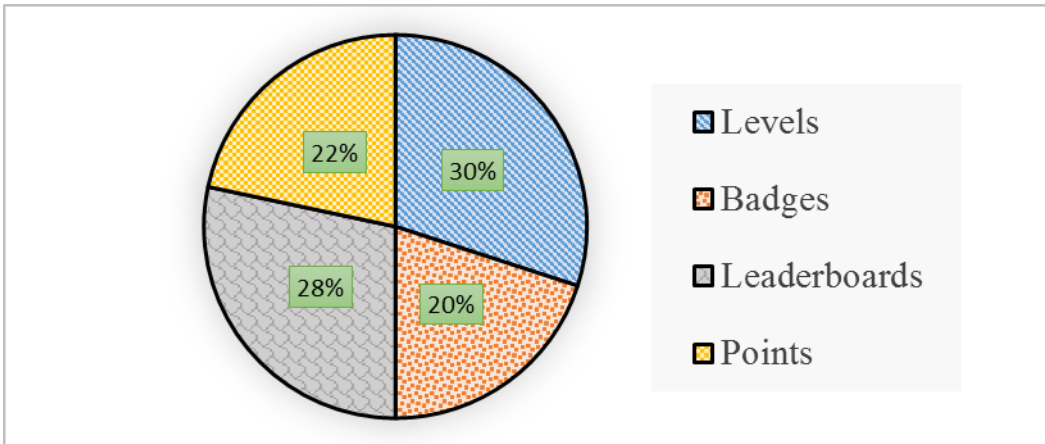


Figure 5-2 View count percentage of gamification elements

As can be seen, the answer to this question has noticeable differences with those of question one. One of the participants mentioned that “I check leaderboards a lot as I would not get a notification if someone surpassed me but since I get notifications for badges and points I am not worried about their updates”. According to this participant, view count results might be affected by the ambiguity of our system so it is not always a good representation of the system success. For instance, in the experiment system there was no notification message for Levels and Leaderboards so it may be the main reason why these two gamification elements had the top visit rates.

5.1.3 Which is the most motivating element for logging into the site?

Table 5-3 Login rate of gamification elements

Gamification Element	Levels	Badges	Leaderboards	Points
Popularity	16	11	14	19

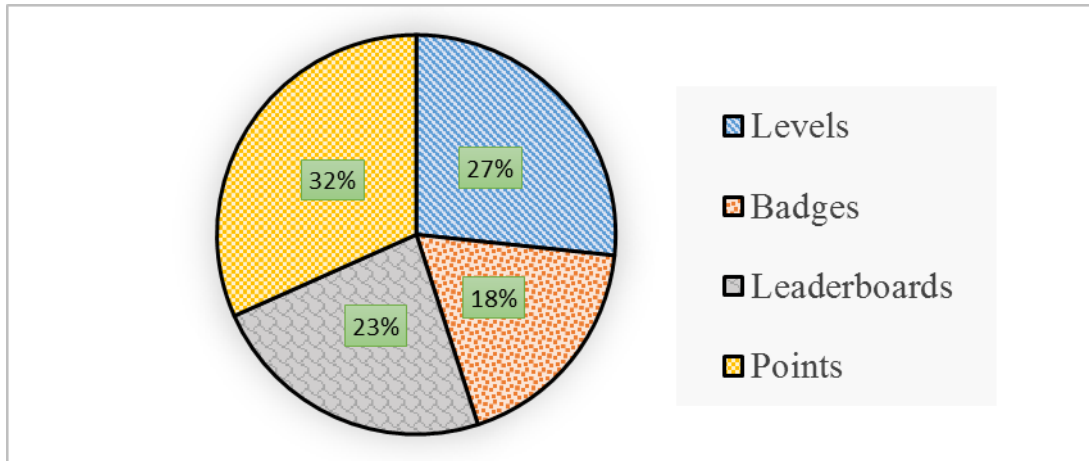


Figure 5-3 Login rate percentage of gamification elements

In the experiment system logging into the system would give additional points to users and points are directly connected to levels and leaderboards. It can justify why the Points has the highest rating in this question. It can be seen that, the result of this question is very different from the popularity rate of elements. Therefore, login rate is not a reliable representation of popularity either as it depends on various factors.

5.1.4 The result of which gamification element do you want to show to your friends?

Table 5-4 Sharing rate of gamification elements

Gamification Element	Levels	Badges	Leaderboards	Points
Popularity	18	15	18	9

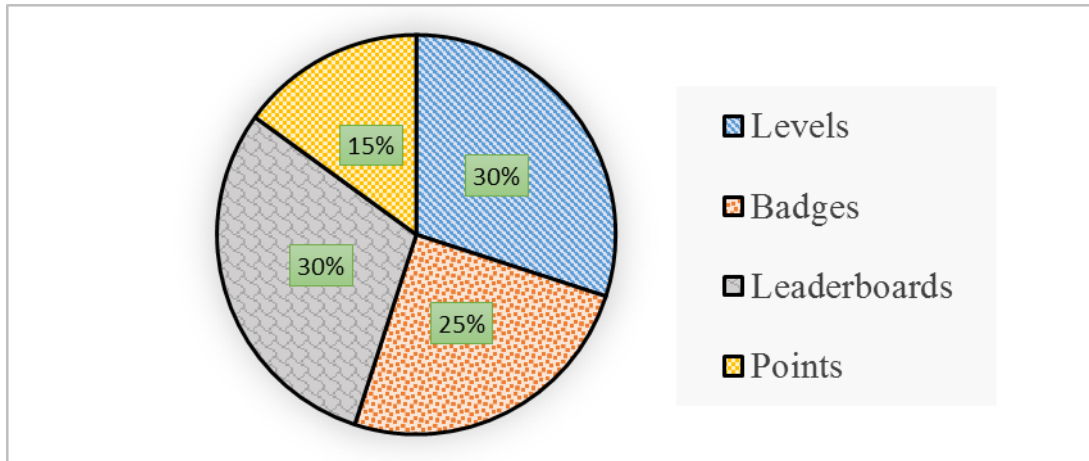


Figure 5-4 Sharing rate percentage of gamification elements

The result of this question is very close to that of the first question. It implies that the users like to put their favorite elements on display. Therefore, it could be the best representation of popularity of different services.

Actual popularity: 1. Levels (32%) 2. Leaderboards (30%) 3. Badges (23%) 4. Points (15%)

Sharing Rate: 1. Levels (30%) 2. Leaderboards (30%) 3. Badges (25%) 4. Points (15%)

It is noteworthy that adding a share option for every part of the system not only is an interesting option for users but also is a great tool for measuring the popularity of different parts of the designed system.

In the next part, gamification mechanics from different aspects were surveyed. In the next three questions the efficacy of different types of rewards are investigated to see how their contingency affects the results.

5.2 Contingency

As described in chapter two, contingency is a metric for classifying rewards. It mainly describes the requirements of each reward. In the questionnaire, firstly, the participants were asked about their own preferences. Thus, they decided based on their own metrics to choose their favorite type of reward.

Rewards are supposed to be entertaining; therefore a connection between contingency of the rewards and the entertainment type upon which they was designed were drawn. Here is the one to one relationship:

1. Task Non Contingent ---Easy Fun
2. Engagement Contingent --People Fun
3. Completion Contingent --Serious Fun
4. Performance Contingent --Hard fun

In the following three questions we asked the participants about contingency. We provided simple definition for each type with some examples for each category of rewards.

5.2.1 What is your favorite type of reward? (General Preference)

Table 5-5 Popularity of rewards according to their contingency

Contingency	Task Non Contingent	Engagement Contingent	Completion Contingent	Performance Contingent
Popularity	16	9	12	23

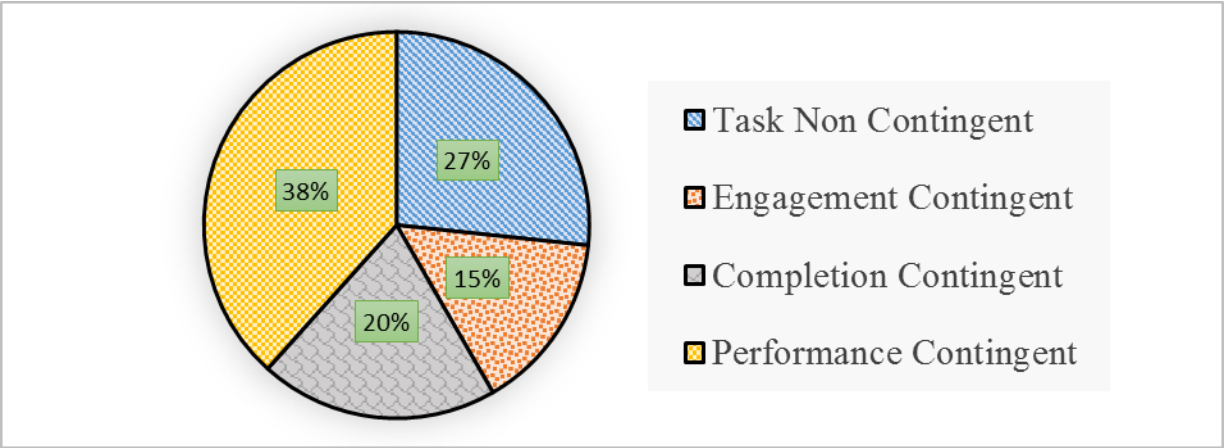


Figure 5-5 Popularity percentage of rewards according to their contingency

According to the result of this question “performance contingent” rewards are the most popular ones. In our experiment, performance can be measured by ratings provided by other users, number of comments and visits of each post or content in the website. As one of the users mentioned: *“I like this sort of rewards as they show off the quality of my posts. I think a lot about what I write, and I deserve my latest badge; it’s called most popular post of the week”*.

With 11% difference, the second most popular rewards are task-non-contingent ones. Badges that are given by a lottery are considered in this category. *“I believe I am very lucky; I like my Lucky Luke badge!”* People normally enjoy surprises. It could be the reason of popularity of this group of badges.

5.2.2 What type of reward is the most exciting for you?

Table 5-6 Type of reward that users found exciting

Contingency	Task Non Contingent	Engagement Contingent	Completion Contingent	Performance Contingent
Popularity	18	10	10	22

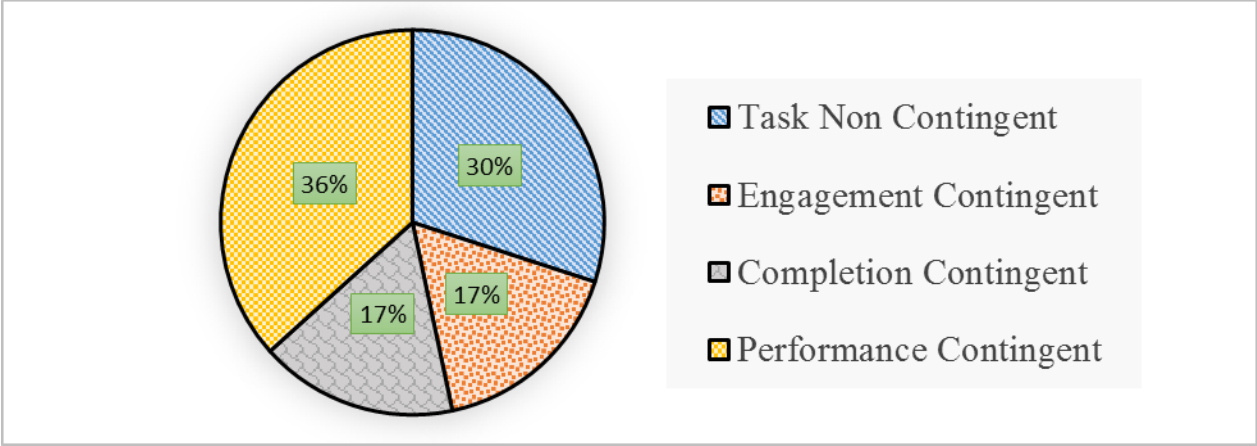


Figure 5-6 Type of reward that users found exciting (in percent)

We expected Task-Non-Contingent type of rewards to be the most exciting one. However, the performance contingent tasks are again in the first rank. *“I love to see how other users like my posts, their great comments make me excited!”* mentioned by one of the users. With only 4% difference the second most exiting type of reward is Task-non-contingent. They are awarded randomly, so they are considered to be by chance or lottery. As users never predict them, they are very surprising for the users.

5.2.3 What type of reward is the most valuable type of rewards for you?

Table 5-7 Type of reward that users found valuable

Contingency	Task Non Contingent	Engagement Contingent	Completion Contingent	Performance Contingent
Popularity	11	9	16	24

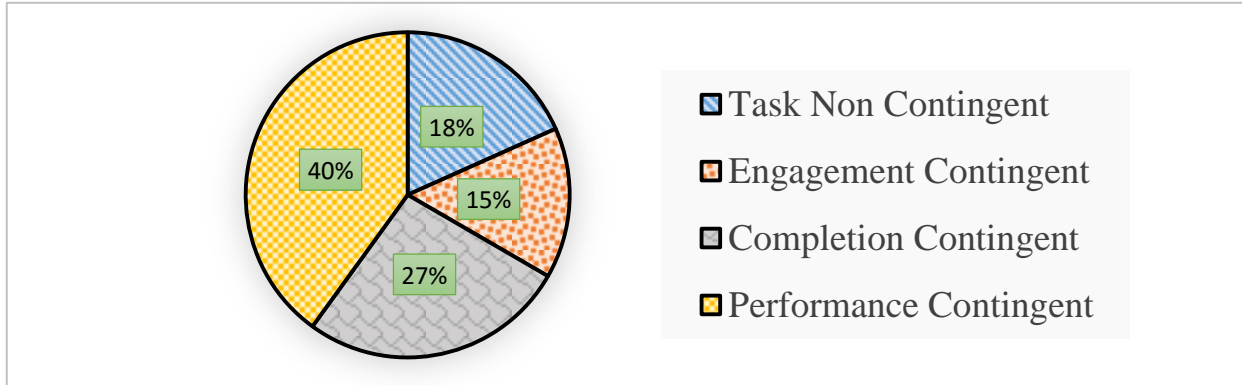


Figure 5-7 Type of reward that users found valuable (in percent)

Once more, the performance contingent rewards have the highest rating for how valuable the reward is. In addition, completion contingent tasks are the second most valuable type of reward for the users. The reason for this result can stem from the fact that completing a task is valuable and consequently, the rewards that are awarded for this reason have more value to users.

In these contingency charts the differences between items are much more noticeable than the previous series of questions (i.e., gamification elements). In all three questions the performance contingency was rated as the most important factor. This might provide an explanation for the failure of some gamified systems that do not have any sort of quality measurements for contributions. In such systems, the users would find it easy to cheat by submitting a huge number of meaningless posts to gather points. In other words, spamming is easy when there are no quality metrics to monitor the users' activities and accordingly allocate the points. In such systems active users who care about the quality of system would become disappointed and leave the system, eventually. In fact, not having performance contingent rewards can be one of the gamification bubbles which makes many gamified systems un-sustainable.

5.3 Points vs. Reputation

To find out what is a good measure of the value of contribution, in the next question the participants were asked to choose between two articles with the following features. The first article had a great rating (number of likes) but it's from a newbie author and the second one does not have a lot of likes but the author has a great level of points. Here is the result:

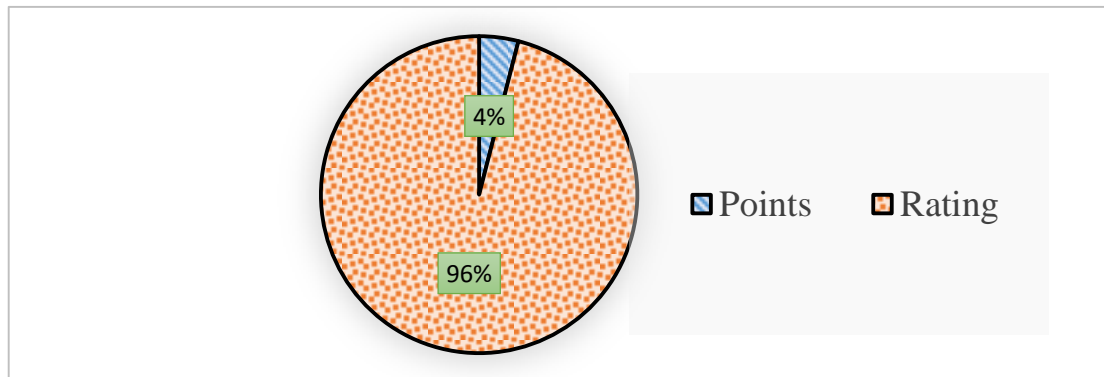


Figure 5-8 Article rating vs author's level

According to the result 96% (58 out of 60) of participants have chosen the article with better ratings.

In the rest of our questions the users were asked to provide more detailed answers so we could obtain more data about the reasons behind their choices. For each question two to five selected comments which fairly represent the rest of the answers are provided here.

5.4 General leaderboard vs. timed leaderboard (weekly or monthly)

In the second week of the experiment a timed leaderboard was added in order to give newbies in the system a chance to appear on the leaderboard. Users were asked to answer three questions about their opinion about timed leaderboard. The following section includes these questions and answers that participants provided.

5.4.1 Do you think it is fair to have a leaderboard that resets every week or month?

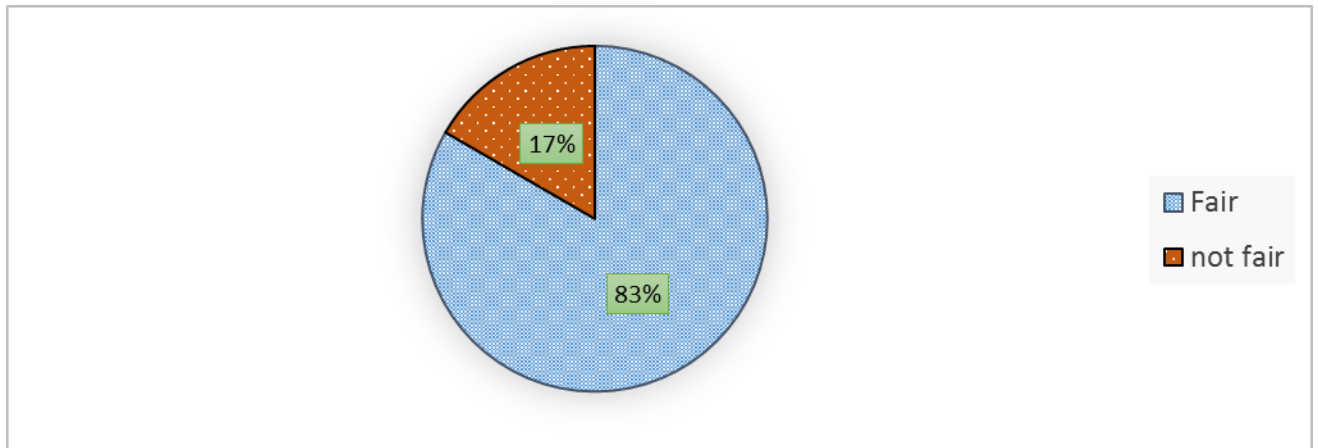


Figure 5-9 How fair users found timed leaderboard.

As shown in the charts result, 83% of users believes that it is fair to have timed leaderboard.

Here are four comments about adding a timed leaderboard from the participants:

“Of course it is fair; I think it’s not fair if we do not have such thing and let certain people who started earlier to stay on top all the time!”

“No it’s not fair at all! We tried a lot to get on top of the leaderboard. Adding another leaderboard in the system will make it too complicated and busy.”

“It’s fair only if you do not touch the main leaderboard. The weekly one should be somewhere else, not in the homepage!”

“It is very beneficial as a new user would see that she has the same opportunity as all of us. Everyone would start from zero every week.”

5.4.2 Do you think it would be helpful for the community to have timed leaderboard?

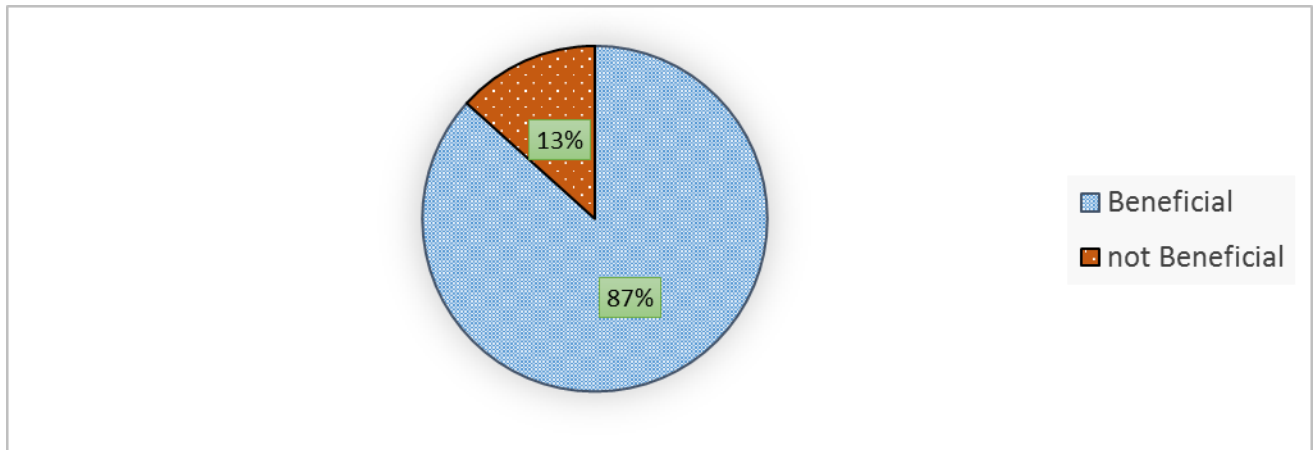


Figure 5-10 Benefit of timed leaderboard

The interesting point about this result is that at least two users who responded “No” to the previous question about timed leaderboard, can see a value in having it for the community.

5.4.3 What type of timed leaderboard do you prefer? Weekly or monthly?

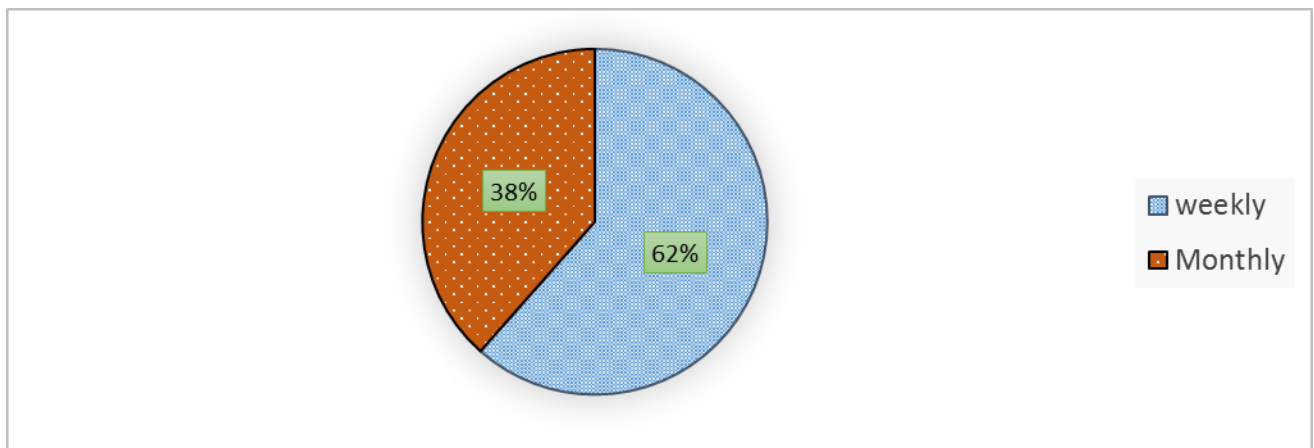


Figure 5-11 Weekly or monthly leaderboard

We asked the people who found the timed leaderboard beneficial about their opinion about the duration of leaderboard. The majority of participants (62%) believed that weekly leaderboard is better. Here are some of their comments:

“Weekly leaderboards are more exiting as I would see the result of my effort very soon so it would be more motivating for me.”

“When it gets too long to achieve your goal, you would forget about that; it’s not a priority for you anymore, so I prefer weekly goals, not any longer!”

“The users of the system are not a lot; so I prefer monthly leaderboard. Otherwise, people who do not deserve it will show up in the leaderboard!”

“If you want to give badge to the top people every week it would be too much! And after a few time badges would feel worthless; so I prefer monthly one.”

5.5 Top users leaderboard Vs. Top articles leaderboard

Two types of leaderboards were created in the experimental system: top users and top articles.

The participants were asked about their preference.

Which leaderboard do you prefer? Top users, top articles, or both?

Table 5-2 Top users’ leaderboard vs. top articles leaderboard

Leaderboard	Top users	Top articles	Both
Popularity	11	9	16

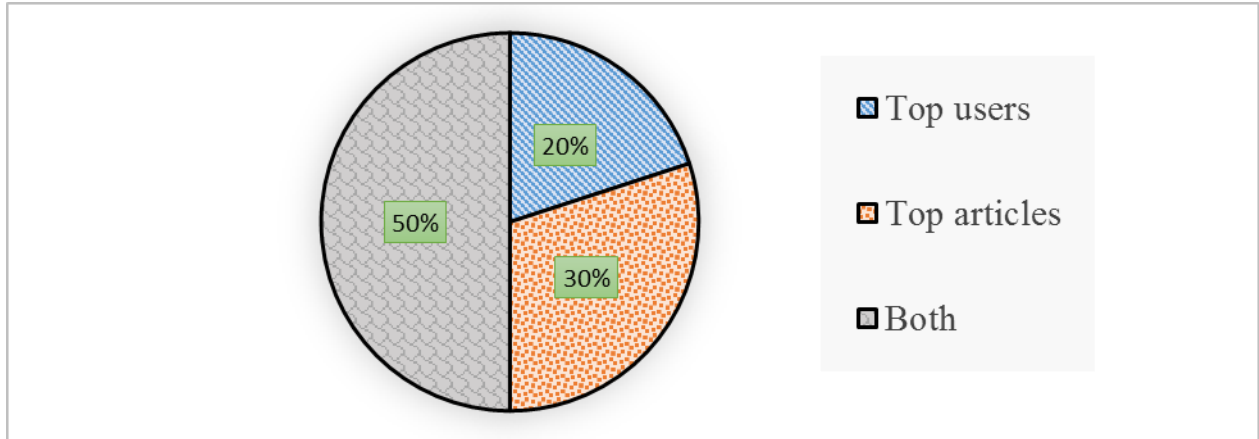


Figure 5-12 Type of leaderboard that users prefer (in percent)

Half of the participants believed that they like both, 30% liked the top articles and 20% liked top users more. Here are some of their comments.

“They are both required; I usually check top articles but being a top user is what I am proud of! I am the third person there!”

“Of course I like the top articles more. One of my articles was promoted to the special page once and I got super excited! It shows what you do has a good quality and has a lot of fans!”

“If I want to read something the top articles helps me a lot; but as a writer I want to see myself as one of the top authors of the site; actually, I like top users more!”

5.6 Sound and Animation

In the next three questions we want to survey the effect of sound and animation. In our gamified system only the badges that are designed for joining each group are animated and their animations are related to the context of that group.

5.6.1 To what extent (in percentage) do you think animated badges are useful in making a task motivating?

The average answer was 61%; here are some of the comments:

“It is more interesting and pleasant; but I do not think if I would do something only because of that”

“Yes animations are influential, especially when you award the badge with some fireworks and clapping animation, it would become super enjoyable!”

“I should have control over it. Sometimes I login into the website at work and I do not want cartoons showing up on my screen!”

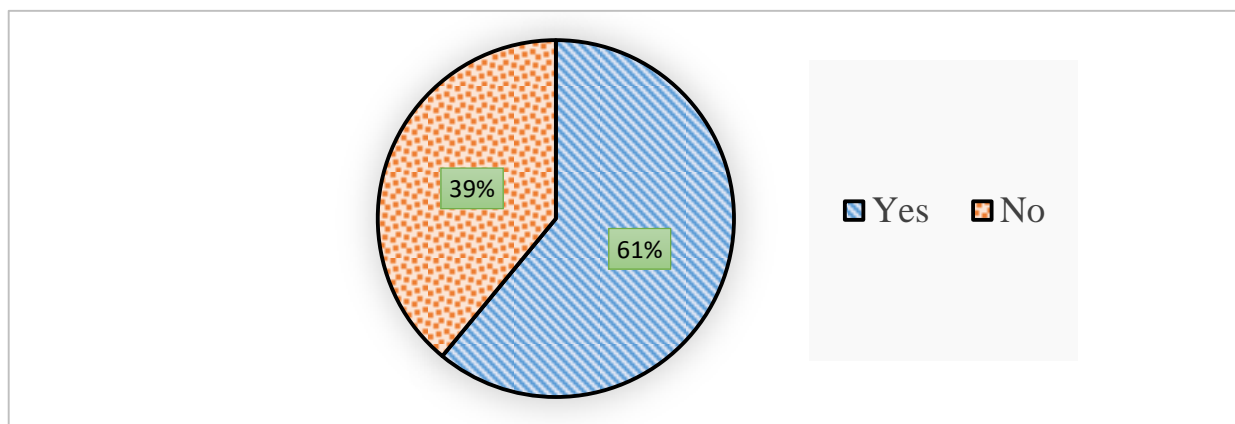


Figure 5-13 Effect of animated badges (in percent)

5.6.2 Would it be more interesting if there was a sound played for cheering you up when you get a new badge?

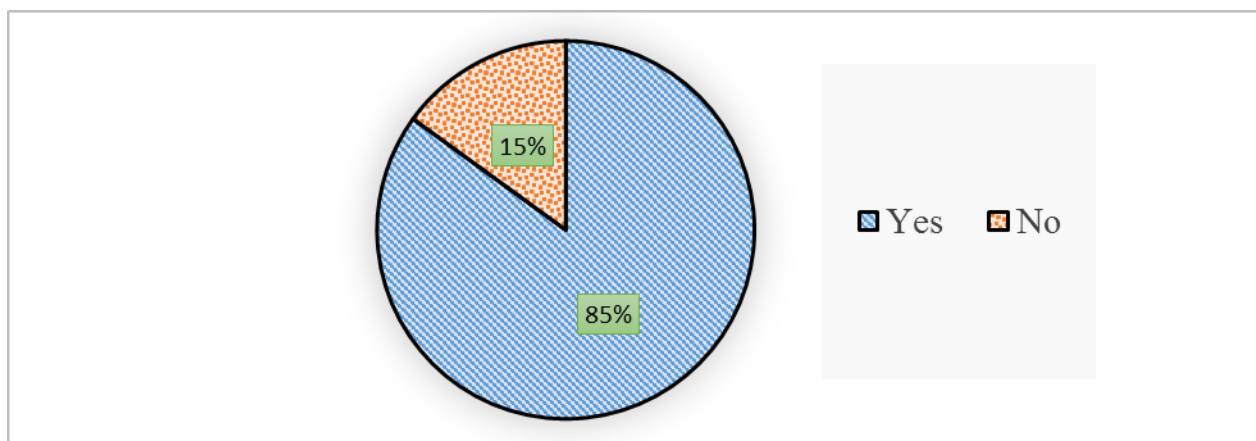


Figure 5-14 Effect of sound (in percent)

85% of the participants like to hear cheering sounds when they get a new badge. Here are some of their comments:

“Yes for sure; it would feel like a real prize! Especially if different badges has different sounds when you award them ”

“Yes I like this idea but I like to have control over it and if I am in bus or at work, the voice would be annoying, so I should be able to turn it off!”

“This is not a website for kids; right?! So I am against it!”

5.6.3 Do you think the congratulating note is effective in giving you the sense of achievement?

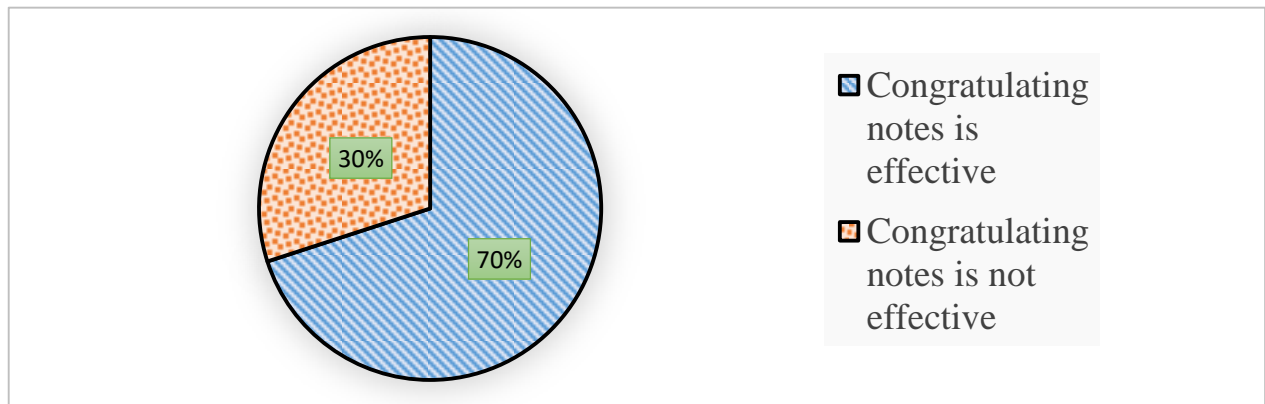


Figure 5-15 Type of leaderboard that users prefer (in percent)

“Yes, it’s very important to me; I like to open it up and read it again and again when I feel down”

“Yes, but I like it to be more informative; it’s a bit vague now; it would be better if you say ‘You have submitted three articles in two days, thus you are qualified for this badge.’ Instead of just saying thanks for being active! ”

“Actually the way you present the card is more important than the content; honestly the font, the color, animations can grab my attention much more!”

5.7 Expected Vs. Unexpected Rewards

Rewards could be expected or unexpected. It would be expected if we inform the users that if they submit one more comment or article they will get a reward (Chapter 2). We asked four questions to compare expected and unexpected rewards from different aspects in our experiment.

Here are the questions:

1. Which one is more interesting for you?
2. Which one is more motivating for you?
3. Which one improves the quality of the contributions?
4. Which one improves the quantity of the contributions?

Table 5-3 Expected and unexpected rewards

	Interesting	Motivating	Improves Quality	Improves Quantity
Expected Rewards	45%	65%	30%	80%
Unexpected Rewards	55%	35%	70%	20%



Figure 5-16 Comparing expected and unexpected rewards

Expected rewards are more motivating for users and they usually improve the quantity of their participations. On the other hand, unexpected rewards are more interesting for the users and they improve the quality of their participations. Therefore, interesting rewards are not necessarily motivating and motivating rewards are not necessarily very interesting!

Here is a comment about this part:

“I like feeling the sense of control with expected rewards. However, I enjoy looking at my unexpected prizes more! I know I didn’t do something to get them what I am rewarded for is something that I found it interesting or beneficial but the smart system knew that I did a great job and rewarded me for that!”

5.8 Chapter Summary

In this chapter we addressed the 6 main research questions introduced in the beginning of chapter 4. Here is a brief summary of the results.

1. As mentioned in Section 5.5, 50% of users like to have both Top user leaderboard and Top articles leaderboard and the top-articles leaderboard is preferred over the Top-users leaderboard.

In Happy-Ladies, a timed (weekly or monthly) leaderboard was added after the normal general leaderboard. 87% of the users found the timed leaderboard beneficial for the community and 62% liked weekly leaderboards more than monthly leaderboards.

2. In order to address the question about comparing rewards based on their contingency, we have designed a few rewards associated with each category and we had 3 questions in the questionnaire related to this subject. Comparing the rewards showed that Performance-contingent rewards are the most popular, the most valuable and the most exciting type of rewards for users of this system. It can be concluded that gamified systems with some sort of quality measurements for contributions have a much higher chance to be sustainable. It rewards the meaningful contributions and prevents spammers from reaching top ranks.

3. As mentioned in Section 2.4, the rewards can be categorized as expected or unexpected. The results of our questionnaire show that expected rewards were more “motivating” for 65% of users and usually are very effective in increasing the “quantity” of contributions. However, unexpected rewards were more “interesting” than expected rewards and four times more influential in increasing

the “quality” of contributions. It can be concluded that unexpected rewards are beneficial for increasing intrinsic motivation and expected rewards increase extrinsic motivation.

4. In order to investigate the effect of using sound and animation, we designed animated badges in the system. The result of the questionnaire shows that the majority of users (61%) found animated badges useful in making a task motivating and 85% of the participants liked hearing sounds for awarding a new badge. Some participants commented about the importance of providing users with the ability of controlling the animation and sounds.

5. The fifth question was about comparing gamification elements which are the most commonly used among 23 gamified systems surveyed in chapter 3. According to the results of the questionnaire, 32% of users chose “Levels” as their favorite gamification element and it is the most popular gamification element in this system. The popularity of the other gamification elements was: 1. Levels (32%) 2. Leaderboards (30%) 3. Badges (23%) 4. Points (15%). It is interesting to see that Points is not very popular by itself, but “Levels” and “Leaderboards” which are calculated based on the user “Points” are very popular.

Besides, we surveyed to learn what type of measurement is a best representation of the popularity of gamification elements. By comparing the charts related to “view count”, “login rate”, and “sharing rate” with the popularity chart, we learned that “sharing rate” has the closest result to the popularity chart, therefore, it could be used for measuring the popularity in social systems.

6. As we expected, users prefer qualitative-measurement tool to quantitative-measurement tool. 96% of users preferred ratings to points when they wanted to decide which article to read.

CHAPTER 6

Conclusions and Future Work

6.1 Major results

In this thesis, we aimed to explore various parameters that contribute to the success of a gamified system. As the first step, we analyzed 23 real world successful examples of gamified systems and investigated their gamified features. According to our study, common patterns in the design of these gamified systems were found that can be of interest for the designers of gamified systems. For instance, the gamification elements that are more often used together in a system were introduced. Moreover, our study led to some potential opportunities for future gamified systems, such as gamification elements that have never been used together before.

During the analysis the successful websites, we noticed that the only available framework for categorizing gamified systems (the Werbach and Hunter [49] framework) is only capable of covering about half of the systems. Therefore, a new framework for categorizing gamified websites was proposed. One of the features of the proposed framework is the overlap of various categories which makes our framework more flexible and comprehensive to accommodate the systems that belong to more than 1 category. This framework is able to cover all the 23 studied gamified systems.

Throughout our literature review and analysis of previous systems, we came across six major research questions the answer. Thus, we decided to build and launch an experimental website as a tool to answer these questions. In the following, the main results obtained during the experiment are described.

It was found that contingency (the kind of action required for receiving rewards) is a highly important factor in making a reward valuable. Amongst various types of contingency, performance-contingent rewards are the most interesting, the most exciting, and the most

valuable type of rewards. Therefore, in order to have a sustainable gamified website, including performance-contingent rewards is highly recommended. It is noteworthy that there is a connection between contingency of the rewards and different types of fun. Performance-contingent rewards are related to “hard fun”, a concept introduced by Nicole Lazzaro [27].

Another way to categorize the rewards is based on being expected or unexpected. It was found that unexpected rewards are influential in increasing the quality of the contributions. On the other hand, if increasing the quantity of contributions is the goal of the system (e.g., for testing features of a system) having expected rewards can be helpful. About 70% of our users found expected rewards more influential on increasing the quantity of contributions.

The results regarding the preferred types of leaderboards indicated that having a timed leaderboard can be helpful, especially for building the confidence of new users and avoiding demotivation among them. Most of the users (87%) found timed leaderboards beneficial for community of the users.

“Levels” was the most popular gamification element. The reason could be the fact that “Levels” has an effect similar to a “Flow channel”. Overcoming more and more difficult tasks related to each level, as the user builds up skills, is enjoyable for the users.

The results also showed that majority of users preferred qualitative-based measurement. For instance, users mainly preferred to read an article with a high rating (i.e., lots of likes) despite the fact that it was written by a newbie, instead of one that does not have a lot of likes but is posted by an author who has a high level of points (owing to his/her previous contributions).

6.2 Future Work

1. This work was focused on a gamified website with predominantly female audience. Conducting a similar study on a gamified website for men can be helpful for finding out the influence of gender on the results, since some of the results could be affected by gender. For instance, given the competitive attitude of males, I assume that men would prefer “top-users leaderboard” to “top-articles leaderboard”. Moreover, a website that is designed for men can have different features which are more interesting for male users. For example, some elements such as “levels” and “badges” could be designed differently to be more appealing to men. Furthermore, for a gender neutral website these elements should be designed in a way to be interesting for both genders. The other option for gender neutral website is providing the users with more than one badge (e.g., feminine and masculine) to choose from.
2. Further research and analysis of the well-known gamified systems can provide more beneficial results. For example, achieving more data regarding the users activities, type of rewards used in their systems, and types of leaderboards could be very beneficial. In addition to collecting more data, analyzing the data from new perspectives could lead to interesting outcomes. For instance, while the concurrent usage of two elements in a specific system is studied here, the study of concurrent usage of three or more elements can be a next step.
3. The other option for attracting more users in a gamified website is providing more personalized experience for them according to their player types [4]. There is a relationship between the player type of the users and the game elements which are more motivating for that category of users [32]. Therefore, future work could provide

one of the player type questioners to the users and use to the results to personalize the user profile and gamification elements.

4. During our experiment, it was found that qualitative-based measurements are very popular and influential. Therefore, rating in a new system could be improved by using a more advanced multi-criteria rating in order to let users evaluate an article according to different metrics. Some examples for such a multi-criteria rating are: “writing quality”, “creativity” and “helpfulness”.

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APPENDIX A

Happy-Ladies questionnaire

Comparing gamification elements

In the first four questions we will compare 4 main gamification elements of Happy-Ladies including levels, badges, leader-boards, and points.

- Which gamification element is the most interesting for you? (Your favorite in general.)
 - levels
 - badges
 - leader-boards
 - points

Your comment:

- Which gamification element have you checked more often to see if it is updated or not?
 - levels
 - badges
 - leader-boards
 - points

Your comment:

- Which one is the most motivating element for logging into the site?
 - levels
 - badges
 - leader-boards
 - points

Your comment:

- The result of which gamification element do you want to show to your friends?
 - levels
 - badges
 - leader-boards
 - points

Your comment:

Contingency

In the first four questions we will compare 4 type of badges in Happy-Ladies. The requirements of each reward is different from another.

- Which one is your favorite badge? (General Preference)
 - Lottery Badge (Lucky Luke)
 - Active Visitor Badge
 - Active Author Badge
 - Top Article of the Week Badge

Your comment:

- Which of the following badges is the most exciting for you? (You get excited when receiving it)
 - Lottery Badge (Lucky Luke)
 - Active Visitor Badge
 - Active Author Badge
 - Top Article of the Week Badge

Your comment:

- Which one is the most valuable type of rewards for you? (If you can only keep one of your badges, you would choose this one)
 - Lottery Badge (Lucky Luke)
 - Active Visitor Badge
 - Active Author Badge
 - Top Article of the Week Badge

Your comment:

Points vs. Reputation

Imagine you want to read one of the following articles. Which one would you choose?

- The article had a great rating (number of likes) but it's from a newbie author
- The article does not have a lot of likes but the author has a great level of points.

General Leaderboard Vs. Timed leaderboard (weekly or monthly)

In the second week a weekly leaderboard was added to the system in order to give newbies in the system a chance to appear on the leaderboard.

- Do you think adding a leaderboard that resets every week or month is fair?
 - Yes
 - No

Your comment:

- Do you think it is helpful for the community to have timed leaderboard?
 - Yes
 - No

Your comment:

- What type of timed leaderboard do you prefer? Weekly or monthly?
 - Weekly
 - Monthly

Your comment:

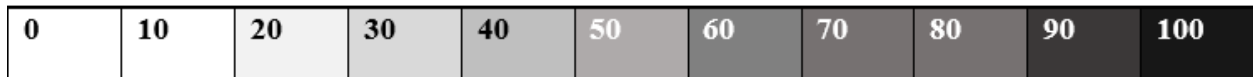
- Top users leaderboard Vs. Top articles leaderboard
 - Top users leaderboard
 - Top articles leaderboard
 - Both

Your comment:

Sound and Animation

In the next three questions we want to survey the effect of sound and animation. In Happy-Ladies only the badges for joining each group are animated.

To what extent (in percentage) do you think animated badges are useful in making a task motivating? Please white your comment regarding this type of badges:



-
- Would it be more interesting if there was a sound played for cheering you up when you get a new badge?
 - Yes
 - No

Your comment:

- Do you think the congratulating note is effective in giving you the sense of achievement?
 - Yes
 - No

Your comment:

Expected Vs. Unexpected Rewards

Badges could be expected or unexpected. (They are expected when you know by submitting one more comment or article you will get you a reward.)

- Which one is more interesting for you?

- Expected
- Unexpected

Your comment:

- Which one is more motivating for you?

- Expected
- Unexpected

Your comment:

- Which one improves the quality of the contributions?

- Expected
- Unexpected

Your comment:

- Which one improves the quantity of the contributions?

- Expected
- Unexpected

Your comment:
