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Gamification

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INTRODUCTION

The concept of ‘gamification’ is about the use of play and passion to drive user engagement in an activity (Groh, 2012); which follows the idea of games where “players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome” (Salen and Zimmermann, 2003, p. 96). This is achieved by the use of game-based elements and mechanisms in a non-game environment. Gamification is not about turning routine activities into a game; but to redesign work processes with game mechanisms for a fun and enjoyable experience. Gamification is, in a nutshell, the combination of various components which drive a sequence of desired mechanics to develop dynamics of interaction behaviours with the intention of supporting key business processes (Werbach and Hunter, 2012). At last, gamification is all about changing the way in which specific activities and processes operate; predominantly for users to have more fun and greater engagement in what they are doing. Gamification focus on the user; the game mechanisms in a gamified system merely exist to ensure a strong sense fun, passion and play that is embedded within the system (Deloitte, 2012).

Transferring the commitment of gamers to solve “just the next level” (as they play over and over again) into commitment to business processes, is an area of emerging interest. This draws on several disciplines ranging from psychology and behavioural sciences through to game theory. We follow the framework provided by Werbach and Hunter (2012) and examine key gamification elements: components (tools and approaches that can be used), mechanics (essential actions describing the way in which these components drive micro-level behaviours), and dynamics (outcomes relating to the behaviours, interactions, and intentions of players). Gamification examples are followed by criticisms of the approach.

BACKGROUND

Gamification is “the use of game design elements in non-game contexts” (Deterding, Dixon, Khaled, & Nacke, 2011, p. 10) with the intent of injecting fun, play, and passion into tasks and processes. The redesign of processes embeds characteristics that are more commonly found in games, into the non-game activities (Deterding et al., 2011, p. 13). Therefore, it is the application of “the *motivational properties* of games and layers them on top of other learning activities, integrating the human desire to communicate and share accomplishment with goal-setting to direct the attention of learners and motivate them to action” (Landers & Callan, 2011, p. 421, emphasis added). The term was not widely adopted until 2010 and there is still significant confusion amongst various terms which have similar meanings, so that gamification can be used interchangeably with terms such as *behavioral games*, *funware*, *applied gaming*, *productivity games*, the *game layer* of a process, or *playful design* (Deterding et al., 2011).

The increase in motivation of users is accomplished through the careful combination of a range of *building blocks* into the design and structure of a given process. This incorporates game-based practices and elements. It remains distinctly different to the concept of *serious games*, which is more tightly concerned with the use of games to achieve serious outcomes. For example, challenges or puzzles in a game, where having multiple people working on the puzzle allows the players to progress in the game, while having the puzzle solved is of real-world purpose to the game-designers (Liu, Alexandrova, Nakajima, & Lehdonvirta, 2011). By having the task in some way incorporated into the overall structure of the game, players accomplish the task as a *side effect* of their gameplay (Oja & Riekki, 2012).

Clearly, fun and engagement in the people’s behaviour has a strong and rich background in behaviour and psychology research. This is necessary to understand the motivation of users and how and why they might react in various ways to particular stimuli. The concept provides improved engagement of the user with the gamified system, relying heavily on recency of interactions, duration of interaction, frequent interactions, the ability for the system to be ‘Viralised’ and become widely adopted, and the ability to rate and evaluate a system (Zichermann & Cunningham, 2011).

Gamification builds on established game-based approaches and an understanding of the nature of humankind, founded on behavioral economics and psychology, to allow system designers to achieve objectives. Gamification is applied in various disciplines to promote and encourage certain behaviours. Examples include Health (Nike+ tracks activities and shares this in a community for comparison; <http://nikeplus.nike.com/plus>), Environment (a speed camera lottery motivates safe and responsible driving; http://www.youtube.com/watch?feature=player_embedded&v=iynzHWwJXaA and the world’s deepest bin to motivate people not to pollute the environment; http://www.youtube.com/watch?feature=player_embedded&v=cbEKAwCoCKw), Social Interaction (Piano Stairs are designed to engage people using stairs and to encourage them to interact with people around themselves; http://www.youtube.com/watch?feature=player_embedded&v=2lXh2n0aPyw) or Science (the computationally intensive challenge of understanding how molecules can be folded can be solved by laypeople when it is turned into a computer game; <http://www.americanscientist.org/science/pub/behind-the-scenes-of-foldit-pioneering-science-gamification>).

MAIN FOCUS OF THE ARTICLE

Even though *serious games* and gamification of activities have to be distinguished with respect to their primary objective, they still share several key elements (Ma, Oikonomou, & Jain, 2011). With serious games (or games in general), the key elements are used to solve a *serious* problem as part of education (rather than a game for entertainment), while gamification is about applying these key elements in a non-game context to induce an engaging behaviour. In the context of training and learning purposes, gamification means that key learning objectives for a particular class module are used to apply the key elements of gamification on the activities that would enable participants to infer the rules for the key learning objectives. The learner is not supposed to be entangled in rules and guidelines how to achieve the objectives as they would do in serious games, but envision the activities in a ‘playful’ way where the participation is voluntary and fun; addressing the passion of the learner to intrinsically feel the obligation to achieve the objectives (Groh, 2012). In this section, the key elements of gamification are described and demonstrated on several examples; see also Figure 1.

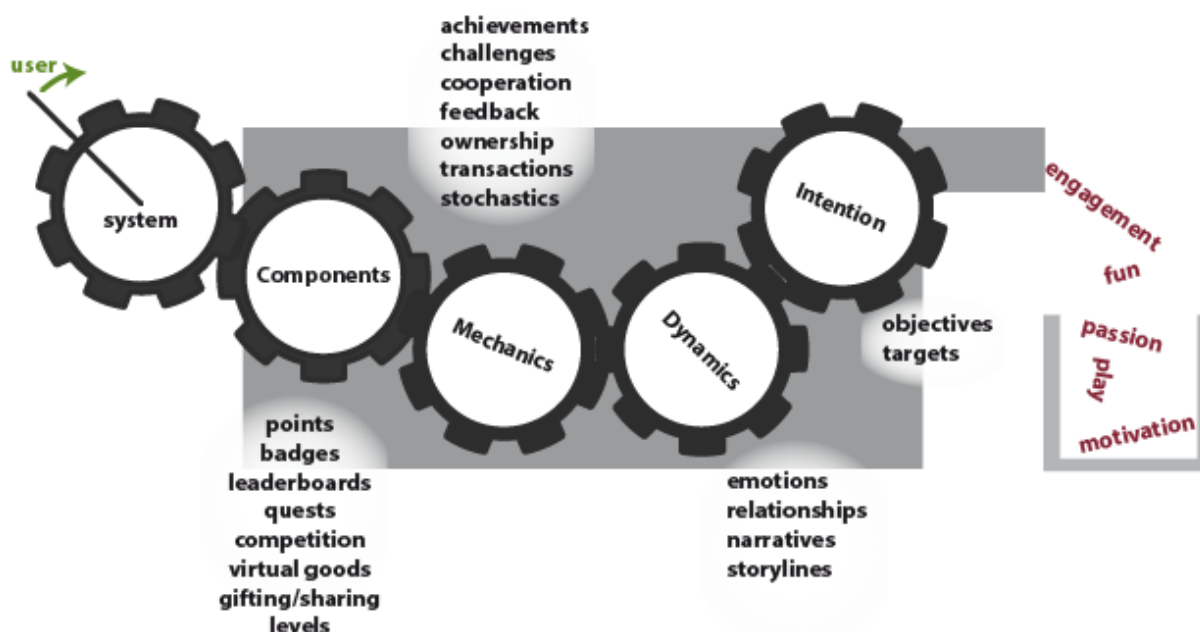


Figure 1: While (serious) games have a specific rule set and are often well-balanced based on experience and repeatable application, gamification relies on a very careful consideration of key elements with respect to the individual applicant. Gamification is only successful if the key elements join and run in unity in favour of the user.

Key Elements

One of the very common misconceptions of gamification is it is as simple as the addition of points-, badge-, or leaderboard-based systems (the PBLs) to existing activities. However, by adding these elements to existing processes particular user behaviours will be influenced and modified. This does not necessarily imply that the desired change of behaviours will be achieved. For example, leaderboards often reflect a snapshot of the latest results. While a new round with an empty leaderboard and equally skilled participants most likely result in a healthy competition, an unbalanced group or already existing perfect scores can have the unintended consequence of discouraging participants due to the big gap to the leaders. As a consequence, the different components and mechanics must be carefully designed and thought through in such a way that they will support the design business dynamics. These dynamics themselves must be clearly linked to key business processes and desired outcomes. The following presentation of ‘components’, ‘mechanics’, and ‘dynamics’ is based on the framework by Werbach and Hunter (2012).

Components

The selection of components is related to the intention and purpose of the system, the target user group, and involved (software) tools. However, the intelligent use of these components to successfully meet the designer requirements is more challenging and requires careful thought. The basic leaderboard as shown in the previous example might be discouraging as the *path to top positions* is out of sight. Introduced handicaps incorporate the skill and experience level and allow beginner to be placed alongside expert with the motivational element of decreasing their handicap. Alternatively, direct comparison can be made to similar opponents with direct (social) links; e.g., co-worker or friends. Instead of challenging everybody in the leaderboard above the own position, just the next known opponent in the list is targeted for improvements. A similar approach could be the display of the next known person down in the list including the gap as well as an estimate about when the person will pass on the leaderboard; addressing the engagement and motivation to stay ahead.

- **Points** to measure and provide a tally of success.

- **Badges** to represent success and pre-defined achievements, which can be flexible and complement leaderboards as a tool for measuring success. The possible badges are generally known in advance to motivate the user to achieve personal goals without direct competition.
- **Leaderboards** to display progression of users and relative success in comparison to opponents.
- **Quests** where a user moves through a challenge towards a defined objective, with the intention of being rewarded. Quests are defined by objectives (e.g., waypoints or milestones) that should be precise, comprehensible, and concise.
- **Competition/challenge** between two users as they strive to outdo another.
- **Virtual goods**, assets that are perceived to be valuable, often as they confer an advantage to a user, or serve to distinguish the user in some way, providing a sense of individuality.
- **Gifting/sharing** of resources between users, allowing users to enjoy the benefits of gifting, helping, and altruism.
- **Levels** of difficulty, providing users with new challenge as they progress; incremental increases in difficulty means that users are never overwhelmed.

Mechanics

The mechanics are slightly more abstract than the components, and often relate to the ongoing nature of how specific components evolve over time or how users interact within the framework. The mechanics are concepts that define potential actions by and states of the user; especially guidelines that are defining how the game progresses, what are the possible reactions on an occurring event, and what influences the behaviour of the user in what kind. The following list depicts some possible game mechanics but is not necessarily exhaustive.

- **Achievements** are the objectives for the user and represent milestones in the storyline. An achievement can be the finalisation of a product, activity over a certain time period, or accumulation of a number of resources. An achievement can be awarded with a badge.
- **Challenges** that require user effort to complete, such as puzzles or other tasks. Challenges are described by a list of objectives to be fulfilled.
- **Cooperation** between users to reach an objective that is not possible alone; e.g., assembling heavy machinery.
- **Feedback**, provided through leaderboards, messages, or other visual or informational displays, to allow a user to recognise how they are doing and to initiate further activities.
- **Ownership** of resources that can be acquired, used, and traded.
- **Progression** in the storyline; including a visualisation for the user to see their progress in an activity. Progress can be induced to prevent the user from becoming frustrated when they do not know what to do. This can be facilitated using hints, environment changes, or actively performing the activity for the user.
- **Transactions** between users allowing trading of resources.
- **Stochastic** elements, where randomness and chance provide a sense of uncertainty and fun.

The beneficial integration of mechanics implies the availability of feedback, algorithms to analysis and to compare results to objectives, which can quantify progress and success. In addition, the algorithms are required to have an instantaneous or extremely rapid response rate in order to smoothly facilitate the gamification of the system – indicating a strong need for a comprehensive information system to support the gamification process.

Dynamics

The dynamics are the resulting behaviours and interactions between users that are being incentivised by the components and mechanics described. They depend on the nature and experience of the users. The introverted user with risk aversion behaves differently compared to someone with affinity to explore risky situations; for example risking a long game period just before achieving an objective to gain some extras. Thus, the design of game dynamics has to incorporate the users’ attributes, which have to be updated throughout the progress within the gamified system.

- **Emotions** that users experience include a sense of curiosity or competitiveness, which can be harnessed and designed to achieve the desired outcomes of the system.
- **Relationships** include the range of interactions that lead to emotional attachments in users; e.g., comradeship and status.
- **Narratives** and **storylines** are an element imported directly from many successful video games. They provide an ongoing and compelling storyline, providing context and meaning for user interactions and adventures (Reiners, Wood, & Dron, in press). The storyline spans multiple stages or levels.

Intention

Gamification must occur within a wider context with particular outcomes that the system designers desire to encourage and support. In businesses this may be largely related to revenue, visitors, or usage of particular online tools. On social engagements it might be having people physically visiting establishment or participating in more conversations. The objectives and therefore the actual intended key outcomes need to be clearly decided in advance. Failure to do this may result in the design and use of several game-based elements that compel some users to become more engaged within a certain part of the system, while driving other users away, or providing others with a disincentive to get involved in the system.

Information systems support

While it is possible to incorporate gamification into processes without technology support, this is proven challenging to achieve in practice. Many recent applications appear to be based on social media networking applications, an area which is internet-based and focuses on strong IT infrastructure support; this IT support enables rapid and simple implementation and integration of gamification systems on social media networking websites. Many existing enterprise systems capture significant volumes of transactional data that can be mined with additional applications. Indeed, there are many firms that offer supplementary ‘enterprise gamification’ packages. These are not without critics, however, as they merely ‘tack on’ to existing systems, implement a few components or mechanics without carefully, integrative design, and may even lead to an unethical and exploitive use of employees, draining the fun from their work (ironically, this entirely contradicts the concept of gamification!) (Werbach & Hunter, 2012).

Examples of Gamified Systems

Even the simplest incorporation of game-based elements into existing routine processes (e.g., calibrating equipment) can result in an increase of user engagement and participation in the (otherwise) thankless, yet crucial, task (Flatla, Gutwin, Nacke, Bateman, & Mandryk, 2011). However, gamification can also be applied in scenarios where the users are already extraordinarily talented and motivated professionals; gamification of Astronaut training encourages the repetitive training of procedures or keeps them motivated on long missions (Cornelissen et al., 2012).

Within educational environments, gamification can be used to motivate and engage students (Reiners et al., 2012; Wood & Reiners, 2012). Landers and Callan (2011) created a social game element in their class, where the desired behaviours by students would make a virtual tree ‘grow’, all incentivised using gamified elements. As an extension of active learning, gamification can be used to structure activities and processes within a module of learning to increase engagement and improve outcomes (Wood & Reiners, 2012), while other target programs of study (Reiners & Wood, 2013).

The Ubi-Ask system allows users to upload images of unknown symbols or signs; e.g., from a country they are currently travelling in, and receive answers from the crowd (Liu et al., 2010). This results in high levels of accuracy and additional information that automatic, software-based systems cannot provide. The incentives include points, badges, a localised leaderboard based on the time for a reply, and the ability to become a local expert (Liu et al., 2011).

The Opower Social program gamifies electricity saving by building a community to compare similar households, create a leaderboard using the energy savings in comparison to your friends, and building teams to hit savings goals in competition with other teams. An additional incentive is the feedback from users sharing their strategy about how they achieved their result; allowing others to progress in the next round (Han, 2012, p. 5).

CRITICAL PERSPECTIVE

The literature offers a variety of definitions for gamification, including sets of models, theories and examples of how it can be applied to different scenarios. But with success and popularity comes criticism and doubt; some assert that gamification is merely the next buzzword (Chorney, 2012). “If games are to solve problems then they must address problems” (Chorney, 2012). Can game solve problems, if they intend to distract from the real-world and provide entertainment? Chorney (2012, p. 3) further argues that game mechanisms are not core characteristics, but “strips games of their essential characteristic: content, and replaces it with a brand.” In addition, it is claimed that the term gamification is merely promoted by marketeers to ride the wave created by the game market during its rapid evolution from a niche market into a mainstream market. Bogost (2011) considers “gamification [as] marketing bullshit, invented by consultants as a means to capture the wild, coveted beast that is videogames and to domesticate it for use in the grey, hopeless wasteland of big business, where bullshit already reigns anyway”. He considers gamification as the next consultant’s strategy to “sell the same bullshit [...] over and over again” (Bogost, 2011); Bogost’s critical examination of gamification emphasises the endless thirst for the introduction of new technologies and processes that do nothing novel in comparison to other technologies and processes introduced before.

Pixie (2010) claims that gamification, and the mechanics behind games, can trick or manipulate users into taking certain actions that they are unlikely to take otherwise; e.g., using the credit card to progress in the game play. Sitzmann (2011) notes similar occurrences in learning, where gaming elements have influenced the real-world behaviours. The question we should ask in this context is whether social games are a perfect realisation of gamification; the few game mechanisms they regularly employ are implemented as a way to drive a source of revenue through engaging users to benefit from changed behaviours in a way that isn’t necessarily reflective of other, more comprehensive, systems. Zichermann (2010) mentioned the “anything can be fun” factor of gamification, but also draws attention to how the foundation of Farmville’s success rests on just 8% of players being engaged and willing to use their credit card. Mapping this to (e)learning would place gamification beyond all or most pedagogical models. Yefeng et al. (2011) support this with experiments which showed that subjects identified as ‘less interested in the activity’ could not be influenced by game mechanisms to the same degree as could those identified as ‘interested in the activity’. The intensity of influence is also reduced if the user is already extremely familiar with the provided core service. Here, Chorney’s (2011) argumentation against gamification is flawed. The target audience of ‘social games’ (e.g., Farmville) is not the same as those of a university; university students -- and we assume that students study a subject to gain domain knowledge -- are interested in the topic but do not yet have complete knowledge. Game mechanisms can be used to ‘encode knowledge’ in the same way that a textbook encodes knowledge using words. Gamification tools are about engagement and finding the ‘inner switch’ to influence users to interact with the content.

Most criticism reveals that gamification has one trait in common with all tools: if used correct and honestly, it is valuable; if not, it can cause damage. In social games, gamification is used to create an asynchronous situation in which the provider has a clear advantage over the users that they seek to influence. As gamification encapsulates the concepts of game mechanisms and game rules, it requires clear and precise definition during design phase of implementation to specify the desired outcomes of the complete package.

FUTURE RESEARCH DIRECTIONS

Some assert that gamification is merely a promotional strategy riding the wave created by the growth of the game market (Chorney, 2012). The term itself is new and as shown in the introduction, several research areas (e.g., serious gaming and business gaming) were already building systems that used games to achieve a certain beneficial outcome. However, gamification is, despite its name, not focussing on games and trying to create a game from a system, but it extracts the core components from games and uses them in the design of a system. The result is not a game, but a system that is more enjoyable as it engages and motivates the user to continue working and improving. This distinction of gamification and other game-based approaches is currently discussed in the relevant communities; a commonly agreed position still has to be established.

Many games can be played by individuals; the component is played by the computer using artificial algorithms to mimic a real opponent as good as possible. The current hype allows experimental observations on (social) networks with many users to compare each other, but over the long run, there is a need to substitute the human being by so-called bots. The bot technology can have various applications; mainly to provide competition and an individual to beat in the leaderboard. Bots can be used to create scenarios or to replay variations to improve the outcome; similar to replaying a level in a game to achieve a higher score. It would be difficult to recreate the same effect with users, but when bots are used as other characters, rewinding and replaying is simplified. Bots can also be adaptive and matched to the skills of the user (Wood & Reiners, 2013); e.g., driving slowly in a race if the user cannot compete, and improve over time in parallel to the users’ development.

Privacy and data-use considerations are issues that must be considered, along with the use of gamified systems involving employees, to avoid criticisms of *exploitationware* where employees are excessively motivated rather than gamification being used to create a playful atmosphere (Bogost, 2011). As a tool, gamification is neutral; however, just as a gun can be used for good or evil, so too can gamification be used to support positive and negative behaviours. The use of cloud-based gamification systems means that the jurisdiction where the servers are located is important, as is local employment law; legal advice may be required during implementation (Werbach & Hunter, 2012).

CONCLUSIONS

As organisations seek new ways of strengthening their connection to both users of their products/services and their employees, gamification and the use of game-based elements are becoming increasingly important and commonplace. The use of specific components, mechanics, and dynamics can be designed into a new system, or as an adjunct to an existing system; in an attempt to improve user engagement by encouraging a sense of fun, passion, and play. Careful design processes underscore the care required in the gamification of a system, particularly at the point where decisions are required on the type of users (whether customers or employees) and what behavioural outcomes are designed and how these are going to support the organisational objectives. Gamification is a new way of thoughts how game elements can improve systems and engage users; yet continuing the body of work done in this area; e.g., serious gaming. It is not substituting previous work, but extends the ideas into new and innovative ways of thinking about system development that actually considers the user as a crucial component that needs to be rewarded and motivated.

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KEY TERMS AND DEFINITIONS

Gamification: The use of game-based mechanics and game-based design elements in non-game settings to engage users and encourage achievement of desired outcomes through motivation of users.

Gamify: the process of incorporating of game-based elements and game-based components, mechanics, and dynamics to a process in order to attain specific outcomes.

Game-based elements: those parts of a game that make it interesting, engaging, and compelling to players.

Business process: A sequence of tasks or activities which are performed by stakeholders (e.g., employees or customers) to achieve a desired outcome.

Serious games: a game-based environment where the primary intention is not the entertainment of the player, but the attainment of some other objective which may be related to investigation or players’ progress towards an objective of some real-world importance.

Components: individual building-blocks that are introduced to gamify a system; individually, these may be found in games, but are they are not necessarily inherently related to fun.

Mechanics: the desired interactions over repeated uses, time, or between users, of various components and other game-based elements to encourage progress and achievement.

Dynamics: The involvement and interaction of users with the gamified system depend on user attributes; the dynamics between the system and users therefore change with user attributes and specified components and mechanics.