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ORIGINAL

CityVille: collaborative game play, communication and skill development in social networks

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ABSTRACT

This paper has as its aim to analyze how CityVille, a videogame hosted on Facebook and oriented to the construction of a virtual city, can favor collaboration between gamers along with the exchange of strategies, equally contributing to learning transfer and skill acquisition. The first step consists in identifying the opportunities which the said game can offer in order to develop skills and promote learning formats linked with planning and resource management, after which a presentation is made of the opinions expressed by a sample of gamers (N=105) –belonging to the Fans-CityVille community– about the priorities established by them to communicate with their neighbors and the skills that they believe to have acquired playing this game.

85.7% of them state that they communicate with others to share strategies and expand their city. Unlike women, who value collaboration, men prioritize competition. Designing their city has enhanced a number of gamer skills in different proportions: creative skills (71.4%); organizational ones (68.0%); skills associated with decision-making and problem-solving (67.0%); and interpersonal skills through interaction with others (61.9%).

The CityVille game mode favors skill development and helps to create a ludic atmosphere of collaboration and optimal strategy exchange through communication between neighbors by strengthening their mutual relationships. Its formula moves away from the often-criticized competitive practices of other games.

KEYWORDS: NETWORKED GAMES, COLLABORATIVE LEARNING, COMMUNICATION, ORGANIZATIONAL SKILLS, INTERPERSONAL SKILLS

1 INTRODUCTION

The ludic applications inserted within networks or online games are experiencing an exponential growth thanks to the multiple connections of users on social networks such as *Facebook*, *Tuenti* or *Google+*, to quote but a few, especially among the youngest users. It is a new formula of communication between people from all over the world with similar tastes who converge on the same ludic environment where the development of game play makes it possible to establish relationships, encouraging collaboration as well as the transfer of strategies and knowledge linked with demands and executions specific to the game (Camilleri, Busuttil & Montebello, 2011; Iacovides, Aczel, Scanlon & Woods, 2012).

These online game scenarios have become a sociological phenomenon which exceeds all expectations due to the increased number of users connected to social networks, thus originating a new collaborative game play culture (Coelho, Espinosa & Medina, 2013; Shaw, 2010; Zhang *et al*., 2012) able to generate interesting knowledge-building formulas (Stahl, 2006). Internet firms have seen them as an opportunity to obtain profits through the design of networked micro-games meant to attract users who play in their platforms (Coelho, Espinosa & Medina, 2013; De Andrade, 2012; Feinleib, 2011); they sell virtual money to gamers so that they can move ahead and reach higher levels more quickly or promote applications which invite them to join, communicate and interact with other users. It is the case de Zynga, a firm launched by Mark Pincus in 2007 and aimed at connecting internet users through videogames (*CityVille, Zynga Poker, Draw Something, Hidden Chronicles, FarmVille, CastleVille, Words With Friends, Empires & Allies, Scramble With Friends, Café World, The Pioneer Trail, Indiana Jones, Adventure World* and *Mafia Wars*...) which boasts over 240 million active users from 175 countries (Zynga, 2013). Despite turning entertainment into business, all these games implicitly favor numerous learning formats (Revuelta, 2013).

Therefore, it has been checked from an educational perspective how some of these networked games encourage mutual collaboration (Altamimi & Skinner, 2012; Coelho, Espinosa & Medina, 2013) together with the exchange of knowledge and experiences between gamers, while they simultaneously favor learning transfer and skill acquisition (Annetta, Murray, Laird, Bohr & Park, 2006). More precisely, the present research study focuses on analyzing the extent to which *CityVille* –according to the players themselves– contributes to generate a ludic environment of collaboration and exchange of strategies which are suitable to build and expand a virtual city through collaboration between neighbors –apart from helping to acquire numerous skills of different kinds.

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2 NETWORKED LUDIC PLATFORMS: COLLABORATIVE GAME PLAY AND SKILL ACQUISITION

2.1 Collaborative game play and communication network

In the opinion of Choi, Choi & Song (2012), social networks integrate people connected from their interactions, where new communication models are emerging (Flores, 2009). The networks theory, which has proved helpful when it comes to understanding human behavior as well as the social structures based on relationships between subjects, postulates that the decision made by any user to join a specific network can respond to various motivations: learning within a collaborative environment; meeting needs of a psychological, social or emotional nature, reinforcing their self-esteem, achieving social recognition, etc. (Colás, González & De Pablos, 2013). Furthermore, virtual interactions prevail to a greater and greater extent, especially among the youngest individuals (Sánchez-Vera, Serrano & Prendes, 2013). Moreover, it has often been checked that emergent social networks are incorporating tools which facilitate access to information, thus enabling users to transform, learn and develop a variety of competences during their interaction with others (Castañeda, 2012).

Similarly, within a ludic context, networked games favor communication between gamers and encourage them to exchange experiences (Altamimi & Skinner, 2012; Ducheneaut, Yee, Nickell & Moore, 2006; Iacovides *et al*., 2012). In the case of games integrated into social networks, users can enjoy and amuse themselves, have a feeling of self-satisfaction after achieving the proposed aims and see how their needs are met through the implementation of their missions or activities –and they can share games as well.

The true innovation introduced by networked videogames lies in their capacity to make multiple gamers from around the world converge, breaking any cultural or language barriers (Coelho, Espinosa & Medina, 2013). Jeon (2011) analyzes how interactions in social networks have contributed to increase the social capital which converges on them, since these virtual platforms are used because of the interest and flexibility that they offer when it comes to communication with one another (Iacovides *et al*., 2012). The studies by Cole & Griffiths (2007) seek to check the extent to which the social interactions derived from ludic activities shared in networks can favor collaborative construction as well as the development of certain skills.

Different researchers argue that online collaborative game play can favor the acquisition of numerous cognitive skills and abilities by subjects (Esnaola & Levis, 2009; Revuelta & Guerra, 2012; Suh, Kim & Kim, 2010). As a matter of fact, virtual ludic scenarios generate some peculiar bonds between gamers from the common interests that bring them together (Choi, Choi & Song, 2012; Iacovides *et al*., 2012). This has led to the spontaneous creation of virtual videogamer communities, some of them conceived as ideal spaces to help the transfer of both strategies and knowledge, generating learning outcomes and even improving them through mutual collaboration (Suthers, 2001; Zhang *et al*., 2012); and others oriented to problem-solving or to the completion of the tasks proposed by the videogame (Sharritt & Suthers, 2009).

Some games conceive communication between users as an obliged interconnection practice, betting on mutual collaboration to avoid loss of energy, death or disappearance. This is something increasingly recurrent in online games, as highlighted by Van Meurs (2011). Furthermore, the games promoted by Facebook are provided with synchronous interaction between the gamers so that both of them can improve in the game and grow (Deterding, 2010). In the specific case of *CityVille*, interactions between players are patterned and a reward system has been articulated to move up levels and be appointed as city mayor or governor.

Other online games have their own virtual communities which favor connection between gamers, promoting relationships that can raise a strong feeling of interpendence for every member, linked with the exchange of experiences that can prove enriching to all community members, many of them based on reaching the accomplishments set by each game (Hussain & Griffiths, 2009; Iacovides *et al*., 2012).

The importance assigned to the existence of videogamer communities stems from the opportunities that the game offers users so that they can optimize their strategies by making them converge with those of others (Del Moral & Fernández, 2012), thus giving added value to decision-making or problem-solving through the activation of the so-called connective intelligence defined by Siemens (2008). In *CityVille*, the aim is focused on the construction of a city, which becomes possible thanks to the resources provided by residents networked through *Facebook* or *Google+*, the platforms on which the game is hosted.

2.2 *CityVille:* an opportunity for skill development

The type of games analyzed –*CityVille, FarmVille, CastleVille*...– focus on the creation or construction of different elements (cities, farms, castles…), demanding the planning of tasks to be performed, the management of resources and an agile decision-making process to achieve the aim sought (Coelho, Espinosa & Medina, 2013; Nummenmaa, Alha & Kultima, 2011). It is additionally a particular way to develop skills from a networked ludic activity.

Its spectacular popularization made us choose to analyze *CityVille* –implemented on *Facebook* in 2010 and subsequently on *Google+*– because it already has 17 million users around the world (Zynga, 2013). The game proposes the creation of a virtual city through the construction of houses, businesses, community or governmental buildings, progressively acquiring more inhabitants and neighbors, until the gamer can shape a mega-city and thereby move up a level according to the 'XP' (the game's scoring system) or stars and energy collected while playing. Although it is possible to advance in the game investing real money, the present study will only analyze the free mode, since it is not essential to spend it to reach high levels and enjoy the prestige which is conferred upon those who own the largest city. The metaphor of a city being constructed on the basis of building acquisition contributes to give verisimilitude and credibility to the ludic scenario, and equally facilitates navigation through that environment (Figure 1).

Figure 1. Graphical gamer interaction interface in CityVille

This environment favors the socialization of users who converge on social networks because of the game, activating interaction with one another (Coelho, Espinosa & Medina, 2013). The game fosters participation and relationships between players (Iacovides *et al*., 2012), betting on the value of other people's experience through the encouragement of visits to neighbors (Jeon, 2011). The game's main driving force lies in the relational motivation of users; even though it does not promote direct social interaction, users do perceive an indirect relationship based on the shared use of resources and contents available in the game, a formula which should be improved in order to consolidate their relationships (Coelho, Espinosa & Medina, 2013; Wohn, Lampe, Wash, Ellison & Vitak, 2011). The fact that *CityVille* is inserted into social networks allows users to have friends who can become neighbors, facilitating the simultaneous growth of their cities as well as progress in the game by means of reciprocal visits to their virtual cities (Jason, 2010).

Users must follow the rules established to move up levels, collecting energy and XP to expand their cities. They can contact their neighbors using the communication tools offered by the game, such as the publication of requests and petitions on their walls, asking them for resources to enlarge their city and increase the number of dwellers. Furthermore, they can obtain their collaboration through visits to their cities which, despite not being compulsory, allow those cities to grow and favor their expansion.

CityVille offers different services: a generator of personal statistics; a provider of new missions to win more XP, energy, products and gifts; together with tools that make communication and interaction with neighbors easier. Gamers can increase the number of inhabitants and collect coins and *CityCash* to expand their city. Despite not being compulsory, collaborating with their neighbors offers them advantages to collect funds or various winnings and, thereby, the possibility of moving up a level and contributing to the growth of their city. They can ask them for permits to erect new buildings, to receive and send presents or items that they need, and to take part in the missions which might be eventually entrusted to them.

Different authors (Osterweil & Le, 2010; Paraskeva, Mysirlaki & Papagianni, 2010; Sharritt, 2008) have described some of the skills boosted by videogames, from the most basic and elementary ones to others characterized by a higher cognitive level (Williams, Kennedy & Moore, 2011), such as:

a) Psychomotor skills: exercise of hand-and-eye coordination, laterality, discrimination and spatial organization.

b) Skills related to the assimilation and retention of information: boosting of attention, memory, organization and association of the data and information presented.

c) Skills associated with information search and treatment: location of data, synthesis and analysis.

d) Organizational skills: design of plans, organization of resources and timing of events.

e) Creative skills: generation of ideas, hypotheses and predictions, development of inductive reasoning, drawing-up of rules from specific cases, etc.

f) Analytical skills: evaluation of ideas and hypotheses, development of deductive reasoning and the application of general rules.

g) Skills linked with decision-making: identification of possible alternatives; adoption of effective criteria; choice of the most valid options…

h) Skills oriented to problem-solving: carrying out operations or calculations, patterned execution of orders or missions, exercise of heuristic thinking (success/failure).

i) Metacognitive skills: review and/or self-assesment of one's own execution, acquisition of good practices for success and learning from mistakes and failures.

j) Interpersonal skills connected to social intelligence (Goleman, 2012): participation in collaborative projects and training focused on leadership and critical capacity.

Of course, being an online game, the ludic proposal made by *CityVille* to users which is focused on the construction of a virtual city implies the exercise of multiple skills to play successfully and reach the highest levels. That is why, following the aforesaid taxonomy, our next step consists in identifying the opportunities provided by this networked game when it comes to developing the different skills (Table 1).

Table 1. Typing skills which may potentially be developed playing *CityVille*

Skills	**Opportunities to develop them in *CityVille***
Organizational	Necessary to appreciate the game's challenges and requirements Required to draft building plans for the city and manage material resources
Creative	Essential to devise the actual city, provided with a peculiar design, in accordance with each user's tastes They define each player's identity features, their originality and the materialization of their creative imagination
Analytical	Related to the ability to deduce and assimilate the game's general rules Indispensable to establish the patterns to be followed, as well as to plan successful strategies
Decision-making	Vital to compare the different actions and select the most operational ones Essential to orient all efforts towards the achievement of the ultimate goal: becoming the mayor, governor...
Problem-solving	Fundamental to determine how to advance on the different game levels quickly Related to the search for effective solutions
Metacognitive	Acquired from interaction with the game Learning derived from successes and mistakes or failures
Interpersonal	Linked with the need to look for allies among their neighbors in order to expand their city, visiting them, offering them gifts, etc. Connected with communication and exchange of experiences between players
Psychomotor	Basic to handle the game's environment: being on Facebook, registering as a user, interacting through the interface, etc.

Table 1. (continued)

Skills	Opportunities to develop them in *CityVille*
Psychomotor	Basic to handle the game's environment: being on Facebook, registering as a user, interacting through the interface, etc.
Information retention and assimilation	Materialized in the comprehension and adoption of rules established by the game Controlling the gifts and requests which are made to neighbors and choose the ones who are visited and why
Information search and treatment	Necessary in the game to identify the keys for the city to grow, support itself and achieve more residents Asking other players for tricks and strategies

Although it is possible to carry out an a priori identification of the chances that this game offers users in terms of promoting training for certain skills, an effort has been made to check the perception that regular *CityVille* gamers themselves believe to have developed with this game.

3 METHODOLOGY

3.1 Study objectives

The present study focuses on analyzing both the priorities established by *CityVille* gamers to communicate with their neighbors and the skills that they believe to have acquired playing, so that an inference can subsequently be made about the extent to which *CityVille* –according to the gamers themselves (N=105)– contributes to generate a ludic atmosphere of collaboration and strategy exchange to build and expand a virtual city through communication between gamers and the development of different skills.

3.2 Instrument

The *Fans-CityVille* community was created on *Facebook* for the purpose of collecting the information. Its 110 members –active gamers in the game– were invited to answer a questionnaire-based online survey and nearly all of them (*N*=105) gave us their opinions. The questions referred to descriptive aspects identifying their profile as regular players: sex, nationality, age, how and when they arrived at the game, how much time they dedicate to it every day, why and what they play for, what level they have reached, how many virtual inhabitants and neighbors they have, as well as other more specific ones aimed at knowing: a) their priorities to communicate with their neighbors, to register their level of agreement with a number of statements; and b) their consideration about the degree of acquisition of certain skills with the game, both aspects being measured with items (on a 1-5 Likert scale).

The instrument reliability measurement gave a *Cronbach's alpha* = .93, suitable for this research study and its validity piloting it with six active *CityVille* gamers above 35 years of age, to refine its drawing-up.

3.3 Methodology

The consultation, which took place inside the aforementioned *Fans-CityVille* virtual community during the second half of March 2013, produced 105 answers. Descriptive statistical techniques were applied to define the sample as well as Kendall's Tau-b statistic to analyze the relationship between category variables. A multivariant analysis was subsequently performed utilizing factor analysis to group the data together by means of the principal components technique; the ANOVA and bivariate correlations to identify the relationships between variables; and multiple regression to detect significant influences between them (Hair, Prentice, Cano & Suárez, 2007) using the SPSS statistical package (v.18).

3.4 Sample description

The sample was formed by (*N*=105) *CityVille* gamers, of whom 62.9% were men and 37.1% women. They came from Colombia (33.3%), Italy (24.8%), Mexico (12.4%), Spain (11.4%), Germany (4.8%), Canada (4.8%), United States (3.8%), and another 4.7% from Brazil, Paraguay, Angola, Austria and Saudi Arabia (Figure 2).

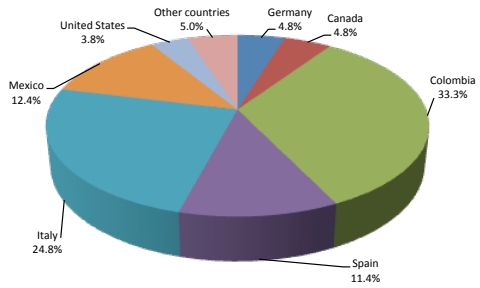

Figure 2. Distribution of gamers in the Fans-CityVille community according to their nationality

As for their age, 44.8% of them are between 36 and 45 years old, while 20.0% are between 46 and 55; another 22.9% corresponds to those with ages comprised between 18 and 25; and 7.6% belong to the 26-35 age group. Only 3.8% of them are older than 55 and 1.0% are under-18s.

94.3% of the respondents see themselves as regular gamers and play every day, as opposed to a small percentage of 5.7% who play once a week. 51.4% are registered on 2-4 online games and 23.8% on 5-7; 16.2% claim to be alone in *CityVille*; the groups of most compulsive gamers are represented by those who claim to play 8-10 games (5.7%) and more than 10 (2.9%).

93.3% were invited to *CityVille* by Facebook acquaintances or friends, 2.9% decided to enter out of curiosity and another 2.9% were induced by advertising on Facebook –only 1.0% of the respondents link the invitation with relatives. 18.1% have been playing for less than 6 months, 29.5% between 6 and 12 months, 44.8% between 13 and 18 months, and only 7.6% have been playing during a period ranging from 19 to 24 months, that is, since the very beginning of *CityVille*.

30.5% plays between 3 and 5 hours per day; another 30.5% dedicates between 1 and 2 hours to the game; 18.1%, less than 1 hour; and a significant 16.2% claim to play over 5 hours every day. On the contrary, 2.9% play once a week and 1.9% do so twice a week.

43.8% reach levels near 100 in the game, 29.5% are situated between 51 and 100, and another 20.9% between 11 and 50. A smaller percentage (4.8%) corresponds to those with levels ranging from 1 to 10, and only 1.0% of the gamers reach levels above 100. Furthermore, the volume of inhabitants who live in the cities of the most compulsive players is considerable: 42.8% have between 300.001 and over 1.000.000 inhabitants; followed by 18.1%, who own between 1,001 and 50,000; 17.2%, between 50.001 and 200,000; 15.2% between 200.001 and 300.000; and only a marginal 6.7% have less than 1.000 inhabitants.

Table 2. Players' priorities to communicate with their neighbors in *CityVille.*

Priorities when playing in *CityVille*	I disagree or hardly agree		I agree		I quite or strongly agree		*M*	*SD*
	N	%	*N*	%	*N*	%		
1. Expanding my city	2	1.9%	4	3.8%	99	94.3%	4.74	.707
2. Helping them to expand their city	3	2.9%	7	6.7%	95	90.5%	4.53	.821
3. Asking them for help	2	1.9%	7	6.7%	96	91.4%	4.64	.735
4. Sharing strategies	4	3.8%	11	10.5%	90	85.7%	4.47	.899
5. Obtaining energy to play on	1	1.0%	8	7.6%	96	91.4%	4.66	.705
6. Achieving more XP to move up levels	2	1.9%	8	7.6%	95	90.5%	4.64	.748
7. Collaborating, giving them presents	6	5.7%	12	11.4%	87	82.9%	4.42	.998
8. Obtaining elements to build	5	4.8%	7	6.7%	93	88.6%	4.55	.920
9. Advancing faster on levels	4	3.8%	5	4.8%	96	91.4%	4.67	.816

It must finally be highlighted that 94.3% claim that they play in *CityVille* to have fun; 80.0% claim to do so to obtain energy and play more, and 79.0% link it to the possibility of building the city of their dreams and having something of their own, even if it is virtual. 75.2% highlight the opportunity to learn new strategies. 67.6% play to meet new people. 93.3% state that they find the game entertaining, 89.5% are happy building their own city and feel satisfied with it, and just above half (54.3%) achieve self-fulfilment when they play in *CityVille*.

4 RESULTS ANALYSIS AND DISCUSSION

Different statistical analyses were carried out after describing the sample. Thus, the correlations showed that the time dedicated to the game correlates positively both with the level reached (W = .430, p < .000) and with the number of inhabitants (W = .454, p < .000), the neighbors that gamers have in their cities (W = .484, p < .000), how long they have been playing (W = .382, p < .000), the money invested in the game (W = .340, p < .000), the number of online games (W = .213, p < .010) and the age-groups of gamers (W = .226, p < .006). The correlations referring to the way in which gamers arrived at *Cityville* (W = -.053, p = n.s.), nationality (W = .088, p = n.s.) and sex (W = .031, p = n.s.) were not significant.

An ANOVA served to check that reaching the top levels in the game is correlated to having a higher number of inhabitants in their virtual city ($F(3.78) = 2.48$, p < .003, ηp^2 = .066, ηp^2 = .666). The same applies to having more neighbors ($F(20.27)$ = 109.74, p < 0.000, ηp^2 = .658); it was checked that 27.6% of the players have more than 100 (between 105 and 200), 25.6% between 51 and 100 neighbors and 46.6% have less than 50 (M = 140, SD = 23.0).

A multiple regression analysis was performed to prove that the sex variable is correlated to being at a higher game level and having a greater number of neighbors. The results show that predictors account for 25.6% of the variance (R^2 = 0.34, $F(3.45)$ = 1.56, p < .035), women being the ones who reach higher levels in *CityVille* (β = -.153, p < .000) and own more neighbors (β = .041, p < .060).

Seeking to investigate the atmosphere of collaboration and strategy exchange generated in *CityVille*, a decision was made to analyze the priorities which gamers claim to have established to communicate with their neighbors, along with the skills that they believe to have acquired playing this game.

4.1 Priorities to communicate with their neighbors

Networked games add a distinctive component to conventional videogames because they incorporate tools which activate user participation, creating virtual communities and making communication easier with synchronous conversations by means of chats or publications on their personal wall –like on Facebook– where they can ask other gamers for help or make visits to their cities. In *CityVille*, interaction ir rewarded with the acquisition of resources to play and the achievement of greater power shares. Regardless of that, it is players' priorities that give an impulse to communication with others; hence our decision to examine the priorities mentioned by the actual gamers (Table 2).

94.3% of the respondents point out that they definitely agree on the fact that one of the priorities established to communicate with their neighbors is to expand their own city, an attitude which is rewarded by the game; 91.4% add that it allows them to advance more quickly, to obtain energy and to move up levels; followed by a group representing 90.5% who justify it by the advantages obtained through the interaction with their neighbors such as, for instance, acquiring more XP, while they simultaneously receive help to expand their city. These highly competitive approaches, which are reinforced by the game, can even be regarded as utilitarian, as they generate a system of interdependence relationships determined by individual interests. This is reflected on their comments, as shown by the fact that a considerably higher percentage of respondents prioritize the request both for help (91.4%) and for building elements (88.6%), as opposed to those who use communication to help others to expand their city or to reward them with gifts (67.6%).

The ANOVA verified the differences between sexes when it comes to the priorities established by gamers to communicate with others. Women prioritize communications as a way to help others ($F(4.09) = 2.40$, p < .040, ηp^2 = .065), to expand their city ($F(4.19) = 2.74$, p < .043, ηp^2 = .077) and to share strategies ($F(4.02) = 3.16$, p < .048, ηp^2 = .125), whereas men communicate with their neighbors if that guarantees them the possibility of building the city of their dreams ($F(3.59) = 3.08$, p < .009, ηp^2 = .015), having something of their own even if it is virtual ($F(2.26) = 2.03$, p < .038, ηp^2 = .042) and learning new strategies ($F(2.25) = 2.02$, p < .040, ηp^2 = .091).

Table 3. Percent distribution of players according to the degree of acquisition that they believe to have reached in the different skills with *CityVille*.

Skills when playing in *CityVille*	I disagree	I hardly agree	I agree	I quite agree	I strongly agree	*M*	*SD*
1. Psychomotor (laterality, spatial organization, hand-and-eye coordination).	15.2%	14.3%	28.6%	27.6%	14.3%	3.11	1.266
2. Information assimilation and retention (attention, memory, association of ideas).	7.6%	8.6%	7.6%	17.1%	59.0%	4.11	1.303
3. Information search and treatment.	10.5%	11.4%	18.1%	29.5%	30.5%	3.58	1.314
4. Organizational (devising plans, organizing resources and events).	3.8%	5.7%	8.6%	13.3%	68.6%	4.37	1.103
5. Analytical (formulation of hypotheses, deductions).	12.4%	17.1%	25.7%	15.2%	29.5%	3.32	1.383
6. Decision-making.	4.8%	1.9%	7.6%	18.1%	67.6%	4.42	1.045
7. Creative.	1.9%	2.9%	7.6%	16.2%	71.4%	4.52	.900
8. Problem-solving.	5.7%	3.8%	9.5%	14.3%	66.7%	4.32	1.156
9. Interpersonal (leadership, critical capacity, participation in collaborative projects).	8.6%	12.4%	17.1%	21.9%	40.0%	3.72	1.334
10. Metacognitive (I learn from my successes and failures).	7.6%	7.6%	15.2%	27.6%	41.9%	3.89	1.230

The nine priorities put forward by gamers when communicating with their neighbors (Table 2) are polarized around two categories: (a) those linked with collaborative processes –the so-called 'collaborative priorities'– such as helping others to expand their cities, collaborating with them by rewarding them with gifts, sharing and learning new strategies; and (b) those oriented to personal achievement or competitive priorities, such as building their own city, owning something, obtaining energy, XP, resources and moving up levels. The ANOVA similarly confirmed that women communicate in order to share and collaborate with their neighbors, while men do so giving priority to their personal achievement.

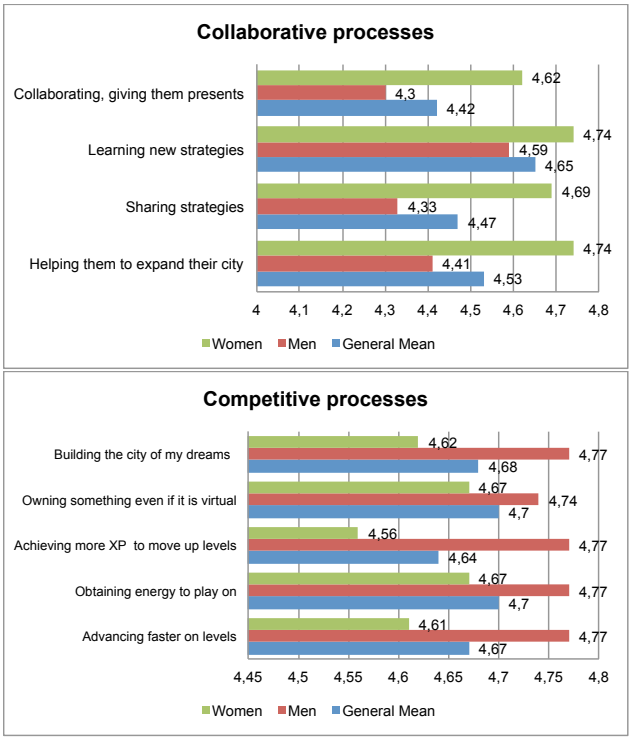

Figure 3. Distribution of *CityVille* gamers' means according to the processes that they prioritize in their communication

CityVille obviously favors implicit learning outcomes of various kinds which users gradually incorporate into their playing experience, adopting different strategies to optimize the process of construction and expansion of their own city. More precisely, 66.7% express their total agreement and state that they communicate with their neighbors in order to share strategies meant to reach higher game levels.

4.2 Skills that users believe to have acquired playing the game

The game has allowed us to prove that subjects acquire and develop different skills according to the practical implementations requested, the cognitive structure involved, as well as to the extrinsic and intrinsic motivations activated and the socio-emotional relationships which might eventually arise.

Table 3 collects the opinions of the interviewed gamers about the level of acquisition of different skills –psychomotor skills, skills related to problem-solving and decision-making, interpersonal skills, etc.– which players claim to have acquired playing in *CityVille*.

The skills that gamers believe to have acquired to a greater extent are the creative ones (71.4%). It is with good reason that the game encourages players to plan their task implementations and the designs of their cities. These are followed by organizational skills, with 68.6%, undoubtedly essential to manage and distribute resources for the construction and shaping of their cities. The same happens with skills linked with decision-making (67.6%) and problem-solving (66.7%).

A smaller percentage was assigned to the retention and assimilation of information (59.0%). It is worth highlighting that, according to 42.0% of the respondents, the game offers them a chance to learn from their own mistakes. A significant percentage (61.9%) is represented by those who believe to have developed their interpersonal skills to some or to a great extent, since the game encourages interactions with others associating those interactions with various rewards.

After examining if the sex variable could discriminate the skills that gamers believe to have acquired with *CityVille*, the ANOVA did not detect any significant differences ($F(8.78) = 12.36$, p = n.s.). However, it was observed that female players claim to have acquired some skills to a greater extent than others, especially creative skills ($M = 4.67$) and organizational

ones (M = 4.64), unlike men, who highlight creative skills (M = 4.44), decision-making (M = 4.44), problem-solving (M = 4.24) and organizational skills (M = 4.21) (Figure 4).

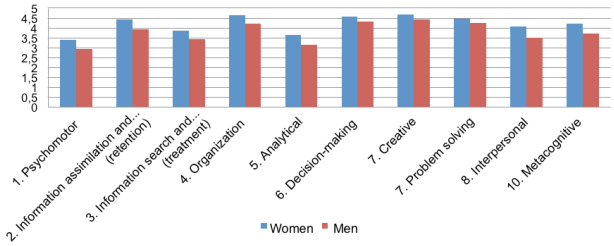

Figure 4. Distribution of gamers' means depending on the skills acquired, differentiated by sex

Factor analysis permits to verify how the skills that players claim to have acquired playing with *CityVille* are grouped together around two components (VE = 79.46%, KMO = .903). The first one includes creative skills, those related to the assimilation and retention of information, organizational skills, and those focused on decision-making and problem-solving, which can be defined as executive skills associated with the most practical expression of this game. Instead, the second component groups together analytical and psychomotor skills, those related to the search for information, along with metacognitive and interpersonal skills, categorized as socio-functional skills especially linked with reflection and socialization (Table 4). The scores for these variables were kept as new regression variables for later statistical analyses.

Table 4. Components Summary of acquired skills by City Ville Gamers applying Varimax Rotation (N=105)

	Factor loading		C*
	1	2	
1. Psychomotor (laterality, spatial organization, hand-and-eye coordination).	.183	**.875**	.798
2. Information assimilation and retention (attention, memory, association of ideas).	**.704**	.558	.807
3. Information search and treatment.	.405	**.825**	.844
4. Organizational (devising plans, organizing resources and events).	**.789**	.275	.699
5. Analytical (formulation of hypotheses, deductions).	.278	**.876**	.844
6. Decision-making.	**.818**	.283	.750
7. Creative.	**.875**	.209	.810
8. Problem-solving.	**.767**	.448	.789
9. Interpersonal (leadership, critical capacity, participation in collaborative projects).	.474	**.785**	.841
10. Metacognitive (I learn from my successes and failures).	.587	**.648**	.764

*Communalities

The ANOVA revealed no statistically significant differences between the skills that men and women believe to have acquired playing this game (executive skills [F (1.21) = 1.21, p = n.s., ηp^2 = .725] and socio-functional ones [F (3.15) = 3.10, p = n.s., ηp^2 = .725]).

The multiple regression analysis additionally made it possible to identify the variables which are correlated to executive and socio-functional skills. The results prove that predictors account for 48.2% of the variance [R^2 = 0.233, F (10.21) = 24.20, p < .000], executive skills show a correlation with how long players have been playing in *CityVille* (β = -.227, p < .077), with the level reached (β = .441, p < .000) and the way in which they arrived (β = -.362, p < .057) –mainly through their friends and acquaintances.

Regarding socio-functional skills, predictors explain 40.6% of the variance [R^2 = 0.165, F (4.93) = 17.14, p < .001], are related to their condition as regular gamers (β = .606, p < .079), to the time dedicated to the game on a daily basis (β = -.199, p < .034), the size of their cities (virtual population: β = .172, p < .002, and the number of neighbors: β = -.120, p < .023. On the whole, gamers perceive that they have boosted both their executive skills, by trying to compete with their neighbors, and the socio-functional ones, in their unrestrained effort to make their city grow.

The aforesaid multiple regression analysis contributed to identify which purposes influence each type of skill developed to a greater extent. More specifically, in relation to executive skills, predictors account for 61.8% of the variance [R^2 = 0.409, F(20.8) = 39.76, p < .000], an influential role is played both by their wish to own something, even if it is virtual (β = .630, p < .000) and by their willingness to share strategies (β = -.257, p < .065) and play with others (β = .074, p < .017). Instead, predictors corresponding to socio-functional skills explain 31.1% of the variance [R^2 = 0.097, F (5.48) = 10.09, p < .005] and are correlated with the aim of sharing strategies (β = .636, p < .001) and obtaining more energy to continue playing (β = -.572, p < .010).

It can finally be stated that the game mode proposed by *CityVille* contributes to make gamers perceive that have acquired various skills, and therefore, consider that this game generates a ludic atmosphere of collaboration and optimal strategy exchange through communication between neighbors.

5 CONCLUSIONS

Online games take advantage of the connectivity that social networks offer users to promote their interaction, presenting the game as a resource not only for entertainment but also as a vehicle to channel communication and interaction between gamers. This collaborative entertainment phenomenon simultaneously contributes to the acquisition and development of various skills.

CityVille is a ludic platform which encourages communication between gamers, fostering their interaction through the networked game, where an essential role corresponds to the planning and implementation of effective strategies to make progress and reach greater accomplishments and power shares expanding their cities.

Users' motivations to play in *CityVille* are associated with the fact that they have fun playing and that it allows them to feel happy, satisfied and self-fulfilled. They justify their continuance in the game by the chance that the latter offers them to have fun, to obtain energy to continue playing and to build the city of their dreams, to have something of their own even if it is virtual, to learn or share new strategies (66.6%) and to meet new people.

Gamers seek to communicate with their neighbours in order to expand their city, since that is rewarded with the collection of energy, as a result of which they have more XP, which allows them to move up a level and continue playing. Furthermore, they

highlight the need to communicate with their neighbors in order to ask them for help to build their city and thereby contribute to expand theirs too. *CityVille* generates a system of interdepence relationships between gamers which is reinforced by their respective interests and can encourage communication, interaction and competition with one another.

The priorities established by women to communicate with their neighbors have a collaborative character (helping to expand their city, collaborating by giving them gifts, sharing and learning new strategies); whereas those established by men have a more competitive nature (building their own city, owning something, obtaining energy, XP, resources and moving up levels). The former communicate to share and collaborate with their neighbors, while the latter do so prioritizing their personal achievement.

The skill acquisition favored by this game is determined by its collaborative nature, betting on communication and the exchange of experiences between gamers and helping to create scenarios to share and learn strategies –as stated by 85.7% of the interviewed players.

It is finally inferred that *CityVille* can offer gamers opportunities which go beyond mere entertainment; the game makes possible to develop executive and socio-functional skills because, in the effort to expand their cities, gamers need to combine various strategies and alternatives to move up levels. Moreover, it promotes a collaborative type of entertainment, advocating interaction between gamers and mutual help in order to reach their respective goals, activating interpersonal skills –as pointed out by 61.0% of the players consulted. It equally encourages communication and strengthens relationships between virtuil friends and/or neighbors, widening their social network thanks to the game and, more precisely, to the construction of virtual cities.

There is no doubt that some games hosted on social networks such as *CityVille, FarmVille, CastleVille*, etc. constitute ludic platforms which promote both communication between users and the exchange of strategies from collaborative activities that benefit everyone, far from the often-criticized competitive practices of other games.

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