GAMIFICATION

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ABSTRACT

Gamification is the use of game thinking and game mechanics in non-game contexts to engage users and solve problems. Despite the amount of books and papers written on the subject, there is no single database or repository that identifies gamification systems and allows those interested to compare and contrast them. This paper aims to fill that gap by creating a database of gamified systems. A total of 79 systems were studied that focused on the following industries: Consumer, Education, Education, Enterprise, Government, Health, Social Good, Research and Finance. Consumer-focused gamification is by far the most popular, with 57% of the systems studied targeted towards the consumer space.

For game mechanics, 84% of the gamified systems used points, making it by far the most popular mechanic used. This was followed closely by Challenges, Badges, Leaderboards, Rewards, Badges, Competition and Cooperation, indicating that the PBL triad of points, badges and leaderboards is fairly strong. However, some of the game mechanics that are found in virtually all video games, such as narrative, difficulty tiers and boss battles, are underutilized in gamification, which lends credence to its critics.

While the criticisms are important to highlight, the breadth and depth of how gamification is being used is encouraging for its importance in the future. Organizations from hospitals, governments, NGOs, established corporations and small startups are all utilizing gamification to motivate users, engage employees and solve a variety of problems the world is facing.

Other interesting results include: 51% of gamified systems attempt to solve the problem of user motivation; 88% of gamified systems are free to end users; 74% of gamified systems are websites; and gamified systems targeted towards Health stand out in their heavy use of progress, challenge and cooperation mechanics in comparison to other industries.

From the research, there still appears to be confusion between what constitutes a gamified system, with serious games and generic loyalty programs being incorrectly included under the definition. Despite this, it is clear that gamification is here to stay and will become an important tool to solve problems: be they business oriented, personal or social.

TABLE OF CONTENTS

Abstract 1
Table of Figures 3
List of Tables 3
Acknowledgements 4
Introduction 5

- The Fun Theory 5
- Defining Gamification 5
- Benefits of Gamification 6
- Criticisms of Gamification 6
- Theoretical Context and Relevance 7
- The Research Question 7

Literature Review 8

- Defining Gamification 8
- Gamification Categorization 9
- Game Mechanics in Gamification 10
- Behaviour Models and Gamification 12
- Gamification Use in Education 14
- Use of Gamification in Adoption of Enterprise Social Networks 15
- Use Of Gamification In The Health Industry 16
- Overview of Literature Review 16
- The Literature gap and the Intended Contribution of Research 17

Methodology 18
Results 21

- What kind of industries are using gamification? 21
- What game mechanics are industries using in their gamification systems? 22
- What objectives are they trying to achieve? 23
- What systems are they applying gamification to? 25
- How are organizations in different industries making use of gamification? 26

Discussion and Reflection 29

- Misconceptions About Gamification and Loyalty Programs 29
- Misconceptions About Gamification VersuS Serious Games 30
- Gamification is Being Applied to Solve Difficult Problems 30
- The Lack of Narrative and Other Game Mechanics 31

Conclusion 32

- Limitations of Research 32
- Future Research Directions 33

References 34
Appendix 37

TABLE OF FIGURES

Figure 1: The Game Element Hierarchy 9
Figure 2: Werbach's Gamification Categories (Right, Intended Results), Revised Categorization (Left, Targets) 10
Figure 3: The Flow Zone 13
Figure 4: Distribution of marks before (left) and after (right) gamification 14
Figure 5: Content Contributions before and after gamification was removed 15
Figure 6: Gamification Systems by Industry 21
Figure 7: Targets of Gamified Systems 22
Figure 8: Game Mechanics Used 22
Figure 9: Points Systems in Details 23
Figure 10: Desired Outcome based on Werbach and Hunter's Classification 23
Figure 11: Primary Problem Solved by Gamification 24
Figure 12: Cost of Gamification Systems 24
Figure 13: Gamified Component 25
Figure 14: Hardware Components 25
Figure 15: Game Mechanics in Consumer vs. Enterprise Gamification Systems 26
Figure 16: Selected Game Mechanics as Utilized by Selected Industries 27
Figure 17: Desired Outcomes by Selected Industries 28
Figure 18: Primary Problem Solved by Selected Industries 28

LIST OF TABLES

Table 1: Game Design Elements 8
Table 2: The Five Different Points Systems 11
Table 3: Gamification Database and Codes 18

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INTRODUCTION

Gamification is the use of game thinking and game mechanics in non-game contexts to engage users and solve problems; it is distinct from serious games, which create full-fledged games to achieve the same results. Gamification is a tool and according to a 2012 Gartner report (Deloitte, 2012), up to 25% of all business processes will take advantage of it by 2015.

However, Gartner expects that 80% of gamified applications will fail by 2014, primarily due to bad design (Fleming, 2012). Gamification does have its critics, the most vocal of which is Bogost (2011), who believes that business executives see gamification as an easy solution to fix problems; they take away what makes games powerful, such as its interactions and behavioural complexities, and reduce them to meaningless points, levels and badges. Therefore, good design is important to counteract the critics, and to ensure that the main aspects of video games that motivate users are translated onto gamified systems.

So what differentiates a well-designed gamification system to a badly designed one? To answer this question, it is important to understand just how gamification is being used, which is the primary aim of this study.

THE FUN THEORY

Since 2009, Volkswagen has released a series of videos showcasing social experiments to prove what they call 'the fun theory'. It believes that by making things fun, people's behaviour can change for the better, and it has created multiple experiments to showcase this. These include encouraging people to take the stairs by making it play the piano as people walk on the steps; turning a bottle deposit bank into an arcade game with points and high scores; and making a garbage bin make a long falling noise followed by a clash when garbage is thrown into it.

The experiments were all successful: the stairs were used by 66% more people, the bottle bank was used by nearly 100 people in comparison to only 2 using an unmodified one nearby, and the garbage bin collected nearly twice as much garbage as an average bin (Volkswagen, 2009).

The fun theory is, in essence, the same concept behind gamification: by making things fun, people are more likely to become engaged. According to Gabe Zichermann, this solves one of the core concepts that is missing from even the best business and strategy books: "without employee and customer engagement, the best laid strategies and tactics are doomed to fail" (Zichermann & Linder, 2013).

DEFINING GAMIFICATION

Since gamification is a term that has only recently been used in the literature, it is important to define it. There are two main definitions:

> "The use of game-thinking and game mechanics to engage users and solve problems."
> (Zichermann & Cunningham, 2011)

> "The use of game elements and game-design techniques in non-game contexts."
> (Werbach & Hunter, 2012)

Both definitions highlight that gamification requires the use of game mechanics, game elements or game design techniques. One of the main things to highlight about gamification is that it is used in non-game contexts; it is not about creating actual games, but using game design techniques to drive user engagement. The use of actual video games, for training or educational purposes, is known as serious games.

In essence, gamification is about reverse engineering what makes video games effective and fun and grafting them onto business applications (Werbach & Hunter, 2012). To succeed, one must have an understanding of business techniques as well as game design, the latter of which proving to be a major hurdling block for most gamified applications.

BENEFITS OF GAMIFICATION

Gamification has gained popularity in recent years after the realization that traditional incentive structures to motivate employees and customers no longer work (Werbach & Hunter, 2012). Gamification is replacing the old approaches. Through it, businesses can move away from extrinsic motivators, such as monetary rewards, towards intrinsic motivators (Zichermann & Cunningham, 2011). By doing so, gamified applications and businesses can successfully drive engagement, interaction, collaboration, awareness and learning.

Gamification has been part of Deloitte's top 10 Tech Trends for 2012 and 2013, with Gartner stating that up to 25% of all business processes will take advantage of gamification by 2015, with 40% of Global 1000 organizations taking advantage of gamification (Deloitte, 2012, 2013). Perhaps this description of gamification highlights its importance for businesses:

> "Gamification can instill challenge, pay-off, and new perspective into day-to-day tasks, tapping into the same human instincts that have led to centuries of passionate competition and engagement – our innate desire to learn, to improve ourselves, to overcome obstacles, and to win. As business becomes increasingly social, our professional and consumer lives are being built using digital interactions. This momentum can be tapped to augment performance by embedding gaming mechanics into traditional processes. Technology in the workplace can be rewarding, and (gasp) even fun." (Deloitte, 2013, p. 52)

CRITICISMS OF GAMIFICATION

While gamification has its advantages, it also has several disadvantages. Gartner, has also stated that "gamification is currently driven by novelty and hype" and predicts that 80% of gamified applications will fail by 2014. They attribute the failure primarily to poor design (Fleming, 2012).

Ian Bogost, co-founder of a game company called Persuasive Games, is another harsh critic. He suggest that gamification be renamed "exploitationware" and sees it as "marketing bullshit, invented by consultants as a means to capture the wild, coveted beast that is video games and to domesticate it for use in the grey, hopeless wasteland of big business, where bullshit already reigns anyway" (Bogost, 2011). He believes that business executives see gamification as an easy solution to fix problems. They take away what makes games powerful, such as its interactions and behavioural complexities, and reduce them to meaningless points, levels and badges.

His point, that gamification designers take the easy way out, is reflected in Gartner's conclusion that many gamified systems fail due to poor design. Game design is *hard*, and if you do not understand what makes video games engaging, then it will be difficult to create a successful gamified application. Even video game publishers, who spend hundreds of millions of dollars developing games, often get aspects of game design wrong.

This drives many applications to focus on what can be called 'pointification': adding points, levels and badges to an application without understanding the meaning behind them, or why anyone would care about gaining points. When adding a points-based system to an application, it is important to understand one thing: the reason for the points. At the same time, it is important to consider that some of the most successful gamified applications do not have a point-based system at all (Werbach & Hunter, 2012).

Another criticism is whether users will lose interest after they get used to the gamification concepts. In other words, are users interested in gamification only because it is new and novel, or is it a lasting concept? However, when applied correctly and the above concerns are addressed, gamification can perhaps be a lasting concept. To ensure that users do not lose interest, one can create communities within systems; World of Warcraft, which launched in 2004, has maintained high levels of user engagement in activities that are inherently tedious through the social aspects of guilds and group quests (Werbach & Hunter, 2012). It is also important to note that gamification is an iterative process: designers of gamified systems must ensure that they continue to develop new engagement models for their system, just as designers of games create new game mechanics.

Another criticism that is raised by critics is whether gamification can be used to exploit people. Disneyland faced this situation in 2011 when it installed electronic leaderboards that showed how quickly employees completed their tasks. The boards created a tense, competitive and hostile work environment and the leaderboards were often referred to as the "electronic whip" (Werbach & Hunter, 2012). While this may have been beneficial for Disneyland, as it may have resulted in improved efficiencies, it highlights that there can be a fine line between what is considered gamification and what is considered exploitation.

THEORETICAL CONTEXT AND RELEVANCE

As it is a fairly new topic, the current body of literature on gamification is quite sparse, with few published peer-reviewed articles. Most of these articles either focus on defining gamification or present case studies of individual gamified systems. What is lacking in the literature is a comprehensive overview of gamification that highlights the industries in which gamification is being used, the game design elements that are being used in these industries and the desired outcomes of using gamification systems.

This paper aims to bridge that gap. Using already established definitions and categorization models, a comprehensive data set of gamified systems were collected and analyzed, whether they are websites, mobile applications or business processes.

THE RESEARCH QUESTION

The main research question at hand is the following:

> *How are organizations in different industries making use of gamification in their operations?*

To address the main research question, the following questions may be answered:

1. *What kind of industries are using gamification?*
2. *What game mechanics are they using in their gamification systems?*
3. *What objectives are they trying to achieve?*
4. *What systems are they applying gamification to?*

DEFINING GAMIFICATION

Gamification as a field of study is still in its growth stages, so some researchers and authors have differing definitions of the term. All agree on that gamification is the use of game design thinking and mechanics to drive user engagement. However, there are some nuances, especially in whether a full-fledged game that is used to for training, engagement or to improve user processes, known as serious games, falls under the umbrella of gamification or not, where there is less of a consensus.

Deterding et al. define gamification as "the use of game design elements in non-game contexts" (Deterding, Dixon, Khaled, & Nacke, 2011). They go on to say that by stating that a *game* is separate from *play* and that it implies explicit rules systems that lead the users towards discrete goals and outcomes. *Elements* include common characteristics found in video games such as avatars, reputations, ranks, levels, feedback systems, rules, etc; in other words, they find it difficult to restrict exactly what is considered a 'game element' and simply state that they are elements that would be found in most games: "readily associated with games, and found to play a significant role in gameplay" (Deterding et al., 2011). Deterding et al found a series of common design elements in games that are shown in **Table 1**: Game Design Elements. Finally, by non-game contexts, Deterding et al make a clear distinction between *serious games*, video games designed for a purpose other than entertainment, and *gamified systems,* systems that use game design elements for a purpose, without the creation of fully-fledged games.

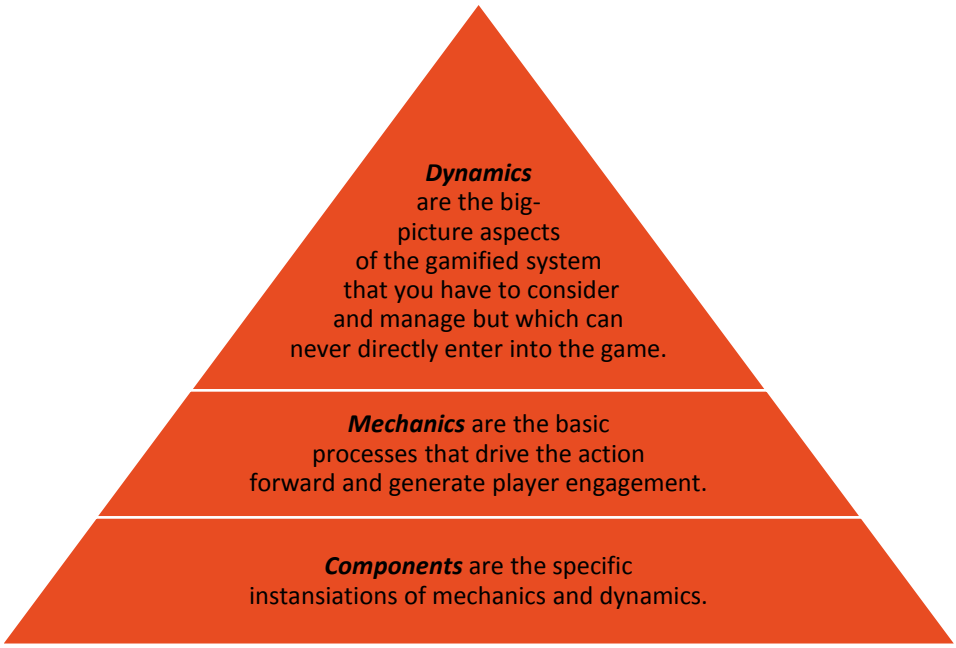
Table 1: Game Design Elements

Level	Description	Example
Game interface design patterns	Common, successful interaction design components and design solutions for a known problem in a context, including prototypical implementations	Badge, leaderboard, level
Game design patterns and mechanics	Commonly reoccurring parts of the design of a game that concern gameplay	Time constraint, limited resources, turns
Game design principles and heuristics	Evaluative guidelines to approach a design problem or analyze a given design solution	Enduring play, clear goals, variety of game styles
Game models	Conceptual models of the components of games or game experience	MDA; challenge, fantasy, curiosity; game design atoms; CEGE
Game design methods	Game design-specific practices and processes	Playtesting, playcentric design, value conscious game design

Source: (Deterding et al., 2011)

Werbach & Hunter have a similar definition of gamification, and describe it as "the use of game elements and game-design techniques in non-game contexts" (Werbach & Hunter, 2012). *Game elements* are described as the smaller pieces, the building blocks that form the integrated experience of the game. They separate game elements into three separate categories: dynamics, mechanics and components, described in **Figure 1** and the full breakdown of each is shown in **Appendix 1**. Werbach & Hunter agree with Deterding, in that gamification focuses solely on *non-game contexts*.

Figure 1: The Game Element Hierarchy



Source: (Werbach & Hunter, 2012)

Zichermann's definition is much broader. He defined gamification as "the process of game-thinking and game mechanics to engage users and solve problems" (Zichermann & Cunningham, 2011, p. xiv). In 2013, he broadened the definition further, describing gamification as "the process of engaging audiences by leveraging the best of loyalty programs, game design and behavioural economics" (Zichermann & Linder, 2013, Introduction). Zichermann's definition is perhaps *too* broad, as it includes serious games, which are excluded by other academics, and loyalty programs, which are not inherently gamified systems. On the other hand, he does include the idea of engagement in both of his definitions, an important aspect of gamification missing from the previous definitions.

For the purpose of this paper, the academic definition, as proposed by Werbach and Hunter, and Deterding et al., will be accepted, and serious games will be excluded from this study.

GAMIFICATION CATEGORIZATION

Little has been written in regards to categorizing gamification systems and analyzing game mechanics. The most detailed work comes from Werbach & Hunter (2012).

Werbach & Hunter created a classification system for gamification, shown in **Figure 2 (left)**, and included three definitions:

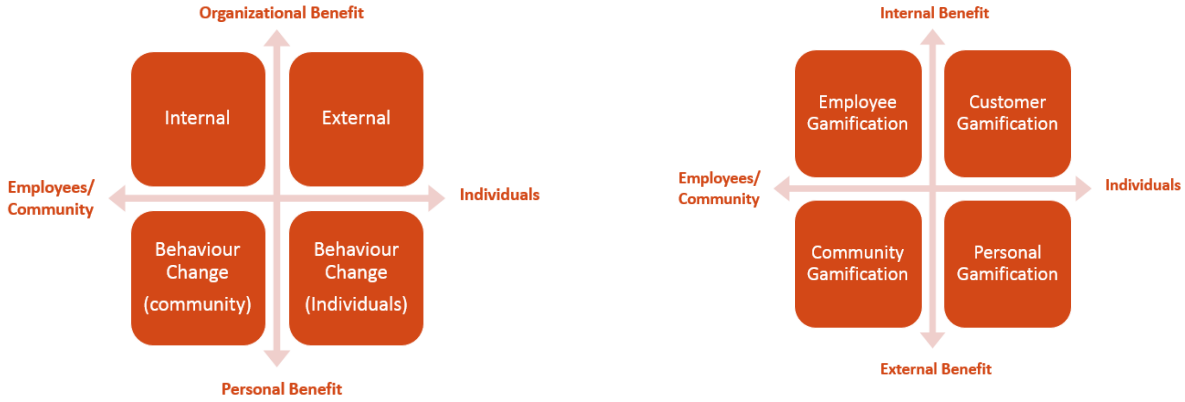
- *Internal Gamification:* the use of "gamification to improve productivity within the organization in order to foster innovation, enhance camaraderie, or otherwise derive positive business results through their own employees" (Werbach & Hunter, 2012, ch. 1). In other words, this is using gamification to *improve business processes and reduce costs*.
- *External Gamification:* the use of gamification involving customers as a "way to improve the relationships between businesses and customers, producing increased engagement, identification with the product, stronger loyalty, and ultimately higher revenues" (Werbach & Hunter, 2012, ch. 1). In other words, this is using gamification to *improve customer relations and increase revenues*.

- *Behaviour-change gamification:* this "seeks to form beneficial new habits among a population. That can involve anything from encouraging people to make better health choices…to redesigning the classroom to make kids learn more while actually enjoying school" (Werbach & Hunter, 2012, ch. 1). In other words, this is using gamification to *motivate people to better themselves and their surroundings*.

While the definitions are coherent, **Figure 2** implies that these systems are mutually exclusive when they are not. For example, Keas is an *internal gamification* solution that is designed to reduce the health care costs of an organization by encouraging employees to lead healthier lifestyles via exercise, also making it a *behaviour-change gamification* system.

However, the figure inspired the author of this report to create a new categorization system to aid in data collection, focused not on the intended results but the intended targets of the gamification system. If a system aims to have an *internal benefit* and targets multiple people, then it is *employee gamification*. If a system aims to have an *internal benefit* but targets individuals, then it is a *customer gamification* system. A *community gamification* system is one that targets behaviour change towards external communities, and an *individual gamification* system is one that targets behaviour change for a single person. Based on the revised categorization, Keas would be considered an employee gamification system.

Figure 2: Werbach's Gamification Categories (Right, Intended Results), Revised Categorization (Left, Targets)



Source: (Werbach & Hunter, 2012)

GAME MECHANICS IN GAMIFICATION

There are plenty of mechanics used in video game design, but not all are directly transferable to gamification. Werbach & Hunter (2012) and Zichermann & Cunningham (2011) have studied these in the most details in their respective books. Below is a list of the most common game mechanics that are used in gamification:

- *Points*: Users are given points whenever they accomplish something the system is trying to encourage them to do. Points keep score, provide immediate feedback, create a sense of progression and provide valuable data for the game designers.
- *Badges*: Werbach defines badges, sometimes called achievement, as "a chunkier version of points" (Werbach & Hunter, 2012) and Zichermann describes them as a "visual points system"(Zichermann & Cunningham, 2011, p. 56). Videogames did not invent badges, as they were used by organizations such as the military and the Boy Scouts. They are a visual representation of a specific accomplishment within a gamified system.

- *Leaderboards*: Leaderboards allow users to see where they stand relative to each other. Both Werbach (2012) and Zichermann (2011) warn about their use: while they can be incredibly motivating, providing a user with a goal to accomplish, they can also be demotivating, causing users who are very behind from the top to stop using the system.

Werbach & Hunter have dubbed the above three mechanics the PBL (Points, Badges and Leaderboards) triad, as they are so common that they are found in most, if not all, gamified systems. In particular, points are some of the most widely used mechanics. They are powerful. They provide immediate feedback to the user that the action he/she just performed is 'correct'. Zichermann (2011) has identified five point-based systems that can be leveraged in gamification, shown in **Table 2**. The different point systems are used for different objectives, such as showing progress, motivating users, rewarding users or establishing trust.

Table 2: The Five Different Points Systems

Experience Points	Experience points (XP) merely identify the rank and performance of a player, and do not have any redeemable value. Users performing desirable actions would gain XP, and XP would never go down, and there is usually no limit.
Redeemable points	These are points that can be exchanged: either for external rewards (gifts, money, status), or for rewards within the gamified system. The presence of redeemable points generates a virtual economy, and in the end points will have a value to users.
Skill points	Skill points are rare in gamification systems. They are separate from XP points, in that they are earned for specific actions, such as the quality of your photos.
Karma points	Karma points, in general, are points that are meaningless. These points create a behavioural path within the system towards certain activities. While Zichermann defines karma points as distinct from experience points, there is no clear distinction between the two. Most gamification systems use karma points instead of experience points. The best example of karma points come from the website reddit, in which users gain 'karma' for each vote they get on their submissions.
Reputation points	These points are the most complex system, and in general indicate the 'trustworthiness' of the user and are used to establish a layer of trust between parties. The best example of reputation points is eBay's points system, which indicates the trustworthiness of sellers in terms of shipping and product quality.

Source: (Zichermann & Cunningham, 2011)

One of the biggest problems with gamification, both as an academic field of study and as a business process, is that most researchers focus on the PBL triad. In the vast majority of articles about gamification, whether they are academic, blogs or news posts, they are often discussed as if they *are* gamification, without understanding other aspects of game design. This has led game designers and critics, such as Ian Bogost, to call gamification "bullshit", claiming that "gets games wrong, mistaking incidental properties like points and levels for primary features like interactions with behavioral complexity" (Bogost, 2011).

Despite this, there are other gamification mechanics that can be used, and these were identified by Werbach and Zichermann in their respective books. Similar to points-based mechanics, there are different game mechanics for different objectives, such as highlighting status and progress, creating challenges or cooperation, or creating a sense of narrative.

Some of the most common are:

- *Levels (Status)*: Levels are a further indication of a user's progress within a game, and generally have one of two meanings. The first meaning indicates a user's status and mastery of a system (e.g. a "level 5" user is two levels higher than a "level 3" user).
- *Level (Progress)*: The second meaning of levels indicates a user's *position* within a system. For example, a gamified system may have ten levels or areas that a user has to progress through, and a user on level five is only halfway through.
- *Challenges* & *Quests*: Challenges are "puzzles or tasks that require effort to solve" (Werbach & Hunter, 2012). They "give players direction for what to do within the world of the gamified experience" (Zichermann & Cunningham, 2011, p. 64). Usually, challenges and quests build on top of point-based systems and are focused on motivating users to accomplish even more difficult tasks.
- *Competition*: Competitions allow users to compete with one another, with a clear winner and loser. At the most basic level, the presence of leaderboards create a form of competition. However, on a broader level, competitions between users and groups determine who can accomplish certain tasks quicker, better, etc.
- *Cooperation*: The opposite of competition, these allow users to work together and collaborate to accomplish certain tasks.
- *Narrative*: Narrative is a "consistent, ongoing storyline" (Werbach & Hunter, 2012, ch. 4). In gamification, narrative is perhaps one of the most overlooked aspects of games, which is problematic as videogame narrative is often one of the most powerful tools to engage users to complete a game.

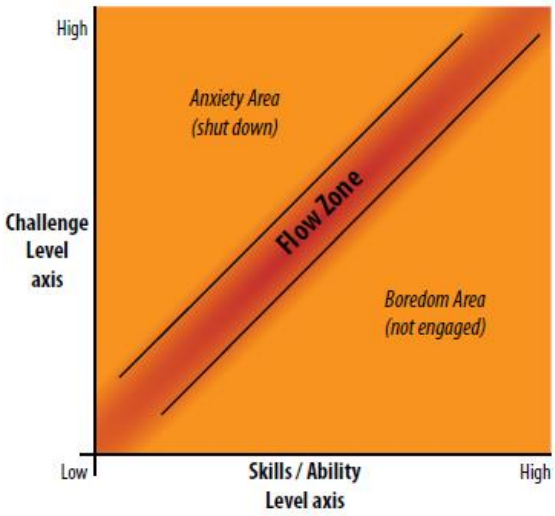
BEHAVIOUR MODELS AND GAMIFICATION

Gamification as a tool is one that attempts to influence users, motivate them towards certain tasks or attempt to change certain behaviours. The majority of the literature focuses on motivational concepts.

One of the most prevalent theories is Mihaly Csikszentmihalyi's flow is found in almost all of the discussions of game design and gamification (Charles, Bustard, & Black, 2011; Deterding et al., 2011; Groh, 2012; Herzig, Strahringer, & Ameling, 2012; McGonigal, 2011; Werbach & Hunter, 2012; Zichermann & Cunningham, 2011). Flow is the "the satisfying, exhilarating feeling of creative accomplishment and heightened functioning" (Csikszentmihalyi, 2000, p. xiii.). He believed that flow is lacking in everyday life but is found in an overwhelming abundance in games and gamelike activities (McGonigal, 2011).

A more modern description of flow is one that almost everyone has experienced. Flow or "being in the zone" is, when a person is occupied on one task and is completely absorbed by it. According to Csikszentmihalyi, this state is often found between anxiety and boredom. If a task is too easy, then the user will be bored and not occupied by it. If a task is too difficult, then the user will become anxious and demotivated. Therefore, game designers, educators, and any other person designing a system to motivate its users must consider the user's skill and challenge level, and slowly increase the challenge level as the user gains experience in order to maintain the state of flow (**Figure 3**).

Figure 3: The Flow Zone



Source: (Csikszentmihalyi, 2000; Zichermann & Linder, 2013)

Despite the concept of flow, most gamification systems rely on extrinsic motivators, such as the PBL triad discussed above. When used by xxx organizations the points can be redeemed for real world gifts or money. This follows the behaviorist model of thinking that considers that a reward or punishment, if applied consistently, will condition people towards certain actions and reinforce certain behaviours (Werbach & Hunter, 2012).

The problem with extrinsic rewards, is that when offered incorrectly, can result in demotivation. There are many studies that show that trying to reward children to read or draw results in demotivating them in the long-run. Children motivated to read by stars or money may stop reading when the rewards are withdrawn or lose interest in these extrinsic motivations. These rewards become expected, and instead of learning to read for the joy of reading, reading becomes a chore to gain these rewards (Werbach & Hunter, 2012). Children who were paid to draw enjoy the act of drawing less than they did before (Zichermann, 2011).

In contrast to the behaviourist approach is the cognitivist theory of Self-Determination (SDT) developed by Deci and Ryan in 1985. The researchers believe that humans are pro-active and have a strong internal desire for growth, but that the external environment must support them. SDT suggests that human needs fall into three categories. First is *competence*, sometimes known as mastery, is the ability for individuals to accomplish external feats. Second is *relatedness* is the universal desire for interactions and social connectedness. Third is *autonomy* is the freedom over your own choices and values (Werbach & Hunter, 2012).

Some aspects of SDT align with Csikszentmihalyi's (2000) flow. Autonomy is reflected in his research, which "showed that flow was most reliably and most efficiently produced by the specific combination of self-chosen goals, personally optimized obstacles, and continuous feedback that make up the essential structure of gameplay" (McGonigal, 2011, p. 36). SDT's *competence* relates to the balance between skill versus challenge that allows people to maintain *flow*.

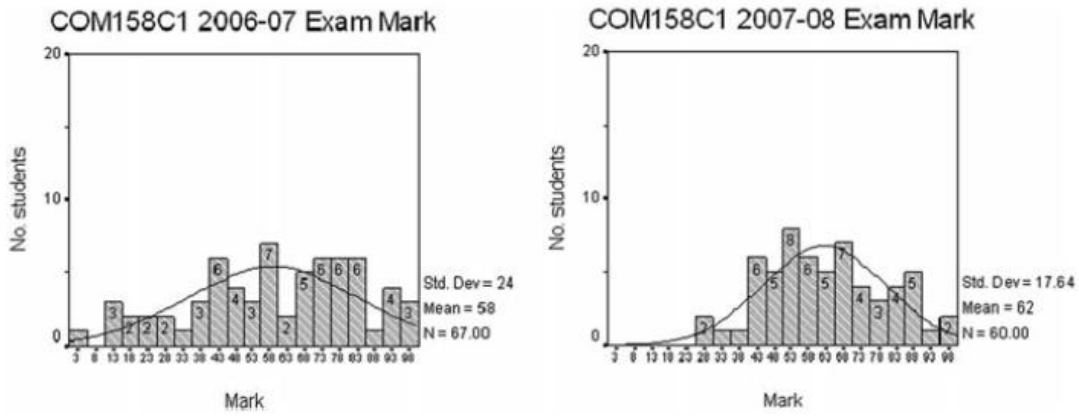
A few academic papers have studied the effects of gamification on already established systems. The most interesting of which was by Kelle, Klemke and Specht (2013). They isolated two game mechanics to study, scores and time-limits, and applied them to already established life support training content in four different control groups. One with no game mechanics, one with scores, one with time-limits, and finally, one with both. The biggest knowledge gain measured was in the group where both mechanics applied. Surprisingly, groups that had only one game mechanic applied showed no significant knowledge gains, while the group with no game mechanics performed better than the group with only one (Kelle, Klemke, & Specht, 2013).

These results lend credit to those who criticize gamification as focused only on pointification. The results have implications for organizations who are implementing gamification. However, the game mechanics which can improve results on their own, and which require a combination effect to be effective, is not clear from the study, as it only focused on the two game mechanics highlighted above. Further studies with a similar structure could be conducted to measure the effects of different game mechanics together.

Gamification has also been successfully utilized in education. A study conducted at the University of Ulster in the United Kingdom applied gamification mechanics to a mandatory first year course for computing students. The mechanics included a points based system, immediate feedback and optional challenges. The pass rate rose from 82% to 95% of the class, an increase of 13 percentage points. The study was repeated for another course in the next semester, and the failure rate dropped from 25% to less than 10%. (Charles et al., 2011).

The results indicate that game-enhanced learning improves student motivation and knowledge gain. Gamification of the modules also smoothed the distribution of the marks, removing the long tail of weak performing students, as shown in **Figure 4**. This suggests gamification of education is of benefit to weaker students, as it improves their motivation, and has less of an effect on stronger students (Charles et al., 2011).

Figure 4: Distribution of marks before (left) and after (right) gamification



Source: (Charles et al., 2011)

One important finding, which the study did not address in detail, is an improvement in grades were seen across all courses that the students were taking. The authors believe that the benefits of gamification from one course had an incidental effect on other courses (Charles et al., 2011), but it could also mean that the group of students in the first year were more enthusiastic about learning overall.

Researchers at Old Dominion University in the United States decided to implement a social network, dubbed *socialPsych*, for all students enrolled in courses in the Psychology department in the summer of 2010. The social network included typical features, such as profiles, comments, walls, etc, but also included gamification mechanics. In particular, these included a certification (badge) system, in which students completed optional quizzes to be labelled 'experts' on a course, and a mentoring system, in which the certifications qualified students to mentor their colleagues (Landers & Callan, 2011).

Results were encouraging. Of 385 students who registered onto the system, 113, or 29%, completed optional tests and an average of 4.8 certifications were gained per student. In general, students found the gamification mechanics enjoyable, fun and rewarding. Researchers also found that students in courses where participation in *socialPsych* was optional were more engaged in the system, contributing to more discussion threads (Landers & Callan, 2011). This supports the notion that gamification is most effective if it is *optional*, and that users are given a choice in whether to engage or not.

USE OF GAMIFICATION IN ADOPTION OF ENTERPRISE SOCIAL NETWORKS

Thom, Millen and DiMicco (2012) studied the effect of adding and then removing gamification mechanics, on the adoption and utilization of an enterprise social network. For a six month period, half of the users of the social network were able to earn points, and the other half acted as the control group Users who were able to earn points contributed more content, such as photos, comments and lists, to the social network (Thom, Millen, & DiMicco, 2012).

After the initial six month testing period, the points system was made available to all users. Then, 10 months after their introduction, the study removed all gamification features from the site, including points and profile badges. The researchers compared the number of contributions two weeks before the removal of the features, and two weeks after, the results of which are shown in **Table 1**.

Figure 5: Content Contributions before and after gamification was removed

	Points Deployed **Total (#/user)**	Points Removed **Total (#/user)**
Photos	4502 (2.6)	2926 (1.7)
Lists	1277 (1.0)	780 (0.64)
Profile comment	8983 (5.5)	4056 (2.5)
Photo comment	2598 (2.9)	1348 (1.5)
List comment	1770 (2.5)	873 (1.2)

Source: (Thom et al., 2012)

The contributions after gamification systems were removed fell dramatically, and all changes were deemed to be statistically significant. This is a clear indication that gamification does improve user engagement. However, at the same time, the researchers noted that the *quality* of the contributions increased after the remove of game mechanics: with gamification mechanics in place, a significant number of the comments were concise and terse (e.g. "HI", "Nice.."), whereas after the removal of the mechanics, the number of these type of comments subsided (Thom et al., 2012).

The results of this study suggest that one of the important considerations of implementing game mechanics is a clear understanding of what attitudes or behaviours that the organization is trying to encourage. In the example of encouraging the use of an enterprise social network, one can choose to encourage the number of comments

posted or the number of *meaningful* comments posted. For example, to improve the quality of the comments, instead of providing points for each comment posted, one can provide points for each conversation created. Game mechanics motivate users towards certain behaviours, and it is easy to motivate users towards the wrong behaviours.

USE OF GAMIFICATION IN THE HEALTH INDUSTRY

Gamification has also been applied in the health industry with positive results. In 2012, a study was conducted by Cafazzo et al. at the Sick Kids Hospital in Toronto. An iPhone health application was developed and provided to 20 adolescents with type 1 diabetes. It was designed to motivate them to monitor their blood glucose levels better. Gamification mechanics were in place, with points being provided for each blood glucose test performed, bonus points for performing a full days' worth of readings (3 readings per day), and for every 200 points awarded, the patients for App Store purchases on iTunes (Cafazzo, Casselman, Hamming, Katzman, & Palmert, 2012).

Results of the system were positive, showing the daily average frequency of measurements increasing by 50%, from 2.4 per day to 3.6 per day. However, while the study showed positive results, no control group was conducted, so it is impossible to generalize the data. At the same time, monetary compensation was used. One may debate whether users were motivated by the gamification aspects or the monetary rewards (though it should be noted that two patients who were eligible for the rewards) (Cafazzo et al., 2012).

OVERVIEW OF LITERATURE REVIEW

While the definitions of gamification have slight variations in the literature, overall they seem to agree on the fundamentals. Video game design can help solve the engagement problems businesses are facing and the motivational problems individuals are facing. While some academics include the concept of serious games within the definition, most agree that gamification is the use of game mechanics and game design elements in *non-game contexts*. The idea of gamification is not to create a complete game, but to take certain aspects of games to drive user engagement and motivation.

One of the biggest issues with gamification is the inherent focus on the points, badges and leaderboards (PBL) triad. The vast majority of gamification implementations only focus on these three game mechanics without understanding the meaning behind them, or why users should care about gaining points.

Along with the PBL triad is the argument between extrinsic and intrinsic motivation. Csikszentmihalyi's flow and the Cognitivist Self-Determination Theory both argue that for creating long term change, intrinsic motivation is more effective however the PBL triad is inherently an extrinsically motivating factor. This is complicated by the fact that extrinsic motivations can uncover and create intrinsically motivating factors, as shown by the example of the Rochester Institute of Technology (RIT). Professors included gamification mechanics within a first year course, including badges and achievements. A special badge could only be achieved if 90% of the students passed the course, which motivated upper level students to create peer-to-peer sessions, despite the fact they were not eligible for rewards. When the gamification elements were removed the next quarter, the juniors and seniors continued to run the peer-to-peer sessions as they found them both enjoyable and rewarding (Werbach & Hunter, 2012).

The above example shows how extrinsic motivation can create intrinsic motivation. Yet this in contrast to examples already discussed where extrinsic motivators can become expected and reduce intrinsic motivation. Therefore, gamification designers must carefully consider the reward structure in the systems they create.

Gamification has also been shown to create positive results. In some situations where it is applied, it seems to increase adoption of a system and increase enjoyment of its users. However, the long-term results of gamification have not been fully studied. It could be found that after a while, these game mechanics lose their novelty, become expected and lose their ability to motivate

THE LITERATURE GAP AND THE INTENDED CONTRIBUTION OF RESEARCH

For the author, it is important that the intended research not only covers a gap in the literature, but that it is also a useful and valuable tool for business start-ups.

There is a lot of discussion in the literature about gamification systems, either prototypes or ones that are actively in use. However, most of these studies are performed in isolation, with each system looked at individually or compared against very similar systems. There is very limited research on how gamification is used in a broader sense, across multiple applications and industries. There is no single and public database that can be accessed to learn how gamification is being used by organizations.

This is surprising, considering the importance of gamification in the future (Deloitte, 2012, 2013). Almost all of the entrepreneurs I have met recently have implemented an element of gamification into their new ventures, and those that have not do not have desire to do so. However, the common element between the entrepreneurs that have implemented it and those that have not is that while both acknowledge that they would like to implement gamification into their systems, and realize its importance, they all have no idea where to begin. They've are aware of it but not about how it's used. It is difficult for them to spend time doing research considering the limited budget of start-ups.

Experts in the field acknowledge the need for such a database. I recently had a discussion with a consultant from the UK, Paula Owen, who has published multiple books on the subject and is using gamification to promote environmental awareness and motivate behavioural changes. After discussing with her the proposed research project, and the creation of the database, she responded the same way as many others that I talked to: she handed me her business card, offered her help and indicated her interest in seeing the final paper.

I also recently met Gabe Zichermann, one of the most active contributors to the field. He has written multiple books on the topic, runs an online information and news website and a yearly conference on the subject. When I discussed the research paper with him, he acknowledged the need for such a database and stated that his company, Gamification.co, is planning to create an online, wiki-based database. I am in discussions with Mr. Zichermann, and his managing editor Mr. Ivan Kuo, about the possibility of collaborating on their online database after the completion of this research paper, where this data will be shared.

This database has the potential to create a starting point for academics, students and most importantly, entrepreneurs on limited budgets who seek to use gamification within their start-ups. They can learn about the common themes and trends within gamification, how game mechanics are applied, and hopefully gain insights into best practises and opportunities for differentiation.

METHODOLOGY

As the goal of the research is to create an understanding of how gamification is being used, a database of gamification systems being used was created. A qualitative research methodology was used, in which gamified systems or applications were found, analyzed through interpretation and codes, and put into the database. This research methodology is limited due to the fact that the interpretations of the systems required the subjective judgement of the researcher. While this may mean it would be difficult to generalize this information, the insights gleaned for it would still be useful (Lee, 2008).

Examples of gamification were found the academic literature, books on the subject, blogs and newspaper articles. Only examples where gamification is an integral part of the overall system were included. For example, LinkedIn provides new users with a progress bar to indicate completion of their profile; once the profile is 'complete', the progress bar is gone and there are no major gamification elements in the rest of the system, so it was not included in the study. A list of studied gamification systems can be found in **Appendix 2**.

Table 3 shows the framework and codes that have been used to collect information.

Table 3: Gamification Database and Codes

Name	The name of the gamified system.
Industry	The industry the gamified system resides in. A system can target multiple industries (e.g. Health towards Consumers vs. Health towards Enterprise). The following options are available: • Consumer • Education • Enterprise • Government • Health • Social Good • Sports • Research
Game Mechanics	The mechanics being applied. The following options are available, and a gamified system can have multiple mechanics: • Avatars: a graphical representation of the user • Points: users gain points for accomplishing tasks • Badges: users gain badges for certain achievements • Leaderboards: users are shown some sort of 'top score' table • Levels / Status: users are split into different tiers to indicate status • Progress: some form of progress is shown to users, such as levels or bars • Challenges: users are given specific challenges to complete outside of routine tasks • Competition: users can compete with one another • Cooperation: users can cooperate with one another • Narrative: some narrative elements are available • Time Limit: some tasks/challenges have specific time limits • Rewards: users are given rewards (external to the system) • Classes/Specializations: users progress towards certain expertise areas • Difficulty Tiers: the gamification elements become more difficult as the user

	progresses • Boss Battles: a unique challenge that is more difficult than normal, usually leads to progression to the next difficulty tier. • Chance / Luck: an element of chance or randomness is present in the system.
Points System	Since points systems are dominant in gamification, it would be helpful to analyse *which* points systems are used. Zichermann's classifications will be used, and a gamified system can have multiple points mechanics: • No points • Experience points • Redeemable points • Skill points • Karma points • Reputation points
Desired Outcome	Werbach & Hunter's classification system will be used, and a gamified system can have multiple outcomes: • Internal gamification: improve business processes • External gamification: improve revenues and client relationships • Behaviour change gamification: change behaviours for the better
Cost for Users	• Free • Paid (One Time) • Paid (Subscription Based) • Enterprise Payment Required: indicates that a system is free for end users but an enterprise organization had to pay for the service • Premium Subscriptions Available • Microtransactions Available
Targets	The classification system inspired by Werbach & Hunter will be used: • Employee gamification • Customer gamification • Community gamification • Personal gamification
Gamified Components	This will answer exactly *what* was gamified, and a system can have multiple components : • Website • Mobile App • Desktop App • Process: some sort of process, business or otherwise, has gamification elements added to it • User routine: is part of the gamification directly tied to a user's routine? • Hardware component (is there a specific piece of hardware within the gamified system?)
Hardware Component	Whether a hardware component is required to use the system: • None • Optional • Required

It is important to note that gamified systems that were provided as a service to organizations were only included once in the database. For example, Keas provides a corporate wellness program and markets its product towards the enterprise. On its website, Keas highlights ten clients, and it likely has more. However, its product is not customized, as it merely provides the same software as a service for each client, and was therefore only counted as one system.

On the other hand, organizations that provide gamification services and consulting, such as Badgeville, were not included in the study, since this study is interested in understanding how gamification is being *used*, not how systems are developed. Organizations such as Badgeville are merely vendors within the gamification space and provide a framework and platform for custom-built gamification systems; these custom-built systems, when they were found, were included in the study.

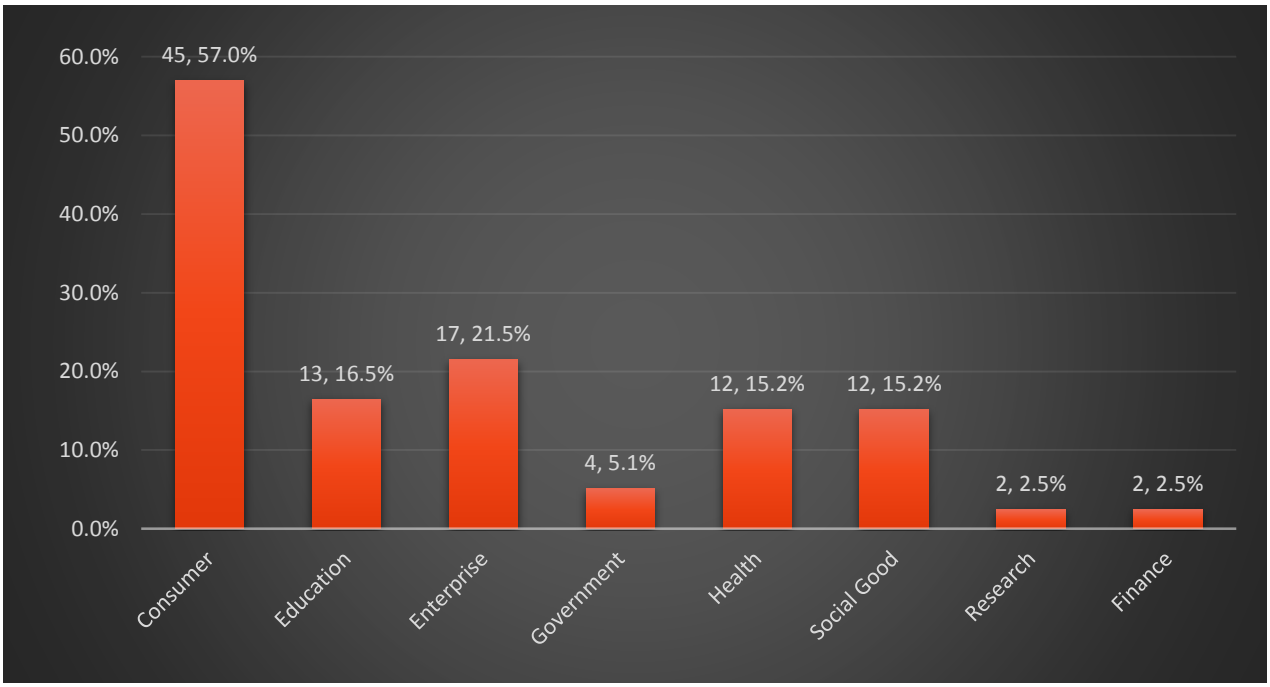
Some information was considered for collection, but for different reasons was excluded. It would be beneficial to understand whether a gamification system was considered successful in its desired outcome. However, without contacting the owners of each gamified system and requesting this data, there is no way to objectively analyze this information. It would also be important to understand whether any of these gamification systems achieved *flow*, but again, without interviewing users of the system, there is no way to gather this information.

WHAT KIND OF INDUSTRIES ARE USING GAMIFICATION?

A total of 79 gamified systems were included in the study, from a variety of industries, as shown in **Figure 6**. More than half of the gamified systems identified, 57%, were focused towards consumers, with Enterprise, Education, Health and Social Good being the other popular industries targeted. Research, Finance and Government systems were the least likely to be gamified.

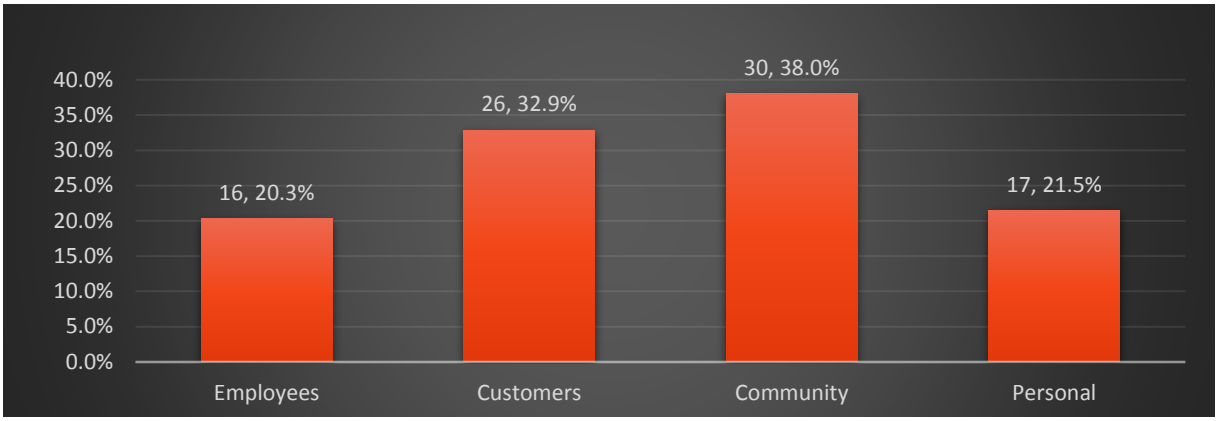
However, as gamification gains traction among consumers and organizations see positive results, one can expect that these industries will begin to use it more. This can already be seen with MMOWGLI (Massively Multiplayer Online War Game Leveraging the Internet) by the United States Navy, which aims to create crowd-sourced solutions for military and non-military strategies. Idea Street, by the UK's Department for Work and Pensions, is a similar example, which crowd sources ideas for improvement from its employees.

Figure 6: Gamification Systems by Industry



Generally, there is an even spread in the targets of gamification systems (**Figure 7**), with communities and customers being the main focus of gamification designers. This indicates that gamification is being utilized for multiple purposes. When targeting customers, it is generally to increase customer loyalty, engagement and in the end, revenues. When targeting communities, usually it is to use the power of groups to accomplish objectives (social, personal or otherwise). When employees are targeted, it is usually to increase employee engagement or to make business processes more efficient and open

Figure 7: Targets of Gamified Systems

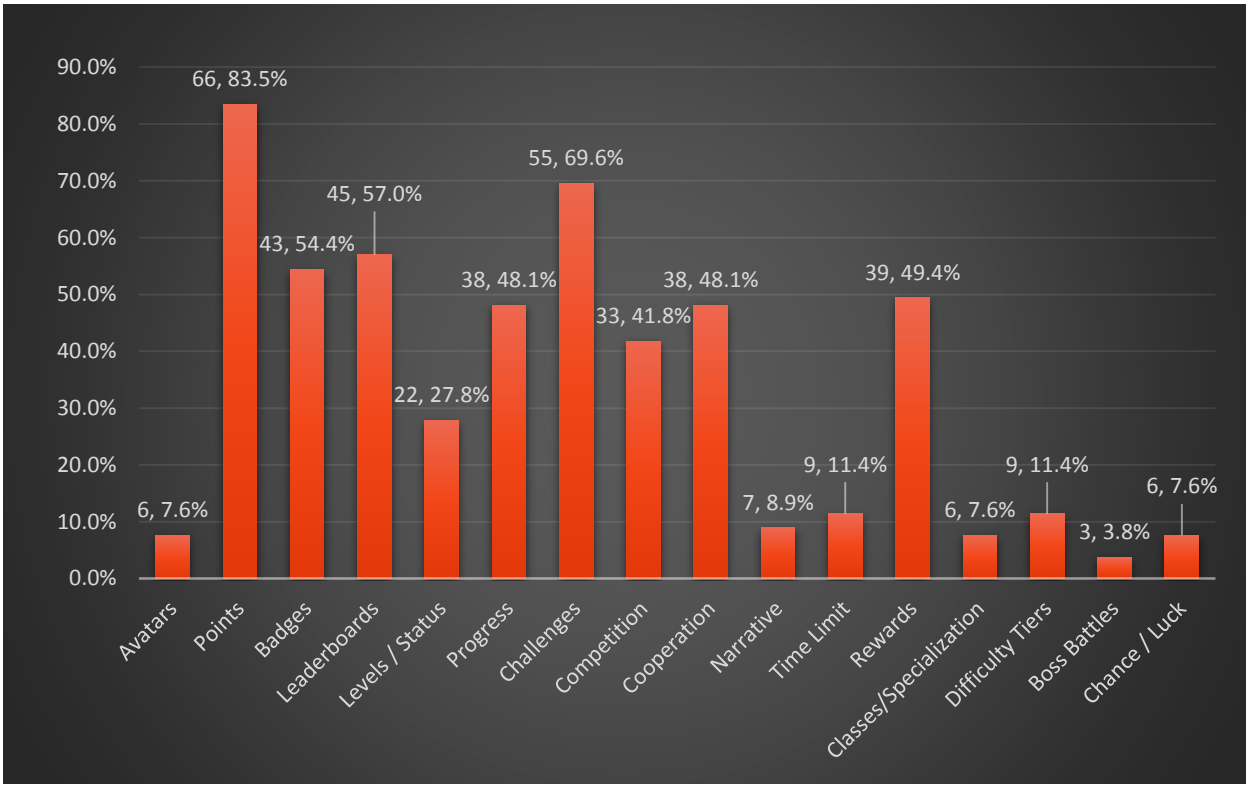


WHAT GAME MECHANICS ARE INDUSTRIES USING IN THEIR GAMIFICATION SYSTEMS?

The most popular game mechanic used was points (**Figure 8**), used in 84% of the gamified systems studied. This was followed closely by Challenges, Badges, Leaderboards, Rewards, Badges, Competition and Cooperation, each of which were used in at least 41% of the systems studied.

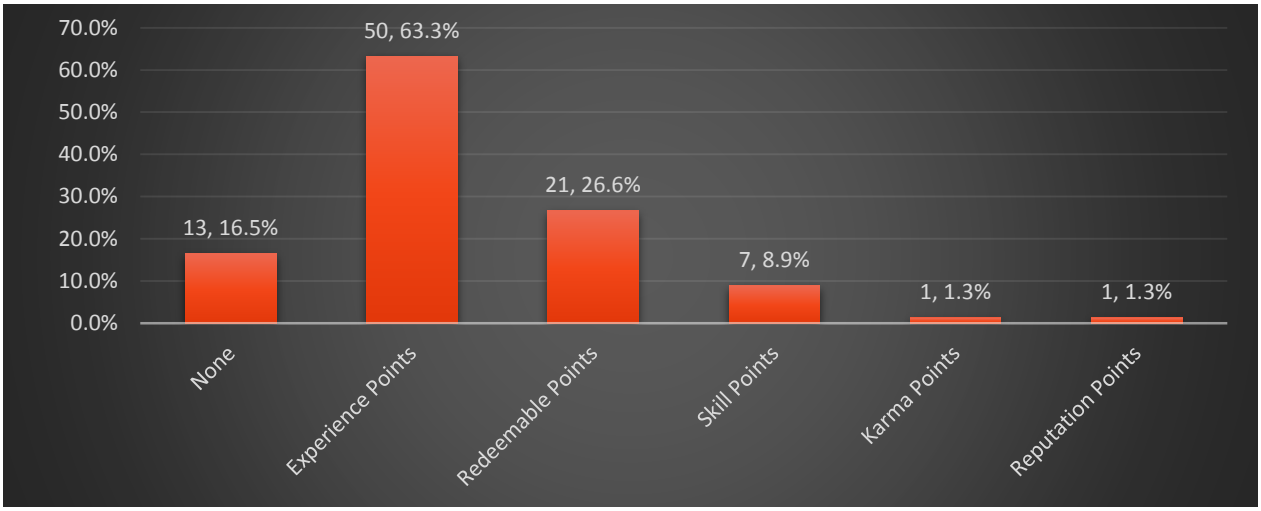
In contrast to the popular game mechanics used, it is important to highlight the unpopular ones. Very few systems used Avatars, Narrative, Time Limits, Classes/Specialization, Difficulty Tiers, Boss Battles or Chance, which were used in less than 12% of the systems studied.

Figure 8: Game Mechanics Used



Examining the points-based mechanics in detail, the majority of the systems included the concept of Experience, which track a user's progress and are generally used as a comparison mechanism in leaderboards. Redeemable Points, which allows the users to redeem collected points for rewards, were the second most popular, with Karma and Reputation Points barely utilized by gamification systems.

Figure 9: Points Systems in Details



WHAT OBJECTIVES ARE THEY TRYING TO ACHIEVE?

Figure 10 shows that, more than half of the gamification systems are focused on changing the behaviour of its users. This coincides with the number of gamification systems being targeted towards consumers. **Figure 11** shows the same pattern, with over half of the gamified systems focusing on user motivation or engagement. The gamification examples range from promoting better health, such as healthmonth.com; Fitbit & Fitocracy, to motivating people to accomplish tasks, such as to do list apps; Carrot and Epic Win, to helping users quit bad habits, such as the quit smoking app Kwit.

Figure 10: Desired Outcome based on Werbach and Hunter's Classification

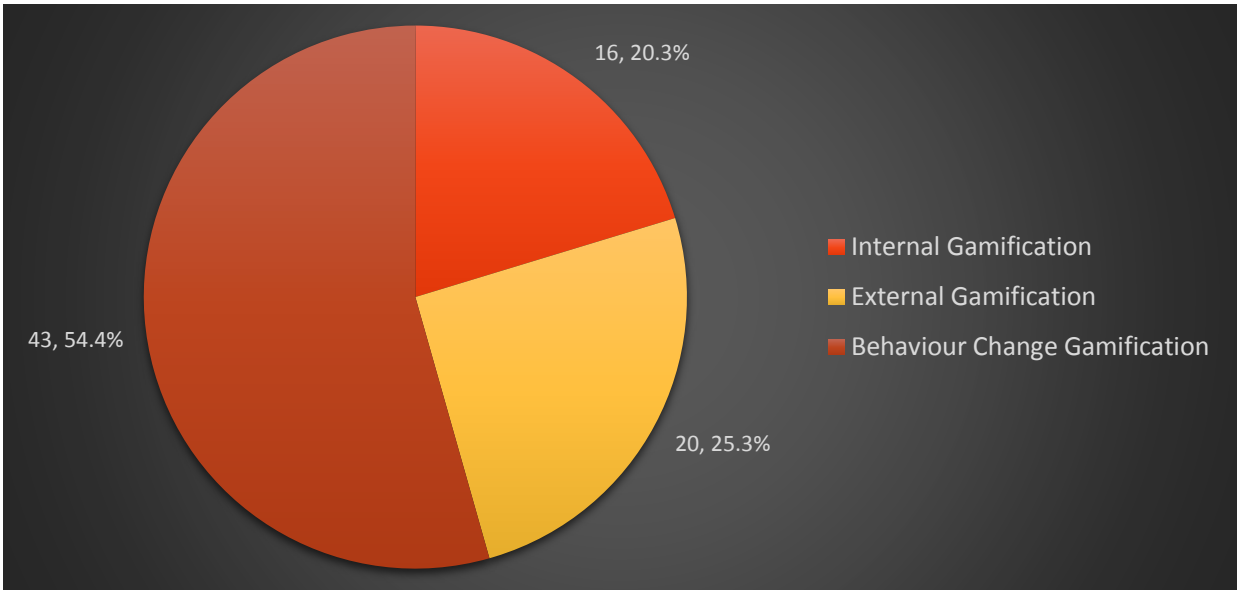
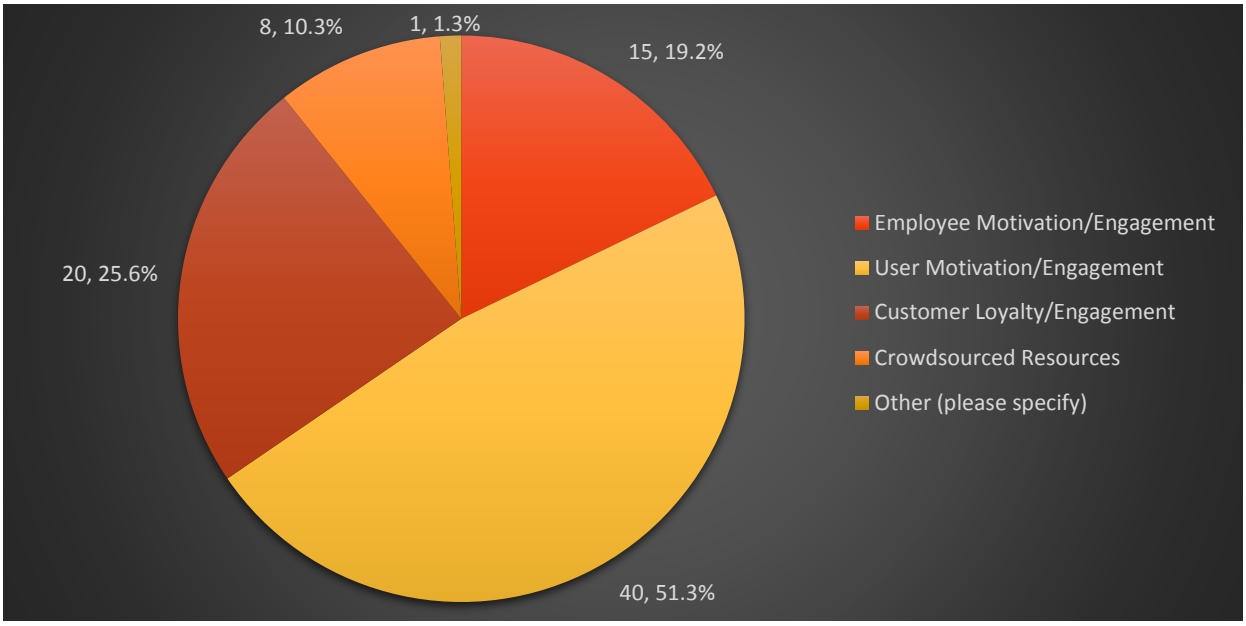
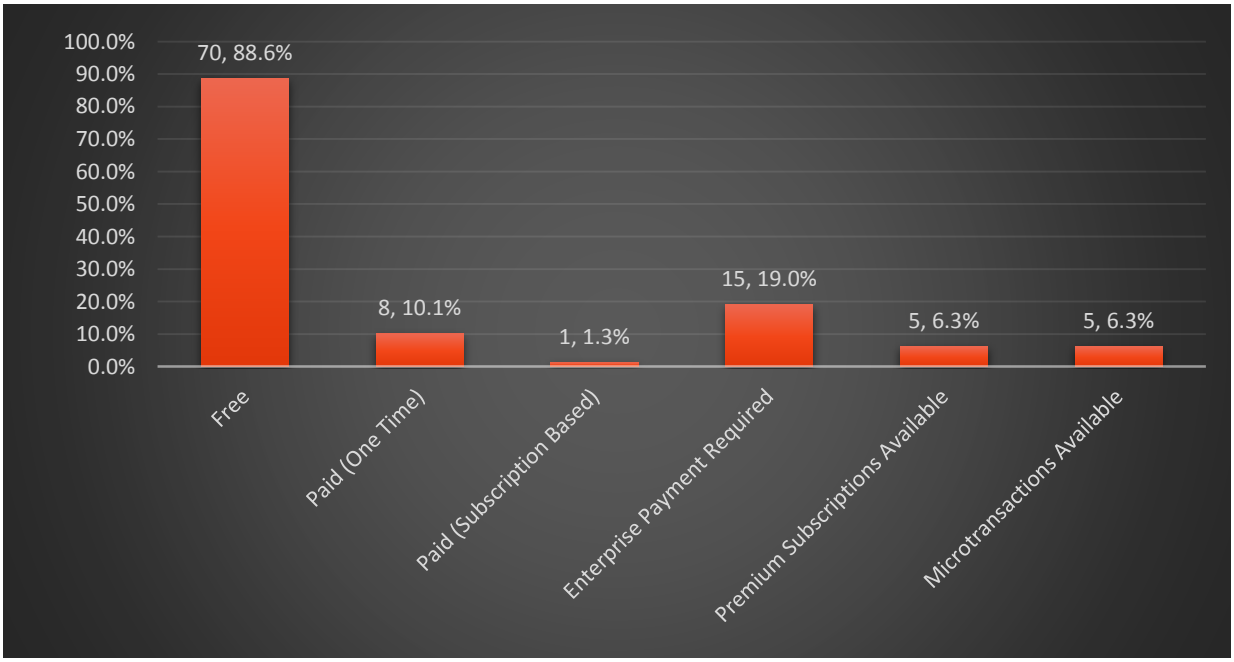


Figure 11: Primary Problem Solved by Gamification



The vast majority of gamified systems were free to end users (**Figure 12**). A few systems, such as Keas, require organizations to pay for the service if offered to their employees or customers. This may indicate that gamification is not used to make people *buy* into a system or app, but instead it is being used to engage and motivate users to keep using the system. While some free systems were supported by premium subscriptions and microtransactions, those that were designed to generate revenue typically did so from advertising, partnerships or referral programs.

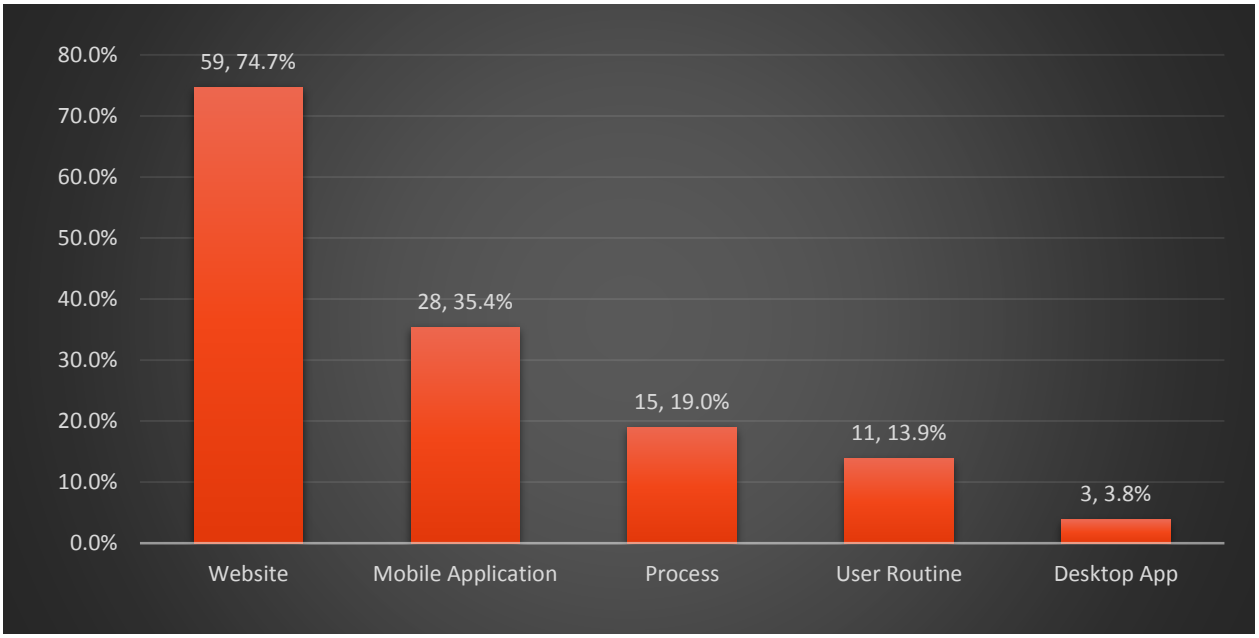
Figure 12: Cost of Gamification Systems



WHAT SYSTEMS ARE THEY APPLYING GAMIFICATION TO?

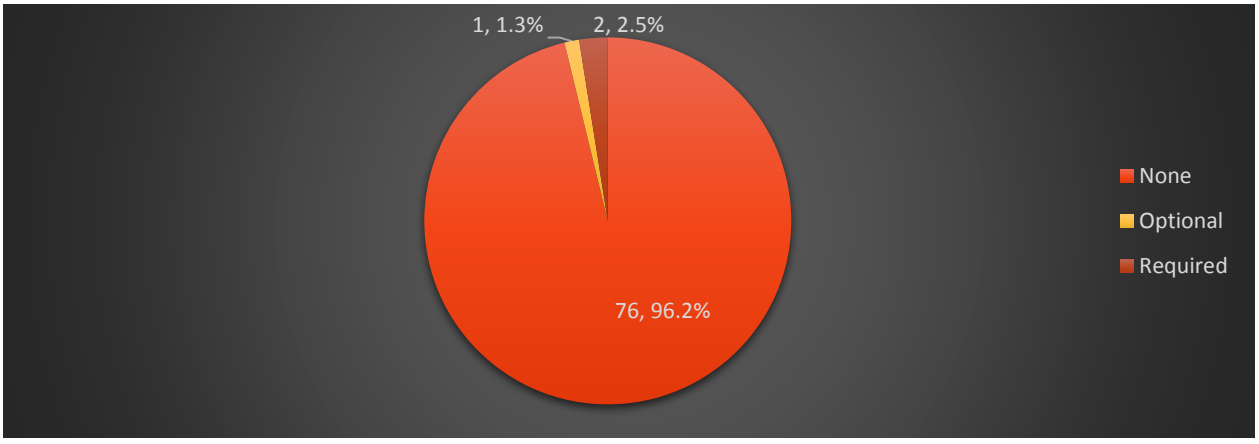
The vast majority of gamification mechanics are applied to websites, with mobile applications being a close second (**Figure 13**), with thirteen systems choosing to combine both. Both business processes and user routines were targets for gamification. When it came to business processes, the gamification systems revolved around making tasks easier or encouraging adoption of certain systems amongst employees. For user routines, the systems revolved around motivating a user to better themselves via exercise, quitting bad habits, or encouraging sustainability

Figure 13: Gamified Component



The large majority of gamification systems in the study, 96%, did not require a hardware component, with only three having any hardware requirements and only two, Zamzee and Nike+, making a hardware component a requirement. Both of these systems used hardware to track a user's activity, and use gamification elements to encourage users to be more active.

Figure 14: Hardware Components



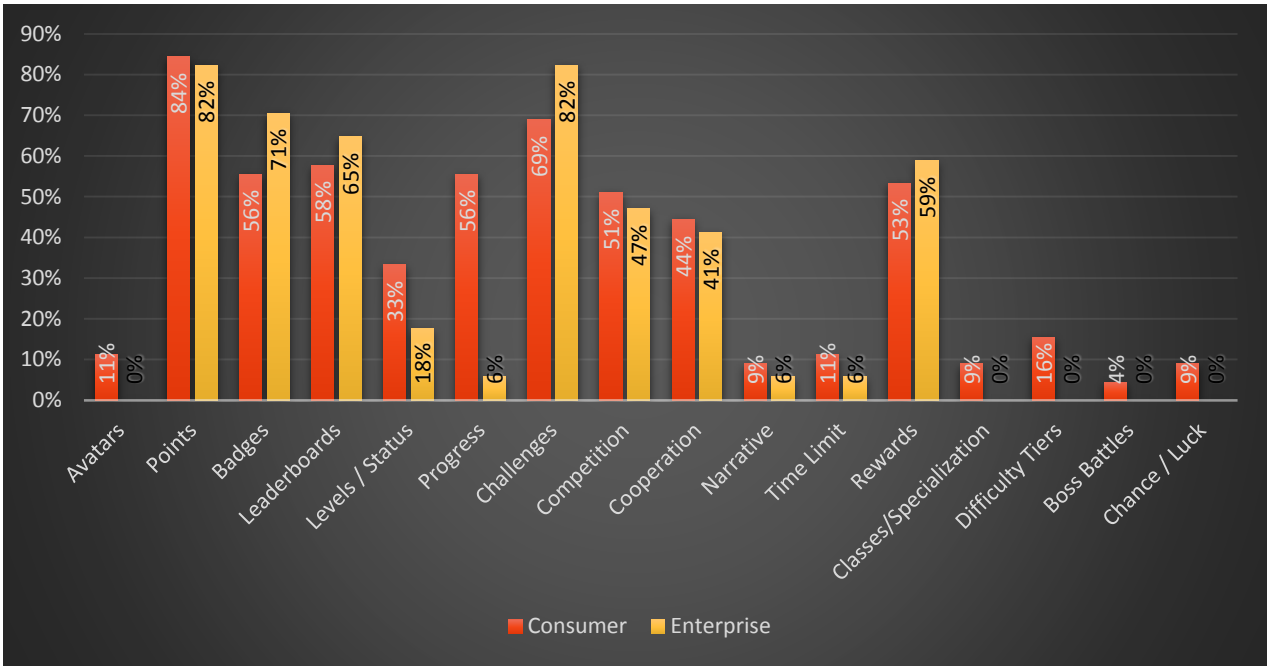
HOW ARE ORGANIZATIONS IN DIFFERENT INDUSTRIES MAKING USE OF GAMIFICATION?

COMPARING CONSUMER VS ENTERPRISE SYSTEMS

The study included 45 gamified systems targeted at consumers and 17 systems targeted at the enterprise which are compared and contrasted below. **Figure 15** shows the comparison of the game mechanics that were used by each industry. Some interesting variations are revealed. First, both industries make use of the points, badges and leaderboards (PBL) triad, with challenges, competition, cooperation and rewards being used in roughly equal measures as well.

One of the main differences is how little enterprise systems use progression. Only 6% of those studied had elements of a progression mechanic in the enterprise in comparison to 56% of consumer systems. While the PBL triad does give users a sense of accomplishment for certain tasks, a progression mechanic allows users to see their relative position within a system, and how far along they are towards completing their goals or tasks.

Figure 15: Game Mechanics in Consumer vs. Enterprise Gamification Systems



COMPARING SELECTED INDUSTRIES

A comparison was done on industries with more than 10 gamified systems to understand any differences between game mechanics, desired outcomes and problems solved by gamification. These industries were Consumer, Education, Enterprise, Health and Social Good. **Figure 16** shows the utilization of popular game mechanics (those that were used by 40% of the systems in the study) by the selected industries.

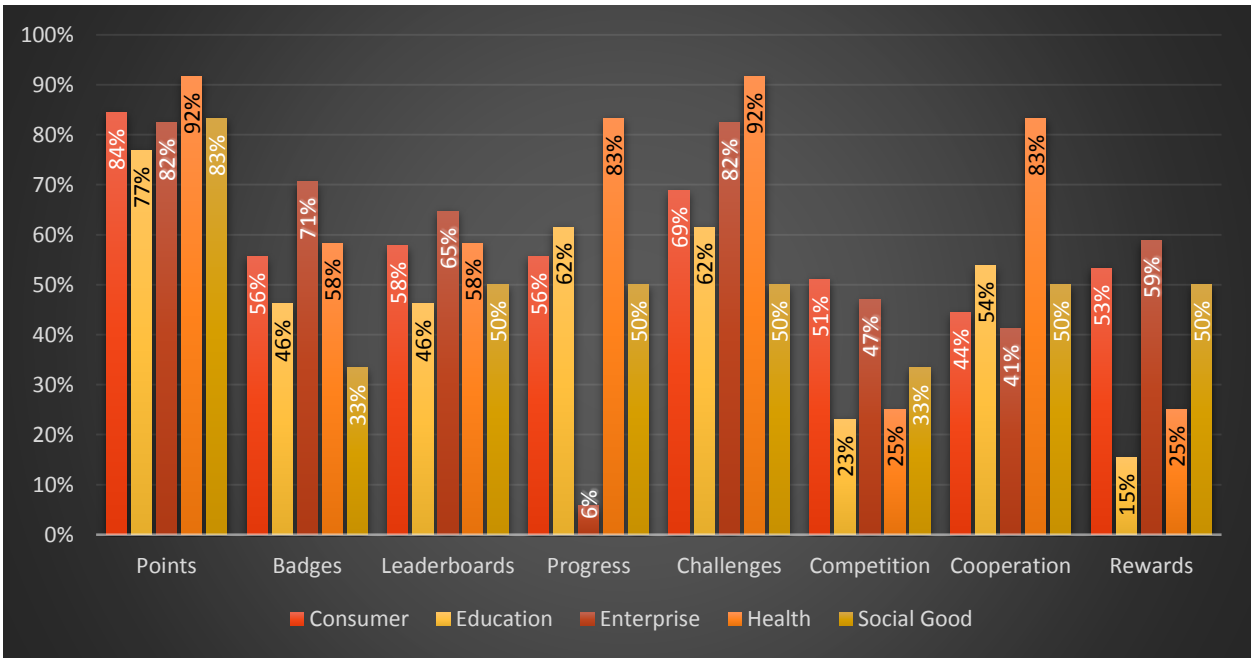
As can be seen, the utilization of the selected game mechanics is fairly even throughout. Points remain the predominant gamification mechanic being used, with the badges, leaderboards and challenges also fairly common.

The Health industry differs from others in its use of two game mechanics: progress and cooperation. 83% of the gamified health systems used both. The use of progress as an indicator of positive feedback, especially when it comes to exercise, is one attempt at solving one of the main demotivational issues. Positive results for exercise is

not immediate (Zichermann & Linder, 2013). By providing progress mechanics (through bars that measure progress through goals), users can keep track of their achievements even if they cannot visually see results on their body. Cooperation mechanics are also likely used to keep users motivated, as they are much more likely to stick to a system if they are working together with friends and colleagues.

The difference between the use of progression in enterprise systems and in health is quite stark. One could argue that the lack of progression mechanics in enterprise systems may be intentional, as it could be misinterpreted by the users as a path towards job promotion. However, just as health systems use progression to indicate a user's progress for tasks that do not have immediate feedback, enterprise systems could do the same. They could use progression to indicate to users how much of a particular task is complete, to give a better visual indicator, rather than use it to indicate the user's overall progression within the system.

Figure 16: Selected Game Mechanics as Utilized by Selected Industries



Since *internal gamification* is focused on improving business processes and making them more efficient, it is no surprise that 82% of gamified systems targeted towards the enterprise focused on this aspect (**Figure 17**). However, there are some gamification systems that were targeted at the enterprise and were focused on *external gamification*, that is, the engagement of customers and the public. The best example would be *InnoCentive*, which allowed enterprises to create public challenges, either for ideas or to solve problems, and offer rewards; individuals that are not affiliated with the enterprise organizations would then compete to solve these challenges.

It is no surprise that gamified systems targeted towards Education, Health and Social good were focused primarily on changing user behaviours. What is surprising, however, is that only 40% of gamified systems targeted towards consumers were focused on *external gamification*, where the primary focus is generating profit, and 58% were focused towards *behaviour change gamification*. This implies that the majority of gamified systems targeted towards consumers are not primarily concerned with using gamification as a means to generate profit, but instead as a means to solve real problems, such as the well-being of consumers and employees. Of course, one could argue that by helping their employees better themselves, whether it is health-wise or otherwise, they can help improve employee morale and thus their productivity.

These results are presented in **Figure 18**, which highlights the primary problems solved by the selected industries. Forty-two percent of gamified systems targeted towards consumers focused on customer loyalty and engagement, while 53% focused on user motivation.

Figure 17: Desired Outcomes by Selected Industries

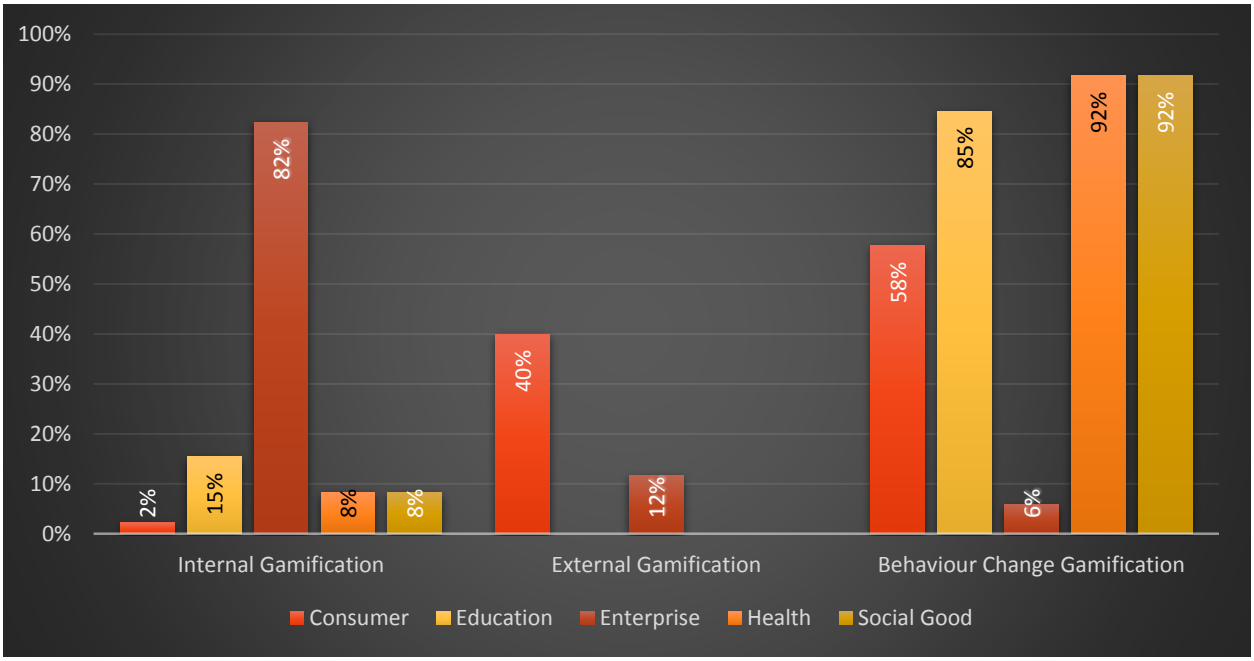
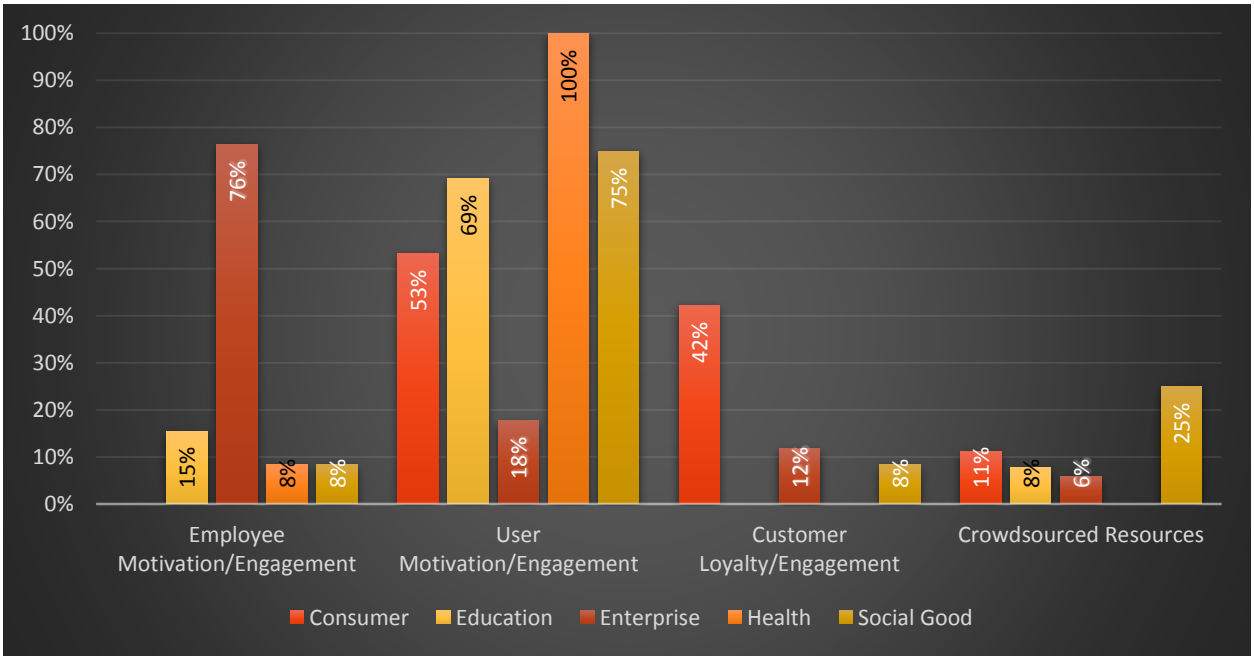


Figure 18: Primary Problem Solved by Selected Industries



DISCUSSION AND REFLECTION

While performing the research, the author came upon a series of insights, realizations and examples, separate from the research results, which are important to highlight below.

MISCONCEPTIONS ABOUT GAMIFICATION AND LOYALTY PROGRAMS

One of the biggest insights that was gained from the research does not tie directly into the generated data set. The level of misconception around what gamification is and what constitutes a gamified system was surprising to the author of this report. There seems to be a lot of confusion, and it can be argued that two of the most commonly cited examples of a gamified system, Mint.com and Starbucks Rewards, are not gamified. This argument is supported by the study by Kelle et al. (2013), in which they found that the use of one game element actually *reduced* the overall knowledge gain, so systems that only use one game element should not be considered 'gamified'.

Mint.com is a financial tool whose purpose is to help people track their spending. The main gamification element in the system is progress bars, which show a user's progress towards certain goals. However, Mint.com never provides a sense of 'playing a game' or fun, and since it simply shows data to a user it cannot be considered gamification (Mint, 2013). Payoff.com is a financial tool that *does* include gamification elements that are clear and prominent: badges, leaderboards, cooperation and a sense of progression beyond just progress bars. Further, the concept of fun is highlighted in its marketing material (Payoff.com, 2013).

Starbucks Rewards is a loyalty program that rewards customers with different membership levels: users gain a 'star' for each purchase, and after 30 stars they achieve 'Gold Level'. They then get a free drink for every subsequent 12 stars earned (Starbucks, 2013). It does not differ greatly from airline loyalty programs, which are also often cited as examples of gamification, yet by the same argument, generic loyalty programs are *not* examples of gamification.

The Starbucks Rewards programs, along with airline loyalty programs, have a single track which users go through: buy a ticket and earn miles; purchase a drink and earn stars. This does not offer users any choice, and as discussed by Werbach & Hunter, *autonomy* is an important aspect of gamification. This is also reflected in Csikszentmihalyi's writings, which indicate that self-chosen goals are an important factor in achieving *flow*.

For the Starbucks Rewards program to truly be gamified, it needs to add elements of fun, choice, and challenges for users to accomplish. For example, along with the one star earned for each drink purchase, it could contain the following rules:

- Try each of our coffee blends within one week, earn the "Taste Tester" badge and an additional star
- Visit five different Starbucks within your city, earn the "Explorer" badge and an additional star
- Bring your personal travel mug for a full week, earn the "Environmentalist" badge and an additional star

By giving users choices and options, users can create challenges for themselves to accomplish, adding elements of fun and ultimately becoming more engaged with the brand. Providing a single track for users to earn points and progress towards status, while themselves can be considered game mechanics, used alone they do not create a gamified system.

Of course, this introduces the question of whether there is a minimum number of game mechanics that need to be in a system for it to be gamified. While that is beyond the scope of this research, I would argue that a gamified

system needs to provide users with a *choice*: not just a choice whether to use the system or not, but multiple progression paths or options within the system.

MISCONCEPTIONS ABOUT GAMIFICATION VERSUS SERIOUS GAMES

Another common misconception is the inclusion of serious games as examples of gamification. The most common example of which was Domino's Pizza Hero. The game takes players through a serious of visual tasks in which they knead the dough, place tomato sauce, cheese and toppings and cook the pizza in the oven. Players are then scored on how quickly and accurately they made the pizza. Players with high scores are then directed to apply to work at Domino's (Zichermann & Linder, 2013).

It can be argued that Pizza Hero is not an example of gamification, but instead an example of a serious game. A simple method is this: take away all the game elements from a system, then analyze what you are left with. If you are left with a functioning system, then it was gamification. If the system you are left with is non-functioning or non-existent, it was a serious game. In the case of Pizza Hero, if you take away the game elements, then you are practically left with a non-existent system; Pizza Hero is itself a game that uses game elements, instead of an application or process that utilizes game elements to engage users.

This distinction is important. While serious games and gamification tend to be used for the same purpose (making things fun to engage users), the implementation of the two is completely different. The investment to create a fully-fledged game with graphics, avatars, gameplay rules, controls, game engines and so on are much, much higher than adding game mechanics or elements to applications, business processes or user routines. Further, some processes may not be suited to a serious game but be perfect candidates for gamification.

GAMIFICATION IS BEING APPLIED TO SOLVE DIFFICULT PROBLEMS

The expectation of the researcher was that most of the gamification systems would be used to improve already established systems (e.g. increase customer loyalty, improve employee engagement or solidify user engagement).

However, it was surprising to learn how often gamification was being used to solve real world problems. Problems that either had no solutions or were difficult to accomplish. For cancer patients, pain management is an important part of their treatment, and it can only be done effectively if patients keep a detailed, daily pain journal. Making patients complete their pain journal consistently is a challenge, especially for children (SickKids, 2012).

In Canada, the Sick Kids hospital created a mobile application called *Pain Squad*, which encouraged children to fill out their pain journal daily. As the children fill out their journal, they unlock rewards, motivational videos from TV show stars and progress through police ranks such as "Rookie", "Sergeant" and "Captain" (SickKids, 2012). Through gamification, it changed the task from a boring one to a more enjoyable one.

In the United Kingdom, the Department for Work and Pensions created *Idea Street*, which allows its staff to propose ideas, vote on them and receive rewards, achievements and badges for their participation. It is an excellent example of using gamification to crowd source information, ideas and concepts. It has proven to be remarkably successful and in the first 9 months, delivered savings of £10 million from 60 different crowd sourced ideas (Zichermann & Linder, 2013).

Foldit is another excellent example: through a gamified experience, it allowed users to model proteins and analyze their structure. In 2011, *Foldit* users in a span of ten days, they deciphered the crystal structure of an AIDS causing

monkey virus, a solution that evaded scientists for 15 years (Zichermann & Linder, 2013). By making protein folding fun, *Foldit* achieved a scientific breakthrough.

There are several systems that use gamification to promote social good, be it environmental or charitable. *Spent* and *Reality Drop* are gamified systems that asks people to role-play in an effort to educate people about living in poverty; *CrowdRise* is a platform that allows individuals and non-profits to create fundraisers and uses gamification to create engagement. *RecycleBank* uses gamification to motivate people towards more sustainable living.

Therefore, when looking at gamification, organizations should not only be focused on how to use it to make processes more efficient or how to increase customer loyalty. While those are important goals for organizations, gamification can also be used to completely change the process and create solutions for previously unsolved problems.

For example, Deloitte recognized that if its consultants shared information about their meetings to their colleagues, it would lead to better overall operational efficiency and knowledge gain. However, Deloitte realized that motivating its busy consultants to share this information on the corporate intranet would be challenging. To avoid this problem, a gamified system with leaderboards, check-ins and points called WhoWhatWere was implemented (Werbach & Hunter, 2012). In this case, gamification was not being used to make an already implemented system or process more efficient, but instead to solve a particular problem: motivating employees to use a new system.

THE LACK OF NARRATIVE AND OTHER GAME MECHANICS

There are few video games that do not have an element of story or narrative. Games either tell a pre-determined story, provide branching storylines based on a player's options or create an environment where the player creates his or her own story (Walker, 2013). Only 9% of the systems analyzed in this research contained any elements of narrative. This leads credence to Ian Bogost's statement that gamification takes away what makes games powerful.

Narrative can come in a variety of ways. Healthmonth's concept of 'spirit animals' that are assigned to users based on their choices is an example of minimal narrative. The CARROT to-do list application creates a narrative out of the user's interactions with the virtual AI system's personality. The Epic Win to-do list RPG creates a whole game world that the user navigates as she completes her tasks.

Regardless of how it is used, narrative is aspect of video games that is underutilised in gamification systems and its discussion is not found in the literature. The same can be said for other game mechanics such as difficulty tiers, boss battles and classes/specialization. Designers of gamification systems should consider including these elements in order to differentiate themselves, and consider what is and is not appropriate.

For example, creating a whole game world for users to navigate through as tasks are completed, complete with visual avatars, enemies and maps, may not be appropriate for an enterprise system, but simpler elements of narrative could be helpful. Just like CARROT, an on-screen avatar, or 'guide', can be used to guide a user through a gamified system and create a sense of connection.

CONCLUSION

Based on examples in the literature review, it was found that a gamification system that is well designed and constructed is likely to achieve positive results. Understanding gamification design is important, Gartner predicts that 80% of gamified applications will fail by 2014, primarily due to bad design. According to the 2013 study by Kelle, Klemke and Specht (2013), a combination effect between different game mechanics is vital for positive results, but it is important to understand which game mechanics go well together, and which ones counteract each other.

The results of this study shows an emphasis on the points, badges and leaderboards triad, which lends credence to Ian Bogost's proclamation that gamification is oversimplifies videogames. Gamification designers need to understand what makes games successful as a whole, beyond the 'tangible' game mechanics. Narrative is one of the game mechanics that could be used to create a motivational effect by itself and is currently not very well utilized.

While the definition of gamification is well defined, what constitutes a gamified system needs to be better understood. Currently, generic loyalty programs, ones that are no different to the ones found five or ten years ago, are being touted as great examples of gamification This lends credence to critics of gamification. Creating a clear understanding of what is and is not a gamified system will help alleviate some of the criticism that gamification has received.

While the above issues are important to highlight, and solutions for them need to be carefully considered, the breadth and depth of how gamification is being used is encouraging for its importance in the future. Organizations from hospitals, governments, NGOs, established corporations and small startups are all utilizing gamification to motivate users, engage employees and solve a variety of problems the world is facing.

Gartner (2012) has predicted the growth of gamification as an important tool to solve problems: be they business oriented, personal or social. The results of this research will create a starting point for anyone who is looking to understand what gamification is all about. If the collaboration with Gamification.co is successful, as discussed in page 17, the full database will be published and available online, so that people may read more about each of the gamified systems studied.

LIMITATIONS OF RESEARCH

As a qualitative study, research was limited to publicly released or publically discussed systems. This excludes all gamification systems which are not publicly available.

The major limitation of this research is that which was discussed in the research methodology section. That is, how to determine whether an analyzed gamification system was deemed successful by its designers. Due to the scope of this research, this would have been very difficult to include. While case studies in academic papers often include their results for public and commercial systems, it would have involved contacting organizations individually to request this information, and many would chose to keep such information secret to maintain their competitive advantage. This is an important piece of information to know to understand what makes a successful gamification system and suggests an area where future research is required.

FUTURE RESEARCH DIRECTIONS

Future research could be designed to analyze what makes a gamification system successful. The study would be based on the research methodologies employed by Kelle et al. (2013), but be expanded to include all the game mechanics discussed in **Table 3**.

As there are many game mechanics that can be studied, it is recommended that the research begin with the most popular game mechanics: Points, Badges and Leaderboards. The study could look at the combination effects of the PBL triad and see how they impact the proposed outcome such as depending on whether all three mechanics were applied, only points and badges, only points and leaderboards, only badges and leaderboards, only one was applied or none were applied.

The same basic research design could be replicated to find the most effective combination of game mechanics that have the biggest impact on the intended outcomes.

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APPENDIX

Appendix 1: Game dynamics, mechanics and components by Werbach & Hunter

Game Dynamics	Game Mechanics	Game Components
Constraints	Challenges	Achievements (defined objectives)
Emotions	Chance	Avatars (visual representations of player)
Narrative	Competition	Badges
Progression	Cooperation	Boss fights
Relationships	Feedback	Collections
	Resource acquisition	Combat
	Rewards	Content unlocking
	Transactions	Gifting
	Turns	Leaderboards
	Win states	Levels
		Points
		Quests
		Social graphs
		Teams
		Virtual goods

Source: (Werbach & Hunter, 2012)

Appendix 2: List of Studied Gamification Systems

Kudos Badges	*Autodesk 3DS Max Trial*
Kwit	*Carrot*
Spent	*Klash*
Foodzy	*PromiseUP*
SCVNGR	*Opower*
Read Social	*JouleBug*
Gamification.co	*Ventus*
EMC RAMP (Recognition, Awards & Motivation)	*MMOWGLI (Massively Multiplayer Online War Game Leveraging the Internet)*
CallidusCloud	*Online Travel Training*
SneakPeeq	*National Post - Post Points*
Deloitte Leadership Academy	*Greengage*
Chamilitary	*Race to the Top (R2T)*
socialPsych	*Work.com (Rypple)*
SaveUp	*Idea Street (UK Dept. for Work and Pensions)*
Payoff	*Target Checkout Game*
ShopKick	*Fuel Up To Play 60*
Pepsi Sound Off	*Keas*
UrTurn	*Nike+*
Chromaroma	*MINI Cooper Hunt and Catch*
Fitbit	*Tabasco Nation*
PowerReviews	*Speed Camera Lottery*
SuperBetter	*Zamzee*
CrowdRise	*KickStarter*
Pain Squad	*InnoCentive*
GamifyApp	*Quirky*
Fleetly	*Microsoft Language Quality Game*
Fitocracy	*Health Month*
Itemz	*StackOverflow*
Proof!	*Foursquare*
Duolingo	*Fold It*
Todoist	*Code Academy*
Verizon Insider	*Khan Academy*
Cause.it	*Recyclebank*
Live58	*Ribbon Hero*
My Ford Mobile	*Just Press Play @ RIT*
Reality Drop	*Wikipedia*
RedCritterTracker.	*Weight Watchers*
RedCritterTracker.	*Samsung Nation*
Epic Win	*Club Psych*
DueProps	