



## **Serious Games And Fun: An Analysis**

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***Abstract:***

*This paper addresses the importance for serious games to be engaging and fun, despite the entertaining factor not being the primary goal of the gaming experience.*

*In order to understand what makes a specific game ‘entertaining’, a few case studies from different fields within the serious games domain, including education, business, rehabilitation and awareness about critical life conditions in third world countries, will be discussed. In particular, the case studies will be analyzed by using the 6-11 Framework, a model suitable for gaining insights on the emotional experience games convey to engage players effectively.*

*Through the proposed analysis, general criteria and principles that should be taken into consideration when designing such games will be discussed so as to provide game designers and researchers with new ideas on how to deliver not only educational and meaningful value but also an engaging and, ultimately, fun experience.*

***Keywords:*** *Serious Games, Emotions, Game Analysis*

## 1. Introduction

Serious games are generally defined as games with a purpose which goes beyond providing mere entertainment and where the focus should be in learning and training instead.

This may give us the idea that “fun” and providing immersive, engaging experiences is not a very important goal. Anyway, as discussed in many papers and books, for example [1], [2] and [3], games are such a fantastic medium for teaching purposes exactly because of their engaging qualities, which are a direct and natural consequence of them being fun and entertaining.

In the end, trying to teach something or train someone through a “bad” game, which is neither engaging nor fun, will most likely be ineffective and a waste of time and resources.

This brings then the fundamental question: “What qualities should a game have to be considered good, fun and engaging so that it can also be effectively used for serious purposes?”

To answer this question, we need to define a set of analysis tools that can help us in understanding how games work and what qualities can make them engaging and immersive. Once this is established, we can proceed in applying some of these approaches to a few case studies and see what kind of insight we may be able to obtain.

## 2. Related Work

In this section, an overview of several different approaches related to game analysis, fun, and emotions experienced in games is presented as these build up the foundational knowledge upon which the present work is developed.

Most of the models here introduced have a strong background in psychology and focus on the study of subjective experiences inferred from the behavior of participants so it is not surprising that a few different and complementary approaches have been proposed in the last few years to analyze games and explain why they are fun and engaging.

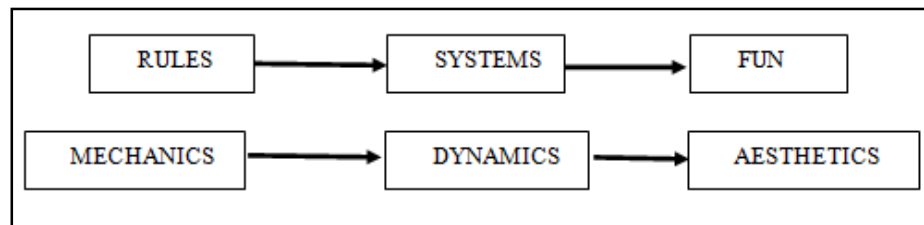
To study what makes games fun, Lazzaro in [4] proposes a framework called “Four Fun Keys” where the experience lived by the player is seen as different types of fun that are associated with a range of emotions. The first fun, called Hard Fun, is related to frustration and pride as the player can be proud when she overcomes a challenge and achieves its goal while she may feel frustrated by repeated failure. The second fun, named Easy Fun, is related to curiosity, with the player is willing to explore the

possibilities offered by the game. The third fun is Serious Fun and is related to relaxation and excitement. Last we have the People Fun, which is related to the feeling of delight at being entertained and it is something best experienced in multiplayer games through interaction with other people.

In [5], Freeman proposed a vast collection of about 1500 rules and techniques grouped into 32 categories for evoking emotions in games. The whole collection was named Emotioneering™, defined as “a vast body of techniques for evoking a breadth and depth of emotion in games, as well as for immersing a player in a role or in a game's world”. Examples of techniques are "role induction" or "player chemistry towards NPC" to facilitate player's immersion into the virtual world.

Instead of proposing rules a-la Freeman, Jesse Schell's approach to game analysis and design involves a set of one hundred Lenses [6]. These "lenses" outline a set of questions, gathered from fields as diverse as psychology, architecture, music, visual design, film, software engineering, theme park design, mathematics, writing, puzzle design, and anthropology, that game designers should ask themselves to analyze their games and, ultimately, gain a better understanding of what makes games fun and interesting to play.

The MDA Framework (Mechanics, Dynamics, and Aesthetics) proposed in [7] is a well known approach among game designers that formalizes the consumption of games and their design counterparts by breaking them into three distinct components (figure 1).



*Figure 1 : Consumption (top) and corresponding design structure of games (bottom) according to the MDA framework.*

As defined by its authors, "Mechanics describe the particular components of the game, at the level of data representation and algorithms. Dynamics describe the run-time behavior of the mechanics acting on player inputs and each others' outputs over time. Aesthetics describe the desirable emotional responses evoked in the player, when she interacts with the game system".

Aesthetics are clearly the most challenging part to analyze as it relates to the subjective experience of "fun" among players and, for this purpose, the MDA model proposes a specific taxonomy named "Eight Kinds of Fun". Specifically:

- Sensation: Game as sense-pleasure
- Fantasy: Game as make-believe
- Narrative : Game as drama
- Challenge: Game as obstacle course
- Fellowship: Game as social framework
- Discovery: Game as uncharted territory
- Expression: Game as self-discovery
- Submission: Game as pastime

So, for example, a game like "The Sims" (EA, 2000) tends to elicit different types of fun including Fantasy, Narrative, Expression, Discovery, Challenge and Submission.

### *2.1.The 6-11 Framework*

The 6-11 Framework [8] is an alternative approach to analyzing the "Aesthetics" as defined in the MDA model. It suggests that games can be so engaging at a subconscious level because they successfully rely on a subset of basic emotions and instincts which are common and deeply rooted in all of us. Specifically, the framework focuses on six emotions and eleven instincts shortlisted from those recurrent in psychology and often analyzed in a number of well known treatises like [9],[10] and [11].

In particular, the six emotions are:

- Fear: one of the most common emotions in games nowadays. Thanks to the newest technologies, it is now possible to represent realistic environments and situations where fear can easily be triggered: think of all the recent survival horror games or dungeon explorations in RPG games for plenty of examples.
- Anger: A powerful emotion that is often used as a motivational factor to play again or to advance in the story to correct any wrongs that some evil character did.
- Joy / Happiness: Arguably, one of the most relevant emotions for having a fun gaming experience. Usually this is a consequence of the player succeeding in

some task and being rewarded by means of power ups, story advancements and so on.

- **Pride:** rewarding players and making them feel good for their achievements is an important motivational factor for pushing them to improve further and advance in the game to face even more difficult challenges.
- **Sadness:** Despite being an emotion that doesn't seem to match with the concept of "fun", game designers have always been attracted by
- it as a way to reach new artistic heights and touch more complex and mature themes.
- **Excitement:** most games worth playing should achieve this and it should happen naturally as a consequence of successfully triggering other emotions and/or instincts.

While the eleven core instincts taken into considerations are:

- **Survival (Fight or Flight):** the most fundamental and primordial of all instincts, triggered when we, like any other living being, are faced with a life threat. According to the situation, we will have to decide whether we should face the threat and fight for our life or try to avoid it by finding a possible way of escaping. This is widely used in many modern videogames, especially FPS and survival horror games.
- **Self Identification:** people tend to admire successful individuals or smart fictional characters and naturally start to imagine of being like their models.
- **Collecting:** a very strong instinct that motivates players to form patterns of objects by completing sets with a common theme. It also relates to our hunting instinct and has been widely used in games since the early days of the medium.
- **Greed:** often we are prone to go beyond a simple "collection" and start amass much more than actually needed just for the sake of it. Whether we are talking about real valuable items or just multiple sets of goods and resources we need to build our virtual empire in a strategy game, a greedy instinct is likely to surface very early in many players' gaming habits.
- **Protection / Care / Nurture:** arguably the "best" instinct of all: the one that pushes every parent to love their children and every person to feel the impulse for caring and helping those in need.

- Aggressiveness: the other side of the coin, usually leading to violence when coupled with greed or anger. It is exploited in countless of games.
- Revenge: another powerful instinct that can act as a motivational force and is often used in games to advance the storyline or justify why we need to annihilate some alien or enemy.
- Competition: deeply linked with the social aspects of our psyche and one of most important instinct in relation to gaming, e.g. leaderboards. Without it, games would lose much of their appeal.
- Communication: the need for expressing ideas, thoughts, or just gossip, was one of the most influential for human evolution and it can be used
- to great effect in games too, while seeking information by talking to a non-playing character (NPC) or while sharing experiences with other players in chatrooms and forums.
- Exploration / Curiosity: all human discoveries, whether of a scientific or geographical nature, have been made thanks to these instincts that always pushed us towards the unknown.
- Color Appreciation: scenes and environments full of vibrant colors naturally attract us, whether it is an abstract or a photorealistic setting. Note, though, that this is not necessarily related to technology prowess and resolution but it is more about the artistic use of colors to make graphics attractive regardless of the actual number of pixels.

The main idea behind the 6-11 Framework is that these emotions and instincts interact with each other (figure 2) to build a network or sequence that should, in general, end with “Joy” and/or “Excitement”, so as to provide players with a meaningful and fun experience. This network can then be related to the actual gameplay by realizing that, when different emotions are naturally aroused in the player by the game, these will trigger different instincts. These instincts, in turn, will force the player to act in the game, ultimately showing how the whole emotional experience can be linked to the various in game actions players can perform, as discussed in [12]

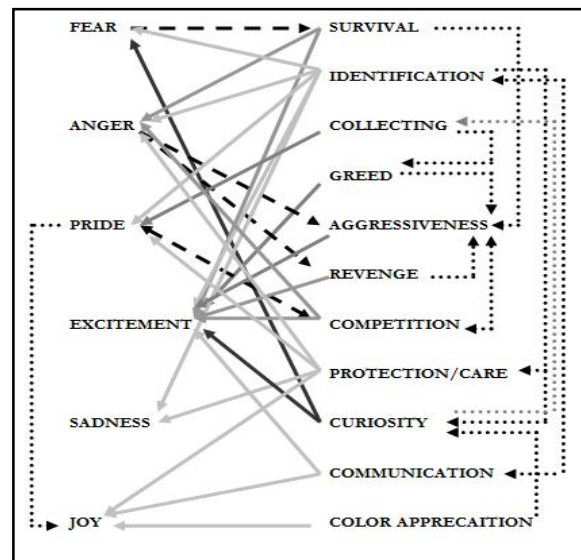


Figure 2 : Possible main relationships between basic emotions and instincts as discussed in [8]: for example, Pride can easily lead to Joy while Fear can lead to Survival and then Aggressiveness (solid lines: from Instincts to Emotions; dashed lines: from Emotions to Instincts; dotted lines indicate interactions within the same group).

### 3. Case Studies

In this section we discuss a few serious games (TRUST, Virtual Orchestra, Ayiti, Desafio Sebrae) through the lenses of the “6-11 Framework” to understand if, and how, they manage to be engaging and ultimately fun besides serving their specific serious purposes.

It should be noted that the 6-11 Framework can be used both as an analysis tool and as a general guideline when starting the design process for a new game. For the former, we need to play the game critically to discover which mechanics and dynamics are used to trigger specific emotional reactions in players (eg. the notification of a NPC death to provoke Sadness and rise the Protection instinct like in Ayiti).

In general, the analysis process could proceed as follows:

- Play the game critically. This means asking ourselves questions such as "How is the game trying to motivate me?", "What are the goals", "How do I feel while playing the game?", "Why am I doing what I am doing?"
- By relating our answers to the previous questions to the elements listed in „6-11 Framework“, determine the intended emotional experience.
- Relate instincts to dynamics and gameplay .

- Explore how gameplay is obtained (i.e. identify core game mechanics) .

To get insights on point 1, playtesters can also be explicitly interviewed by using surveys including questions related to different emotions, as illustrated in [13], and then the results can be used to derive or validate a corresponding diagram describing the perceived emotional experience.

During the design phase of a game, instead, the framework may help developers to focus on specific emotions and instincts which they believe to be more relevant or suitable to a particular context by drawing an ideal experience they want to convey. Once this is done, they can proceed in crafting the game in a way that makes such experience possible. This was the approach used in TRUST/Bumbleland and the Virtual Orchestra.

### *3.1. TRUST/Bumbleland*

TRUST [14] is a therapeutic game project started by Dr. Lizbeth Goodman and the UK based SMARTLab (University of the Arts London) to provide enjoyable and engaging rehabilitation exercises to children in hospitals. In this project, games are connected to a special active chair (figure 3) where joysticks could be placed in different locations and organized in different patterns emphasizing arms or legs movement to provide suitable exercises to patients with different needs.

The idea behind the application is to have children do therapeutic and rehabilitation exercises involving different limbs in an engaging and exciting way, avoiding the risk for the exercises to be perceived as a boring chore by the young patient.



*Figure 3 : An Active Chair used in the TRUST project, providing motion feedback and an immersive gateway into a fun rehabilitation experience.*

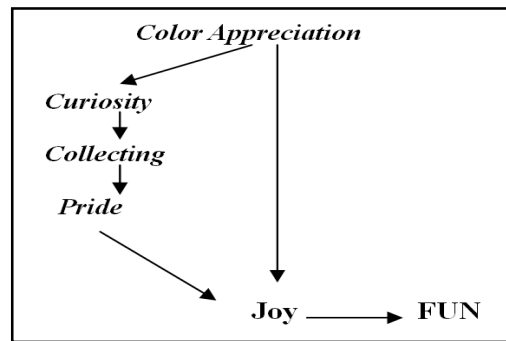


A first game prototype was developed in 2005 in collaboration with Nanyang Technological University (NTU) in Singapore and then NTU proceeded in developing also an additional game concept named “Bumbleland” (figure 4), trying to maximize its engagement qualities through a bigger and more colorful fantasy world where kids could freely roam by driving a cute looking yellow buggy.



*Figure 4: Bumbleland, developed by NTU gameLAB in 2005 for use with the Active Chair: in the game, players had to drive a cute looking car across a fantasy world to discover and collect candies.*

The aim of the game was to provide a joyful experience to the children involved while allowing them to do some light practice on specific limbs thanks to easily reachable joysticks and a straightforward control system. To achieve these goals, the game was designed from the ground up to be set into a bright and colorful 3D graphical world (resonating with the Color Appreciation instinct) to subconsciously motivate young players to move around and explore the environment (relying on our Curiosity instinct) and find a set of candies (ie. Collecting instinct). The emotional experience the development team aimed for can then be described in terms of the 6-11 framework as follows (figure 5), with Curiosity and Collecting being responsible for driving the actual gameplay and keeping the young players engaged in the game by rewarding them for their exploration by finding and collecting various bonus items and candies.



*Figure 5: The emotional experience developers aimed for while designing the rehabilitation game Bumbleland, ultimately leading to Joy by having players roam a colorful world looking for candies and sweets.*

### *3.2. The Virtual Orchestra*

The Virtual Orchestra [15] is another project developed at NTU gameLAB with the aim of providing a music teaching game for children that would also work as a basic tool for orchestral conducting practice aimed at beginning music students.

It was clear to the development team that the game had to emphasize players' Identification and Competition instincts to reach its teaching goals so it was implemented in a first person perspective by using a wireless gyro mouse (figure 6) to simulate a baton and facilitate a straightforward interaction between the player and the game. A scoring system was also designed to evaluate players' performance according to how closely they were mimicking real conducting gestures.

Indeed this effectively fostered the competitiveness among players as it could clearly be seen in different playtesting sessions and at roadshows where the game successfully engaged young children to queue up and play again and again to score higher than their friends.



*Figure 6: A very young player waving the wireless gyromouse as a baton during a public demo of the Virtual Orchestra in Singapore.*

*Anyway, to make the game more emotionally engaging, developers also wanted to make young players “care” for the musicians of the orchestra, like if they were characters they could effectively interact with and affect somehow.*

To achieve this, developers tried to raise players' “Protection/Caring” instinct by adding a sort of “health bar” (in the game named “concentration level”, see Figure 7) to each section of musicians which decreased when players committed mistakes, eg. abruptly changing the tempo of the performance. As the bar gets depleted in the game, the musicians start skipping more and more notes and, ultimately, stop playing.

According to several young players informally interviewed after the playing sessions, this small addition was indeed successful in helping them to establish an emotional connection with the virtual characters, making them more attentive and engaged with the game since they didn't want the bar to drop to zero and negatively affect the musicians.



*Figure 7: A particular from the Virtual Orchestra, showing the concentration level of the violin section above the players.*

By looking at the game through the 6-11Framework (Figure 8) we can better appreciate how, starting from the Identification instinct obtained thanks to a first person perspective and the use of wireless gyromouse acting as a conductor's baton, the game aimed at engaging players through their Competition and Protection instincts to ultimately provide a joyful and rewarding learning experience.

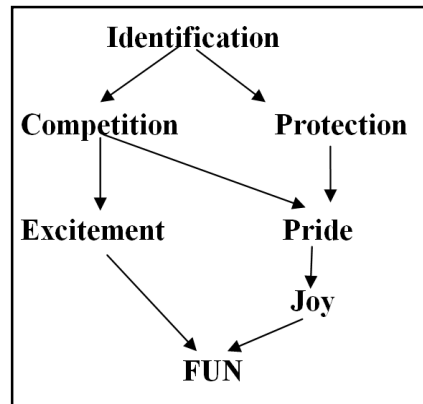


Figure 8: Analysis for the Virtual Orchestra, outlining how the competition, together with the protection instincts, successfully build up and engaging and fun gameplay.

### 3.3.Ayiti: The Cost of Life

Funded by Microsoft and designed by the New York based GameLab in collaboration with Global Kids' "Playing 4 Keeps" program, "Ayiti: The Cost of Life" [16] is a serious game aimed at kids and young adults to bring awareness about poverty and dramatic living conditions in countries like Haiti. Here players have to control a family of five in their seasonal activities and manage their budget and time across work and study to provide them with an overall better quality of life and a brighter future.

The game, shown in figure 9, is extremely challenging but successfully manages to be engaging thanks to its ability of establishing an emotional link between in-game characters, their struggles and the players also thanks

to the possibility of allowing the latter to set their own goals, emphasizing different aspects of life like Health, Education, Happiness and Money, all of which ultimately set a scenario for triggering player's "Protection" instinct and her wish to help the unfortunate family.

This is also achieved by presenting the family as a whole as well as giving some simple but meaningful detail on each individual member: in doing so, the game makes players

empathize with the virtual characters firmly defining the Protection instinct at the core of its experience. This is then the driving force motivating players throughout the game, as illustrated in figure 10, making them curious to see how life conditions can evolve based on their specific choices and then getting proud or sad at the resulting successes and failures.



Figure 9: A screenshot of Ayiti, showing the simple but effective graphic style used for the game: from here players can direct any family member to specific activities.

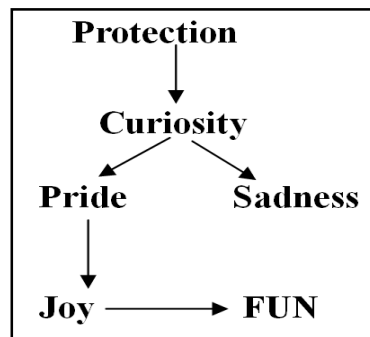


Figure 10 : Analysis for Ayiti: players' Protection instinct is clearly at the core of the experience. This will motivate players to know more about the family's living conditions and try to use the available options to improve their lives and reach specific goals. Success and failure will then make players either proud or sad, motivating them to continue on a specific path or try a different strategy. Either way, players will learn more about the real life conditions and struggles of people living in third world countries

### *3.4.Desafio Sebrae*

Desafio Sebrae [17] is a successful South American business game designed to simulate the management of a virtual company targeted at college students.

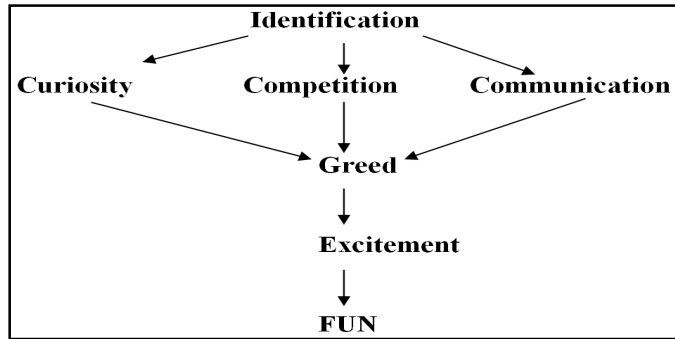
Here players have to work in a team of three to five to manage a virtual enterprise and make periodic business decisions.

The game puts the students into the shoes of budding entrepreneurs and forces them to face all the difficulties arising from the responsibility of managing a business, involving them in taking fundamental decisions regarding marketing, production, board meetings, competitor analysis, buying supplies, hiring employees and expanding the facilities.

Each decision influences the performance of the company and affects the final results of the game, pushing the team to focus and analyze all areas of the game, i.e. business management, carefully.

In this game, particular efforts are made to have players face a realistic environment and real life issues: loans, negative cash flow, employees strike, aggressive competition etc. can all happen but everything is carefully designed to be a consequence of players' own actions. In this way, the game successfully manages to have the students critically analyze their playing and management style to understand the root of the problems and find appropriate solutions.

The game was playtested using the “6-11 Framework” as discussed in [13] and the analysis confirmed the relevance of different emotional elements that can be related together as shown in Figure 11, where we see how the game focused in making players feel like they are in charge of the business (Identification) and communicate effectively between them to compete with other teams and find out all about the possibilities offered by the virtual world:



*Figure 11 - An analysis of a team based business oriented game like Desafio Sebrae. To achieve its serious objective (teaching sound business practices) the game has to offer players enough variety and strategic options (for Curiosity), pit teams against each other (Competition) and give players tools to share their strategies and ideas (Communication). All these have to be effective means to reach specific objectives related to business growth and revenue (Greed).*

#### **4. Conclusion**

In the end, how did all these different games find the "fun" element to keep players interested?

From the proposed analyses we can actually realize how they implicitly tried to engage players by relying on those specific instincts and emotions that should be more likely to resonate with their respective target audiences.

For example, rehabilitation or educational games aimed at children may rely on fantasy and colorful scenarios to easily bring young players into the gaming world, thanks to natural instincts like Color Appreciation and Curiosity, especially since the latter is usually extremely strong in many young children.

On the other hand, games facing global and social issues, like poverty, should try to find a way to engage players more deeply, likely through people's natural Protection instinct, to make them empathize effectively with the NPCs (Non Playable Characters). Once an emotional connection is established between players and the characters on screen, it will be much easier for the game to reach its goals and let players gain a better understanding of the portrayed scenarios and sociopolitical issues.

Finally, business games, like the one analyzed, should likely emphasize competition, greed and effective communication to successfully push and motivate players to critically analyze their results and how they managed to build up, or waste, a fortune. It

is then up to the actual gameplay to give players appropriate means of expressing these instincts in a way that manages to satisfy the original requirements.

When all this happens seamlessly, developers have not only achieved the serious goal they aimed for but also managed to successfully deliver an engaging and fun game that enhances the overall value of the experience and reinforces learning or any other specific purpose that was originally intended.

In this context, the 6-11 Framework, though a simple and straightforward analysis tool, can be a valuable asset in analyzing specific needs and characteristics of a given target audience and then design games more effectively by focusing design and gameplay choices accordingly.



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