Videogames Evolution of their Graphic Line _ an Approach Between Aesthetic and Technology _

Evolución de Videojuegos y su Línea Gráfica _ un enfoque entre la Estética y la Tecnología _

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Abstract

There are many studies about the historical evolution of videogames, by considering, for decades, their creation as a technological milestone of obvious acceptance in the market. However, in these studies, due to the high importance given to the development of the technology they use, the value of the aesthetic aspects involved in them has been omitted. For example, the personification of a character, ignoring the importance that its design can have in fulfilling its role in the game; due to its connection with the player. This research seeks to analyze the evolution of graphic lines of characters and the environment of popular video games. The perception of video games in a sample size of a young Ecuadorian population is also analyzed. The most relevant aesthetic aspects of the videogames related to their evolution and success in the market are studied. The evolutionary changes that have occurred in their main characters are also analyzed, evaluating important aspects such as quality, colors, shapes and textures considered in its design. Other graphic elements are observed in the direct relation with the development of contents, and videogames trends, as well as the way in which their characters interact with a player.

Keywords: Videogames; aesthetic; design; graphic line; technology.

Resumen

Existen varios estudios sobre la evolución histórica de los videojuegos, considerando por décadas, su creación como un hito tecnológico de manifiesta aceptación en el mercado. Sin embargo, en estos estudios, por la elevada importancia que se da al desarrollo de la tecnología que utilizan, ha hecho que se omita de cierta forma el valor de los aspectos estéticos involucrados en ellos. Por ejemplo, en la caracterización de un personaje, se ignora en muchos casos la relevancia que su diseño puede tener en el cumplimiento de su rol en un videojuego, dada la conexión con el jugador. Esta investigación busca analizar la evolución de líneas gráficas considerando los aspectos estéticos de sus personajes e interfaces en videojuegos populares. También se analiza la percepción que se tiene de los videojuegos desde el punto de vista de un grupo de jóvenes ecuatorianos. Se identifican los aspectos estéticos más relevantes relacionados con la evolución de los videojuegos y su éxito en el mercado. Se analizan, además, los cambios evolutivos que se han dado en sus personajes, evaluando aspectos importantes de su diseño como: calidad, colores, formas y texturas. Se observan otros elementos gráficos en relación directa con el desarrollo de contenidos, y tendencias de los videojuegos, así como la forma en que sus personajes interactúan con el jugador.

Palabras claves: Videojuegos; estética; diseño; línea gráfica; tecnología.

1. Introduction

The graphic line of characters designed as protagonists for video games has evolved for generations in apparent relation to technological development, both in terms of hardware and software (Belli & López Raventós, 2008). For example, the evolutionary innovations in the ease of manufacturing game consoles led to the creation of multi-use mobile devices (Belli & López Raventós, 2008; Dillon, 2016). This is also the case with cell phones, which support the execution of games, currently including 3D images and augmented reality. Therefore, it is evident that research on video game evolution has been developed from a predominantly technological perspective (Belli & López Raventós, 2008; Planells de la Maza, 2010), leaving aside the study of graphic design and other aesthetic aspects represented in their virtual worlds. There is also little literature that addresses the digital evolution of video game characters and the importance their aesthetic appearance can have on the adoption of such games.

When analyzing the success of video games and what gives them their current appeal, we cannot ignore the graphic and audiovisual factors (Sánchez, Alfageme, & Serrano, 2010), which is a fundamental reason for their popularity. The good quality of the graphics, varied design effects, and the aesthetics used for the characters make the public an attractive product with potential for success (Vida & Hernández, 2005). For decades, it has been argued that design becomes the essence of something, containing everything that seeks to represent a company in its products (Wong, 1993), a criterion that is still valid.

Nowadays, video games can no longer be considered just an object of entertainment or something superficial that can be extinguished with the changes in the individual's tastes over time (García & Gértrudix, 2006). These have remained rooted in society due to their constant evolution and transformation, parallel to people's changing interests, considering the experiences and sensations they generate in the player (Sánchez et al., 2010). The types of games are so moldable that they have been involved in various categories and added to their repertoire over the years. For example, we can identify a lot of literature about how games related to sport, fight and action, history, mental agility, music, and even education have been developed (Belli & López Raventós, 2008), both in logical reasoning, languages, natural sciences, mathematics, among other disciplines. However, we found very little evidence of research on the effect of their aesthetic aspect on players, whether at a social, personal, or psychological level.

On the other hand, when analyzing the success of video games and what gives them their current appeal, you cannot ignore the graphic and audiovisual factor (Sánchez, Alfageme, & Serrano, 2010), this being one of the fundamental reasons for its popularity. The good quality of the graphics, varied design effects, and the aesthetics used for the characters make the public an attractive product with potential for success (Vida & Hernández, 2005). For decades, it has been held that design becomes the essence of something, as it contains everything that a company seeks to represent about its products (Wong, 1993), a criterion that is still valid today. Nowadays, video games

can no longer be considered just another entertainment object or something superficial that can be extinguished with the changes in the individual's tastes over time (García & Gértrudix, 2006). They have remained rooted in society due to their constant evolution and transformation, parallel to people's changing interests, considering the experiences and sensations they generate in the player (Sánchez et al., 2010). The types of games are so malleable that they have been involved in various categories and added to their repertoire over the years. For example, there is significant literature on how games related to sports, fighting and action, history, mental agility, music, and even education have been developed (Belli & López Raventós, 2008), covering logical reasoning, languages, natural sciences, mathematics, and other disciplines. However, we find very little research evidence on the impact of aesthetic appearance on players, whether at a social, personal, or psychological level.

On the other hand, there are studies that show great acceptance of video games in young people, whether as personal entertainment or emotional aid (Sánchez et al. 2010), raising the question of why the results? Also, we wonder if the graphic line, its color, design, and possible changes related to its aesthetic and visual aspects psychologically attract people to use a video game. Based on the questions, the objective of this research is to analyze the evolution of the graphic line of the most popular video games in recent decades, taking into consideration existing literature and the opinions of young Ecuadorians as focus groups in a local environment. This

is to determine the most relevant aspects identified in successful video games.

Through an exploratory study to reconstruct a chronology of video games to identify important factors related to design aspects and other binding characteristics. This leads us to answer the following questions: What are the most relevant aspects of the evolution of the graphic line of the most popular video games in our environment? The study begins with the analysis of relevant literature on the subject. Then, it continues with the analysis of primary data from surveys and interviews with focus groups of young people living in the city of Guayaquil. With this data, the first findings on preferences and use of video games and their aesthetic characteristics are obtained for the analysis of results.

1.1. Justification

Existing studies on video games reveal that they have changed over time. The capabilities, skills, and abilities of different video game characters and the establishment of objectives for solving the problem presented in the video game as the goal to be achieved are some of the suggested bases for conducting research on the topic (Sánchez et al., 2010). Based on this, it is also important to understand the most important aspects to consider before purchasing a video game. The user's experience with aesthetic aspects to be reviewed, such as design, colors, shapes, and textures, depends on the different video game companies, as each uses a different graphic style. Although we find literature on the history of video games and other related topics, such as the studies by Belli and López

Raventós (2008) and Dillon (2016), no specific information has been found about their characters, their relationship with a graphic style, and the structure of their designs, within the context of the history and themes of the video game. Especially for the analysis of educational effects on children and young people linked to a social, historical, or cultural context.

2. Theoretical Framework and Literary Analysis

Since its inception, the popularity of video games in society has steadily increased, creating its own market under the umbrella of the entertainment industry. Their development has improved considerably, starting with flat illustrations and animations of two dimensions, such as Arcade machines, simple home consoles, and virtual reality. There is literature, videos, and images that describe the evolution of video games and their development in history, such as the study of the birth of video games since 1952 presented by Belli and López Raventós (2008) and others about adventure games since 1975 of Planells de la Maza (2010). They place greater emphasis on their technological development. However, there is a lack of knowledge about the evolution of the graphic line and aesthetic and visual factors.

There are arguments that, since 1952, have indicated the development of a program that is considered the first video game called "Nought and Crosses," also known as OXO. The game was an automated version of the classic three-in-a-row paper, which ran on a computer from that time ().

During that decade and between the 1960s and 1970s, other video games adapted to computers of the time were developed at the Massachusetts Institute, MIT, and Standford University, respectively (Belli & López Raventós, 2008).

In 1974 an entertainment device was developed using Cathode Ray Tubes (CRT). This was so simple it was just a radar, where the player controlled a missile with the aim of making an impact against the object (Dillon, 2016). At that time, image and design were not apparently important in the development of video games. Nevertheless, this period is considered the beginning of a new era in the entertainment industry.

Source: https://cutt.ly/BtT1Wj
Figure 1. Game simulator: Nought and Crosses.
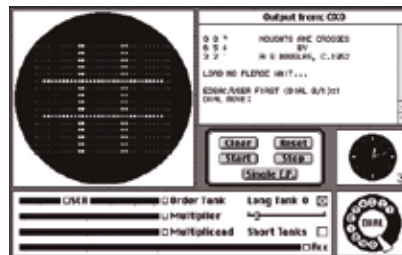
In the 1970s, arcade games also appeared; some examples of these early games are Spacewar, Computer Space, and Space Invaders (as an example). These games emphasized programming aspects, as their goal was to test players' speed and reflexes to attract early enthusiasts. However, these features of first-person action games were limited by technological constraints (Belli & López Raventós, 2008). An evolution was also identified in the physical design of

consoles and large machines with different designs, which were placed in establishments where people would play.

Source: https://cutt.ly/9tT1dQ

Figure 2. Computer Space Interface.

In the mid-'80s and '90s, there was the popularization of "Nintendo Entertainment System" (NES) consoles, defined as Nintendo home consoles, which began to show great changes in design, both in characters, interphases, and other elements involved as an integral part of the game. It identifies the marked use of images defined as 2D, solid, and bright colors with black backgrounds. López Raventós (2016) indicates that in this period, in certain parts of the world, there were polarizations on the use of video game systems, already a little more attractive but on different technologies. While Japan was betting on the use of home consoles like the Famicom (Family Computer), launched by Nintendo in 1983 and known in the West as NES, in Europe, it favored the use of microcomputers like the Commodore 64 or the Spectrum.

According to Belli and López Raventós (2008), in the 1990s, there was an important technical leap in video game consoles with the so-called "16-bit generation". Introducing

the Super Nintendo Entertainment System "SNES," the Turbografx as the NEC PC Engine, the CPS Changer (Capcom), and the Neo Geo (SNK), a console with similar technical characteristics to an arcade but too expensive for home use. However, there was a significant increase in the number of players, the introduction of new technologies such as CD-ROM use, and significant changes in the evolution of types and genres of video games. Thanks to the increased technical capabilities available for PC, new 3D environments are emerging from pre-rendered 3D environments such as Alone in the Dark, which are produced on the SNES, like Donkey Kong Country and Killer Instinct. In this era, the first successful polygonal game known as Virtual Racing ( ) also emerges as a launching point of 3D technologies.

Source: https://cutt.ly/ptT1Yp

Figure 3. Virtual Racing Interface.

One can look back and notice the constant visual evolution in the aesthetics of video game graphics. From using lines and geometric shapes to including more complex 2D characters, the first experiments in representing a 3D environment by shading pixel colors to create the illusion of volume, and eventually, the discovery and use of polygons to create true digital three-dimensionality. Interestingly, this began with the development of the first 3D model in 1974, based on a simple mathematical model

created from a teapot sketch ( ). This model, known as the Utah Teapot, was designed by Martin Edward Newell at the University of Utah and has become an iconic symbol in computer graphics (López, 2015).

Figure 4. Sketch Utah by Martin Edward Newell.

Currently, the interest of video game developers is focused on providing higher quality with realistic and hyperrealistic game aesthetics, taking into account aspects such as augmented reality and online accessibility. The goal is to reach users by connecting various devices to the internet to play games, primarily through widespread use on mobile devices such as cell phones and tablets (Lara & Villarreal, 2004).

2.2. Video games, their aesthetics, their relationship with technological aspects, and the entertainment industry.

The technology and video game industries have been intertwined since their inception. This is intended to demonstrate the capacity of computers for technological innovation. The evolution of the video game console industry, its impact on the entertainment world, and its global value are also mentioned. It is also argued that the video game industry has been directly linked to technological innovation. Electronic technology industries have always driven innovation in this field. For example, semiconductor companies such as Fairchild and National Semiconductor believed that video game consoles were perfect for their new technology, thus having a significant impact on boosting video game production (Johns, 2005).

It is argued that among the technological factors that have contributed to making video games look more aesthetically appealing is the progressive development of higher resolution –pixels per inch– screens, as this allows for improved definition and sharpness of their graphics. For example, VGA (video graphics array) resolutions and numerous slightly different extensions that increase the number of pixels per inch, designed for screen formats with different aspect ratios, such as 4:3, have been used. Also, HD (high definition) resolutions for 16:9 screen formats. Each type of format has specific dimensions and color palettes handled by a large number of megapixels in interlaced images transmitted at high speed, providing higher quality and richness in the image (Bustillos Rojas, 2013).

Another very important technological factor for gamers is latency, understood as the time elapsed between the instant a player performs an action, from the keyboard, mouse, or by pressing a touch button, until the moment it is displayed on the screen (Dávila, Macías, & Lamas, 2017). Depending on the hardware values, the screen processes information as projected frames per second or frame rate, managing color space on the monitor and displaying an attractive and pleasant image.

On the other hand, part of the video game industry's growth is related to the corporate giant Nintendo, which, with the huge Super Mario Bros. game's huge acceptance, revolutionized the industry with a console that revitalized a declining market and forced several companies to close. This console, called the NES, along with the launch of the popular Super Mario Bros. game in 1985, would lead Nintendo to position itself in the global market. The NES, with just 2KB of RAM and an 8-bit data transmission bus, allowed for an entertaining experience for many despite the limitations of the technology and the capacity that could be achieved at the time. Over the years, several consoles were developed that supported the advancements of Super Mario Bros. games, leading to the emergence of the Nintendo 3DS. This model shows great fluidity in the visual experience and a complete liberation from the 2D format to 3 (Nintendo, 2019).

Since 1995, an international video game convention called Electronic Entertainments Expo (E3) has been held, where video game companies exhibit their upcoming releases. For the June 2019 convention, there is already a list of games to be presented, including Star Wars Jedi: Fallen Order, Battlefield V, FIFA 20, Madden NFL 20, and The Sims 4. All with realistic to hyper-realistic aesthetics. Here again, Nintendo is betting on realism with the launch of Pokemon Sword and Shield. All these games developed by high-end companies are called AAA games due to the current trends towards which young people are aiming (Vidaextra, 2019). Despite the attraction to realism, the popularity of other video games with retro aesthetic

features is also identified, such as the so-called Indie games created by individuals and small groups. These games are beginning to compete with AAA, offering a variety of realistic and non-realistic styles. While moving away from the realistic, some of these games have developed a consistent retro aesthetic. Many opted for elements such as pixel art, black and white, watercolor imitation, and pencil drawing, among other techniques. This is the case with Cuphead (Figure 5. Cuphead vintage aesthetic), a video game with the same aesthetic as old Walt Disney films and shorts but with the ease and freedom of movement offered by its 2D digital format (Moreira, 2017; PérezRufí, 2016).

Source: https://bit.ly/2wKVZGy

Figure 5. Cuphead old aesthetic.

2.3. Evolution of video games and their influence on education and visual media.

One of the analysis variables to argue the evolution of video games in the audiovisual media is that they have taught that nothing is born spontaneously. This means that the growth of video games occurs thanks to the advancement of technology that goes hand in hand with the digital revolution, and that allows research to reveal its importance and how it is introduced in cultural, social, educational, and industrial media. The fact that there is a lot of research on video games

and their effects is a sign of their importance as a topic of discussion. For example, the study called "Game Studies" explains that the set of theoretical processes of several researchers should be shared and brought to an end among several since, as a theory, video games need to be better understood as a phenomenon (Navarrete, Gómez, & Pérez, 2014).

Today, video games are a technological resource that is being recognized as useful from other points of view, particularly used in the classroom as an educational support tool. It is argued that video games with good planning provide highly creative situations that, when well conducted, contribute to or encourage exploration, research, and significant discoveries (Cuello, 2006).

In a study by Chuang and Chen (2007), they sought to find the differences between standardized learning and the application of video games through observation and analysis. They were able to identify in their results the existence of a great difference between both scenarios. In other studies, it is also argued that video games used as didactic games can be a great support in education since their use, for example, can directly influence children's learning as a fun and easy way to understand (Marín & Martín, 2014; Solorzano, 2006).

The fact that video games as a support in the classroom can facilitate the learning performance of students is demonstrated by this type of study, where it is indicated that video games not only improve the processes of memory/ fact of the participants but also promote problem-solving skills at a time

when the participant recognizes multiple solutions for them. For example, the study by Chuang and Chen (2007) focused on participants remembering key facts, definitions, and concepts, which apparently resulted in a better understanding of factual materials and concepts. Consequently, it is identified that users know they have to memorize key facts or concepts even if they are just playing a game.

2.4. Importance of characters in the evolution of video games as a primary creative element.

Video games carry a symbolic charge, which is why they are compared to a work of art in which the audience becomes involved. While in the performing arts, the artist seeks to be the performer, the player is seen as such in video games. The artist uses references from other artists for their work. The player executes actions proposed in the game to develop or advance the plot (Tavinor, 2010). To this end, they appropriate game modes that allow them to become more interested in the story, generating genuine interactivity. There are third-person video games that represent their players as computerized characters, such as Super Mario Bros. and Sonic. In other video games, however, the gameplay is first-person, in which the player's view is simulated on the screen, interpreting this action through limbs or parts of the torso holding a weapon. This game model is popular in Resident Evil (Tavinor, 2010).

In the evolution of video games, creative elements have been established based on the communicational elements of this area. These are the story, the characters that will

inhabit the game, and the genres of other types of games. These elements will give an orientation and credibility to the game. In the beginning, these elements were simply cyclical actions, and then more elaborate illustrations began to be developed, using different graphic styles. Later, stories became important by incorporating animals and objects to create conflicts within the story that the main character of the videogame should solve.

Source: https://cutt.ly/ytT0qx

Figure 6. Super Mario Bros 1 Interface.

Source: https://cutt.ly/ttT0ss

Figure 7. The old version of The Legend of Zelda, 1986.

Garfias (2010) indicates that the inclusion of a character, to assume their existence and give greater credibility to the game, began to be considered an important part of the video game's story, even if that character does not narrate or tell anything. A character should have character and perform actions that define their personality within the video game context. The video game industry leverages these traits to provide entertainment with the character as long as a prior study of the cultural context of that time has been conducted. This author maintains that

> stories cannot be created without characters since their actions carry the weight of the plot. The important thing about a character in video games is to exploit the visual character that the medium offers so that their clothing, accessories, and personal brands refer to the reason for their personality and actions (Garfias, 2010, p. 168).

It also indicates that George Broussard, president and creator of 3D REALMS, argues that the key characteristics that should be considered when designing a character are personality traits, appearance, motivations, crutches, and names. The combination of these elements derives personality.

Going back to the 80s and 90s, with the arcade game where the first Pac-Man character with recognized design features was born. The designers then reinforced the idea of making games like Donkey Kong (Figure 8) and Sonic (Figure 9), which marked history. From there, the character acquired the star's role in this world. With the incorporation of the characters, the need to adapt them to a

genre was created. This refers to classifying video games into groups of genres, such as action, adventure, platform, racing, shooting, role-playing, puzzles, and musicals, among others (Garfias, 2010; Latorre, 2011).

Figure 8. Donkey Kong Interface, 1981.

Figure 9. The initial screen of the Sonic game, 1991.

According to the Royal Spanish Academy (RAE), graphic design is defined as "the previous process of mental configuration, prefiguration in the search for a solution in any field." From the first theories of Wallas, which began in 1926, the creative process for a good design should be classified as follows: preparation, where the design idea is born, defining characteristics that must be adapted to the environment; incubation, where all the probabilities of the design to be developed are captured, it requires a high level of imagination, images and symbols are used to get to what is wanted; illumination, where the idea can be clearly visualized; and finally, verification, which is where the idea is started to see if it meets the proposed objective (Contreras & Broitman, 2013).

Another important aspect of the graphic line is the choice of colors, as Castañeda points out: "We should carefully examine the appearance in color typologies, understanding the role they play in accordance with communicative or decorative nature of the product" (2008, p. 3).

Finally, for the graphic line of the games, a character construction must be followed. These may include formulating character hypotheses, reviewing the character hypothesis, relating interviewed users to behavioral variables, identifying behavioral patterns, synthesizing relevant characteristics and goals, verifying the completeness of the cast, developing narratives, and defining character types (Méndez, 2010).

3 Methodological Approach and data collection

This exploratory research allows the subject to be analyzed and divided into sections for a broader view of the in-depth

details that must be investigated. Therefore, a pragmatic paradigmatic approach follows a methodological process where pluralistic methods strategies are applied whose purpose is to achieve a result, but not in the rigor of the method (Creswell, 2013; Solorzano, Sanzogni, & Houghton, 2014). Research begins with the construction of a baseline where the problem is identified and problems formulated to determine a more accurate study and to establish priorities for collecting information relevant to the topic. A survey was designed as part of the tools for collecting primary data and their subsequent analysis on some issues at qualitative and quantitative levels. The survey is conducted in person or using digital media such as Google Forms. The pilot test was planned to be conducted as a survey of at least 40 young people living in the city of Guayaquil. The aim is to be able to sample in order to understand better opinions and preferences regarding the use of the most popular games in a local environment.

Some of the information collected is quantified to facilitate the analysis and presentation of results. The percentages of young people who like and continue to play video games are examined, as well as the preferences and opinions regarding the visual aspects of the game, such as graphic style, textures, color, rendering, quality, and character. Also, it is selected and analyzed for the type of video game company that completes most of the preferences to be identified.

Using qualitative methods, 10 interviews were conducted with cultural groups of video game enthusiasts. These interviews were conducted in person with young people for whom video games are already part of their daily lives. The goal was to identify the perceptions and opinions of people in the field regarding the research topic. The data collected was categorized using open and axial codes to facilitate the presentation and discussion of the results.

4. Data analysis

In the tabulation of data collected from a survey process carried out on 40 young people and 10 interviews, 80% of the population concerned are between 18 and 30 years old, 12% are 9 to 12, and 8% are over 30. More than 90% of this population are currently playing video games, and over 40% play two to three games actively. Aspects related to use preferences and visual characteristics of the games were asked for further analysis and discussion of results (figures 10-14).
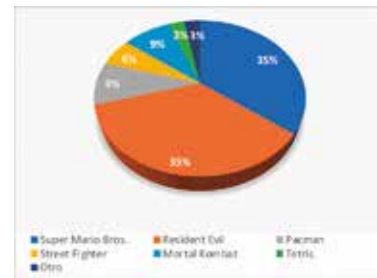

Figure 10. What do you consider to be the most popular or well-known video game in Ecuador at this time?

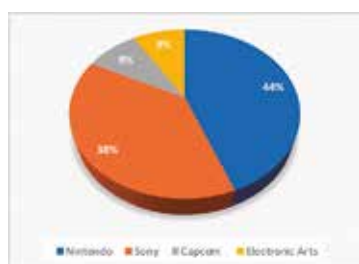**Figure 11**. What visually attracts you the most in a video game?

Figure 12. Which of the following video game companies do you consider to present better visual aesthetics in video games?

Based on the questions asked, giving the respondents a list of the most popular games identified in the history and evolution of video games, they selected Resident Evil and Mario Bros as the most popular in the medium with 35% of the total (Figure 10), coinciding with the popularity of these same games also at the international level, according to literature identified on the subject.

Regarding the visual image of the games, 59% of respondents indicate that their visual preference is related to the video game quality (Figure 11). And, among the influential companies in the industry, a close preference is reflected between SONY with 38% and Nintendo with 44% (Figure 12).

Additionally, it was determined that among the respondents, the most popular video game genres currently used by users are strategy, educational, and arcade (Figure 13). It was also given to choose from their favorite video games by ordering them according to their preferences, placing Super Mario Bros with 19% approximately (Figure 14) in the first place. This could be corroborated by placing Super Mario again as one of the favorites in history after selecting it among the two favorite video games that attract you visually, with approximately 35% (Figure 10).

Figure 13. Rank from highest to lowest, with 1 being the highest and 7 being the lowest; which type of video game do you like the most?

Figure 14. Select 3 video games that you like to play the most.

On the other hand, based on the interviews, it was observed that users are guided by their tastes and preferences when

choosing to play a video game (Table 1). It was also evident that the graphical aspects are very relevant for video game users. Most of them emphasize their preference in the style of the games, either current with surreal or retro (examples of coded opinions in Table 2). Still, they also relate to their preference for the genre of the game ((examples of coded opinions in Table 1).

interested in the game, being the context of the story what catches his/her attention, what captivates him/her at the moment of playing (examples of codified opinions in Table 3). In addition, it is identified that user's favorite characters are chosen by their personal tastes, apparently related to certain skills of their characters (examples in Table 4).

Table 1. Analysis 1 -

Example of user preferences and opinions

Category	Code	Recording unit
User tastes related to genre	Game preferences PJ	1. My preference with respect to video games is arcade. 2. I do like war games such as Call of Duty 3. I love Sony video games; they are realistic

Table 2. Analysis 2 –

Example of visual aspects preferences

Category	Code	Recording unit
Visual and graphic aspects of video games	Graphic style of the video game AGV	1. I look for realism; a good story is important. 2. I like it if it has a retro style, 8- and 16-bit graphics. 3. I love the characters; they have different behaviors and costumes with surreal aspects.

Table 3. Analysis 3 –

Example Content Preferences

Category	Code	Recording unit
Interest in the context and story of the video game	Description, plot of the video game. DV	1. There must be a good scriptwriter for the story. 2. It's a murderer who is in the past. The story connects with the users. 3. I love Mario Bros because it transports us to various worlds.

Table 4. Analysis 4 –

Example preference characters

Category	Code	Recording unit
Aspects of the character	Character personality and abilities AP	1. Because he is fast, he has long-range powers. 2. Mario Bros is very fast, very agile and swift. Above all, it's interesting that he has to save the princess. 3. Mario Bros is my favorite.

By analyzing the interviews, it was also possible to determine that the content or the plot of the video game is very relevant to the user since this way, he/she becomes

5. Discussion and results

5.1. Presentation and discussion of results

Regarding video game preferences, we first sought to identify the most popular video games in the environment in relation to those identified in existing literature on their history, evolution, and popularity to date, with Super Mario Bros and Resident Evil being clearly recognized in both cases. Then, we sought to know the video game genre that attracts users most in the medium. As a result, strategy and arcade video games stood out. Specifically, considering the choice of video games in the history and opinions of local youth as a reference, the questions of the statement in Figures 10 and 14 were taken into account. From the answers, it is highlighted popularity regarding the range of Nintendo games in Mario Bros, both in the opinions of which is the most popular (Figure 10) and in the choice of the video games they like the most (Figure 14), there was a greater preference for Mario Bros. This leads to analyzing whether these results' causes are more related to visual aspects or gameplay.

Addressing the issue of visual preferences, in general, 59% of local users indicate that they prefer the quality of the video game to appeal to visual aspects, referring to the definition of graphics. This is reinforced by the fact that 45% of respondents prefer Sony's aesthetics since it has video games that seek to be more realistic and have higher-quality graphics in pixel resolution and detail. However, his preference for Nintendo's video games was highly debated. However, it is argued that the reason for using Nintendo may also be influenced by being an institution already positioned by its video games, noting that Nintendo's games attract more by their gameplay than by their visual aesthetics.

5.2. Presentation of the results of the analysis of graphic lines in video games

As indicated in the previous section, the results identify Super Mario Bros and Resident Evil as the most popular video games. This selection provides more ways to develop a more specific analysis, specifically on the graphic lines of these two video games. It was sought to assess whether there are really more noticeable changes in dimensions, strokes, and chromatic range. The two visual factors within Graphic Design that were identified as the most relevant were color and quality. These will be taken as the analysis variables of the graph line. The quality variable is observed to be technically linked with the number of pixels on the screen and the density, measured in pixels per inch (Vázquez, Flores, Hernández, & Meneses, 2017).

Super Mario Bros. is a game produced by Nintendo that became popular during the 8-bit console era (Figure 15). Resident Evil was originally released for the PlayStation on a platform developed by Sony (Figure 16), which was later adapted to other platforms and had a 128-bit processing quality (Belli & López Raventós, 2008; Iglesias & Blanque, 2011). This allows us to see the evolution in the quality of graphics in video games, both in terms of strokes and the combination of colors, lights, and shadows, and how this combination of quality can influence preferences.
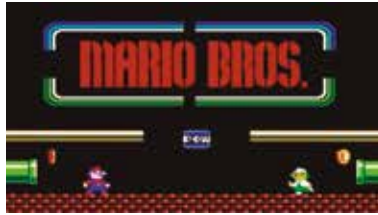
Figure 15. Mario Bros Interface, 2006.

Figure 16. Screenshot of the video game Resident Evil, 1998.

5.3. Evolutionary analysis of graphic features in Nintendo's Super Mario Bros.

1985. The first Super Mario Bros starts with a warm color palette: ochre, orange, brown and green. In terms of quality, large pixels, without borders or volume, are completely flat, given that the screen resolution did not allow for these aspects (Figure 17a).

1991. The palette is completely changed to cool colors, using cyan and magenta with monochromatic colors between lower blues and stronger pinks. More pixels are used on its quality, which generates a little more

volume in the composition of the character, including edges and more details such as areas of light and shadows by a greater use of colors. (Figure 17b).

1996. The colors are changed again, but this time not so far from the previous ones, changing magenta for red and cyan for blue, making use of the primary colors: red, blue, and yellow with a little white and using gray shades. Regarding its quality, the use of the character in three dimensions begins. Still, with incipient results, since geometric finishes and marked angles are observed, but the existence of volume is rescued. (Figure 17c).
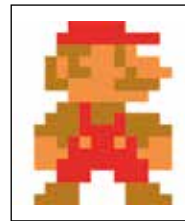
a) Mario Bros 1985

b) Mario Bros 1991.
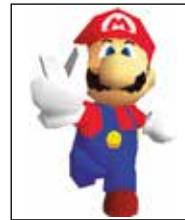
c) Mari Bros 1996

d) Mario Bros 2007.

Figure 17. Mario Bros character evolution

2007. The use of defined base colors in the aesthetic, red, blue, and yellow, which are primary colors without common shades, are a contrast to the eye and reach people more quickly. These colors in the character's

respective clothing become its trademark. In terms of quality, the on-screen resolution increases, allowing for a large volume in the character's construction. It becomes three-dimensional, with many details in the hair and variations in eye color. You can even notice the texture (material) of the clothes he wears, maintaining the animated style that has characterized the character since its beginnings (Figure 17d).

5.4. Evolution of graphic features in SONY Resident Evil

1998. A cool-toned palette is used within a monochromatic range of blues. In terms of quality, a 3D design was used from the beginning, but it was equally geometric without many details, using shadows to give the character volume (Figure 17a).

2004. In this second version, the color palette shows that the character generally wears dark or ochre jackets, which go hand in hand with the character's personality. The range of colors, such as grays and browns, conveys a sense of seriousness. In terms of quality, the 3D design is observed, with a notable improvement in the amount of detail, both in the clothing and in the character's structure, making it more realistic (Figure 17 b).

2012. The color palette is dominated by ochre and dark tones, as has been the case in previous releases, giving the character a dark personality. In this version, the quality of the three-dimensional design looks more realistic and fuller of details, from every fold of the clothes and hair design accessories such as weapons, characterizing the character (Figure 18c).

a) Resident Evil 1998

b) Resident Evil 2004.   c) Resident Evil 2012.

Figura 18. Evolución personaje Resident Evil.

5.5. Characteristics and design effect of the characters

Among popular video games, there is a trend framed in the quality that allows the resolution and processing speed of current devices and an aesthetic of realistic and hyper-realistic games and, in some cases, of retro character. The option is for players to choose the roles and actions of the characters to represent them virtually. Therefore, according to Ramirez (2012), the connection between the player and the video game is created by performing the player's actions.

Such a connection can become so deep that it can call into question the player-character roles, as a great immersion of the user in the video game is created. Users, in their role as players, and according to their personal tastes, the quality of the characters or the actions they represent, choose the games and their characters, thus demonstrating the high degree of importance that users give to video game characters.

6. Conclusions

Based on a review of existing literature and a discussion of the results from the primary data analysis, the evolution of video games was examined, identifying and analyzing some of the most popular. It was identified that character development and design, in terms of color palette and graphic line quality, at each stage or phase is also limited by the technological advances of the era in which they were developed and the console to which they belong. It is argued that the first games were based solely on executing actions limiting vertical and horizontal axes, which initially drove spatial games to achieve the highest score and advance to the next level. Later, complex plots were developed in which protagonists emerged. These characters, created with specific physical and intellectual characteristics, seek to fulfill a purpose within the games. Based on these aspects, the development of the image and visual effects of the protagonists and other video game elements are driven, seeking to fit them with the environment, aesthetics, and functions designed according to the game genre.

It is also observed that video games today, for the most part, tend to focus on a realistic and hyperrealistic game aesthetic. However, despite the attraction for realism, nostalgia for aesthetics has led them to take past elements but use them with current technologies. This is evidenced by the increasing popularity of other video games, such as so-called Indie games.

Players can choose a main character according to their preferences, allowing them to take on roles within the game. This is related to the degree of importance that users attach to their created characters, as well as the context of the video game, the graphics, its aesthetics, and quality. Based on these aspects, it can be deduced that the visual aesthetics factor is an important variable for users when deciding to purchase a video game. However, since the evaluations were carried out among a small group of young people, it is recommended that this study be expanded to confirm the results obtained.

7. Acknowledgements

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