

Colour and Light for storytelling and storydoing in museum videogames.

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ABSTRACT

This paper analyses some cultural videogames produced, in recent years, by art and archaeological museums, in order to understand how colour can become a visual tool to support gaming and cultural storytelling. The traditional methodologies of visual language analysis are adapted to the distinctive features of the new medium, as the interactivity and navigability of virtual game spaces. The aim of the research is to investigate colour both as a tool that the game designer uses to structure the narrative and as a visual element that the player interprets to develop the game actions.

KEYWORDS Cultural heritage, narrative colour, interactive colour, educational videogames, cultural games

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1. Introduction

The game sector has expanded rapidly in recent years, revealing the great potential of the videogame as an expressive and communicative medium. This has also happened thanks to the interdisciplinary field of Game Studies interested in pursuing two research paths: the anthropological one explores the psycho-pedagogical value of the videogame and its socio-cultural implications; the semiotic one is based on the design of the videogame, investigating the relationships between new forms of communication and visual language (Pecchinenda, 2010). This latter field of study demonstrates how videogames are not only a social phenomenon, but also the convergence point to redefine our relationship with the world of images (Wolf & Perron, 2003). In fact, videogames have a unique property compared to other visual narratives: they are the first medium that combines visual dynamism and an active participatory role. While the spectator observes the characters' dynamics from the outside in other media, the player is at the centre of the story in videogame, influencing the narrative through his actions thanks to the interaction. The new interactive role of the player, and thus the ability "to manipulate the images reproduced on the screen" (Alinovi, 2002, 17), determines new narrative opportunities also for the represented space that is no longer only observable, but also an explorable virtual place. Therefore, traditional narrative is replaced by what Sean Cubitt (2001) calls 'post-narrative spatialisation'. The designers can control the narrative process by distributing information in the game space (Jenkins, 2004), since they cannot predict every action carried out by the player. The player is tasked to interpret a potentially unlimited number of spatial representations and to produce actions and movements in order to reconstruct the story. The image is the first element to be perceived in the videogame (Günzel, 2008) because the visual component is the most pervasive dimension of the gaming experience (De Leo, 2007). Therefore, the elements of the visual language become a true communicative code between designer and player. Starting from these considerations, the research aims to investigate the narrative role of colour in videogames, analysing how it contributes not only to explicit narrative content, but also to transforming it into movements, actions or choices to be taken by the player.

2. Research Methodology

The topic investigated in this research is still little explored by scholars and, consequently, not provided with a rich bibliography for reference. It is therefore helpful to use the traditional methodologies of colour

studies and adapt them to analysing the new medium's main features: the narrative component, the emotional and perceptive immersion, the interaction and the playful exploration of virtual space. Torben Grodal describes the videogame as "the medium that is closest to the basic embodied experience of a story" (2002, p.197). Nicolas Esposito also defines the videogame as "a game which we play thanks to an audiovisual apparatus and which can be based on a story" (2005, p.2). The reference bibliography, therefore, is restricted to those texts that deal mainly with the semiotic, psychological and communicative aspects of colour, as these can be related to the videogames' peculiar features. It is important to circumscribe the type of videogames in the analysis to so-called Cultural Games. These are museum-produced videogames that accurately simulate the features of entertainment games. The only difference is that they introduce places and/or cultural assets into their narrative, with the aim of supporting the knowledge of the artworks and the fruition of the museum. This decision is based on the consideration that colour can be investigated starting from its role in the spatial representation, since the narrative component is a crucial element in these videogames. Furthermore, the control of visual and chromatic language cannot be exclusively determined by gaming requirements in museum products as they are related to culturally significant environments. We analyse three Cultural Games in order to examine the different narrative potential of colour in museum videogames: *Past for Future* (2018) by the National Archaeological Museum in Taranto, *The Medici Game* (2019) by the Uffizi Galleries in Florence and *Prisme7* (2020) by the Centre Pompidou in Paris. The three videogames are selected on the basis of common parameters. These are in fact videogames produced by art and archaeological museums for the purpose of telling stories related to the collections and to the museum. It becomes a priority to analyse the museum context in which colour is also a key component in the interpretation and communication of the artwork. The catchment area is also fundamental. The selected games are appropriate for all age groups and can also be used outside the museum; consequently, the colour choices are made in order to be received by the widest audience sphere. The last parameter is the recent year in which the videogames were produced. Today, in fact, museum videogames are abandoning purposes such as excessive realism and hyper-stimulated graphics, since they cannot compete with entertainment games, and are pursuing a simpler style, linked to communicative and expressive capacity rather than technological impact. Therefore, the research methodology adopted involves a qualitative and comparative analysis of videogames, conducted through the combined use of research methods: the activity of

playing game products, the reproduction of their full content through gameplay videos, the reading of scientific writings on the matter, as well as the consultation of auxiliary materials such as blogs, websites and online magazines.

3. Emotional colour

Past for Future is the official videogame of the National Archaeological Museum of Taranto - MArTa. The main character of the horizontally scrolling game is William, a young man who embarks on a journey to get out of an emotional impasse in his life. The journey will lead him to discover the treasures of the museum and the Apulian city; in fact, the main purpose of the game is to narrate the beauty of Taranto, using the MArTa as a link between the ancient and the contemporary city. Colour is used by illustrator Tida Kietsungden in the depiction of the game scenarios to recreate suggestions and emotions that the city and the museum are able to offer the visitor. The videogame team has in fact stated that the main intention is to graphically reproduce the combination of light and colour reflected in the city's millenary architectural stratigraphy, given by the relationship between the sun and the two seas on which Taranto stands. It is therefore crucial to analyse colours not so much in their singularity, but rather in their mutual relationship and interaction (Albers, 2013). The colour palettes adopted in the game space, in fact, reflect the state of happiness or sadness of the main character (Fig.1). The videogame starts with a rainy London skyline and a silent, gloomy house in which William is alone. The shaded areas, as well as the dark and dim tones, reflect the sad and depressed soul of the character, distant both geographically and psychologically from the Italian family. In the following scenes, London gives way to Taranto, recreated by modelling some of its most significant places, such as the historic centre, the archaeological areas and the seaport. The representation of the Apulian city accompanies the character's moral and psychological evolution. The warm hues, the bright, saturated colours reflect the tale of a vivid and shining city in which William discovers himself. This analysis highlights the link between environmental colour properties and feelings of joy/sadness, reinforcing previous studies that have shown that images in a virtual environment leading to the perception of joy tend to be brighter, more saturated and with more colours than images of sadness (DeMelo & Gratch, 2009; Geslin, Jégou & Beaudoin, 2015). The player can also make time jumps between ancient Taranto, a flourishing Spartan colony, and the new city, differentiated in the videogame by the colour (Fig.2). In fact, the player identifies contemporary Taranto through its intense and vivid

colours, often further accentuated by black contour lines. On the other hand, pastel colours are used in the drawing of ancient Taranto; the shades and soft points of white, similar to pictorial brushstrokes, recall the idea of a past memory. The archaeological museum is the link between the two cities: the chromatic qualities of the two temporal dimensions intertwine and mingle in the representation of the exhibition spaces. The colour in *Past for Future* aims, therefore, to elicit emotions similar to those the player might experience when exploring the archaeological ruins of Taranto, thus inviting him to physically visit the city and discover its history.

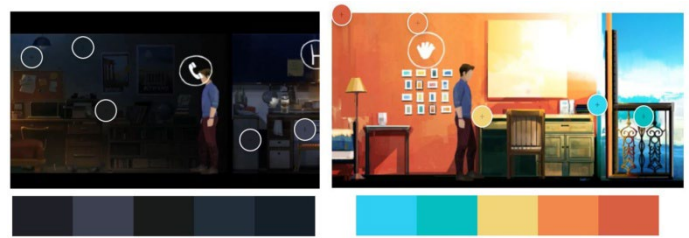


Fig. 1. Colour in *Past for Future*. The opposing palettes highlight the main character's different emotional states in the cities of London and Taranto.



Fig. 2. Intensity of colour. The differences between contemporary and ancient Taranto are expressed by the contrast between intense and soft colours.

4. Interactive Colour

The Medici Game is the first 3D videogame dedicated to an Italian museum, the Uffizi Galleries in Florence. The game focuses on the famous grand ducal dynasty of the Medici and their sumptuous residence at Palazzo Pitti. The main character of the game is Catherine, a young art historian trapped in the palace at night. She is forced to solve a long series of puzzles that will lead her to discover the palace's secrets, in order to escape the building unharmed. Although the game is set in a virtual reconstruction of the Pitti Palace, the story is mainly focused on the mysteries connected with the Medici family and the artistic masterpieces in its collections. Light and colour assume a crucial role in the narrative as they have the task of creating an atmosphere not existing inside the physical museum spaces, immersing the player in a virtual environment surrounded by mystery

and suspense. Colour has always been used to create interest, communicate symbolic messages and trigger emotional responses in visual narratives (D'Andrade & Egan, 1974). In fact, studies show that prolonged exposure to a certain colour can create reactions that connect the viewer to specific symbols and emotions (Gegenfurtner & Sharpe, 2000). This also happens in *The Medici Game*. In particular, the colour black is used to define the tone and atmosphere of the videogame, becoming a symbol of the mystery and darkness that involves and 'imprisons' the player in the adventure. The story in videogames, however, is built through the player's actions and movements, unlike other visual media. The player, in fact, has ample autonomy in the navigation and exploration of the space in *The Medici Game*, being free to move his avatar through the apparently empty and silent rooms of the Pitti Palace. This is convenient from the cultural narrative point of view, as it allows the player to observe all museum environments and artworks in detail. On the other hand, this freedom of movement requires the game designer to be more careful and precise in the representation of virtual environments, as he must attract the player into areas that are crucial for the correct narrative development and for the resolution of puzzles hidden in the space. Colour therefore becomes an useful tool for influencing player's behaviour and choices (Roohi & Forouzandeh, 2019). For this reason, black is often contrasted with other shades of colour in *The Medici Game*: these, although less present, acquire greater visual weight as they focus the player's attention on specific spatial areas. For example, the contrast of black with blue, red or yellow, accentuated by high saturation, indicates to the player the direction in which to move. Also the light-shadow relationship serves to support spatial orientation. The use of colour for wayfinding is certainly a typical property of all videogames, including entertainment games (Stewart, 2017). However, what is particularly interesting is that colour balancing serves to distinguish interactive from non-interactive spatial elements in *The Medici Game*. In fact, it has been proven that colour constitutes an effective code for organising our visual world by grouping similar elements together (Schulz & Sanocki, 2003). This aspect is interesting because the representation of virtual space in a cultural videogame is more complex than that of an entertainment videogame. In this specific case, the spatial model must both be coherent with the physical spaces of the grand ducal palace and allow the development of the story as planned by the game designer. Many cultural assets in gamespace only serve to give completeness to the spatial context, informing the player of their presence and location. Colour allows to highlight interactive artworks (Fig.3) that contain narrative clues functional to the

player's investigative story. For example, all the walls are frescoed in the representation of the *Sala di Giovanni da San Giovanni*. This represents a scheme coherent with the physical space of the museum. However, the medallion held by the swan's beak in the south wall fresco stands out because it is depicted in a highly saturated gold colour (Fig.4). This becomes a spatial clue necessary to continue with the game. The colours used are not chosen arbitrarily in *The Medici Game*, but they depend on the Palazzo Pitti's features: the red thus becomes the dominant colour in the Throne Room, the green in the Green Room, the white in the Stucchi Room, and so on.



Fig. 3. Colour in *The Medici Game*. Cultural artifacts that have a narrative function are highlighted by colour.

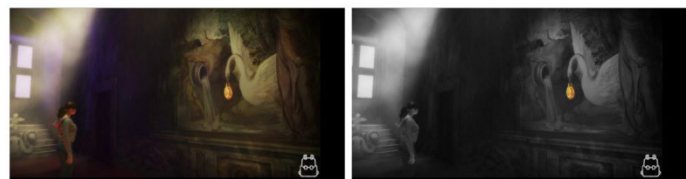


Fig. 4. The saturation of colour. The highly saturated gold medallion in the *Sala di Giovanni da San Giovanni* becomes a narrative clue.

5. Thematic Colour

Colour assumes a central role in the story of *Prisme7*, the videogame of the Centre Pompidou in Paris. It becomes a visual and interactive guide capable of transforming even very complex artistic concepts into a stimulating gaming experience. *Prisme7* is a platform game composed of seven levels in which the player is called to move an abstract entity inside different virtual environments. The player is introduced to the world of contemporary art without didactic or informative content, but by immersing himself in specific visual worlds in which colour takes on different features and qualities. They take their inspiration from the poetics of the most famous modern artists from Europe and overseas, such as Xavier Veilhan, Piet Mondrian and Andy Warhol. The exploration of the seven virtual spaces allows the player to investigate seven topics related to colour, namely: functional colour, systemic colour, colour and activism, emotional colour, spiritual colour, light and physics, light and immersion. A specific space has been designed for each topic and a new one can be unlocked only after

completing the previous level. The colour functions as a visual interpretive code (Fig.5) (Schulz & Sanocki, 2003); this choice is appropriate not only for the gameplay, but also for the cultural storytelling, because it allows the game designer to break down a complex topic into smaller thematic chapters. The knowledge of art becomes more complex as the game progresses: it starts from the most basic link between colour and function to arrive at the topic of colour as an autonomous and free form of expression in the final level. The first level introduces the player to the topic of functional colour, representing a clear reference to the architectural logic of the Centre Pompidou. The image of the French museum centre is well-known for its exposed systems, whose pipes are differentiated by colour according to their use: yellow for electricity, red for lifts and escalators, green for the water system and blue for ventilation. These elements can also be found in the first virtual game environment (Fig. 6), that is represented as an open space divided by walls on which the artworks are placed and fitted with a system of large coloured tubes. Each spatial element is defined by a specific colour: blue pipes allow the player to move horizontally from one room to another, artwork protection devices are yellow and must not be touched by the player, red platforms send warnings and messages. The player also has to assign a colour to elements that are colourless in this level; by transforming the spatial configuration, he gradually understands that all objects with a specific function will have the same colour.

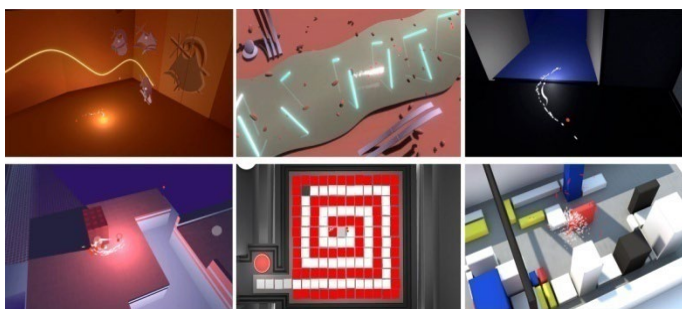


Fig. 5. Colour in Prisme7. Colour guides the player in the construction of artistic concepts.



Fig. 6. Functional colour. Colour in the first level of the game is an allusion to the chromatic logic of the Centre Pompidou in Paris.

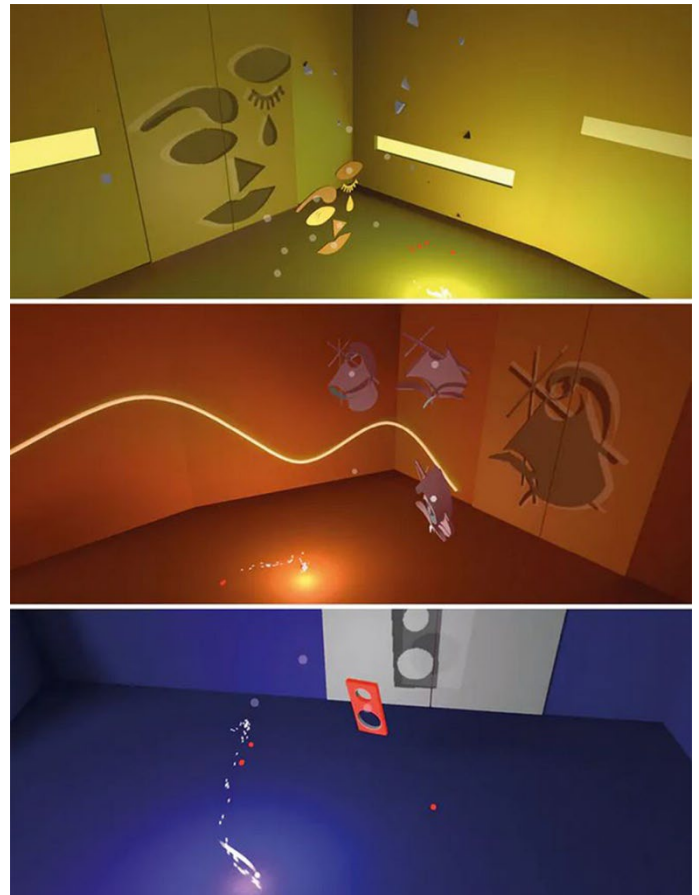


Fig. 7. Colour and light in Prisme7. The topics of colour and light are linked in the last two levels of the game.

Levels 2 to 5 are each inspired by a specific contemporary artist. The second level is deeply influenced by Vera Molnár's artworks, in particular by the painting *Identiques mais différents*; this is in fact one of the prizes to be collected during the game. Colour is used as an algorithmic code that defines a strongly geometric and modular space. The player moves around colouring the floor tiles red, but this produces opposite effects on other tiles, which become white and cannot be walked on. He will have to find the way out by using the logic of colour symmetry and balance. The third level, on the other hand, is inspired by Piet Mondrian's artworks and his idea of art as a social balance activator. The starting space is composed of coloured blocks on a white background, recalling the painting *Composition in Yellow, Red and Blue*. The virtual environment is then transformed into an industrial space where colour activates conveyor belts and unlocks access doors. The fourth chapter pays homage to Picasso, telling about the emotion subjectively communicated by art. Space is thus presented as a blank canvas that starts to be coloured when the player moves to specific points. The spatial image is gradually modelled, leaving the player free to explore and move without following specific rules. The space is created with brushstroke-like movements that

symbolise the player's emotion. He himself becomes the creator of the space and artist of the artwork. The fifth level is inspired by Vassily Kandinsky and his mysticism: each spatial area is characterised by pure, abstract shapes and must be activated with colour combinations transcending the symbolism of shapes and colour codes. The last two levels are related to the topic of colour in combination with light. Light and shadow, which are considered immaterial concepts in the common imagination, become concrete elements through which the space can be structurally and physically modified in this videogame (Fig.7). The player varies his actions and movements according to how colour and space interact with each other, unconsciously learning about the central role that light and colour can play in artwork.

6. Conclusions

The research presented in this paper focuses not so much on the colourimetric properties of the colour stimuli, but rather on their semiotic significance as elements of the communicative language able to become a tool of knowledge and memory for people who experience them (Regier et al., 2005). The analysis of three Cultural Games shows, in fact, different and gradually more complex ways of using colour to support stories related to museums and artistic/archaeological heritage (Table 1). The psychology of colour becomes in *Past for Future* one of the main tools for activating emotional and empathic processes between the protagonist and the game space, which are inevitably reflected in the relationship that the developers hope will arise between the player, the city of Taranto and the MArTa. Colour in *The Medici Game* is interpreted as an effective tool by which to tell intangible stories related to the museum. This case also revealed how the analysis of colour in videogames cannot be limited only to spatial images, but requires considerations concerning movement in space and actions on the objects. In this regard, we investigated the ways in which colour allows the construction of a gameplay appropriate and coherent with the story's cultural content, while ensuring the interactive and immersive properties of the videogame. Colour in *Prisme7* becomes a device able to narrate modern and contemporary art through an interactive narrative method. Colour, in fact, allows the construction of a more immediate model for the interpretation of complex content, which can also be understood by those audiences that are unfamiliar with traditional methods of cultural transmission. The three case studies demonstrated how colour can become a narrative tool thanks to its objective features, such as hue, saturation and brightness, through its psychological aspects and relationships. In conclusion, the research

does not intend to be exhaustive on the topic, but invites reflection on how a conscious use of colour in Cultural Games can contribute to the construction of museum stories experienced in an unconventional way.

Cultural Games	Narrative use of colour	Narrative purpose of colour	Narrative features of colour
<i>Past for Future</i>	Emotional Colour	to recreate suggestions and emotions that city and museum are able to offer the visitor.	Chromatic interactions; colour contrasts (dark/light tones, luminous/dim tones, cold/warm tones, pastel/sharp colours).
<i>The Medici Game</i>	Interactive Colour	to reproduce a mysterious atmosphere connected to the De Medici family and Palazzo Pitti's secrets; to attract the player into narrative areas.	Colour balance and visual weight; high colour saturation; interactivity of yellow, red, blue and green; light and shadows.
<i>Prisme7</i>	Thematic Colour	to be a visual interpretive code capable of translating complex artistic topics into playful elements.	relationship of colour with elements of the visual language (light, shadows, shapes, spaces) and with artistic compositional logic (balance, symmetry, rhythm, modularity, harmony).

Table 1. Summary table of the narrative use of colour in Cultural Games.

7. Conflict of interest declaration

The author declares that nothing affected her objectivity or independence and original work. Therefore, no conflict of interest exists.

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9. Short biography of the author(s)

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