Design of a Social Serious Game to revalue the Argentinian aboriginal cultures

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***Abstract*— This article presents a serious game for social networks aimed at revaluing aboriginal cultures in our country. Towards the end of the 20th century, policies were implemented aimed at compensating for the historical displacement of certain groups, among them, the aboriginal peoples. However, many issues still persist, here and around the world. For this reason, after analyzing the characteristics of social serious games, we propose a game of this style as an innovative tool for enabling learning processes that are more effective than the traditional methods, thus providing an attractive space that favors socialization, cooperation and entertainment, while collaborating with knowledge acquisition. The poll results that motivated the development of this game will be presented. The team's anthropologists, artists, computer scientists and teachers trust this game will help acknowledge historical and current issues for the aboriginal peoples, seeking to strengthen the idea of Argentina as a pluriethnic and multicultural country.**

Keywords— ***Serious Game; Social Game; Heritage Culture; Games for kids; Games with kids.***

I. INTRODUCTION

Currently, the use of multiple electronic media is an integral part of the lives of many children. The TV, the dominating medium from the 90s onwards, is seeing significant competition. Nowadays, children can watch a TV show on their computers, use their cellphone to surf the Internet and access social networks from their tablet. Although this is not the case for all children, a high percentage have access to one or another and, consequently, spend hour after hour using them and playing through them. Our work with heterogeneous communities of children shows that children aged 9 to 12 spend an average of 3 daily hours playing. Likewise, the number of users joining social networks such as *Facebook* and *Twitter* grows daily. Technological convergence, the hallmark of today's communication media, allows children, and even teenagers to access the same places, often social networks, from different media. Can these children, digital natives, seize the use of social networks to acquire knowledge? With the serious game in this article, we aim at creating a community where children have fun, share their experience with the game, compete for scores in a collaborative manner, and, collaterally, learn without trying, without seeking it. Social networks have the potential to make this happen. They help promote pro-social behavior, increase social skills and provide an attractive space to play, a significant space to transfer and acquire knowledge.

What knowledge do we seek to transfer? In Argentina there are almost a thousand aboriginal communities scattered around the country, with a total self-acknowledged aboriginal population of 2.38%, which represents around 955032 people, according to the official report of the INDEC 2010 Census [1]. Likewise, it is important to emphasize, extending our geographical scope, that although there are nearly thirty million aboriginal people in Latin America, a high percentage of children are unaware of their existence or have disproportionate notions about them. The goal of this game is to spread the cultures of these peoples, help in them be acknowledged as existing today and not only in the past, with an identity that is constructed and reconstructed in the framework of their relationships and situations, both inside and outside the community.

The proposal of this online game has hidden pedagogical purposes that we expect will enable players to incorporate knowledge about the aboriginal cultures in a natural and relaxed way, awakening their curiosity and will to learn. The game will attempt to generate an emotional state that will enable more effective learning processes than traditional teaching methods. Social networks and the time children spend in them can be better seized if, besides favoring socialization, cooperation and fun, they collaborate with the acquisition of knowledge-culture in children.

This work is organized thus: after proposing a definition for serious gaming and describing the motivations for the development of this social game the current social network characteristics are analyzed. Following, the design of the game is described in terms of mechanics, dynamics and aesthetics, and finally the mechanisms used to transfer knowledge through the game are detailed. Conclusions close this paper.

II. SERIOUS GAMES DEFINITION

It is interesting to note first the definition given by Kate Salen and Eric Zimmerman [2] who claim that: *"A game is a*

system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome". This definition has some important elements, such as artificial conflict, the rules that must be followed to solve this conflict, and the fact that the game must have a quantifiable outcome, i.e., that the possible outcomes must be valued. It is also interesting to note the definition given by Jesper Jul based on these aspects, but analyzing in more detail the relationship between the player and the game, clarifying the outcomes of the game as positive or negative, evidencing the player's effort to reach a certain goal, and considering the state of mind of a player with a negative or positive outcome. Jasper's definition is as follows: "*A game is a rule-based formal system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels attached to the outcome, and the consequences of the activity are optional and negotiable*" [3].

Taking that last definition as a basis, we propose the incorporation of the following premise for the game to be serious: *the game must provide benefits in the real world*. The benefits will depend on the goal of the game, for example, educational games should facilitate knowledge acquisition, health games should favor a physical and/or mental improvement, business games should favor the incorporation of labor skills in employees, etc. In particular, the game we are presenting will try to benefit non-aboriginal children and adolescents with the acquisition of knowledge through social networks. It will also generate awareness on the values of aboriginal cultures and the rights of these peoples. On the other hand, we expect aboriginal children to feel satisfied with the game and can self-acknowledge their aboriginal roots, without fear of discrimination.

III. Motivations for Creating a Social Serious Game

There are numerous motivations to design and implement a new serious game for *Facebook*. On the one hand, there is the high amount of hours children and teenagers spend online, sharing information with friends and playing videogames. This statement is based on a recent poll by the Ministry of Education of the Nation that revealed that 70% of Argentinian children are part of a social network and use the Internet to communicate with their friends, have fun and pass the time [4]. Likewise, in order to discover the habits and preferences of Argentinian children aged 9 to 12 in respect to games, a quantitative approach was used. A poll was established in public and private educational institutions of our country. An illustrated questionnaire was designed with 12 age-appropriate questions and administered by the teachers of each course.

Following is a graphic representation of information that is very significant for the decision of making a social serious game. Fig. 1 shows the activities preferred by children outside school hours, with a strong tendency towards playing videogames, playing with friends and surfing the Internet.

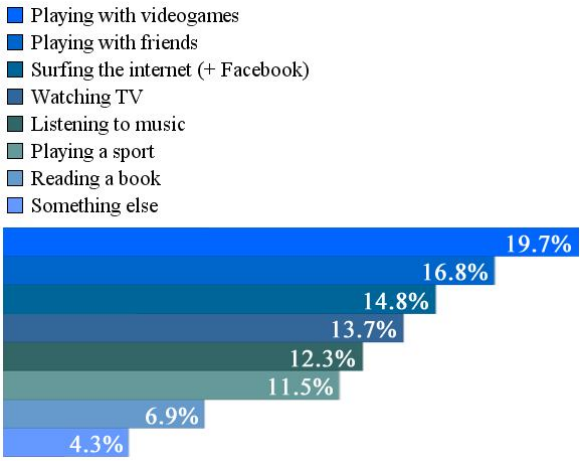

Fig. 1. Preferred activities

From a more theoretical perspective, it is worth detailing the analysis made by Lazzaro [5] in relation to emotions generated by games and how they make the game a fun teaching tool. She has divided emotions into four major categories – *Hard Fun*, emotions provoked by the intention of overcoming obstacles and progressing, *Easy Fun*, emotions brought about by visual and sonic aspects, *Serious Fun*, emotions that come up when playing is expected to have a purpose, a goal, and *People Fun*, the emotion brought about by interacting, cooperating and competing with other players.

In short, the expansion of Information and Communication Technologies (ICTs), the daily use of social networks in all environments and the amount of daily hours children spend playing must be seized for purposes other than fun. The data obtained from polls and the undoubted emotions social gaming brings about motivated the design of a social serious game whose goal is to amuse, but also to raise awareness among children on the fact that the aboriginal peoples are not a thing of the past, but still exist and make up a large part of our society. The viral expansion provided by social networks will favor spreading knowledge and values and reaching a larger portion of the population.

IV. Social Gaming Characteristics

Social networks may stimulate collaborative learning because they facilitate the formation of effective and affective groups, allow communication within groups and help strengthen individual and collective identities.

Most games embedded in social networks use asynchronous communication. This is due to the way in which people use a social network: multiple short daily sessions. For this reason, games have had to adapt to the routines of the players, and not the other way around. Asynchronous gaming has been successful in social networks, as Järvinen [6] says. He identifies 5 characteristics that provoke playfulness on Facebook: *physicality*, *spontaneity*, *inherent sociability*, *narrativity* and *asynchronicity*. However, in current times, synchronicity is also a characteristic that can provide interesting benefits in the interaction of players with the social

game. For example, motivating real time interaction strengthens the sense of "social presence" in children. Players choose social games to become more social. The immediate presence of others, even in the form of avatars, is one of the factors that favors the creation of a strong sense of social immediacy. This, together with the immediate reciprocity achieved through this kind of interaction, favors the retention of the player in the game.

The data collected in relation to the modalities of the games shows a natural tendency towards synchronic gaming, that is, a marked preference to sharing a common playing space simultaneously with other people (mainly friends). It is also observed that many children also like to play alone. Fig. 2 illustrates the findings.

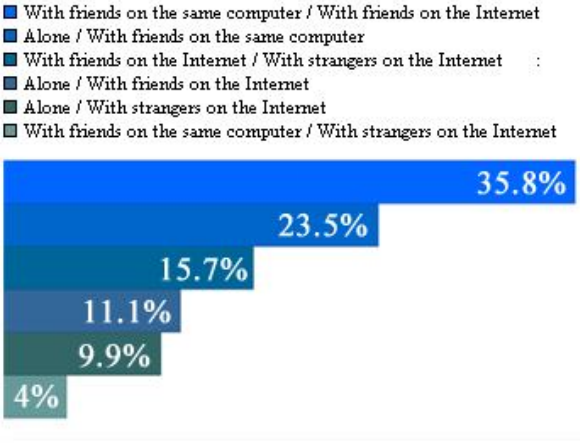

Fig. 2. Preferences regarding game modalities

Attending to the data on the polls, the game we are presenting, called *Raíces*, will contemplate different game modalities: playing alone, with friends and with strangers. To spread the word on the game, several of the functionalities provided by *Facebook* will be used, such as publishing the player's progress on their wall, showing the friends that are using the game and the level they are on, ranking the players, enabling gift sending and invitations, among others [7]. These are *asynchronous* functionalities. However, the game will also exploit some *synchronic* characteristics such as inviting players to the game to solve levels collaboratively, and communicating through virtual chats.

V. GAME DESIGN

After using the polls to collect data on the types of games children play and taking into account educational possibilities offered by different games, we chose a platform game. This type of game features a main character that is controlled by the player and must move from left to right, jumping on platforms suspended in the air, and overcoming different obstacles.

Within platform games there are several aspects that can be more or less interesting for players. In [8] three preference patterns or subgenres are identified: *combat*, *flow* and *puzzle*. Taking this classification as a basis and with the goal of making an attractive game for children, the game will have three different paths, each with elements and mechanics specific to these subgenres.

There will also be levels that will combine elements of several subgenres and require the synchronic presence of other players (friends or strangers) that come from a different path. Real time cooperation to reach a goal stimulates participation among the players, as each participant feels needed for success. Fig. 3 shows a map of the levels of the game and the subgenres provided.

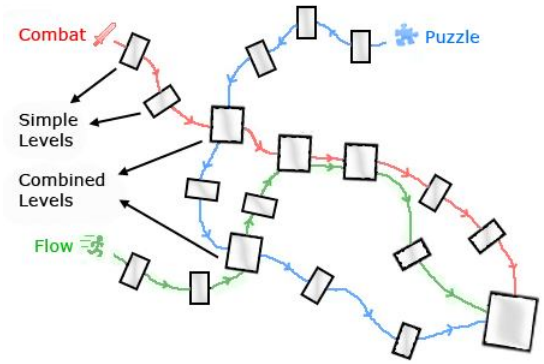

Fig. 3. Map of game levels

All paths have a common element: to complete each level certain elements will have to be picked up (level pieces) and a door will have to be reached (end of level).

Following, the basic characteristics of each genre are described:

***Combat*:** built around fights against multiple enemies in order to pass each level. These enemies are either fixed or mobile creatures that make advancing difficult and must be progressively eliminated until the end of the level. Eventually, bigger enemies will appear that will have to be defeated (bosses).

***Flow*:** the player must move skillfully, avoid obstacles, etc. In this subgenre, rhythmic jumping and moving patterns occupy a central role. Levels have more abysses, movements are faster, elements chase the character or fall from the sky, there are time restrictions, etc.

***Puzzle*:** the player must carefully watch the level and identify objects and paths, reasoning how to combine them and gather all level pieces.

Games are developed by designers-programmers and used or consumed by players. When a game is designed, the developer inevitably thinks about the players, how they will play, how they will interact, what will make that fun, how the game will be consumed. The MDA framework [9] is a tool that helps understand the artifacts involved in designing a game; it divides a game into *mechanics* that describe the rules and main parts of the game in terms of data and algorithms, *dynamics*, that describe the behavior of the mechanics when it is used by a player, and *aesthetics* that represent the emotional responses of players interacting with the game.

The MDA framework formalizes the consumption of games by breaking them into their distinct components:

and establishing their design counterparts:

Taking the MDA model as a basis, following, we describe the mechanics, the dynamics and the aesthetics of the game as proposed in this article.

A. *Game Mechanics*

The general mechanics of the game includes:
(1) Moving the character to the left and the right.
(2) Jumping on platforms.
(3) Collecting level pieces.
(4) Collecting objects to customize the avatar.
(5) Collecting elements to gather game points.
(6) Completing a level by reaching the final door with all level pieces.
(7) Trading game points for objects.
(8) Resuming the level from the most recent checkpoint as a consequence of losing a life.
(9) Restarting the level as a consequence of losing all lives.
(10) Playing the same level with other players.
(11) Winning additional game points by playing with other players.
(12) Communicating with other players by means of a virtual chat.

Following, we enumerate the specific mechanics of each subgenre:
Combat
(C1) Shooting arrows.
(C2) Using a weapon to make a direct hit.
(C3) Jumping over an enemy.
(C4) Shooting arrows, hitting directly with weapons and jumping over an enemy damage/destroy them.
(C5) Shooting arrows, hitting directly with weapons and jumping over an animal damage/destroy them.
(C6) Destroying enemies wins game points.
(C7) Damaging animals loses points.
(C8) If the character is reached by an enemy, it loses a life.
(C9) Enemies block level pieces.

Flow
(F1) If the character is reached by a moving object, it loses one life. (F2) If it falls off a precipice, it also loses one life.
(F3) The character can bounce over certain objects to jump higher.
(F4) Passing over certain locations can make the character move faster.
(F5) If time runs out, the level must be replayed.
(F6) If the character falls on a certain kind of vegetation, it crushes it and loses points.

Puzzle
(P1) Growing a tree anywhere. It can be jumped on. After a few seconds, the tree disappears.
(P2) Requesting help from an animal (they move through places the main character cannot reach). Animals can pick up objects like the character. After a few seconds, the animal disappears.
(P3) Invoking rain to produce holes in the ground. After a few seconds, the rain stops and the ground is level again.
(P4) Acquiring a skill (tree, animal, rain).
(P5) Once acquired, the skill can be used whenever necessary.

B. *Game Dynamics*

It is expected that the following general dynamics will be derived from the mechanics proposed:
dynamic(1): (1)+(2)+(3)+(6) The player will jump through the platforms to obtain level pieces.
dynamic(2): (1)+(2)+(4) The player will seek new objects.
dynamic(3): (1)+(2)+(5)+(7) The player will try to gather the greatest possible amount of points.
dynamic(4): (6)+(9) If a level is too difficult, the player will seek to play with someone in order to solve it.
dynamic(5): (7)+(10) The player will play with others to gather more points.
dynamic(6): (6)+(9)+(11) The players will coordinate their moves through virtual chat.

Following we describe the dynamics expected for each subgenre:
Combat
dynamic(7): (8)+(9)+(C9) The player will avoid enemies.
dynamic(8): (6)+(C4)+(C6)+(C9) The player will seek to destroy enemies to gather points and obtain level pieces.
dynamic(9): (4)+(C1)+(C2) The player will seek new weapons.
dynamic(10): (7)+(C5)+(C7) The player will avoid damaging animals.

Flow
dynamic(11): (8)+(9)+(F1)+(F2)+(F5) The player will have to move fast to avoid being hit moving objects and falling on precipices.
dynamic(12): (F4)+(F5) When there are multiple options, the player will seek the fastest path.
dynamic(13): (6)+(F5) The player will try to obtain all level pieces and get to the door before time runs out.
dynamic(14): (7)+(F6) The player will avoid damaging the vegetation.

Puzzle
dynamic(15): (P1) The player will use the *tree* skill to jump on it and reach higher places.
dynamic(16): (P2) The player will use the *animal* skill for picking up objects.
dynamic(17): (P3) The placer will use the *rain* skill to access new locations.

dynamic(18): (6)+(P1)+(P2)+(P3) The player will analyze how to combine P1, P2 and P3 (where and in what order) to obtain level pieces.

C. Game Aesthetics

Taking the eight taxonomies of the MDA framework into consideration, regarding the aesthetics that will be generated from the dynamics, we can state that the game will attempt to generate mainly ***Fellowship*** (game as a social framework) and ***Challenge*** (game as obstacle course).

Fellowship will arise from solving levels together and interacting with friends (dynamics 4, 5 and 6). Challenge will be structured through progressively more difficult levels and will be given by dynamics 1, 3, 7, 8, 10, 11, 13, 14 and 15.

As secondary components, the following will also appear: ***Expression*** (game as self-discovery) and ***Sensation*** (game as sense-pleasure). Expression will be given by the possibility to customize the character (dynamics 2 and 9), speaking with their own words (dynamic 6), and choosing a path to follow. Sensation will be given by elements that generate emotions like awe, admiration and surprise.

II. Knowledge Transfer through the Game

It is expected that, as the game progresses, children will be able to acknowledge and incorporate aspects of the culture of these aboriginal peoples such as their language, clothing, music, customs, etc. Avatar customization will contribute by including traditional clothing and accessories of each culture, allowing children to play with combinations and discover what everything was used for by means of the descriptions that accompany the items. Level backgrounds will provide information on the places of origin of each people.

Cultural aspects such as musical instruments, medicine, crafts (pottery, silver crafts, etc) and religious imagery will be represented in the game. Level pieces will include these elements, allowing the player to discover the elements that are typical of each culture through the levels.

It is worth emphasizing the existence of cross-curricular topics that address common issues. Respecting nature and acknowledging the wisdom of our elders are some of them. To reflect the former, the topic of respect for animals and plants will be emphasized. If pointless damage is done to nature in the game, the player will be warned and punished. Regarding the latter, each level will include a character, an old man or woman, that will advise the player on how to make progress in the game, provide information on the meaning of certain elements and, in some levels, tell short stories.

Regarding languages, an approach to phonology will be sought. Many of the objects that appear throughout the game will have their name in the original language, and some short stories will include some original words. The virtual chatting space used to communicate with other players will include fixed messages with bilingual text for children to learn basic words.

During level loading, trivia will be offered to score additional points.

To complete the educational aspect of the game, as different pieces and objects are gathered or stories are heard from the old man, items will be unlocked in a game album. This will be accessible at any point in the game to see all the items obtained and information about them.

III. Conclusions

After a long time struggling to be heard, the aboriginal peoples of Argentina are beginning to recover their place and rights. However, many issues persist, and so the contribution of education to a definitive acknowledgement of their rights and their total integration is paramount. This paper has presented the design of a serious game for *Facebook* that will attempt to enable learning processes that are more effective than traditional teaching methods while providing an attractive space that favors socialization, cooperation and fun, while collaborating with knowledge acquisition and helping raise awareness on historic and current issues involving the aboriginal peoples of our country.

Regarding the design of the game, we have described the theoretical frameworks that were taken into account to make the game fun and motivating for children, and presented a synthesis of the *mechanics*, *dynamics* and *aesthetics* of the game, together with the way in which we wished knowledge would be transferred in order to generate more emotions and will to learn.

Finally, it is worth noting that the data collected from polls confirm that children and adolescents are very involved in an audiovisual culture and consumption of new technologies, which makes it necessary to seize these characteristics in generating new educational proposals.

It is expected that this videogame, hallmark of the times, will enable more effective learning processes than traditional teaching methods, and that the teachers of our educational institutions see the results of this innovative proposals.

Acknowledgment

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