Towards a Sustainable Gamification Impact

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Abstract— **Gamification is defined as the use of game elements in a non-gaming context. It is been getting a lot of attention in recent years. However, the number of research done on gamification is limited. One of the problems it faces is sustainability. Designers might overlook the elements that increase sustainability due to lack of a standard framework that contains the essential components to achieve that goal. This conceptual paper proposes a framework that aims to increase the sustainability of the desired impact of gamified applications. This framework contains the following components: flow, relatedness, purpose, autonomy and mastery in the design of gamified applications. The proposed framework will help to guide future work in the field of games and gamification. In the future we aim to study the framework further and test its application in real environments.**

Gamification; Sustainability; Flow; User Engagment, Motivation

I. INTRODUCTION

Game applications extend beyond the scope of entertainment. In fact, it includes serious games, simulations and gamification. Since 2010, gamification, which is the use of game elements and techniques in a non-gaming context, gained popularity. It is used to increase engagement and loyalty, motivate people, and shift behavior. In the past few years, gamification has been applied in many applications in several fields, including marketing, education and healthcare.

There existed many ways in which gamification can be implemented in order to enhance user's engagement. However, it is not always guaranteed that the implementation in its most basic form can achieve this goal. Hence, it is sometimes crucial to complement gamification with other techniques. For instance, recent research shows that including social elements to gamification can further enhance user's engagement [1]. However the more the service is used and the longer people interact with it, the more they gain personal experience of the service, thus becoming an expert in the application [1].

According to [2], there are four elements that alleviate motivation: relatedness, purpose, autonomy and mastery. However, applying these elements into gamification has not been adequately addressed in the literature. Moreover, it is necessary to understand how flow can be integrated in the gamification process. Furthermore, mastery and autonomy are two important elements for the flow in gamification since they help in balancing users' skills with the presented challenges. Additionally, storyline comes in conjunction with flow. In games, for example, the storyline can help to promote the player's immersion through meaningful challenges, impacting flow experiences [3]. Thus, it needs to be addressed as well as a mean to keep people engaged in the long term regarding the purpose of the application.

However, the impact of gamification might be temporary. Some research shows that the longer the gamified application is used, the less effect it has on its users [4]. Moreover, some designers might overlook the elements that increase the sustainability of gamification due to the lack of a standard framework that contains the essential components to achieve that goal.

This paper proposes a framework that increases the sustainability of the desired impact of gamified applications. This framework contains the following components: flow, relatedness, purpose, autonomy and mastery in the design of gamified applications. The proposed framework will help to guide future work in the field of games and gamification.

II. GAMIFICATION

Gamification is the use of game techniques and mechanics in other fields. It is a design process that involves play, fun and user experience [5] through the application of game design elements into non-game contexts. Moreover, it can be applied in many fields and for different purposes [6]. For example in e-government, gamification can be used to motivate and build citizenship actions through mobile applications that combine pervasive computing to non-leisure contexts, working geo-location data and feedback loops to improve participation [7]. Furthermore, from a business perspective, gamification can improve engagement of users in actions related to services, products and/or brands [8]. In other applications, gamification can function as a way to improve long-term relationships, motivating users to interact with virtual and tangible rewards [9].

Moreover, [10] in her book "Reality is Broken" argues that games have the power to fulfill human needs and solve real world problems. This reflection put games on a different standard. They are not only tools for entertainment, but also a source of inspiration, engagement and persuasion [11]. Furthermore, the emotional factor in games is powerful. A simple scoring system for example can motivate people to

V. W. V. thanks the program Science Without Borders, managed by *Coordenação de Aperfeiçoamento de Pessoal de Nível* Superior (CAPES), Brazil, for grants provided for this research

A. A. Acknowledges sponsorship by King Abdullah Foreign Scholarship Program, Saudi Arabia

change behavior. In fact, once a game rewards users with positive feedback, give social support to actions and develop attitudes or behavior, it becomes a social actor in pervasive computing environments [11]. Persuasive technology is defined as any type of interactive computing system that is developed to influence people's attitudes or behaviors [11]. Furthermore, the ability to identify oneself with others and with the game is one of the most powerful persuasion principles [11] .

The boundaries between the two terms, game and gamification, are often blurred. One could ask is a gamified application a game or merely an application? According to [6], this limit is "empirical, subjective and social", and depends on the user's perceptions. The relationship between game elements and gamification does not necessary transform every gamified system into a game. Essentially, game elements in the context of gamified applications should be considered as affordances to gameful experiences [6]. In this paper the words games and gamification are used together, however, indicating the use of game techniques in gamified systems.

Gamification has proved to be successful in many fields. Having a clear end goal is one of the most important points for gamifying a system [12]. This way it can be measured to indicate if it successful or not. However, this does not deny the fact that gamification systems reach a saturation point where they lose their appeal and therefore their effect.

Two of the main underlying concepts of gamification: motivation and engagement; both of which will be highlighted in the following paragraphs.

A. Motivation in Gamification

Motivation is one of the main concepts that gamification is built on [1]. There are two types of motivations that drive people's actions, intrinsic and extrinsic. Intrinsic motivation are actions that are driven by an internal interest or enjoyment, while extrinsic motivation are those actions done solely to gain a certain outcome regardless of the activity itself.

In addition, [13] differentiates extrinsic motivation as a way to reach objectives or achieve specific goals and intrinsic motivation as a process of engagement, without the suggestion an outcome, in which fun is mentioned as one feature of involvement. Both types are used in gamification. However, the latter could lead to an unsuitable gamified system. Whereas the former can lead to a sustainable gamified system since it satisfies an internal quest of an individual.

Also, considering the aspects of motivation and behavior design in the global society, gamification operates in very a similar way, setting goals and rules, rewarding winners and penalizing losers [14]. Thus, gamified applications tend to have some familiarity to the societal system.

Furthermore, motivation of an individual can result from four types of interactions while playing a game. These are explained by [15] and summarized in (see **TABLE 1**). This indicates that the individual motivations can be emphasized by social contexts and individual needs, which can be adopted in a creation of gamified system.

TABLE 1. KEYS OF FUN

Hard Fun	Motivation to mastery, achievement and challenge.
Easy Fun	Players want to be immersed into fantasy worlds, exploration, and adventure.
Serious Fun	People play games for excitement and relief in a social context
People Fun	Players play games to cooperate, compete or performance with other participants.

In principle, motivational needs (e.g. competence, autonomy, and relatedness) are concepts borrowed from Self-Determination Theory (SDT) [16]. It can be applied in the context of gamified systems and services. This is due to the significant relationship between autonomy, satisfaction, intrinsic motivation, gameplay experience, and social meaning [6].

In addition, flow, which is a mental state of immersion in an activity, is one of the elements that could promote motivation. Moreover, flow is characterized by engrossed focus, complete involvement and enjoyment in the activity itself [2]. In fact, some research shows that it has a great impact on motivation [17]. This is especially because different gaming situations could satisfy different psychological needs, including power, achievement, information and relationship [18]. This means that elements of fun, enjoyment, control, autonomy and flow experiences should be relevant to the construction of intrinsic motivation.

B. Engagement in Gamification

In today's engagement economy, getting the attention of consumers is not enough [19]. It is necessary to drive meaningful experiences for people. In this context, engagement has been defined as a connection and a relationship between a consumer and a product or a service, which includes metrics like recency, frequency, duration, virality and ratings [8]. Consistently, [20] define engagement as the way people interact and interpret the business values, including customer relationship over time and experiences delivered through touchpoints. However, can engagement be only related to time and repetition? Engagement can also be emotional, physical, intellectual, and spiritual and therefore can impact purchase repetition and positive word-of-mouth [21]. This is one aspect that could even influence behavioral actions that goes beyond the act of purchase by itself, including customer recommendations, web postings and different manifestations [22].

In gamification, engagement could be provided by game-design techniques. This is because games are considered as a combination of human nature and design, and not only entertainment, where the reward system is provided by the game itself [5]. Also, videogames offer elements that keep player's attention and interest, which make them tools for persuasive actions [11]. Although engagement has a strong link to time-related actions and sustainable conditions, it is

necessary to understand how to enhance this state by providing a well-designed process of gamification. Considering previous research [8], one of the main issues gamified applications face is the long-term relationship with consumers/players.

Thus, the aim of this paper is to consider this opportunity to propose a framework that utilizes both concepts to produce sustainable gamification impact, which will be explained below.

III. Framework for Sustainable Gamification Impact (SGI)

After painting the current situation of gamification and highlighting the lack of research regarding its sustainable effect, we suggest a number of elements that could influence the impact of gamification.

The presented framework for Sustainable Gamification Impact (SGI) considers essentially three backgrounds borrowed from Flow dimensions [23], Pink's elements to drive motivation [2] and SDT [16] (see **TABLE 2**).

As highlighted before, previous findings show that in contexts involving gamified applications, perceived usefulness, enjoyment and playfulness tend to fade and decrease on the long-term relationship [8]. This relationship could be connected to flow, motivation and engagement as follows:

- Flow is related to intrinsic motivation [17], especially through a process of engagement and involvement [13].
- Motivation is the main concept of gamification [1] and it is related to autonomy, enjoyment and control [6], relatedness and competence [24], and mastery and purpose [2].
- Engagement is related to the repetition of one action [8] and user's involvement [13], [20].

Therefore, the SGI framework proposes a focus on flow dimensions and motivational determinants in order to provide engaging and sustainable gamified experience (see **Figure 1**). Furthermore, mastery is something that is achieved by competence, skills, challenges and time. Therefore, it is shown as the "journey" in the outer circle. Moreover, the elements provided in **Figure 1** are explained in detail in the following sections.

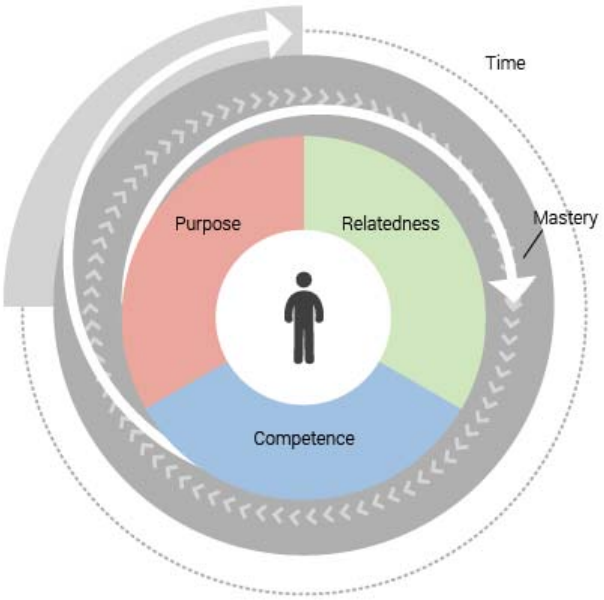

Figure 1. SGI Framework.

A. Flow

By definition, flow takes place when people feel that they are totally involved in one action, which includes four components such as control, attention, curiosity and intrinsic interest [23].

In essence, the "Flow Theory" (see Fig. 2) describes a mental state of full focus and immersion in one activity. Therefore, is also desirable to vary the difficulty inside the flow region, where people are neither *under-challenged* nor *over-challenged*. Even failures are desired, because it improves the experience of mastering the challenge thereafter. Of course, it should also vary the challenge itself to prevent doing the same thing all over.

For this reason, seven dimensions take part of flow experiences, such as clear goals and immediate feedback, balance between level of challenge and personal skill, merging of action and awareness, sense of potential control, loss of self-consciousness, time distortion and autotelic or self-rewarding experience [23] (see **TABLE 2**). Thus, the conception of optimal experiences or flow has a clear relationship to significant and personal goals.

Moreover, it is crucial to present these goals in a clear and visual way as well as structure them well. That means the goals are taken apart into smaller portions in such a way that there are always small and doable tasks. The scaffolding for those challenges should increase the difficulty for reaching the next level.

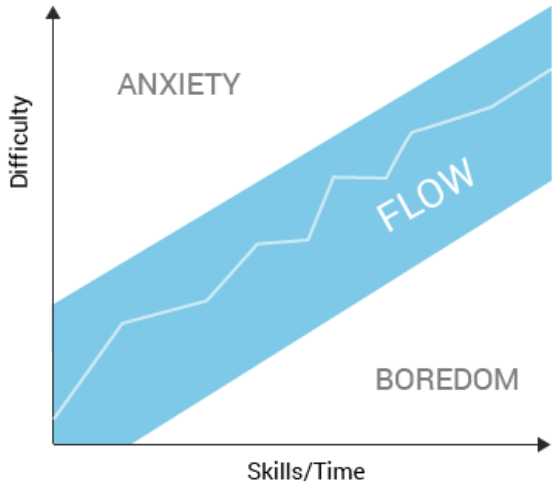

Figure 2. The image illustrates the Flow Theory: while the difficulty and challenge (skills/time) are in flow state, people are neither anxious nor bored [2].

In games, flow is represented by the combination of challenge and performance, regarding the player's skills [25]. For example, the concept of flow could be associated to positive affect that games creates to the user, suggesting that components such as the accomplishment of tasks, ability to concentration, clear goals, feedback, effortless involvement, control, alteration of the notion of time and disappearance of sense of the self during the flow experience, could inform affective game design [24].

Basically, there is one more thing games are really good at: giving juicy feedback, something often lacking in real-life. The term "juicy" means that the feedback is "fresh" and encouraging as well as, in contrast to real-life, a gamer has the possibility to get feedback at any given state of the game [26].

In addition, flow has been related to the analysis of player enjoyment while playing a game. For example, [27] applied the flow framework [2] in order to evaluate player's experiences and to identify elements that could make players engaged to the gameplay. Thus, flow could be associated with motivational aspects.

Furthermore, flow could affect the intention to play online games, especially if combined with social features [17]. Thus, this aspect could be reflected into gamified applications, balancing challenges and the ability to perform the action, within a social context.

TABLE 2. ELEMENTS THAT IMPACT THE GAMIFICATION PROCESS

Flow dimensions [23]	Pink's elements to drive motivation [2]	SDT [16]
Clear goals and immediate feedback	Mastery, Purpose	Competence
Balance between level of challenge and personal skill	Mastery	Competence
Merging of action and awareness	Mastery, Autonomy	Autonomy
Sense of potential control	Autonomy	Autonomy
Loss of self-consciousness	Autonomy	Autonomy
Time distortion	Autonomy	Autonomy
Autotelic or self-rewarding experience	Purpose	Autonomy

B. Relatedness

By definition, relatedness can be considered as the universal need to interact and be connected with others [26]. Inherited from SDT, it can be also defined as the feel of belonging and connectivity with other people [24].

In the game context, a common method applied to reach more relatedness is a meaningful story [26]. In most cases this means that the player has to save mankind from something. This approach can also be used in real-life applications by wrapping a story around the activity, which is further supported with suitable visuals. However, in the context of relatedness it is important to beware of social context meaning. While something is clear on different platforms or within a certain group, it can be confusing for people outside this area.

In addition, relatedness combined to meaningful communities should be suitable for successful applications. For example, the mini game *Foldit* [28] primarily engages a lot of people with a scientific background. This directly leads to the next point. In order for status and reputation (levels, badges, leaderboards) to work, it is important to connect the user to a meaningful community with the same interests. An achievement is made to show it to your friends with the same interests. If there is nobody whom you can show it to, your achievement will not be special.

Also, relatedness can be considered as a factor that could promote intrinsic motivation, if combined with other human needs such as autonomy and competence [24]. Consistently, this combination could also help gamified applications to perform efficiently, as motivational affordances [6].

C. Purpose

In the context of flow, purpose is related to autotelic experiences, composed by *auto* (self) and *telos* (goal or purpose), which means that an autotelic experience has a self-fulfilling goal, making the whole rewarding journey [2].

In addition, purpose is one aspect of human condition, related to a motive and meaningful goals, which should not be overlooked in situations that involve motivational attempts [17]. For that reason, it is important to catch the user's personal goals, or more general and customizable goals, which are connected to any interest or passion of the user that he/she already has in his/her everyday life, as goals are able to provide a sense of purpose to players [15].

In gamification, a way to apply purpose is by the transformation of utilitarian approaches into hedonic or autotelic attempts [29]. This means that the gamified application should be less designed as a tool or a mean to itself and more developed as an intrinsic reward.

Therefore, purpose has a strong relationship not only to clear goals, but also to meaningful feedbacks, transforming the player's journey into a reward itself. For example, the important message of the feedback should be related to the achievement of the goal [2]. Hence, the implementation of significant and clear feedback is important to be considered.

In games, the utilization of feedback loops is represented by the balance of positive and negative factors inside the game as, for example, ending the game by giving a positive feedback to the player through a reward [15]. However, this balance should consider also the player's purpose and the other elements highlighted in the SGI framework. The purpose by itself would not be able to determine a sustainable gamified application, unless elements such as mastery, flow, autonomy and relatedness are designed in combination to clear goals and respective feedbacks.

Thus, in the SGI framework, purpose could be represented by the designation of meaningful goals and customizable goals and relevant feedback loops, regarding the user's goals.

D. *Autonomy*

Autonomy is the "universal need to control one's own life" and according to the SDT, it is one of the premises of intrinsic motivation, involving control and choice [16]. Consistently, this aspect shows that people want to be in control of their tasks and could be related to a positive experience, leading to engagement [17].

In particular, the voluntary aspect provided by games could promote a sense of autonomy, control and enjoyment, enhancing intrinsic motivational approaches [6]. Hence, games and gamified applications could be effective designed in order to provide autonomy to players, as play is voluntary [26].

However, the use of autonomy in gamification must be carefully done. The use of "if/then" reward, people will tend to realize that they are losing their autonomy and being controlled, which is in general a really de-motivating experience. Furthermore, devaluating the activity is another point to beware of when using extrinsic rewards [26]. For example, if there is a sweepstake from a service and the condition to take part is to re-tweet it, the signal is that the service is not good enough. For that reason, the people would not autonomously re-tweet it to their friends. However, there are methods to deal with that. For example, customer services show that shared goals and individual pursuit works quite well.

Also, the utilization of informational feedback rather than controlling feedback and the use of unexpected rewards could help to provide positive experiences.

E. *Mastery*

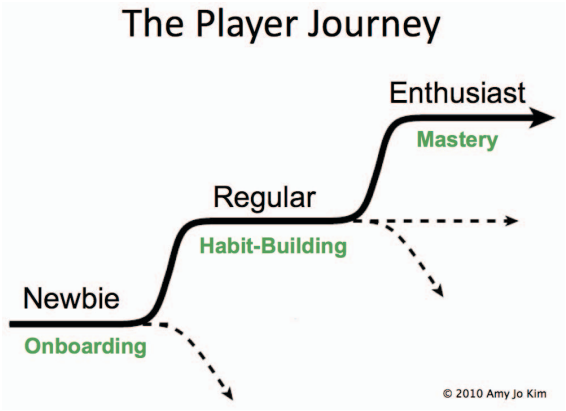

Figure 3. Amy Jo Kim's Player Journey [30].

Mastery is considered as the desire of "getting better at something that matters" through engaging activities, especially when the activity itself is self-rewarding [17]. This means that mastery should be combined with autonomy and purpose, providing a whole and unique experience to the user. Moreover, well-designed games can promote learning through practice, which would develop mastery experiences [30] as illustrated in Fig. 3.

In essence, efficient games give to the player the ability to master, which could interfere in the player's journey or the lifecycle of the application [1]. In gamified systems that depend in novelty and dynamic responses, the concept to promote mastery within the system should be considered. For this reason, actions that include time-based patterns, visibility of progress, social actions and emotional engagement through curiosity, delight and fun are usually implemented in applications that aim mastery [6].

IV. Conclusion and Future Work

In conclusion, this conceptual paper proposed a framework to increase the sustainability of a gamification impact. The presented framework contains five elements and other sub-elements. These are flow, relatedness, purpose, autonomy and mastery, which work together in order to balance and design the best experience to the user. The aim of this framework is to be a guide for future application of gamification in any field, such as health, marketing, business, work and learning. In the future, we aim to apply this framework and study its effects further.

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