A Theoretical Perspective on the Inner workings of Gamification in the Workplace

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Abstract

Typically, gamification intends to afford gameful experiences in non-game contexts with the goal of promoting desired behaviour. There are however many gamified designs that fail to achieve these goals and there is a lack of theory that can help to explain why some gamified designs are effective while others are not. Within this paper a theoretical perspective is proposed towards explaining the inner workings of gamification in the workplace. Specifically the theoretical model aims to explain how gamification design elements concurrently affect motivation towards desired behaviour and the experience of gamefulness. We draw on expectancy theory to explain how gamification design elements influence motivation and propose to measure the potential for a gameful experience through the effect a design has on psychological, affective and consciousness altering states.

Introduction

Gamification is becoming increasingly prevalent in the workplace as a means to increase organisational performance while making the process of the work itself more rewarding [10,14,15,42]. The market for gamification technology in the workplace is expected to grow from USD 1.65 billion in 2015 to USD 11.10 billion in 2020. Some of the main drivers of this growth are the promise of gamification technology to increase employee motivation and satisfaction, and as a result organisational performance [55]. Despite its recent upwards trend in adoption, and the increased research to investigate this new approach, little is known about the inner workings of gamification design [59] making it difficult to measure the effects of independent gamification design elements on its intended goals. Without being able to measure these inner workings designers lack the data to make data-driven design decisions, or even understand why certain gamification designs are effective in achieving their goals, while others are not.

Gamification design has often been introduced in companies as a simple method to increase employee focus on high value activities and drive employee engagement and motivation [4,9,61]. Early academic research into the "simple" relationship between the use of gamification design, defined as the application of game-design elements and game principles in non-game contexts [13], has supplied empirical support for the use of gamification design elements and the increased performance and effort on work related tasks by employees [2,17,19,24]. The simple view of gamification helped give rise to gamification applications and experiments in which game elements like points, badges and leaderboards where added to work processes in order to increase performance. The majority of these applications and experiments only tested short-term effects and generally found a positive connection between the application of game design elements and a performance measure [27]. These types of gamification applications generating mainly short term effects received criticism for not driving sustained engagement, motivation or increased effort [7,53], while even risking long term harm to intrinsic motivation for the tasks that were gamified [29]. Perhaps as a result of this criticism, or through its own evolution, the view on what gamification is has changed in recent years, and gamification evangelists like Yu-Kai Chou and Gabe Zichermann started to refer to gamification as behavioural design or behavioural engineering [11,12] with a focus on utilising game techniques and game thinking in designing for sustained engagement and motivation.

Gamification was recently redefined by Huotari and Hamari [33] as a process of enhancing a service with affordances for gameful experiences in order to support users' overall value creation. Within this definition the main goal of using a gamification design approach is to induce a gameful experience. Furthermore game elements were not specifically necessary in order for a design to be classified as gamified. Instead the intent of the designer in terms of achieving a gameful experience took precedent over the shape of the design. Aside from the experiential goal of a gamified design, it also has the goal of affecting behaviours as desired by the designer [42].

The current challenge in the field of gamification research is to provide validated theoretical underpinnings as to how gamification design elements lead to the achievement of gamification goals, namely the gameful experience and affecting user behaviour [41,58,59].

Within this paper we address this challenge by taking a two pronged approach. First, by placing gamification in the context of work design we review the available literature that explains the inner workings of work design in relation

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to employee behaviour. Based on this review we asses whether existing validated theories within the context of the workplace can help to explain how the application of gamification design elements can affect employee behaviour. Second, we review existing literature on gamification and psychology to understand how gamification design elements induce a gameful experience among the employees working with the gamified system. The academic purpose of this paper is to provide a theoretical framework grounded in theories that are already validated within the context of work. From a practical perspective we expect that the measurement of the inner workings of gamification will provide data that helps designers to make data-driven design choices aimed at both experiential and behavioural goals.

How Gamification Design Affects Behaviour

Gamification design approaches have been utilised in the workplace to achieve a variety of behavioural goals. including increased engagement & productivity [46,54], change management [32] and organisational citizenship behaviour [34,54]. While these goals are not exclusive to gamification design approaches, they are recognised as goals that are susceptible to be strongly and positively affected by a gamification approach. The current challenge, as gamification is a relatively new field and theories about its inner workings are scarce and not yet validated [59], is to understand the theoretical background as to why gamification designs elements are adept at achieving these behavioural goals.

While the gamification design approach may be novel, the general pursuit to influence employee behaviour to achieve organisational goals has a long history in academics. Gamification design is similar to many earlier work design models in that it explains how deliberate changes by the employer to the work environment affect the motivation of the employee to perform work related tasks. Theories from the field of job design that fit within these criteria can be divided into two main areas. First, there are the need based models like the Need theory [39] the Job Characteristics model [26], and the 4-Drive model [47] which focus on fulfilment of biological or psychological needs through job and workplace design in oder to increase overall motivation for the work. Within these theories motivation is defined as the effort that an employee applies and maintains towards organisational goals [49]. Second, there are the cognition based models in which motivation is defined as the conscious decision to perform a behaviour as desired by the employer (instead of performing alternative available courses of action) [62]. Within this definition it is proposed that an employee makes deliberate choices in terms of the level of effort they plan to contribute on specific tasks. Theories that fit within this description include expectancy theory [62], self-efficacy theory [5], equity theory [1], goal-setting theory [38] and self-determination theory [56]. Each of these theories propose that changes to the work environment need to be made on a task level and take into account contextual differences of the work environment. For the purpose of explaining the inner workings of gamification design in relation to its effect on behaviour, the cognition based models are more suited as gamification designs are consistently positioned to influence behaviour on a task level [59].

While each of the cognition based models included are similar in terms of their ability to affect behaviour they are different in terms of their inputs and explanation as to how they affect behaviour. Upon closer examination some of the theories are closely related, for example the self-efficacy theory and the goal-setting theory both discuss how motivation for a difficult task can vary according to its difficulty and the availability of constructive feedback. On the other hand theories like Self Determination theory and Equity theory describe very different process and share no similarities.

While each of the individual theories provides valuable and in-depth insights into how changes in the work environment affect employee behaviour, expectancy theory is the only theory that is able to encompass the other theories into an inclusive model and provide directions as to how motivation to act can be measured [62].

Expectancy Theory and Motivation to Act

In expectancy theory Vroom proposes that wether or not an employee will choose a specific course of action is the result of the motivational force associated with that specific course of action exceeding the motivational force associated with other voluntary alternatives that the employee has. According to Vroom motivational force (MF) is a product of expectancy, instrumentality and valence

$$(MF) = \text{Expectancy} \times \text{Instrumentality} \times \text{Valence}$$

An individual's expectancy is the cognitive belief that a certain amount of effort will lead to the successful performance of the intended task (e.g. I am able to meet the deadline). Expectancy has been likened to self-efficacy [23, 38] as both constructs discuss the relationship between self-perceived capability of the employee in regards to the task at hand and the amount of effort the employee expects to need to invest into the task in order to be successful.

The instrumentality of successful performance lies in the cognitive belief that performing the task will indeed lead to a desired result (e.g. meeting the deadline is likely to get noticed). Instrumentality is closely related to distributive and procedural justice as perceived fairness and transparency of reward and resource distribution will increase the belief that performance will actually lead to the expected result [3].

Lastly the valence of a result lies in the value that a person attributes to that result (e.g. meeting the deadline is important for a coveted promotion) Valence is closely related to both the self-determination theory and goal-setting theory in that they propose that individuals decide to enact a desired behaviour if that action can result in the attainment of intrinsically or extrinsically motivated goals [38,56]. In other words, an individual that is faced with the option of performing an action will make a value judgement on the desired outcomes that an action could potentially

deliver. As employers and designers we can influence this valuation by increasing awareness of existing motivational affordances (rewards, benefits, compensations) that are most likely to be valued by the employee, or add motivational affordances to the design in the hopes that they are desired by the user.

How Gamification Design Elements Can Positively Affect Instrumentality, Expectancy and Valence.

By using the expectancy theory it becomes possible to recognise how game design elements can have a positive effect on motivation to perform a desired behaviour through an increase on instrumentality, expectancy and valence (Figure 1). For example, procedural justice and perceived understanding of the performance appraisal system have a positive effect on the instrumentality of performance through improved predictability and controllability of the outcome resulting from successful performance [31, 64]. Procedural justice is fostered when decision-making processes adhere to a number of specific rules [64]. As such game design elements like clear and transparent game rule systems and transparent fixed ratio reward systems can through procedural justice lead to an increase in instrumentality associated with a desired behaviour.

Relationships between attributed valence and gamification design elements are not deterministic as they are dependent on context and individual predispositions. There are however tendencies for these relationships [30], and as such a variety of different design elements like quests, badges, character stats, etc, carry the potential to create valence for several different salient goals and/ or needs [15].

Last, an example as to how game design elements can increase expectancy can be recognised in the common use of immediate positive feedback systems as a way to increase self-efficacy [48].

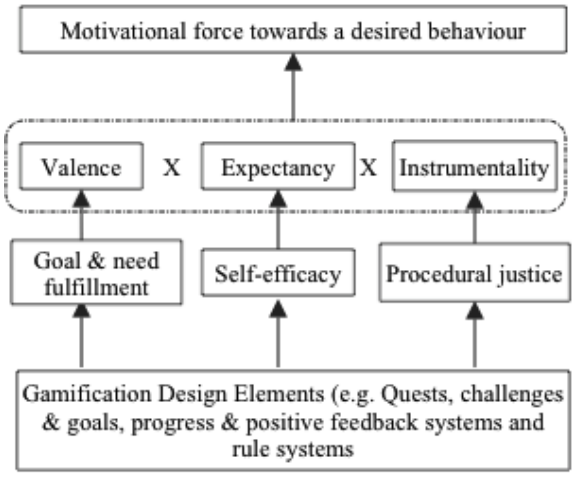

Figure 1. How Gamification Design Affects Behaviour

How Gamification Designs Induce Gameful Experiences

The term gamefulness was first suggested by McGonigal [40] to describe the unique experiential condition of games. Rather than using the term gamification which was at that time being criticised for the defining of a design approach by its shape (e.g. it looks like a game), she opted for the term gameful design which would define the design approach by its experience (e.g. it feels like a game). While the concept of a gameful experience has been accepted as an adept way to describe the aim of gamification there is still debate on what a gameful experience is and which exact conditions are needed to label an experience as gameful [33]. Furthermore the only valid way to measure a gameful experience would be through self-reporting as games and gamified designs can induce a gameful experience in one person, while failing to induce a gameful experience in others. (e.g. through a difference in skill or affect) [28].

Within their paper on the definition of gamification, Huotari and Hamari [33] propose a starting point towards describing a gameful experience by referring to specific psychological factors/ experiential states associated with games. This initial list, which is by no means proposed as all inclusive, can be divided into three distinct constructs (Table 1.). First, it is possible to distinguish psychological states experienced during needs fulfilment the most commonly referred to in gamification research being the psychological states proposed in the self determination theory: mastery, relatedness, and competence [56.59]. Second, we can recognise affective states resulting from emotional arousal (e.g. suspense [13]). Third, we can recognise psychological factors like immersion and flow which are best defined as an altered state of consciousness brought about by deep engagement with an activity [8,43].

Table 1. Experiential states characteristic for games, by type

Experiential states [33]	Type of state
Competence	Psychological state
Relatedness	Psychological state
Mastery/ achievement	Psychological state
Hedonic pleasure	Affective state
Suspense	Affective state
Immersion	Consciousness altering state
Flow	Consciousness altering state

Adapted from Huotari & Hamari 2017, pp 23 [33].

In summary, there are no clear set of conditions that constitute a gameful experience, and as gameful experiences are individualistic in nature it is impossible toguarantee that a certain game or gamification design will induce a gameful experience among all users. We can however try to deduce what a gameful experience is by asking those that experienced them, and preliminary findings suggest psychological states experienced during need fulfilment, affective states experienced during emotional arousal and altered states of consciousness experienced during deep engagement with the gamified environment. From a design perspective this means that adding game elements that create suspense, or conditions that facilitate flow or immersion are not guaranteed to create a gameful experience, they are however more likely to do so than gamified environments in which the design has not included elements that induce emotional arousal, need fulfilment or immersion.

How Gamification Design Elements Influence Psychological States Through Psychological Need Fulfilment.

A broad appeal of games is based on the ability of games to fulfil the psychological needs of players. For example players can experience pleasurable feelings of competence through receiving informational performance feedback in the forms of points and levels [16,51]. Specifically feedback that is made juicy, by for example providing context in the form of a narrative emphasising meaning or significance, can create immediate pleasurable experiences enhancing this experience of feeling competent [37].
Aside from competence other psychological need fulfilment like the experience of relatedness or belonging can be induced by playing with others [51]. Psychological need satisfaction occurs across different demographics of players, within a variety of genres and content, as such they can be expected to generate a pleasure experience to different player types and across different behavioural goals [51].
When it comes to the pleasurable experience of autonomy and control the negative effect of too little autonomy of control is more visible than situations where control and autonomy are present in the right amount. For example unintuitive designs or complex controls with which a user is not familiar mitigate the opportunity for a positive user experience [45]. Furthermore, gamified environments in which players make use of intuitive controls allowing them to focus on game play rather than game mechanics increased the potential for a user to experience presence. Presence is a state in which players feel immersed in the game environment and substitute the physical reality for the virtual reality. Players experiencing presence are desirable for game designers as it is directly related to how gameplay itself satisfies psychological needs [51].

How Game Design Elements Alter Consciousness Through Deep Engagement.

There are several ways in which players that are deeply engaged in a game can experience consciousness alteration. We have used the term consciousness alteration to describe the experience of detachment from the physical reality and a sense of merging with the game environment by losing awareness of the mediating technology [21]. The most notable constructs describing such experiences are presence, immersion and flow, and while each of these constructs have distinguishing factors, they share the experience of being "in the game environment". There is a broad understanding within the general game community about these constructs, but on an academic level there is still an avid discussion about what causes these states and what defines them [36].
A starting point for explaining how the different states may be interconnected has been coined by Ermi and Mäyrä [18], they propose that immersion is a manifold construct that can be conceptualised in terms of sensory immersion, closely resembling presence, challenge based immersion, closely resembling flow and imaginative immersion, which shares similarities with narrative immersion [57]. Using this description of immersion Nacke and Lindley [43] suggested design criteria that could induce these different states of immersion including a complex and explorable virtual environment in which the player needs to finds its own route, challenge levels in which adversaries increase in difficulty, sensory effects suitable for the environment (lightning, sounds, scripted and responsive animations), feedback systems in the form of rewards, mood enhancing aesthetics (variety of models, dynamic lighting and ambient sounds) and narrative framing. Initial experimental results indeed show an increase in experienced immersion when these factors are present although no specific insight is available about which specific factors were more important and whether they are influenced by individual predispositions of the players [43]. While the state of immersion is viewed as critical to game enjoyment, immersion being the outcome of a good game experience, the enjoyment from immersion can also be a result of allowing the user to momentarily lose self-consciousness [44]. In a sense immersion allows a player to have a pleasurable distraction in which they can detach themselves from everyday worries and evaluation by others and escape for a period into the game or task environment. [36].

How Game Design Elements Influence Affective States by Eliciting Emotions.

Another important reason for many players to engage in games is the ability of game environments and game play to invoke strong emotional responses [52, 60]. Emotions commonly associated with gameplay include suspense [13, 35,37], frustration [22,50], thrill [25, 52] and relief [25, 63]. Emotions are typically described in terms of dimensions of valence and arousal, where the valence dimensions described the degree to which the affective experience is positive or negative and the arousal dimension indicates the level of activation ranging from excited to to sleepy [6].
Within these emotional dimensions games are commonly designed to elicit emotions higher on the arousal range with valences related to both positive (e.g. thrill) and negative affects (e.g frustration).
When designing a game, or gamified environment that

Table 2. Sources that create emotional cues in games

	Audience roles	
Type of emotion	Observer participant	Actor-participant
Ecological	Sensory environment	Proprioceptio n
Narrative	Narrative situations	Role-play
Game	Game events	Gameplay
Artefact	Design	Creations by player

Adapted from Frome, 2007 [20]

elicits emotion distinctions can be made in regards to the type of audience (Table 2) as a player can receive emotional cues as an observer, or as an active participant [20]. Furthermore the emotional cues can come from four distinct sources of emotion within a game environment [20] (Table 2). The first proposed source is that related to the game itself in terms of winning, losing, progressing. The second source of emotional cues comes from the narrative related to the game and can be related to the protagonist, antagonist or a representation of the players within the game (e.g. role-play). A third source for emotional cues comes from the artefacts in the game which can include the artful and aesthetic designs as created by the game designer but also the creation made by the player him or herself. Lastly there are the emotional cues coming from the ecological (sensory) environment of the player as observer and the more visceral responses that they potentially elicit. From an active participant perspective the player can experience emotional cues through proprioception where the player's mediated sensory input mimics a players physiological

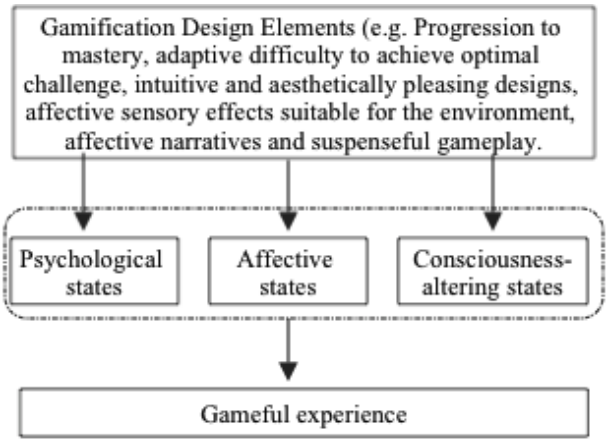

Figure 2. How Gamification Design Induces Gameful Experiences

response to events (e.g. blurring, shaking screens when recovering from a blast in a first person shooter) [20]. While research into affective design is relatively new its importance for a pleasurable game experience has long been acknowledged among practitioners, as such it is expected to facilitate a gameful experience in gamified environments as well.

In summary, gameful experiences are subjective and game or gamified designs cannot be certain in inducing a gameful experience in all users at all times. Gamification design elements can however help to facilitate gameful experiences through their ability to induce psychological, affective and consciousness altering states (Figure 2).

Conclusion

An increasing amount of organisations consider, or are already, using a gamification design approach to increase employee motivation towards specific tasks while providing them with a gameful experience [55]. Gamification design uses game design elements with the aim to achieve both behavioural and experiential goals concurrently [13,42,59] allowing for task-level design that carries benefits for both the employer and employee. The current state of research about gamified designs has evolved from whether it works to how or why it works [59]. Within this paper we outlined a theoretical proposal that aims to explain a potential answer to this question. Aside from providing a theoretical perspective about the inner workings of gamification our focus has been on making use, where possible, of existing validated theories that use measurable factors and constructs.

Within our model (Figure 3) the starting point of measurement are the gamification design elements that an employee interacts with in the execution of a task. It is important to understand that the game design elements that an employee interacts with include contextual and pre-existing motivational conditions including for example management feedback systems, compensation & benefits schemes and cultural norms within an organisation. This is in line with standard gamification design practices that recommend contextual analysis of existing processes, behaviours and cultures [42]. The model further proposes a two-directional effect that the gamification design elements have on the employee, on the one hand the design facilitates the motivation to perform a desired action of the employee, and on the other hand the design influences the gameful experience the employee perceives.

A difficulty in creating consensus within the field of gamification on any proposed theoretical model on the inner-workings of gamification lies in the different perspectives available on what constitutes a gameful experience [33] or even what constitutes motivation [49]. Within this paper we pose that gamification design operates on a task level, rather than on a job or workplace level, and as such we explain motivation to perform a desired behaviour from a task level perspective. We have not tried to define gamefulness in this paper but have taken the starting point from Huotari and Hamari [33] in terms of the psychological factors commonly associated with games,

from this starting point we propose that a gameful experience can be facilitated by affective, psychological and consciousness altering states.

It is impossible to measure motivation to act without looking into someones brain, as the motivation to act is a force that is created before the actual behaviour takes place. Despite this motivation is often measured in experiments by its outcome, i.e. the actual behaviour. The problem with only measuring behaviour is that it only shows whether or not the gamification design elements combined created more or less motivational force directed towards the desired behaviour compared to existing motivational force towards any viable alternative behaviour. The expectancy theory from Vroom [62] allows for measurement of motivation to act on a task level before actual behaviour takes place which enables measurement of motivation to act as a result of the addition of gamification design elements to an existing system. Following this we propose that gamification design is effective in changing behaviour by increasing the motivational force of a desired behaviour (through an increasing of perceived valence, instrumentality or expectancy), or by decreasing the motivational force of alternative behaviour.

Within this paper we did not do an exhaustive research on what mediates the relationship between gamification design elements and the factors of the expectancy theory (valence, instrumentality and expectancy), we did however do a preliminary literature search and found suggestive evidence that describe how constructs like self-efficacy, potential for need or goal fulfilment and increases in procedural justice influence the factors of the expectancy theory while themselves being influenced by gamification design elements [15,48,64].

As far as we are aware no-one has attempted to define what constitutes a gameful experience, yet there seems to be consensus among different academics that gamified design facilitates and aims to induce this experience among its users. Whether or not an employee has a gameful experience in a given design is subjective and varies per person [33], and as a result it is difficult to directly measure a relationship between gamification design elements and whether or not a user experiences gamefulness. Instead we propose to measure affective, psychological and consciousness altering states that are present before an existing system is enriched with a gamified design, and again after the design has been implemented. Measuring the initial state and the state after the addition of gamification design elements will enable researchers to understand through which states the design was most effective.

Lastly, within this paper we do not propose exclusive relationships between individual gamification design elements and the different factors of the model (e.g. valence, expectancy, affective states, etc). While we have given examples of these relationships to provide support for the model we have also recognised that many of the gamification design elements described in literature affect multiple factors in our model. For example virtual rewards can affect valence, if the virtual reward is valued by the employee, at the same time it can affect expectancy through its function of providing a positive feedback to an action and concurrently it can affect the affective state of the employee through experiencing a win-state. Future empirical research using this model is expected to provide empirical evidence on relationships between specific gamification design elements and the different factors outlined in this model.

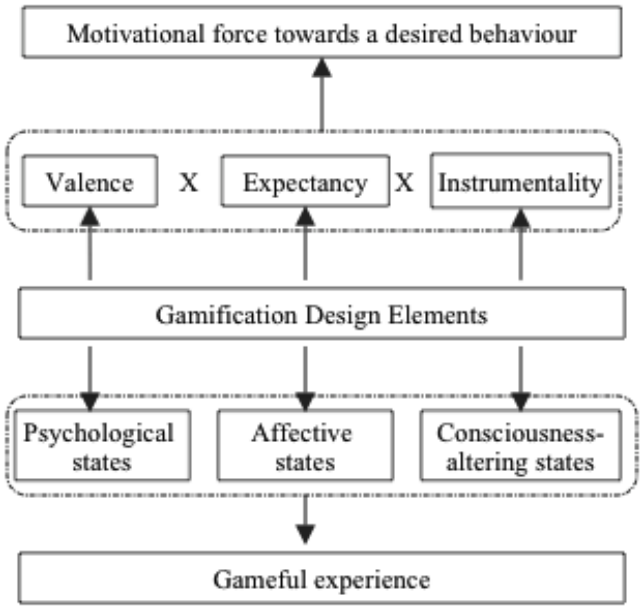

Figure 3. Proposed model on the inner workings of gamification in the workplace.

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