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Image Learning

edited by
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EDITORIAL

ISSUE 06 APRIL 2022 Image Learning

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This issue 06 of *IMG journal* addresses the crucial question of how images –in their eclectic modes of implementation and presentation– can function as facilitators of learning and of the construction or expression of knowledge. The use of images in learning and occupational settings, which has always been sensitive to change, has evolved over time and continues to evolve in step with human development. Even if we confine our analysis to the domain of teaching and learning –with a view to drawing out the breadth of application of images from day care to kindergarten through primary/secondary school and university training courses– we still encounter a great diversity of perspectives and programs composing a truly complex trajectory that is difficult to define and catalogue. >

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One possible means of conducting this analysis, however, is to home in on the images used or created within a given teaching-learning path, investigating how they were identified and presented, what was done with them, how they were modified, and what role they played in the teaching-learning process, whether formal (school-university) or informal (where who is teaching whom remains an open question). Another analytical approach is to examine the type of image selected for use, even simply in terms of analogue versus digital images (Dallari, 1986; Farné, 2002, 2021).
To come back to the teaching-learning process per se, a key reference work still today, for those with an interest in education, as well as in image, is Comenius' (1592-1670) *Orbis sensualium pictus* (1658), thought to be the first textbook in which pictures were purposely introduced to facilitate pupils' learning. In this wonderful book, whose various European editions featured both Latin and the vernacular of the country of publication, images played a privileged role. To understand the importance that Comenius attributed to images and their material rendering, it should be noted that he put off the publication of another book because he had not been able to find good enough illustrators:

> I would have liked to enrich this book with figures that vividly expressed the shape of things, placing beside each the corresponding nomenclature, so that the children's wits would be more readily engaged and their first impres-

> sions of things more accurate. However, I gave up this project (although it had already been initiated) due to the lack of good engravers in this place.
> (Comenio, 1974, p. 560)

From the very first illustration (the prelude or *invitatio*), the teacher speaks directly to the students, inviting them to follow him along this new pathway through the world of knowledge. "Teacher. *Veni, Puer! disce sapere*. Pupil. *Quid hoc est? sapere*. Teacher. *Omnia quae necessaria, recte intelligere, recte agere, recte eloqui*. Pupil. *Quis me hoc ostendam tibi omnia; nominabo tibi omnia*. […] *Hic habes vivum et vocale Alphabethum*." [Teacher: Come, boy! Learn to be wise. Pupil: What is it to be wise? Teacher: To understand all that is necessary, to act rightly, to speak properly. Pupil: Who will teach me this? Teacher. I with God. Pupil: How? Teacher: I will lead you through all things; I will show you everything; I will name all things for you. […] Here you have the living and vocal alphabet.] (Comenio, 1974, pp. 560-570, our translation from Latin)
The image becomes a key stage along the path towards knowledge, a distinct entity that is not a mere replacement for words, or a possible way to make learning come alive, but rather is the only substitute for the thing itself, because as Comenius as apt to recall:

> In schools too they teach words before things […] Yet because things are substance and words are accidental; things the body and words the

> ornament; […], they must be presented together to the human intellect; but first the things, which are the object of both the intellect and the discourse.
> (Comenio, 1974, p. 223)

Although in introducing this issue, we thought it important to focus on Comenius, whose contribution still tends to be overlooked, there is a further, additional point that needs to be made. Images may be analysed from two different perspectives: those presented for teaching purposes, which have been pre-chosen by the teacher on account of their clarity and power to exemplify or illustrate a concept, development, or vision of knowledge; and those constructed and created directly by students, researchers, or artists themselves, with a view to exploring unknown territories or pursuing their own personal lines of inquiry.
John Berger has something to say on the dimension of inquiry, and specifically in relation to the act of drawing and the potential that flows from the encounter between our gaze and a given drawing:

> I believe that the most intense and open-ended activity of our eyes, of our gaze, occurs in drawing. There is something before us and, with our eyes, we question its manifestation. It is generally believed that the thing looked at is passive and that it is we, in observing it, who are active. In reality, what happens when one truly

> draws –and I am certain that anyone who has attempted to draw in a non-mechanical fashion will agree– is that, at a certain point, the thing releases energy, which is there to encounter the energy contained in the gaze of the beholder. Let us imagine for a moment that this energy is a beam: each time the two beams touch, something happens. Sometimes they do not meet, similarly to when one speaks without being heard. This means that the act of looking is in fact an active, non-one-sided, reciprocal encounter. Which naturally corresponds to the mystical-philosophical theories that held sway until the eighteenth century, I would say more or less up to Descartes. In the terms of those theories, appearances were read as messages: messages that were hidden or contained in, or conveyed by appearances, and the visible was in some sense a sign of the invisible.
> (Berger, 1980, p. 3)

Berger further investigates this issue in the introduction to his book *On Drawing*:

> For the artist, drawing is discovering. And that is not just a slick phrase, it is quite literally true. It is the actual act of drawing that forces the artist to look at the object in front of him, to dissect it in his mind's eye and put it together again; or, if he is drawing from memory, that forces him to

> dredge his own mind, to discover the content of his own store of past observations.
> (Berger, 2005, p. 11)

The various papers in this issue all view image as a form of exploration and knowledge that is complete in itself. The authors selected to contribute were asked to provide a detailed account of their research and projects that reflected how images variously represented for them a space of in-depth inquiry, a tool, an opportunity to exchange ideas.

Even when the research presented here deals with issues related to spatiality, it is possible to find a common thread linking the different stages in the production of knowledge: visual thinking plays a foundational role not only in the translation of knowledge into communicative form but is itself a trigger for generating possible innovative aspects in the relationship between subjects and space.

The formalization of spatialized thinking, whether analytical or design-related, cannot be separated from an ongoing confrontation with the world of the visual, in its possible diverse and extensive declinations. From this point of view, the contributions in this volume also teach us to look more closely at the intimate relationship between our educational actions and the physical spaces that contain them, in a constant interpretative circularity mediated by images.

Drawing comes before, during and after, within this process of knowledge making.

In light of the contents of the issue, it seems appropriate to close this introduction with a short aphorism that Bruno Munari, in his work *Before the Drawing*, placed next to one of his own illustrations: "Seen close up, it is highly complex" (Munari, 1996, p. 26). This caption encapsulates the observation that the world of images is most intricate, indeterminate, and richly multifaceted, offering those who work with the medium the opportunity to enhance their personal development via a constantly evolving relationship with a field that is itself a living form of learning.

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BEYOND MAPS.
A WORKSHOP ON USERS' SENSE OF PLACE AND VISUAL REPRESENTATION AT MILANO-BICOCCA UNIVERSITY

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CAMPUS
MENTAL MAPS
SENSE OF PLACE
BICOCCA DISTRICT
URBAN IMAGINATION

In a trans-scalar perspective, the Bicocca district extends from the local NIL (*Nucleo di Identità Locale*) to part of Municipality 9, Sesto San Giovanni and Cinisello Balsamo. Recently, the University of Milan-Bicocca, as regards to the so-called '*terza missione*', has remarked its role as a key-pole for the surrounding area by proposing research, educational (and orientation) activities, as well as institutional initiatives based in this post-industrial area of Milan. Within this scenario, our group was in charge of designing a project leading to an artistic image representing the district users' sense of place. By combining geography of perception, urban sociology, participatory design and the *flânerie* approaches, we planned a working process starting from the 'subjective production of images' by the district's users and inhabitants. The project was structured in two phases: (1) December 2020 – January 2021: we organised two workshops by inviting groups of students, teachers and shop owners and working on their mental maps to construct a final image resulting from the two teams' negotiation processes. The reading of the maps was initially inspired by the categories identified by Kevin Lynch (1962) and then moved on to a process of co-construction of a collective image; (2) March 2021: we shared the visual body with a professional illustrator (Carlo Stanga) entrusted with the mandate to translate the images into an artistic product. The essay discusses the visual representation of users' sense of place and the potential legacy upon communication strategies, way-findings tools and education projects[1].

MILANO-BICOCCA AND ITS TERRITORY: BETWEEN TRANSITIONS AND *FLÂNERIE*

The work presented in this paper stresses the link between our University and the Bicocca district. The former suburb, which was the setting for factories and workers' struggles for decades, in the '90s became a new centre of attraction for higher education and the advanced tertiary sector. In this context, a new, dynamic institution actively involved in our city public life should base many of its public engagement activities on the close relationship with its surroundings and implement actions aimed at improving the quality of life of students, workers and inhabitants in the area. Moving around the Bicocca campus today means having the opportunity to get in touch with the historical and cultural stratifications that shape our neighbourhood. Bicocca may be seen even as a place to be discovered and walked slowly, as a *flâneur* or *flâneuse* would do, experiencing the symbolic, cultural and social aspects that mark such a peculiar urban area. The notion of *flâneur* or *flâneuse* –in use since the late 19th century to designate writers, poets and intellectuals that critically observed people's behavior while strolling among the crowd, and codified in the Walter Benjamin's influential work on the Passages of Paris– is once again of central interest, especially in sociology, geography and arts. It relates to a specific practice of walking and exploring urban places, as well as to a particular type of reflective relationship with people and spaces. In such a framework, *flâneur/flâneuse* can be considered as the object as well as the subject of the analysis (Tester, 1993). Moreover, linkages between *flânerie* and ethnographic approaches have been often studied, having peculiar similarities (Jenks & Neves, 2000).

Only by exploring the interstices we can grasp the *genius loci* of a neighbourhood and we can intercept its soul beyond the superficial largely known representations. Every user, therefore, should find his/her way around the most iconic buildings (the University, Pirelli HangarBicocca, Teatro degli

Arcimboldi), but also get lost in everyday places (whether a cafe, a bookshop, or a post office). Due to this background, this essay aims at describing a project that has sought to 'map' the geographies of the district's inhabitants and to find keys to hold together individual experiences and a collective sense of place.

BACKGROUND: MOVING BEYOND CARTOGRAPHIES

In September 2020, in synergy with the ongoing upgrade of the visual and textual supports providing UNIMIB students' orientation, our Communications Office, by mandate of Deputy-Rector Prof. Maria Grazia Riva, launched a pilot project on inhabitants and users' spatial experience. The target was to integrate the cartography and textual information already widely implemented on our website[2] with an image representing the sense of place of the community that experiences our Campus on a daily basis (i.e., students, faculties and staff but also residents, workers and shop owners). Our group was in charge of conducting this pilot action. Combining geography of perception, urban sociology, participatory design and the *flânerie* approaches, we designed a working process centred on the 'subjective production of images'. The project was inspired by a holistic view on orientation, namely the combination of the sense of place, practices and spatial experiences as parts of a collective heritage. As mentioned in the first paragraph, the action stressed the relevance of our University as one of the actors actively involved in the area. Moreover, this project is included within the initiatives the University promoted to cope with challenges students and staff faced during the pandemic, and specifically to allow future students unable to experience the district for a long period to get in touch with the spatial dimension of our Campus. The legacy of Covid, as defined by Edgar Morin (2020), was thus transformed into the challenge of making the place of university education more intelligible and understandable, as well as more engaging.

METHODOLOGY

The mutual interrelation among environmental perception, geographical imagination and spatial behaviour is a topic dating back to a few decades ago (Bianchi & Perussia, 1978; Perussia, 1980; Bonnes & Secchiaroli, 1992); since then, it has left behind a pivotal legacy on geographical and urban studies. Within this huge scientific debate, our contribution refers specifically to the paradigms known as 'geography of perception' and 'behavioural geography' (Gold, 1980), namely the study of the relations between spatial experience and the visual representation of our sense of place. These paradigms developed the idea that each person forms a unique, unrepeatable mental image of the environment he or she knows, that is, his or her everyday geographies. This interpretation, as Geipel (1980) reminds us, combines subjective geographical experience and collective meanings, patterns and narratives. Geographical knowledge and spatial behaviour (Golledge & Stimson, 1997) are directly linked to the action carried out by the subject –with a body and a set of perceptive faculties– in a given physical environment, and to the influence that the social, cultural and political context exerts in the construction of geographical imaginaries. Since the beginning, 'behavioural geography' and the 'geography of perception' have turned their attention to the production of mental images, and thus to the link between spatial experience and cognitive patterns; working on the reproduction of these images in visual form; in geography, this object is called 'mental map', i.e., the representation that an individual constructs of a given place (Gould & White, 1974). Mental maps are the product of both personal experience and the interaction with geographical images (videos, movies, cartography, photos, newspaper, and atlas). Mental maps have been consolidated as a tool for geographical research, planning and urban studies (Milgram & Jodelet, 1976). In the work conducted on the image of the Campus, we refer mainly to Lynch's (1962), Saarinen's (1971) and, considering its relevance for our city, Bianchi and Perussia's (1978) works.

The multidisciplinary debate that followed the 'Golden Age' of these approaches profoundly challenged and delegitimized their theoretical soundness. However, on a methodological level, these tools still show great validity (Pánek, 2016), especially in projects that aim at acting on the negotiation between subjective image and collective visions, experiences and practices and in the investigations of social representations and constructs (Milgram, 1982)[3]. Moreover, as brilliantly discussed by Greenberg Raanan and Shoval (2014) mental maps offers multiple hooks with other methods presently adopted in space planning and studies. In their work they presented:

> a combination of mental maps and interviews for examining perceptions of territorial boundaries, with tracking technology (GPS) and activity diaries to track the actual use of space (Greenberg Raanan & Shoval, 2014, p. 28).

James (2020) recently revised traditional 'behavioural geography' methods and frameworks, as he claimed that 'while behavioural geography as a sub-discipline has waned, several concepts remain helpful when asking geographical questions' (pp. 187-188), and Pánek (2016) gave a pointing review of promising integration among the use of mental maps and participatory approaches to urban planning. In the specific case under study here, the question was how to promote a dialogue among visual art, social experience and individual meanings of spatial experience.

Working with mental maps

The project was structured in two phases. The aim was to link the subjective production of images, the collective negotiation on the sense of place and the creation of an artistic illustration. The idea was that the collective (shared) mental map of the users would be the background on which Carlo Stanga (a professional illustrator) would base his creation process. The most innovative aspect of the project was the act of providing a professional artist with photographs, textual material and cartographies, integrated by the result of this experimental work

conducted on the sense of place of the inhabitants, students and staff of our university. In the first phase of the project, we organized workshops with students, professors and employees of the university to create a shared map. We immediately recognized the importance of involving the various users in the process of constructing an image of the Campus and the district.

In spite of the limited possibilities offered by the pandemic scenario of October 2020, we organized three workshops in order to obtain a first image of Bicocca from the point of view of the people who habitually visit it for study, business or job reasons. Two workshops were organized in December 2020 (the first on 2/12/2020 and the second on 23/12/2020), gathering a total of 16 participants: 9 students (bachelor' students, master' students, PhD students)[4]; 8 university employees and faculties (professors, research fellows, technical-administrative staff) and a shop owner. All the participants joined on a voluntary basis. Two sub-groups were formed, both consisting of a mix of students and university staff[5]. The workshops followed a standardized structure:

– the meeting took place online on the ®*Webex* platform, with the support of ®*Jamboard* digital whiteboards (available in the *Google* package).
– each meeting lasted about three hours.
– two facilitators conducted the workshop.
– the workshop was structured in a preliminary individual exercise followed by a sequence of group meetings.

Before taking part in the collective meeting, each participant was asked to carry out and send us by e-mail the following assignment:

> Try to draw the Bicocca on an A4 sheet of paper. You can use pencils, pastels, and felt-tip pens, and you can choose the colours (even just black) and the style that comes most spontaneously to you. Picture your drawing helping someone (who does not know this space) move around it. In imagining the Bicocca, we would like you to refer to your own personal experience. Don't worry about lines, verisimilitude or aesthetics, design the Bicocca for yourself.

The aim was to bring out the places that each participant pointed as important landmarks. The group meeting was organized in three different stages. The first stage was aimed at enabling participants to present their mental maps. In this phase, everyone told the others about his or her drawing or map, explaining how the flow of representation had taken place: which elements had immediately come to mind, what difficulties he or she had had, the reason for certain stylistic choices or the meaning of certain symbols included in the drawing. In fact, the assignment left a large degree of freedom with regard to the ways of representing Bicocca, and participants followed their own way. The drawings reflect the different ways the Campus-district can be observed. Few participants favoured a 'cartographic' view (Figure 2 and Figure 4), a tendency that is well known in the literature on mental maps (Bianchi & Perussia, 1978). Others, however, drew symbolic objects or sites evoking their personal emotions and experience (Figure 1). A third typology emerged, namely a combination of the 'plausible' image of the area and the collection of symbolic or functional elements linked to the daily life in the Campus (Figure 3).

The second stage consisted in a collective negotiation process led by a facilitator. During this time, the participants sought

Figure 1 Drawing from the first workshop – Bicocca from a Professor's point of view.

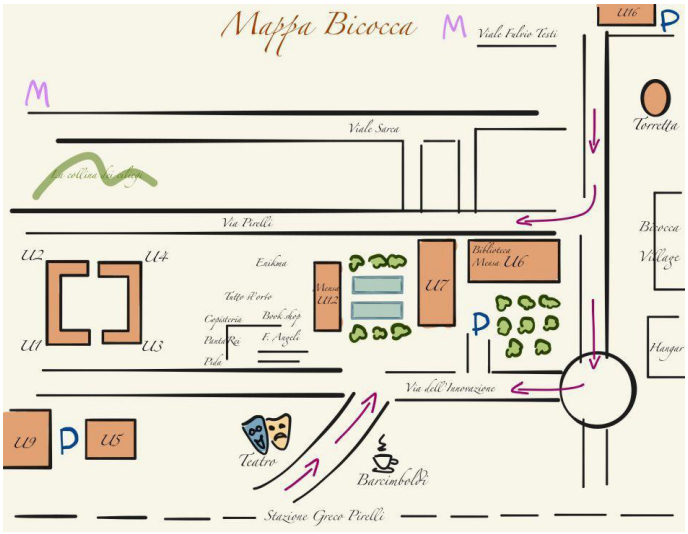

Figure 2 Drawing from the first workshop – Bicocca from a PhD Student's point of view.

agreement on some spatial indicators. The indicators used are partly based on the classification made by Kevin Lynch (1962), that is, edges (the boundaries of the Campus), paths (i.e., the journeys people make every day to go to work or to reach the means of transport), nodes (the places where these routes meet or converge), landmarks (the spatial objects that 'give meaning' to the Campus as a place where people work and live).

The final stage was the graphic translation of what emerged from the discussion: using the digital blackboard and following the group's instructions, a facilitator drew a collective image. During this last phase, participants were asked to enrich the draft map with post-it notes pointing out missing information or elements that could not be represented graphically[6]. In addition, this moment of summary was an opportunity to continue the discussion on some issues that had not previously been explored (i.e., the presence of human beings within the drawing, the presence of residential and business buildings in the district, the background, etc.). At the end of each meeting, we proposed a final prompt to the participants, asking them to indicate with

a post-it on the map we had created together three places/objects that help them to find their way and three places related to their biographies.

Throughout the process of the workshops –personal drawing, collective negotiation, final map– two aspects strongly emerged that we would like to emphasise: the role of mobility nodes; the iconic colour of the Bicocca buildings. The words of the participants themselves help us to grasp the depth of their relevance:

> I included the metro stops because the first form of orientation for a person who is not from Milan is the metro. […] I also added the Greco-Pirelli station because, although I have never taken the train there, I used to go with my classmates to take the train, so indirectly it was also an important place for me.
> (M., Student, WS1)

> I wanted to draw the buildings with their colour because when you see a big red building it means you've arrived.
> (S., Student, WS2)

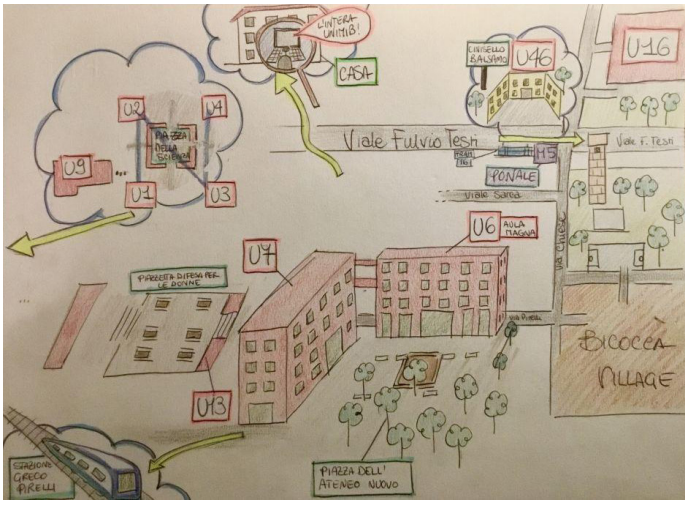

Figure 3 Drawing from the second workshop – Bicocca from a Student's point of view.

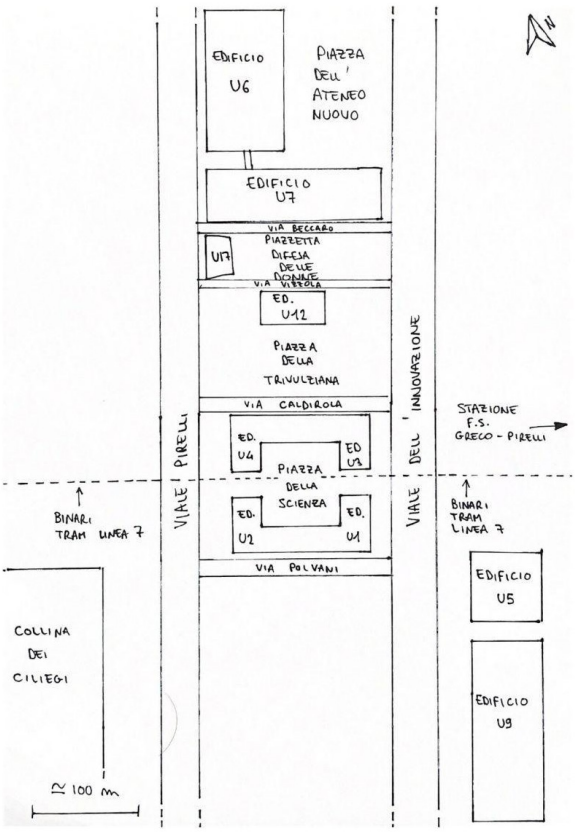

Figure 4 Drawing from the second workshop – Bicocca from a PhD Student's point of view

If these points might seem obvious to those who know the Campus[7] and are also represented in institutional maps, the participants stressed the need to highlight them in a graphic representation of the area, giving them the status of 'common heritage'[8] and an identity value[9].

In January 2021, the participants in both workshops were re-contacted, and two representatives from each group made themselves available for a further online meeting on 4 February 2021.

The aim of the third workshop was to bring together the two groups that had worked on the project, to share the two maps that had emerged and to discuss the outstanding elements: e.g., human presence, places of industrial memory,

inside spots, etc. As a basis for the meeting, we used a drawing that summarized the common elements of the drawings of the two groups. We elicited a discussion, implementing and enriching the drawing and adding some post-its useful for the next step of the project. At the end of the work, the working group produced a map where the elements represented are the summary of edges, paths, nodes and landmarks emerging from the three workshops. The map is a rich representation of users' sense of place.

MOVING TOWARDS ART

A crucial technique of the workshops was the use of mental maps, initially individual and later collective, created as a tool for sharing and explaining the personal and collective sense of place. Working in small groups led to the construction of a collective representation, which became the focal point of memories, experiences, perceptions, habits and visions. Writing, thinking and drawing the campus through the 'sign of the other' (Pezzoni, 2013) was particularly meaningful, mainly because drawing was not a familiar tool for any of the participants; indeed, they had to deal with the detachment, typical of adulthood, towards this medium (Bonaccorsi, 2019). This unfamiliarity allowed for greater concentration, rarefaction and the precise identification of each point.

Carlo Stanga punctually described this stage, by reminding that,

> identifying a mental map is like a slalom among memories, cartographic references, experiences and stories. It is a slalom that, instead of avoiding elements, amalgamates them to find correspondences, to unveil the unique identity of that place. In this way, we try to discover the *Genius Loci* by detecting many elements that recur persistently and characteristically[10].

As the first steps documented in the previous paragraph were completed, the image was integrated with key land-

marks and spatial patterns underlined by the literature on the district (Bigatti & Nuvolati, 2018; Bolocan Goldstein, 2003; Dell'Agnese, 2005). From the individual maps, passing through the collective one, which was shared, debated over, and enriched with further ideas, the group constructed a prototype serving as a background for the work of Carlo Stanga who commented as follow:

> this is Bicocca! a district that settles in the memories evoking a tangle of experiences mostly significantly positive and immersed in an unmistakable atmosphere made of large open spaces, colours, meeting places, suggestive names, first level cultural services[11] (Figure 5).

As previously clarified, the process called upon several users who were explicitly asked to participate in a shared activity shaping the image of Bicocca. The same type of graphics and illustrations used, while respecting his artistic freedom,

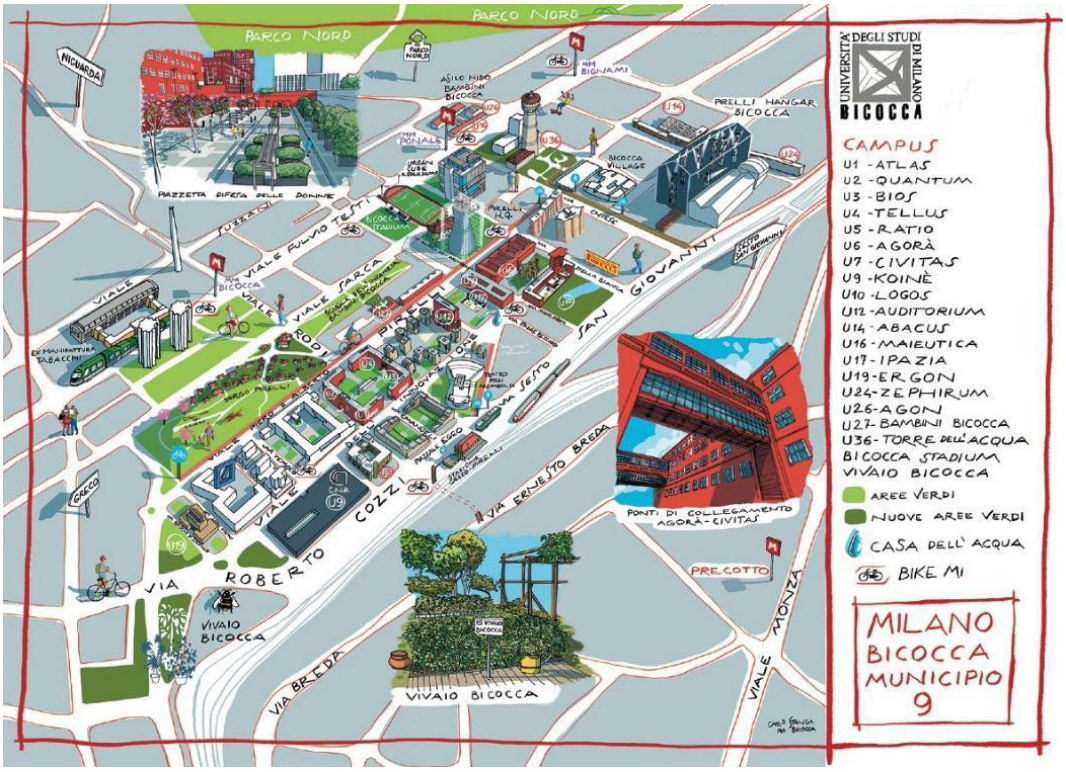

Figure 5 Final Version of Carlo Stanga work

had to reflect the modernity of those spaces, welcoming the persistence of the past. A series of meetings were also necessary with the illustrator to set a cooperative workflow. The drawing of the map –in this case made by a professional artist– was the final step.

BEYOND THE PROJECT: POTENTIAL LEGACIES ON EDUCATION AND COMMUNICATION ACTIONS

Carlo Stanga work (Figure 5) is planned to remain a key image for communicating the sense of place and visually enriching users' spatial experience. The legacy of this experimental work may be identified in a range of actions covering a large spectrum of strategies in the fields of education, communication and students' services. Stanga's image will be adopted as a background for future communication products: working as a logo, as a recognisable iconographic element in future communication strategies. Moreover, Stanga's work has already being pointed as a «visual and iconic landmark» of Agorà-U6 (UNIMIB main building, Figure 6).

Orientation Commission and Communication Office have being planning a new offer for first-year students: the *Bicocca Walking Tours*. At the opening of the academic year, a team of mentors will guide first-year students by walking thematic tours of the campus area. The image of Stanga will act as a visual support integrating cartographic representations. Finally, the work produced can be included in the artistic repertoire of the neighbourhood where, for example, one of the country's most important contemporary art museums is located. As Carlo reported:

> In this case, it was not so different to illustrate, i.e. illuminate, a place such as a university, in fact in the case of Bicocca there is such a close symbiosis between the city and the university that I did not suffer any differences, on the contrary, it was pleasant to understand the strength of this union which is also the secret of the success of this Campus[12].

Figure 6 Carlo Stanga work in Agorà-U6 hall.

To conclude, a set of implications needs to be further investigated. By adopting a critical approach to the project's outputs and applications, we close the essay with three open questions. The integration of subjective production of images (e.g. users' mental maps) and artistic interpretation needs to be critically assessed, as the two processes (or methods) do not always use the same languages. Furthermore, the method we followed could be applied to multi-functional neighbourhoods. Finally, the use of Stanga's work in orientation, communication and training projects is still at a preliminary stage.

NOTES

1 This essay is largely based on the work *From mental maps to art* (Agrestini et al. *in press*) presented at *IMG 2021 Image Learning*. However, this version focuses on the visual representation of sense of place and on the legacy of our work on future district and University urban actions.

2 https://www.unimib.it/servizi/bicocca-orienta

3 Gould and White masterpiece has been recently re-published, reinforcing, decades after the first edition, the relevance of visual representation of personal and social sense of spaces.

4 In this case, it seemed a good opportunity to involve students from the tutoring group of the University's degree courses for two reasons: on the one hand, they are often people who have been attending Bicocca for a long time; on the other, they might have an interesting point of view because of their role and their proximity with a large number of students.

5 We chose to form heterogeneous groups with regard to roles – and with regard to disciplines/departments of origin – in order to allow a meeting of different and interesting experiences and backgrounds. Despite these differences, everyone was at the same level during the workshop, and the working environment was relaxed.

6 This was possible thanks to the possibilities offered by the Jamboard workspace: each participant could interact with the others in the same moment.

7 In fact, the modal split of the Bicocca population shows that most people use public transportation to get to the University (the last survey conducted in 2020 showed that 80% of respondents use TPL).

8 The experience and the significance of the station is shared, even if it would not be part of one's daily routine.

9 The characteristic colours of the buildings aids to recognise that I am/you are here, in Bicocca.

10 Quote from informal chats with Carlo Stanga.

11 Quote from informal chats with Carlo Stanga.

12 Quote from informal chats with Carlo Stanga.

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THE REPRESENTATION OF SPACE AS A NARRATIVE LANGUAGE IN VIDEOGAMES

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ESSAY 99/06

VIDEOGAMES
GAMESPACE
VISUAL NARRATIVE

The research examines the videogame as a new form of visual narration, in which the story is constructed not only by the designer's authorial intentions, but also by the interpretation of the player, who moves and acts in the gamespace. The space, therefore, can assume a central narrative role, helping the player in the construction of meanings necessary for the understanding of the story. The aim of this research is to analyse the representation of space as a narrative language in videogames, examining how spatial suggestions become a formal and structural code of visual signs, able to emphasize tones and atmospheres and/or express emotional values. The survey methodology includes a comparative analysis of videogame spaces, starting from the main types of narratives: realistic, verisimilar and unrealistic; this distinction allows to identify three macro-groups of spatial representations, having specific and defined characteristics. This research underlines how the scientific area of representation can contribute significantly to the study of videogame, understood as a narrative form in which the drawing of the space is applied as an irreplaceable modality for the construction of a visual code of thought.

INTRODUCTION

In recent years, the rapid growth of the videogame in the global media industry, has contributed to the development of Game Studies, an interdisciplinary field that not only focuses on the psycho-pedagogical value and cultural implications of the videogame, but also on the relationship between its communicative forms and visual language (Pecchinenda, 2010). This shows that videogames are not only a social phenomenon, but also the convergence point for a redefinition of our relationship with the visual storytelling (Wolf & Perron, 2003). Scholars of visual culture believe that each medium borrows certain features from its predecessors, differing in identity properties. As in other visual narratives, even in videogames the story is told through images, giving a central role to the spatial representation that contains all the elements functional to the story (Zoran, 1984). The videogame, however, has a unique feature: it is the first medium that combines visual dynamism and active participatory role (Greenfield, 1984). If in other media the viewer observes the actions of the characters from the outside, the interaction in the video game breaks this mechanism. The player is at the center of the story, he completes it through his actions (Adams, 2002). The passage from the 'spectatorial' position to an interactive one, also implies a new relationship with space. Manipulating the images on the screen means acting on space; this makes the video game "the medium that is closest to the basic embodied experience of a story" (Grodal, 2000, p. 197). The traditional narrative, therefore, is replaced by what Cubitt (2001) calls "post-narrative spatialization" suggesting that the space is no longer a visual extension of conventional narrative structures, but becomes itself a way to organize the story. Space constitutes, not by chance, the only category commonly accepted by game studies researchers. According to Aarseth (2007), in fact, "the games celebrate and explore spatial representation as their central motif and raison d'être" (p. 44). Jenkins (2003) argues that game designers don't tell

stories but they design worlds and sculpt spaces that are necessary to tell them. Starting from these considerations, the research aims to investigate the drawing of space as the main narrative tool in videogames. This topic is very interesting for the disciplinary field of visual representation. The representation has always been assigned, throughout the centuries, the responsibility of mediating between experts and society, since it is able to incardinate concepts in a system of signs, aimed at subtracting complexity and transmitting meaning.

NARRATION AND SPACE IN VIDEOGAMES

Compared to other media, the interactivity in videogames is significantly denser, as the user can explore and manipulate the spatial dimension (Alinovi, 2002). The designer of the gamespace, therefore, not predicting every move of the player, he must consider his presence and help him to interpret the story. Flynn (2004) in his studies shows that players inhabit the gamespace by reporting their own body history in it, because they are conditioned by their experiences in real space; movements and actions in the virtual space also reflect their counterparts in reality. The reproduction of specific suggestions and spatial perceptions, therefore, becomes a formal and structural code of visual signs, able to emphasize tones and atmospheres and/or to express subjective and emotional values. So no spatial scheme is created a priori in the gamespace, but it reapplies, transforms or abandons elements of the real space to support the player in understanding the story. The research aims, therefore, to analyze the possible relationships between space representation and narrative language in videogames. Considering that "the visual component is not the exclusive dimension of the ludic and aesthetic experience, but undoubtedly the most pervasive and evident" (De Leo, 2007, p. 281), the analysis focuses on the processes of player spatial knowledge stimulated by sight. Each spatial element is investigated not in its

value for the game dynamics, but in the meaning that each player, in his 'mental map', is able to attribute to it because of its visual features. The investigation includes the comparative analysis between virtual space in videogames. We choose games in which the role of space is so relevant that strong subjective and patemic values are projected onto it. Spaces are distinguished according to their belonging to one of three typological classes of tales, namely: realistic narratives, referring to real spaces, i.e., that exist or have characters corresponding to reality; verisimilar narratives, referring to imaginary spaces, i.e., that are created on real models but cannot be linked to any existing place; unrealistic narratives, referring to invented spaces, i.e., that are non-existent, fantastic or surreal places.

EMPATHIC/ANEMPATHETIC SPACES

In realistic narratives, spaces reproduce characters corresponding to those that would be found in physical reality. In this latter, as Vitta asserts, the forms of living and perceiving emerge from the relationship between the spatial features and the human experiences within them (Vitta, 2008). Therefore, even in video games, the 'experiential images' of realistic places are drawn up in order to bring this relationship to a harmonious or discordant state, thus functioning as emotional amplifiers (Pallasmaa, 2001). The cinema critic Chion (1997), talking about the music of the film The Shining, defines it as 'anempathetic', because "it shows a clear indifference to the situation, developing in an equal, fearless and ineluctable way [...] which does not freeze the emotion, but doubles it" (p. 15). This description, as stated by Carocci (2018), is also referable to those spatial representations that have the same purpose. For this reason, two types of spaces can be distinguished: the anempathetic ones, deliberately made indifferent to the narrative situations, contrasting with the actions of the characters within it, thus creating negative emotions; the empathetic ones, which partici-

pate in the story, entering into harmony with the characters, developing positive feelings. In order to understand how the representation affects the perception of space, we investigate two video games both set in a hotel: *The Suicide of Rachel Foster* and *Maquisard*. In the walking simulator *The Suicide of Rachel Foster*, the player takes the role of the young Nicole who, after ten years, returns to the family hotel, abandoned when her father was involved in a sinful relationship with a sixteen year old girl, Rachel, who committed suicide after the relationship was made public. The hotel is, in effect, an anempathetic space, because the tension between geometry and emotional scenarios is clearly accentuated. Although the main character has lived there for years, the space appears alien and disorienting to her. The representation of the hotel, disused and abandoned, aims to distort the player's perception, creating claustrophobic and suffocating sensations. The first-person view and the partial frames never offer the awareness of the verticality of the architecture which appears immense and disproportionate. Moreover, the connecting spaces dominate the other environments. Corridors, staircases, tunnels and interstices, not establishing a univocal relationship with the space, deny the player any reference points to orient himself and build a mental map of the hotel (Figure 1). Since every place seems to lead to any other place, exploration is deprived of any pleasurable quality that could make the space a safe place. The emotional state of suspense does not depend on scary elements, which the game is lacking, but on the feeling that the hotel is not as abandoned as it seems. The discovery of initially inaccessible or hidden areas, as well as the change of position of some elements when the protagonist returns to rooms she has already explored, give the idea of a constantly changing space, maintaining a pulsating atmosphere within it. The feeling of detachment is also rendered through the details of the interiors. The contrast and the opacity of the materials' and furniture's colors, symbolize an earlier era than the one in which the protagonist lives and a space that is no longer at her measure. In addition, the massive presence of geometric ornaments and furnishings,

Fig. 1 One-O-One Games Studio, *The Suicide of Rachel Foster*, 2020. Collage elaborated by the author.

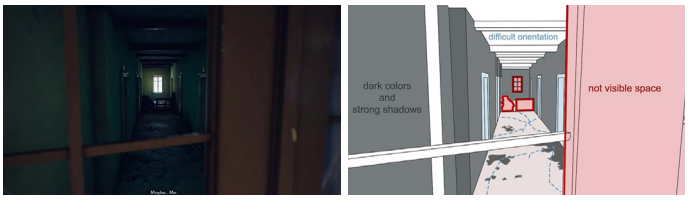

Fig. 2 Greta Attademo, The anempathetic space in *The Suicide of Rachel Foster*, 2021. Author's elaboration.

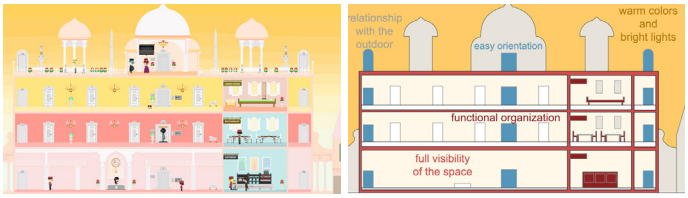

Fig. 3 Greta Attademo, The empathic space in *Maquisard*, 2021. Author's elaboration.

such as carpets, rugs, and curtains, establish in the player the perception that there is something dangerous hidden in the hotel. The miscellany of discordant details, textures and materials, does not allow the player to organize and control the space. The main character, besides being alone, appears trapped by the space (Figure 2): the few openings on the outside, in fact, show a blurred landscape covered by snow; the deprivation of any relationship with the surroundings, increases the player's sense of apprehension and anxiety. The space evokes, therefore, a generalized feeling in which the character's emotions do not reverberate, but are heard as distant echoes (Carocci, 2018).

In *Maquisard*, instead, the character is a lobby boy of the Maquisard Hotel who aspires to become a spy; having discov-

ered the presence of an undercover government agent, he decides to start investigating the hotel guests in order to find clues to his identity. Also here the exploration of space constitutes the element of narrative development; the investigation, however, does not appear dangerous, thanks to the representation of space in longitudinal section (Figure 3). It allows the player to perceive the space seamlessly, facilitating the construction of a cognitive hotel map. This device also allows to show the outside of the building, communicating how the space is open and relational. The particular viewpoint, moreover, permits the visualization of the simultaneous actions of the characters in the hotel, with the possibility of enlarging each environment to focus on a specific narrative scene. The atmosphere is calm and stable during the game: although it is necessary not to be discovered by the other characters, the player takes full control of the space, being always aware of the guests' movements and of the avatar's position. Moreover, the avatar can see what is happening in the private rooms only by looking through the door peephole and, therefore, without losing control of the other environments. The spaces of the Maquisard are perfectly in sync with the actions of the lobby boy. The centrally located elevator speeds up movement between floors, and the stairwell on the right permits more furtive movements. Furniture can be moved in order to hide from indiscreet eyes. The use of color is also fundamental: on the one hand, it improves the understanding of the space, since each gradation corresponds to a different function of the environments; on the other hand, the pastel shades make the space stylized and artificial, allowing the player to participate in the playful fiction and to be conscious of the serene and peaceful atmosphere.

The two-dimensional representation of space is certainly useful to stimulate a harmonious relationship between space and people, but there are also empathic three-dimensional game-spaces. The game *FireWatch* tells the story of Henry, an American man with a difficult past marked by family bereavements who, needing to isolate himself from the world, decides to accept a job as a forest ranger in the heart of Wyo-

Fig. 4 Greta Attademo, The empathic space in *Firewatch*, 2021. Author's elaboration.

ming. The first-person view of space coincides with the introspective story of the protagonist. He lives in a tall control tower surrounded by woods, a symbol of his isolation (Figure 4). The space is depicted in a pictorial style, dominated by dense, layered color fields that aim to transform the physical landscape into a parallel soul place. At the beginning, the game maintains slow and calm tones, as the protagonist explores the space consciously guided by a map and the disposition of the natural elements that seems to create a pathway track. The change of narrative rhythm, in the second part of the game, coincides with the transformation of space: the representation of fire-prone areas, in fact, reveals a greater excitement and changes in the character's mood. Space, therefore, enters into relation with both the positive and negative emotions of the protagonist; the choice of the natural location allows a continuous parallelism between landscape and spirit that influences the evolution of the narrative plot.

UTOPIAN/DYSTOPIAN SPACES

Verisimilar narration proposes stories that cannot be compatible with the existing reality, but that could come true in precise, even if improbable, space-time conditions. In visual media, it is usually used to tell hypothetical social contexts, not related to any existing civilization or one that existed in the past. This is why also the spaces are imaginary: although sometimes they refer to existing places, they do not correspond to them. The complex system of social interactions and dynamics, at the center of the story, is in fact communicated in a more intuitive way through the extreme relationship between the

space and its inhabitants. When it is strongly positive, we talk about 'utopia': with this expression, coined by More, we mean a political, social and/or religious order that, even if it cannot be matched in reality, is proposed as an ideal model to aspire because better than the existing one. To indicate the opposite scenario, Mill coined in 1816 the term 'dystopia'. It indicates a system in which some socio-political expressions, or particular environmental and technological conditions, appear as highly oppressive or dangerous for individuals. Although it represents an imaginary future, like utopia "dystopia also has a deep connection to historical and social reality" (Battaglia, 1998, p. 13); the real is not only embraced, but its negative characteristics are pushed to the extreme. Consequently, for verisimilar narratives in videogames we distinguish between utopian spaces, where the relationship between physical and social space is ideal, highly rationalized, and better than the existing one, and dystopian spaces, where this relationship is inadequate, distorted, and worse than the real one. Unlike empathic/anempathic spaces, utopian/dystopian spaces are imaginary. Therefore, they cannot be assumed as familiar by the player, but must present forms and spatial relations totally different from the reality. Representation, in other words, must contribute to amplifying the perception of uncertainty or indeterminacy regarding the explored environment. If in realistic spaces it required the "presence of specific real-world references, in imaginary spaces it focuses on their 'absence or non-existence" (Iser, 1980, p. 137). In fact, it is the insubstantiality of the space that pushes the player's imagination to the point of completing a mental map: "the true character of these images consists in the fact that they highlight aspects that could not have emerged through direct perception" (Iser, 1980, p. 137). There are many video games belonging to this category, such as *Sable*, *The Last of Us*, *Fallout 3*, *Cyberpunk 2077* (Figure 5).

We choose to analyze *Bioshock*, because this videogame is able to combine dystopian and utopian spaces. The story tells, in fact, the underwater city of Rapture, located in the Atlantic Ocean between Greenland and Iceland, founded with the desire

Fig. 5 From top left to bottom right: Shedworks, *Sable*, 2021; Naughty Dog, *The Last of Us Part II*, 2020; Inon Zour, *Fallout 3*, 2008; Konrad Tomaszkiewicz, *Cyberpunk 2077*, 2020. Collage elaborated by the author. The use of dystopian worlds in videogames.

Fig. 6 Paul Hellquist, *Bioshock*, 2007. Retrieved February, 2, 2022 from https://multiplayer.it/recensioni/bioshock-the-collection-recensione.html. The underwater city of Rapture.

to organize a new ideal social order that, however, over time, turns into a dystopian scenario. The general decay of the space, where chaos and disorder seem to take over, signals that something has happened, but the narrative is veiled with a sense of mystery that still leaves the player free to make interpretations. The damaged and flooded urban areas contrast with the aerodynamic shapes of towers and skyscrapers that, surmounted by large gears and connected by tunnels, identify a real rhizomatic space (Figure 6). This representation creates a tangible perception of an urban system changed by time, but which initially had to be synchronized and functioning as a 'machine city'. Even the buildings are decaying and disused (Figure 7); some of the details still visible show signs of art deco, high-end materials and curved, sinuous surface furnishings, making the player reflect on the luxurious nature that must have permeated the

Fig. 7 Paul Hellquist, *Bioshock*, 2007. Retrieved February, 2, 2022 from https://multiplayer.it/recensioni/bioshock-the-collection-recensione.html. The decaying and disused buildings in *Bioshock*.

city in the past. The change is still visible in the functional re-adaptations of the public space: below the tracks of a train, now disused, there are a series of slum-like dwellings that contrast with the taller buildings, still in good condition, bringing out the economic contrast between the city's social classes. The first narrative clue of the past of a utopian city can be found in the lighthouse that, now devoid of lights, loses its implicit sign of city landmark. Inside it, in fact, the player finds the sculptural bust of a man, Andrew Ryan, creator of the city, under which is engraved the phrase "No gods or king, just men". Continuing with the exploration, the player finds photographs, newspaper clippings and paintings that allow to reconstruct the history of Rapture. It was the utopian project of a society that, exploiting the remote location, would create a self-sufficient system, powered by marine life and geothermal energy from undersea volcanoes. However, the capitalistic and elitist economic system, in which everything was privately held and overpriced, led to the flourishing of criminal activity and resentment of less fortunate citizens, culminating in the collapse of Ryan and the entire social system he had built. The representation of the city, therefore, is the fulcrum of the story: its location, shape and spatial relations already show a society that is clearly different from the infinitely possible ones of reality. Even though the player has never visited the ancient Rapture, he can hypothesize it in its utopian guise, overturning the images provided by that dystopian world (Figure 8). In other words, the change of space is the element

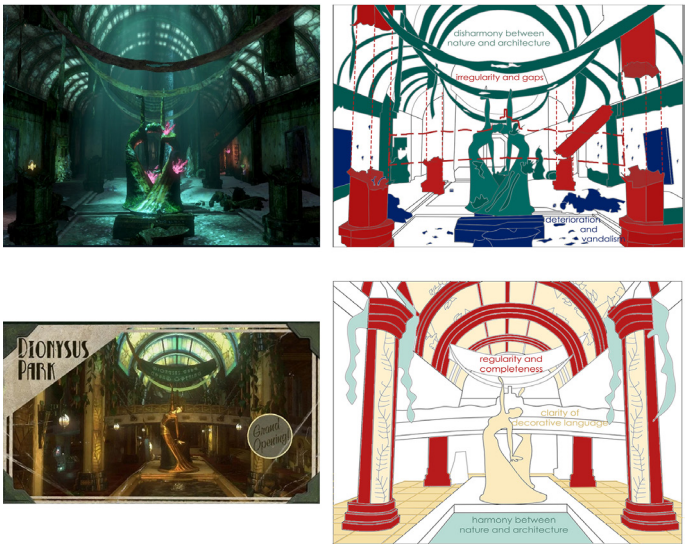

Fig. 8 Greta Attademo, The utopian/dystopian space in *Bioshock*, 2021. Author's elaboration.

through which all the gaps of an apparently ideal social model are interpreted. This model, now deprived of its power structures, turns out to be completely unsuitable for the individuals' needs. The player's perception is built through the deficiencies in the representation: what he sees is perceived as harmful and hostile; consequently, what is absent is catalogued in his imagination as beneficial and just.

UNREALISTIC NARRATIVES AND IMPOSSIBLE/ ELSEWHERE SPACES

The unrealistic narratives propose stories that not only do not coincide with reality, but are also impossible to be realized. The spaces in which they are set are, so, invented: although responding to the characteristic of imaginary places, as well as utopian and dystopian worlds, they do not denounce other ways in which reality could be, but subvert its rules. These representations make explicit, in fact, their unrealizability in the physical world by pushing the spatial logic to the breaking point, hypothesizing architectural and urban forms that defy physical laws. This is why we talk about impossible spaces and of elsewhere.

These spaces are not born with the advent of digital technology, but abound in ancient mythologies, religions and literature, proclaiming themselves as spaces that refuse to be simply places by subverting the Newtonian-Euclidean paradigm of homogeneity and uniformity. An example is the conformation of hell in the Divine Comedy, whose topology "is as twisted as a Mobius strip (or more precisely a Klein bottle)" (Gomel, 2017, p. 2). In videogames, impossible spaces have even more complex developments than in other media. Ryan (1991) underlines that the potentially n-dimensional digital environment is the best model through which space can assume different aspects from the conventional linearity of narratological schemes. In the virtual gamespace it is possible to realize those architectures that, in other visual narratives, could be represented but not explored. The total absence of restrictions, both physical and constructive, allows, in fact, to explore and navigate architectures that are impossible in real space. The opportunity to investigate non-Euclidean geometry concepts and bizarre topologies means that impossible spaces are widely used in videogames. In some cases, the attention is placed on the narrative of illusory and paradoxical architectural structures, such as those in *Thief*, *Bloodborne* and *Manifold Garden* (Figure 9). In other videogames the focus is on the construction of real different worlds with unreal logics, as in *Destiny*, *The Signal From Tölva* and *Obduction* (Figure 10).

An emblematic impossible space is certainly that of *Monument Valley*, whose inspiration comes precisely from the artistic works of Escher. The story tells of the silent princess Ida's journey through surreal imaginary worlds made of mysterious monuments, hidden paths and illusory spaces. Each level consists of a different architecture, floating in space, which becomes the protagonist of the game. The isometric representation allows the player not only to show the three dimensions of the building with a limited distortion, but also to observe both its exterior and interior at the same time. The spatial images, at first glance, appear extremely familiar, recalling Islamic minarets, Indian wells and Scottish castles in their shapes. The use of bright pastel colors also suggests that the space is harmonious

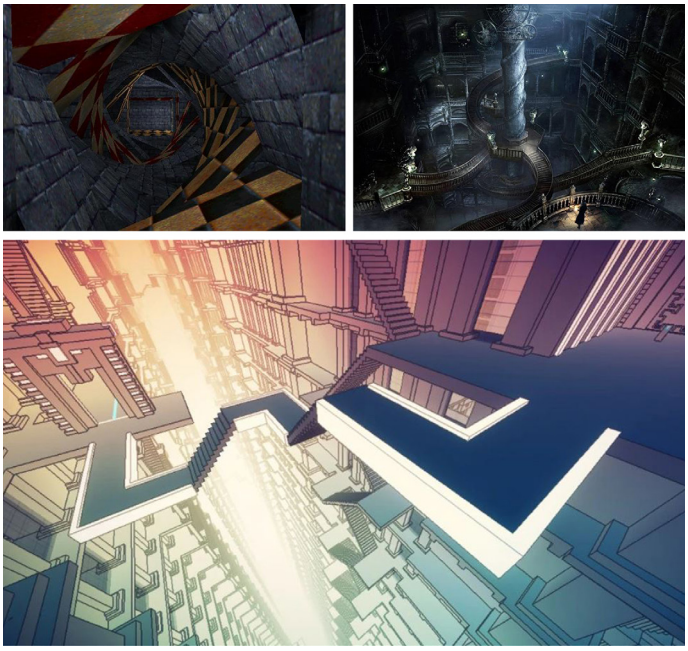

Fig. 9 From top left to bottom: Alexandre Breault, *Thief*, 2014; Kazuhiro Hamatani, *Bloodborne*, 2015; William Chyr, *Manifold Garden*, 2019. Collage elaborated by the author. The use of impossible worlds in videogames.

and recognizable, inspired by the architecture of Ricardo Bofill and Peter Eisenman (Lange, 2015). On closer examination, architecture reveals its opposition to the real world, acquiring its own rules and properties which become more and more complex as the game progresses. The player, in fact, starts to perform movements as he would do in real space, to then realize that they do not fit the new architectural structure. By moving certain portions of the space, he becomes aware of the impossible logics that dominate it: there is no gravitational force, the architecture can tip or rotate, stairs become ceilings, floors become walls, interiors become exteriors (Figure 11). The loss of spatial oppositions—inside/outside, below/above—amplifies the staggering of space and the inebriation of the impossible achieved or overcome. The player, therefore, can interpret the story only by moving away from reality and understanding the new spatial conditions and relationships, made up of incongruities and geometric distortions.

Fig. 8 From top to bottom right: Lars Bakken, *Destiny*, 2019; Big Robot, *The Signal From Tölva*, 2017; Rand Miller, *Obduction*, 2017. Collage elaborated by the author. The use of spaces of Elsewhere in videogames.

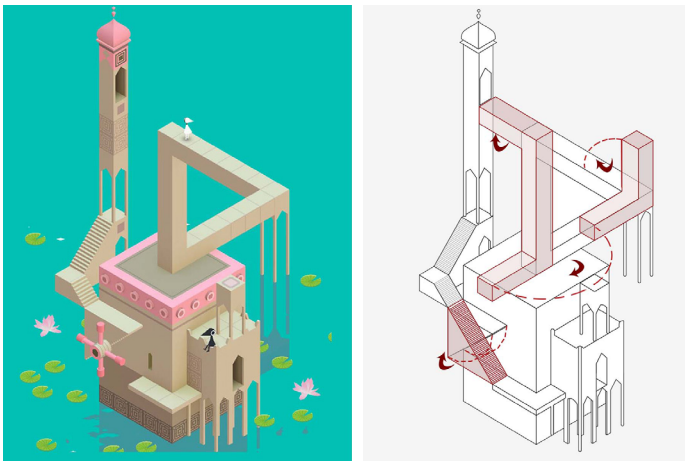

Fig. 11 Greta Attademo, The impossible space in *Monument Valley*, 2021. Author's elaboration.

CONCLUSIONS

The research underlines how the field of representation can contribute to the extension of the academic literature on videogames, intended as a narrative form in which the drawing of space is practiced as an essential modality for the construction of a visual code of thought. The realistic stories coincide with spatial representations that do not necessarily require a high

level of verism, but that reproduce, in the relationship with individuals, sensations similar to those that we would have in the real context. In the anempathetic space, the presence of numerous opposing spatial elements makes the overall configuration of the environments illegible or difficult to interpret. In empathic space, instead, all elements are coordinated and distinct, creating harmony between characters and environment. The verisimilar narratives adopt spatial representations whose perception, although different from what we would have in a real space, is able to lead us back to it through differences, whether they are lacks as in dystopian spaces or additions as in utopian ones. Both emphasize an extreme relationship between individual and space, which can be highly positive or negative. The imaginative complexity required to the player is, therefore, greater; he must connect details and spatial clues to recompose the complex ideologies at the base of the game. The unrealistic stories, on the other hand, make use of spatial representations that, while initially appearing familiar, turn out to be far from the logic of physical reality. The features of the previous spaces are mixed, reformulated and overturned in paradoxical and unrealistic spatial solutions; it is precisely the diversity from reality that constitutes the fulcrum of impossible spaces and elsewhere.

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RAINBOWS BETWEEN ART AND SCIENCE
AN UNCONVENTIONAL ANALYSIS

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OPTICS
KNOWLEDGE IMAGES LEARNING
VISUAL SIMULATION
MODELING LEARNING
ART AND SCIENCE

What do have in common a friar lived in the 17th century, a contemporary American artist of the Land Art movement and an Italian structural engineer popular between the two World Wars? The answer can be certainly found in the common scientific approach of the three authors, but more precisely in their shared passion for the natural phenomenon of rainbow. This paper focuses on the contextualization of studies related to this atmospheric phenomenon starting from the classical period – considering its depictions in the history of science and art. Between the protagonists of this story, whose approaches go from aesthetic researches to natural philosophy, we can find the friar Emmanuel Maignan (1601-1676): a scholar of optics who was the author of one of the most important gnomonic treatises in the Baroque period. Since 1980 the artist Charles Ross has used big glass prisms –precisely oriented– to project the chromatic spectrum within architectural scale installations. Then, in the early decades of the 20th century the engineer Arturo Danusso (1880-1968) developed a method to evaluate the tension stress of the reinforced concrete structures based on photoelasticity. In addition to the examination of the heterogeneous uses of rainbow in art and science, this paper also intends to focus on the relationship between light and optics intended as a 'universal method' to study natural phenomena over the centuries.

OPTICS AND RAINBOW IN HISTORY

The first description on the functioning of rainbow phenomenon can be found in the third century B.C. in Alexander from Afrodisia's work –200 B.C.– who considered the rainbow as a combination of light and colors, but didn't define a precise law. Aristotle (384-322 B.C.) was the first who considered the formation of rainbow directly connected to the optical laws. In his treatise *Meteorologia* the philosopher affirmed that the sight, compared to all the other senses, is the only one that allows the perception of colors. Other elements perceived by our sight, such as the shape of objects, could be known via our touch as well. He studied the origin of the second rainbow –sometimes visible in the sky– and at the end of his analysis he discovered the following issues. First, the center of rainbows is always between the observer's position and the sun; second, its shape is an arch of circumference never bigger than a half-circle; third, rainbows are caused by the reflective power of rain drops, able to show only three colors (Maitte, 2006). Seneca –who lived in the first century A.C.– in his book *Naturales Quaestiones* explains that the rainbow comes from a reflection of sun rays on the rain drops. He affirms also that is possible to see it within a cylinder of glass crossed by a ray of light. Even if the theories of these authors were not so precise about the difference between reflection and refraction, they influenced the researches on this topic until the 18th century, highlighting the relationship between optics, light and rainbow.

During the Arabian Middle Age some researchers such as al-Fārisī –who lived in the 13th century– started to consider the colored arch in the sky as a product of reflections and refractions according to the theories of the mathematician Alhazen in the 10th century in his treatise about optics. Well known is the work of Alhazen, published by Friederick Riesner (1533-1580) in Basil in 1572 with the title *Opticae Thesaurus*. In its frontispiece, among many optical phenomena, a rainbow is represented in the background. The Arabian science

influenced the middle-aged Latin culture: for example Roger Bacon (1214-1292), following the theories of Robert Grosseteste (1175-1253) about reflection and refraction, affirmed that the rainbow can be considered the basis of an imaginary cone whose vertex is the sun and whose axis is the line connecting sun, the observer's eye and the center of the arch. Finally, in the same period, the most precise description of this phenomenon is given by Teodorico von Freiberg (1250-1311), similar to the one currently accepted: using a big sphere filled with water –like a big drop of rain– he experimented that the colors were produced by two refractions and one reflection.

In the Renaissance period the rainbow was studied by other authors like Giovanni Battista Della Porta (1535-1615) and Marco Antonio De Dominicis (1560-1624). What's more, it started to appear in the frontispieces of treatises about optics and physics (Figure 1) and in the engraving *Melancolia I* by Albrecht Dürer (1471-1528) because of its symbolic and mystic implications (Boyer, 1987).

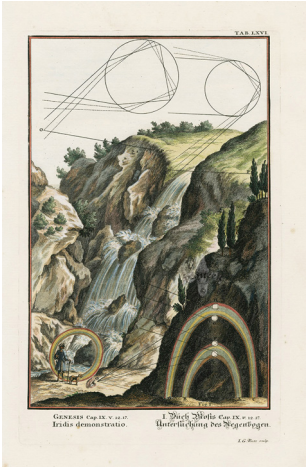

Fig. 1 Scheuchzer, J. J. (1731), *Physica Sacra*, tab. LXVI, Iridis Demonstration.

Teodorico's experiment was carried out by René Descartes (1596-1650) in the baroque period. Using the sphere filled with water he was able to calculate that the colors appeared when the angle between the axis and the generatrix of the imaginary cone of light was around 42°. Descartes became famous for the codification of the refraction law, today known as Snell-Descartes law. Thanks to an instrument of his own invention –composed by a board with a hole covered with a glass prism– he was able to observe the appearance of different colors depending on the inclination of the source of light. Descartes was really fascinated by the magnifying power of lenses, so that the last chapter of his treatise *La Dioptrique* is completely dedicated to the description of grinding machines for the production of these tools. In a letter written to an artisan –a lenses maker– he expresses his desire to demonstrate the existence of alien life in the solar system using telescope or the possibility to project messages on the surface of the moon by employing light and lenses.

More generally Descartes was able to develop a theory about light, reflection and refraction using a geometrical and experimental method.

Less than one century later Isaac Newton (1642-1726), with the experiment of the prism, demonstrated that the white light is composed by the seven colors of the rainbow – each of them characterized by a different wavelength (Corradi, 2016). In detail, Newton decided to communicate his theory about light and colors via a letter, today known as *Letter to Oldenburg*, addressed to the Royal Society in 1672. In this document the scholar explains that during the experiment he employed a dark room and a prism crossed by a sun beam coming inside the room from a small hole: on the opposite wall he observed a vivid colored and extended spot. At the side of his theory about rainbow there is a new physical explanation of light phenomena: light is composed by different corpuscles that are deviated in various ways thanks to refraction, producing the decomposition of light in colors. Each color is characterized by a degree of refractivity –lower for red compared to violet– that cannot be modified. According to Newton's theory there are two kinds of colors: the primary and secondary – which are composed by first ones. The primary are red, yellow, green, blue, violet, orange and indigo, this is the theory of seven color explained also in his 1704 *Opticks*. He also noticed that the most unexpected and wonderful color is white, composed by all the seven primary colors mentioned before. According to the scientist white seems to be the purest and simplest color, but in reality it became assembled and heterogeneous. In another letter addressed to Robert Hooke (1635-1703) Newton compares the refraction of a light ray to the string of a musical instrument pressed by the player's finger: the refractive surface can be seen as the position of the finger, the white light as the part of the string without vibration and the different colors as the vibrant part of the same string. The analogy between light and music continues when the scholar describes his well-known chromatic circle, comparing the seven colors of

rainbow to the seven musical notes and the combination of colors to the octaves. In this context we can notice how Newton arranged physical laws according to the order of the world, in the same way as Johannes Kepler (1571-1630) had done before him.

EMMANUEL MAIGNAN. A RAINBOW FOR A SUNDIAL

In a recent research I focused on the digital reconstruction of an unrealized project for a scientific villa designed by Francesco Borromini (1599-1667) around 1644 for Cardinal Camillo Pamphilj. I'm referring to Villa Dorja Pamphilj which was finally built following a totally different project conceived by Alessandro Algardi (1598-1654) and Francesco Grimaldi (1606-1680). The documents on this topic are stored in the Vatican Apostolic Library and in the State Archives of Rome. These sources are both graphic and written: the graphic materials are composed by the blueprint by Francesco Borromini, a plan and a symmetrical facade in two solutions. The literary documents include a handwritten in Latin by the monk Emmanuel Maignan (1601-1676), where 21 scientific games are described and conceived to decorate the villa (Maignan, n.d.).

The games by Maignan represent investigations on optics, gnomonics, void existence, acoustics, astronomy and so on with the typical geometrical approach of that time. The French friar Maignan –belonging to order of Minims– spent a part of his life in the convent of the Santissima Trinità dei Monti in Rome from 1637 to 1650. In the corridors of the cloister at the first floor he depicted the portrait of Saint Francis of Paola in anomorphosis and a catoptric sundial. In 1648 Maignan realized a similar clock for Bernardino Spada (1594-1661) in his palace Capo di Ferro. Thanks to a small mirror positioned on the windowsill it is possible to read the time observing the reflected sunray moving on the ceiling where the hours line had been previously calculated

and traced. In point six of Maignan's handwritten for Villa Pamphilj –reconstructed with digital tools combining Borromini drawings and Maignan's description– the monk refers to the realization of a catoptric sundial on the vaults of two angular towers (Bortot, 2020), the same solar clocks he practically built in Trinità dei Monti and in Palazzo Spada. The monk writes

> on both the vaults of the northern towers and the wall around, through the art of catoptrics it will be put a device indicating whatever it refers to both the motion of sun and stars, thanks to the reflection of a sunbeam. Likewise, in the same place two mirrors will be arranged so that on the wall or on the vault a perpetual iris will be produced. The rainbow will indicate the parallel where the sun will be and thus it will show single places, such as cities or regions where the sun will reach its zenith that day. (Maignan, n.d., pp. 627-628)

Maignan thinks to align the geographic places of the world where it is possible to know the astronomical midday, along the projection on the spherical vault of a perpetual arch of light obtained through a tool called *Iride Horariae Dioptricae*, shown in the fourth book of his treatise about gnomonic entitled *Perspectiva Horaria* (Maignan, 1648). In other words, the position of the arc points out the parallel where the sun is

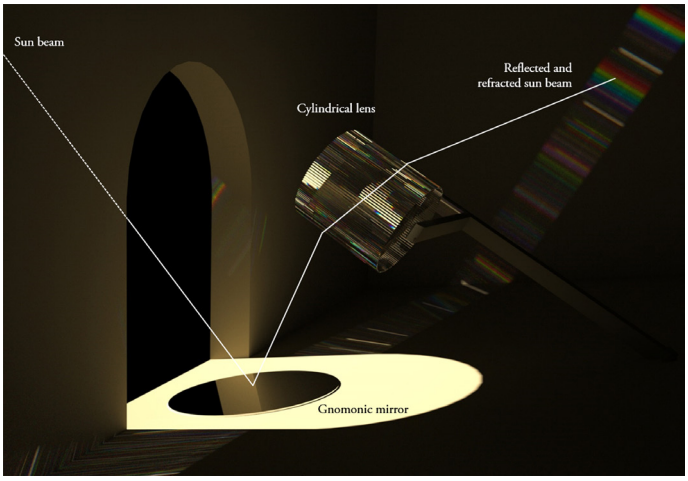

Fig. 2 Explanation of *Iride Horariae Dioptricae* by Maignan (digital reconstruction by the author).

located, it changes in the course of the year indicating every day the places where the star is at its zenith. In the clocks of Trinità dei Monti and Palazzo Spada, these locations are more simply arranged along a line marked in black. The Book IV of *Perspectiva Horaria* is therefore entirely dedicated to the explanation of how to achieve these refraction sundials, but not only. Maignan focuses on the theme of the 'iris', produced by an instrument called *Iride Horariae Dioptricae*. The Father states "the reflected light shows only the whiteness that is typical of its nature. Instead, when it is refracted according to the way and the amount of refraction, becomes yellow, green, purple and blue".

The digital simulations necessarily lead back to point six of the manuscript for Villa Pamphilj (Figure 2). Fixed the planar gnomonic mirror on the windowsill, we will see an arc of a refracted circle of light, split off in the rainbow colors, intersecting the cone of light refracted with a cylinder of a transparent material (Figure 3). In short, it is once again a problem due to the conical sections, already explained by Apollonius of Perga in the second century B.C. which is no more connected to abstract geometrical objects but to astronomical phenomena. Maignan uses his devices to create sundials, but also to study the nature of light and the way it spreads around.

Fig. 3 The projection of the rainbow using the device described by Maignan (digital reconstruction by the author).

In the Book IV of *Perspectiva Horaria* the *Iride Horariae Dioptricae* is described in detail. In particular it is exposed how to make the *Iride* more brightly through the use of the transparent cylinder

> nevertheless you can obtain more vivid colors if you will make small grooves on the cylindrical surface, with equal and very frequent intervals, because the effect of the rainbow would be more beautiful if these facets [those belonging to the grooves], followed each other very quickly and progressively. In fact in this way the rainbow would be interrupted and it would be not a continuous arc but necessarily an arc with breaks. (Maignan, 1648, pp. 684-685)

In order to obtain the desired effect, therefore it will not be sufficient to smooth the external surface of the crystal cylinder, but to highlight its generatrix by engraving it with the aim of amplifying the refractive phenomenon. A variant to the device is offered by the friar in the Book III of *Perspectiva Horaria*, a section of the treatise dedicated to phenomena of reflection. In this case the device is called *Iride Horariae Catoptricae*: leaving the gnomonic planar mirror fixed on the window sill, we will obtain two distinct admirable effects using a reflective cylinder or a dioptric one, mounted on suitable supports. With the mirroring cylinder we will have a projection of a luminous arc on the hemispherical vault, if the portion of the cone of reflected light –product of the infinite generatrix of solar rays– will intercept –when reflected obliquely– an inclined mirroring cylinder according to the desired coverage area to illuminate. According to Maignan the value of *Iride Horariae Dioptricae* is not only related to scientific experiments or to the art of wonder, but also to symbolic and religious interpretation of light, as it will be explained in the conclusion of this paper.

CHARLES ROSS. TANGIBLE RAINBOW

Charles Ross is an American artist born in 1937 with a Bachelor of Arts and Mathematics. He belongs to a generation of artists defined minimalists whose works are based on natural phenomena and interaction with the landscape in order to produce precise perceptual effects. Among the artworks we can mention Larry Bell's vacuum chamber, Donald Judd's Plexiglas boxes, Robert Morris's mirrored cubes, Robert Smithson's inverted mirrored pyramid, John McCracken's fiberglass sculptures, Dan Flavin's fluorescent light bulbs, Robert Irwin's white circular aluminum discs, etc. Since 1971 Ross has been creating an earthwork known as Star Axis in New Mexico desert which is a naked eye observatory, a huge sundial and an architectonic sculpture.

The Star Tunnel is the central element of Star Axis and it is precisely aligned with the earth's axis. In 1993 he realized *Day Burns: Solstice to Equinox*, a series of canvas obtained with some magnifying lenses, capable of burning the support thanks to the exposition to sun rays. Starting from the end of the Sixties, fascinated by the refraction of light, he started a series of sculptures called Prisms. These geometric transparent objects produce effects of reflection, distortion, fragmentation and dislocation in the observer. According to Klaus Ottmann "these objects do not refract light as much as they provide an experience of relativity by containing or presenting various perspectives. Thanks to them the world can be observed simultaneously from several sides or moving at different speeds" (McEvilley, 2012, p. 17). His relation with architecture is highlighted by the installation with large-scale glass prisms which he used to project rainbows. The spectrums continuously evolve throughout the day, spreading bright white light or contracting into brilliant bands of solar color moving through the space. For example in 1996 he realized the Dwan Light Sanctuary in collaboration with the architect Laban Wingert (Figure 4). The building is provided with twenty-four large scale prisms specifically aligned with the sun to project different and precise spectrum events for every season. The inner circular white plaster space is aligned not

Fig. 4 Rainbow projections inside the Dwan Sanctuary, © 2021 Charles Ross Artists Rights Society (ARS), New York.

only with the sun, but also with the moon and stars in order to focus on specific seasonal events like winter and summer solstice, equinox, midsummer, midwinter, etc. The twenty-four prisms produce changing solar-spectrum events that circulate across the walls and floor during the day, and lunar spectrums at full moon. The relation between architecture and artwork offers not only the experience of color and light to visitors, but also the passing of time. The aim of the artist is to connect human beings with the laws of the universe. This is the reason why Ross' ultimate goal is to create a nexus of solar spectrum artworks all over the world so that the spectrum installed in one location, is always rising in another. Considering the aforementioned sundials by Maignan, some unexpected analogies arise along with the work of Ross: first, a common intention of transporting an open air phenomena –the one of rainbow– in a close chamber; second, the idea of using the solar spectrum as a sign of time passing. It is also significative the use of rainbows for Ross' Chapel. In fact, according to him, light can raise spirits regardless of a specific religion. The breakdown of light in its visible spectrum –as it was done by Newton in his experiment– also fascinated the Italian artist Marinellia Pirelli (1925-2009). Between the unrealized works of Pirelli the one called *The Skewered Butterfly* is essential for our topic: from the sketches of her project for the installation we deduce that a double rainbow, simulating the wings of an insect, would have been projected in a dark space, thanks to a light source placed on the floor and refracted by a lens designed for this purpose. Marinellia asked the light physicist Vasco Ronchi (1897-1988) to carry out a feasibility study of the prisms necessary for obtaining the effect: the answer provided by the scholar demonstrated the high costs of execution of these small and indispensable objects. At the time, there was only one company which could build these prisms: the Steg & Reuter of Bad Homburg. However, Marinellia decided to give up the realization of the lens because it seemed immoral that a work of art –or even just a piece of it– could cost more than the salary of professor

Ronchi. The fascination for luminous phenomena is reflected in a large part of the Marinellia's production. Using artificial light sources, translucent surfaces and prismatic lenses, she conceived works whose titles unequivocally demonstrate the seductive power exercised by celestial bodies: *Meteore* (1970-1972), *Room of Light* (1969-2003), *Pulsar 360°* (1970-2001), *Meteorites* (1965) and so on. "In this eighteenth-century villa, using advanced technologies, I sum up the optical games characterizing the century of lights" (Pirelli, 2003, p. 62), says Marinellia Pirelli in the occasion of the *Ombra Luce* exhibition, set up at the *Villa Menafoglio Litta Panza* in Varese in 2003. In this context it seems appropriate to mention also the work of the artist Olafur Eliasson. He uses technical devices and natural elements such as light, water and fog to transform exhibition spaces into immersive, site-specific environments. The main themes are human perception and our relationship to the natural world. Rainbows are protagonists of some of his artworks such as *Beauty* (1993): in a darkened space some nozzles are arranged in a row spraying a curtain of fine mist from the ceiling into the bright beam of a spotlight. From certain perspectives, a rainbow can be seen in the falling water; it shifts in intensity or disappears as the viewer approaches it or moves away. Another example is the installation *Round Rainbow* (2005) that shows a variety of refractive phenomena: a halogen light mounted on a tripod illuminates a plexi-torus suspended in the center of a dark room thanks to a transparent wire that allows it to rotate on the vertical axis. Varying the rotation of torus in relation to the fixed spot light it is possible to observe the projections of a circular rainbow on the walls of the room, or the shadow of the solid or a circumference of light.

ARTURO DANUSSO. THE RAINBOW OF STRUCTURES

Arturo Danusso (1880-1968) was an Italian engineer and one of the protagonists of the history of structural engineering

in the 20th century. The specific history of construction is quite interesting because, before the two World Wars and then during the reconstruction, there was a prolific generation of engineers who became popular worldwide. To support this statement we can affirm that the peak of his success is well represented by the great number of Italian projects exhibited in the *Twentieth Century Engineering* show at the Museum of Modern Art in New York in 1964. The Italian structural engineering was a part of the Italian style, widely recognized thanks to the ability of producing technologically advanced objects with handcrafted characteristics. It also significant the huge number of patents acquired during the reconstruction of Italy after the Second World War: for example the one by Pier Luigi Nervi (1891-1979) for his invention of ferrocement (Iori & Poretti, 2020). In the same topic we can also mention the researches by Gustavo Colonnetti (1886-1968) on elasticity and the application of prestressed concrete. The importance of this 'Italian school' is not only connected with the realization of innovative structures –bridges, big domes, hangars, dams, skyscrapers, etc.– but also with original methods for the calculation of the projects. Colonnetti had an analytical approach, while Danusso preferred an empirical one. More in detail, Danusso developed a theory formulated at the beginning of 1800 by the physicist Dawid Brewster (1781-1868) and later applied to structural calculation by Augustin-Charles-Marie Mesnager (1862-1933). The method, called Photoelasticity, experimentally determines the stress distribution in a material under mechanical deformation. When illuminating –via a polarized light– a semi-transparent

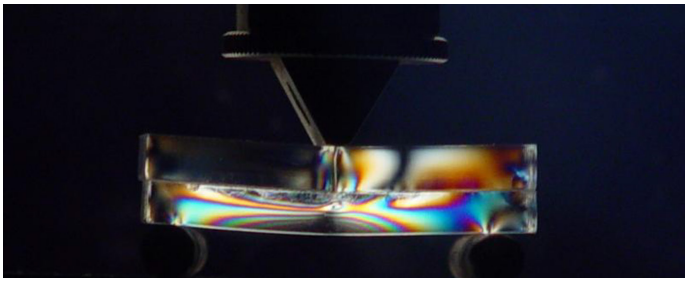

Fig. 5 Example of isocline on a prism made of plexiglass (photoelastic stress test by Elena Sperotto).

–i.e. made of polycarbonate– maquette of a structure with loads applied it is possible to observe the stress tensional states in form of colored isostatic curves (Mondina, 1958) (Figure 5). Danusso preferred this optical approach to the analytical one because he thought that mathematical methods at that time couldn't evaluate all the forces in a reinforced concrete structure. He founded the Prove modelli e costruzioni laboratory at the Politecnico di Milano in 1931 and ISMES –Istituto Sperimentale Modelli e Strutture– in Bergamo in 1951. Until the seventies these laboratories became a reference for structural analysis worldwide. In addition to the technical applications of Photoelasticity, it is interesting to consider the role of light in this approach explained by Danusso

> this method uses the most subtle and attentive of observers, giving it the task of inspecting the stress tensor in every point. The structure is represented by a transparent model: the light polarized ray following our orders, penetrates it; it puts in contact for a moment its own vitality with the most intimate parts of model, tormented by efforts comparable to those that the real construction will have to sustain; then the ray goes out and loyally describes on the screen, with an elegant succession of shades and hues, everything that he has seen. (1932, p. 206)

This passage highlights a humanistic approach to science. In fact Danusso like all of his colleagues at that time, was influenced by the neo idealistic philosophy by Benedetto Croce. He was also a fervent catholic and in his lectures he usually refers to the physical order as an analog mirror of the moral order outlining suggestive analogies between mechanics and life (Desideri et al., 2012).

CONCLUSIONS

The essential history of rainbow described at the beginning highlights the great curiosity for this meteorologic

phenomenon, but also the complexity of its explanation considering the relation with the nature of light and to the refraction law. We haven't mentioned the great fascination for rainbow reflected by mythological tales and literal works during the centuries. We can observe that the historical experiment and researches about light have a strict relation with the concept of projection before this method became a form of geometrical representation. The relation between light and optics is also highlighted by a similar physical behavior of light and visual rays, probably is not for chance that the studies about rainbow have been geometrically carried out in combination with sight perception.

The investigations in this field start to become artwork –and no more experiments– in our contemporary time reproducing a physical phenomenon thanks to the control of reflection and refraction laws. The three protagonists of this story, even if belonging to different historical period and with completely different personal interests, are gathered by the unveiling role of light. It looks like a religious man, an artist and an engineer recognized the value of light as a primordial element and a spiritual representation. Another monk belonging to the order of Minims, father Marin Mersenne, quoting San Paolo, affirms "everything that appears is light" but "as our eyes are too weak to bear its glow, colors are offered to us to appreciate its perfection" (Beaulieu & De Waard, 1933, p. 451). This affirmation highlights the divine nature of light and the inability of man to tolerate its image if not broken down in its spectrum of color.

We can state that light –and rainbow– is one of the natural phenomena that mostly attracted scientists and artists, marking in this way the short distance between these two areas of research and expression. In the Greek mythology the goddess Iride was born from the relationship between Taumante –son of Earth and Sea– and Elettra – daughter of Ocean. Iride is symbolically considered the intermediary, the one who is able to connect Night and Day, Earth and Sky, Gods and man.

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CULTURAL EXPRESSION: 'ARTISTIC' OR 'SOCIAL' COMPETENCE?

IMAGE CREATIVITY IN YOUNG ADULTS ASPIRING TO BECOME PRIMARY LEVEL TEACHERS IN ITALIAN-SPEAKING SWITZERLAND

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ESSAY 101/06

ART HISTORY
CASE STUDY
EUROPEAN CULTURAL AWARENESS
EXPRESSION COMPETENCE
VISUAL EXPRESSION

Two different cohorts of young adults, as a function of their access to Teacher training program for pre-primary and primary teachers in the Canton of Ticino (CH), attended in 2021 and 2022 a weeklong art workshop at the Department of Education and Learning of SUPSI (DFA). Framed within an annual training course, these intensive ateliers involved graphic, pictorial and plastic artistic research focusing on the theme 'Art and War', mobilizing the potential of the artwork to arouse not only emotional reactions, but also generative on a cognitive level, in order to develop reflective-critical thinking and creative thinking. Technical-expressive and representational competences have been placed in the foreground, activating strategies of figurative-abstract expression on the two-dimensional surface or in three dimensions. The article approach can be traced to the perspective of the case study and it is based on the resources (knowledge, skills and attitudes) referred to in Key competence 8 for lifelong learning, *Cultural awareness and expression competence* (European Council Recommendation of 22 May 2018). The project is intended to verify the status of both the image and visual culture in the transition between upper secondary and university of teacher education for the school system of the Italian-speaking Canton of Switzerland.

INTRODUCTION

Analysis of Cultural awareness and expression competence

The European Council's 8th key competence for lifelong learning, *Cultural awareness and expression competence* (Official Journal of the European Union, C 189/11, 2018) defines the resources required (knowledge, skills and attitudes) as follows: "knowledge of local, national, regional, European and global cultures and expressions, including their languages, heritage and traditions, and cultural products, and an understanding of how these expressions can influence each other as well as the ideas of the individual" (*ibidem*). The "understanding" competence particularly involves "the different ways of communicating ideas between creator, participant and audience" within various traditional artistic languages as well as "hybrid forms". The question of identity is also considered, and specifically the coexistence of heritage "within a world of cultural diversity", insofar as "arts and other cultural forms can be a way to both view and shape the world" (*ibidem*).

This statement partly justifies the choice made by the author in addressing Picasso's *Guernica* as the main vehicle of meaning making in the studio art lesson. *Guernica* thus is offered as a prototype of artistic expression strongly embedded in collective events of historical and aesthetic significance, emerging as an archetype of the modern representation of war. The training experience presented here thus follows Bromley's (1990) definition of the case study –"systematic inquiry into an event or a set of related events which aims to describe and explain the phenomenon of interest" (p. 302)– where the war event constitutes the referential phenomenon for the iconic representation task proposed to the art workshop participants. Another reason for the choice of *Guernica* is to be found in the typology of this inquiry, a teaching case study that, because of its didactic-applicative character, involves student-centered activities based on visual artifacts already investigated in the domain of the discipline and capable of conveying reflections and

implementation of formatively significant theoretical and practical elements (Davis & Wilcock, 2003).

With regard to the second context of resource activation, i.e. 'skills', it should be emphasized that, according to European Council's 8th key competence, they "include the ability to express and interpret figurative and abstract ideas, experiences and emotions", being capable of "empathy" in a range of "arts and other cultural forms" (C 189/11, 2018). Lastly, with reference to the dispositional aspects of the participants in the art workshop, it should be stressed the "positive attitude" of *Cultural awareness and expression competence* as a "curiosity about the world, an openness to imagine new possibilities, and a willingness to participate in cultural experiences" (C 189/12, 2019).

In addition to being a good practice, the presented case study may also provide insights for a future arts-based research (Hudson & Hudson, 2007; McKay & Sappa, 2020) focused on exploring *non-cognitive resources* to cultural expression competence, as future teachers, in a population of young adults between upper secondary and university education. As a matter of fact, the purpose of the case study presented was not the problem of curricular integration of European Key competence 8 (Bracun Sova & Kemperl, 2012), but to observe the perceived self-efficacy of young art workshop participants. This emphasis is to be placed in relation to the well-known dispositional difficulties that have long been considered in the literature, both in semiotic-visual terms (Pizzo Russo, 1988, p. 101) and in terms of teachers' preparation for artistic and expressive languages (Certini, 2015; Pinto et al., 2009).

The method implemented was therefore to mobilize the *Cultural awareness and expression competence* resources in the students participating in the workshop, while testing a teaching hypothesis structured around three disciplinary and transversal processes:

1. Openness to social criticism art forms, in line with the critical approach of some contemporary art and visual culture;

2. Availability to expressive involvement from a perspective that is not only studio art-making 'techniques', with reference to the *Piano di studio della scuola dell'obbligo ticinese* (2015) and the concept of *Visual Competence* (Wagner & Schönau, 2016);
3. Overcoming, as future generalist teachers, the 'utilitarian' vision of artistic education in primary schools, by assuming an attitude of *researchers of meaning* through visual form, rather than 'suppliers' of creative activities inspired by the didactic formula of *Best Practices*.

Demographic portrait of participants

In the edition of 2021 as well as in that of 2022, the *Visual and Plastic Art Design* workshop has involved sixteen students ranged in age from 20 to 25 years old. The cohort of young adults was heterogeneous in terms of prior studies, coming from different post-compulsory study paths, but all had in common the fact that they had not obtained a high school or specialized diploma. For this reason, they were following the one-year curriculum called the *Complementary Professional Maturity Course* (Passerelle maturité professionnelle/spécialisée - Hautes écoles universitaires), a 'preliminary' course that prepares participants for the complementary exam in order to access teacher training at the pre-primary and primary school level (certification of the specialized high school diploma for pedagogical studies). Areas of training include languages, mathematics, science and the arts.

The *Visual and Plastic Art Design* art week took place at the Department of Education and Learning (DFA) of the University of Applied Sciences and Arts of Southern Switzerland (SUPSI) and was designed to enable the class to acquire the artistic and cultural skills that, in the Swiss upper secondary school framework, are required at the end of a general culture school with a pedagogical focus (CDPE, 2018). However, this professional specialization is not provided in the Canton of Ticino. It is a field of study that proposes both theoretical-applicative ("principles of the figurative arts") and

expressive learning objectives ("creative skills in the field of the figurative arts", CDPE, p. 11). The percentage of students who had previously done vocational training in the technical-artistic field is a quarter (4 students out of 16), while the majority came from health and social sectors, the commercial sector and other vocational courses.

Perceived students' preparedness for the *artistic encounter* between previous training and professional self-projection

Twelve out of the sixteen students involved in the pictorial and plastic laboratory announced themselves to be poorly introduced to artistic and expressive languages, as well as to the history of art and visual culture in general. The four students trained in professional schools with an artistic vocation had, on the other hand, acquired pretty good technical-expressive skills, although little profiled in the cultural domain and in personal research through artistic practice.

Having to comply with the compensatory requirement of the block week, on the one hand, and aiming at a meta-reflective educational intention on the other –also in view of the term *awareness*, which qualifies the European competence– the artwork *Guernica* (1936) by Picasso was proposed as a starting point. This iconic reference in international Art education (Arnheim, 1962/2007) is a classic of modern art, a sort of 'pre-text' in the sense of a point of visual departure for the students' personal research, according to the "vehicular" approach to the work of art proposed by Dallari (2005) and by Ciarcià & Dallari (2016). This approach partly moderates the theoretical drifts of a didactic treatment of figurative expression in the abstract and 'reading only' mode, rather than a hands-on studio approach (i.e. manipulative and authorial in the visual reinterpretation). The author of the article is aware, however, that even in the active setting of the art classroom the 'intellectualistic' imprint returns to appear –sometimes even in primary school– offering itself as a cultural supplement to creative-manual paths otherwise

considered not challenging enough from the cognitive profile or not supported by art history (Bae, 2014, p. 62; Bracun Sova & Kemperl, 2012; Rickenmann, 2018, p. 60).

CULTURAL EXPRESSION: AN 'ARTISTIC' AND 'SOCIAL' COMPETENCE

Arts and emotion in learning visual competence

The role of emotions in artistic experiences has long been the subject of numerous researches in psychology and aesthetics (D'Angelo, 2020; Freedberg & Gallese, 2014), where the concept of 'empathy' acquires a connotation influenced by the culture of reference and the iconographic subject represented, according to the assumptions of the "good form" theorized by Gestalt (Crescimanno, 2010). Inspired by a contemporary tradition of artistic and visual didactics as an inseparable interweaving of intellect and matter (Rosenberg, 2016; Schönau, 2017), of reflexivity and action (Buschkühle, 2012), the operational proposal of the *Visual and Plastic Art Design* workshop aims at emotionally and semantically deconstructing the Picassian reference to activate an aesthetic/poietical process of personal 're-presentation'. The idea is that, in the complexity of the present time, a good teaching design for competences in art is not so much a matter of technical application of the *Best Practice* identified as a goal, or as a guarantee of "quality" (Cremer & Sternfeld, 2015; Mörsch, 2015), as it is an opportunity for the subject undergoing training to face a problematic scenario of social, as well as aesthetic significance (Kraehe, Hood & Travis, 2015; Milbrandt, 2010), where the dimensions of enjoyment and expression are strongly influenced by the "epistemological tacit assumptions" of the teachers themselves (Zuccoli, 2020, p. 80).

The aim is to recognize the "immersive" and "subversive" potential (Cremer & Sternfeld, 2015) of expressive themes and materials, to the extent that visual thinking

and manual sensibility collaborate in an intentionality that is assertive because artistic: "as we grow, we learn different things; but as we grow artistically, we learn things differently" (Sullivan, 2014, p. 270). The attempt, therefore, is to increase the educational significance of creative-manual activity in the educational context, not by barricading oneself behind one's own 'disciplinary fence' –while even leveraging it– but by actively working on the sensitivity to media and materials and on socially shareable interpretations in a representation: "Focusing on visual(ization) does not do away with art in education. Rather, it is a way to rethink traditional art skills, avant-garde works of art, and artistic habits of mind in the context of visually dominated cultures" (Krahe, 2019, p. 5). The scholarly reference is to the pedagogical-artistic and problematizing attitude that the North American school has long focused on in *Visual culture art education* (Carpenter II & Tavin, 2010; Tavin, 2016; Wilson & Marmé Thompson, 2007) and that the author of this article has also considered in the reflection on his own didactic approach to the initial training of art teachers in the lower secondary (Bottinelli Montandon & Canonica Manz, 2019).

Meaning and activation of the artistic laboratory

The laboratory was introduced by the iconographic contextualization of *Guernica* (Picasso, 1937), with the aim of extending the reading of the work to the theme of 'Art and War'. Some image creation professionals were then presented and discussed –Banksy and war photojournalists– who, although without any historical or stylistic link with Picasso, have explicitly conveyed through their visual expression the theme of war and, in particular, the problem of the civilian populations who have suffered from it. One of the expected results of the *Visual and Plastic Art Design* workshop, as a matter of fact, was the possibility of activating awareness of a significant moment in history (the Spanish civil war), but also in art (Picasso's figurative code as a stylistic signature of modernity), in order to be able to

'read them against the light', interpreting and representing in turn a 'visual thinking', also in a meta-disciplinary function (transversal competences and general education contexts of the *Piano di studio della scuola dell'obbligo ticinese*, DECS, DS, 2015).

This educational outcome corresponds to a need of the trainee involved in the *Visual and Plastic Art Design* workshop –young adult and citizen– in order to acquire specific resources to make sense of the above mentioned Key competence 8 for lifelong learning: "understanding, developing and *expressing one's own ideas* and sense of place or role in society in a variety of ways and contexts" (Official Journal of the European Union, C 189/11, italics added). Knowing some models from the historical and artistic context is, therefore, a resource to be 'invested' in order to broaden one's cultural references and to consider learning as a transversal process, rather than a sectorial one.

Analysis of the artwork, extension to the processes involved

As already mentioned, the proposed lesson on *Guernica* derives from Arnheim's perceptual method (1962/2007) and in particular from the analysis of the extended horizontal format and the four compositional blocks in succession.

Students are thus invited to read from right to left, both through the dynamic vectors of the configurations –especially in the two central blocks with the beam of light culminating in the horse's head– and through the attitudes of the characters.

The war-inspired scene frames the emotional tension between the burning house on the far right and the 'weeping bull/mother' group on the left: both vertical elements statically act as the wings of an imaginary triptych. The dynamic comment on "visual(ization)", which was evoked earlier in Krahe's words (2019), can also be useful for understanding the following passage from Arnheim, which, in the author's didactic approach, functioned as a 'key to exit' from Guernica:

The long panel determines an absence of compactness. As the viewer's eye travels across the canvas, it inspects

Fig. 1 Mario Bottinelli Montandon, *Graphic reworking from Guernica by Pablo Picasso*, 2021, digital image.

> a sequence of themes instead of encountering a single, highly integrated structure [...]. The world conceived for Guernica is, therefore, a world where very similar events occur everywhere *without a strong unitary organization* (1962/2007, p. 57, italics added).

Pictures of war leading to expression

The absence of "unitary organization" as an expressive and social meaning is the concept that was most insisted upon in the proposal of an image by Banksy (*Napalm girl*, 2004) and a photograph by Nick Ut, the photojournalist in Vietnam, which constitutes its iconic source (*Kim Phuc - Napalm girl*, June 8, 1972). Other war photographs were also presented, images of cities destroyed by bombing in which some figures stand out: two children playing with a bicycle (Raqqa, 2019) and a solitary painter, Theodor Rosenhauer, portrayed in September 1945 in the ruins of Dresden, working on the painting *View of the Japanische Palais after the bombing*. These heterogeneous elements –Picasso and the images of war– served the function of sharing meaning before activating the students in personal research and, therefore, artistic design.

Even without showing them, the images of the Russian-Ukrainian conflict appeared spontaneously in the imagination of the participants of the second edition of the *Visual and Plastic Art Design* workshop (March 2022), proposing themselves in a dramatic and non-intentional way as 'referents of reality'. The interesting fact, here, is not the political-ideological embroidery that can be superimposed on the background of the images of war, but the realization that cultural awareness is already an 'expression', to the extent that it is the very reality of the world in which we all live that presents us the bill of a media-globalized civilization. Therefore, empathy/indifference may also be aesthetic values, if they display a feeling/insensitivity of the suffering of the 'other', who is no longer –if he ever was– far away from those who are called to the competence of a cultural expression.

It should be stressed, however, that the didactic approach practiced in the *Visual and Technical Artistic Design* laboratory was not exclusively discursive, conceptual or "ethical/social" in nature. The students' critical and reflective thinking, their 'cultural awareness and expression', were in fact stimulated and accompanied mainly by direct experience with the artistic materials proposed by the teachers: the charcoal technique, for the graphic-painting *atelier*, and the *papier-mâché* technique for the plastic-manipulative *atelier*.

Concepts as images

According to Schönau's warning (2014), it is not helpful for the subject-author who tries his hand at expression through images to be overwhelmed by the difficulties of translating concepts into visual form: "The best thing a teacher can do in the classroom when supporting students in their search for meaning, is to prevent students from drowning in the complexity to visualize their ideas" (p. 306). Caution is therefore a must, both because art teachers can sometimes have a tendency to 'conceptualize' the

task –perhaps in the wake of certain contemporary art, minimalist in its aesthetic production and apparently lacking in technical skills (Bertan, 2004, p. 23)– and because it would not be gratifying for a relatively inexperienced author to find that what he or she has executed is a clumsy approximation of predefined models (available or implicit), or a poor translation of what could be more effectively expressed through words or writing.

Parallel to these methodological indications is the need to address the proverbial difficulty many have in responding to the request to draw. Here, in fact, emerges from a large part of the population, adults and pre-adolescents, the technical and representational foreignness to graphic language, a phenomenon that the literature has dealt with for decades and from different perspectives (Cohn, 2012; Garista et al., 2016; Pizzo Russo, 1988). On the other hand, the commitment to give form to a content is equivalent to the "semantic/procedural structures" (Case & Okamoto, 1996, p. 23) that has been contextualized in the *Visual and Plastic Art Design* workshop.

RESULTS

Manifestations of visual meanings as expressive choices

Individual fragments from *Guernica*, on the one hand, and individual iconographic research on the theme of war, on the other, represented a "more effective point of departure for learning" (Schönau, 2014, p. 306). These sources acted as a sort of 'referential scaffolding' necessary for students to initiate strategies of expression in both visual languages of two- and three-dimensional form. The didactic path, as already outlined in paragraph *Analysis of the artwork, extension to the processes involved*, began with a dialogic frontal lesson in order to share with students the inner sense of Arnheim's reading of *Guernica* (process B, paragraph *Analysis of Cultural awareness and expression*

Figs. 2, 3 Students of the *Visual and Plastic Art Design* workshop, *D'après Guernica*, 2021, *papier-mâché*, wood, wire.

competence) and together to mobilize the generalization of meaning in authors closer in time (process A, paragraph *Analysis of Cultural awareness and expression competence*).

In the images below, we have a partial sample of the various phases of the elaboration of the personal project by some students and we can see how, in some cases, the authors preferred to dedicate themselves to a technical investigation of the artistic reference (Figures 2, 3), while in others the symbolic significance was privileged as the aim of the creative action (Figures 4, 5).

Each student was also invited, at the end of the block week, to present his or her final work to the large group –a choice between the graphic and the plastic experience, or a hybrid of the two– commenting in written words on the themes that, in his or her opinion, were essential in the enjoyment of the artifact.

To prepare for the final presentation task, the students were given a self-regulating criterion in the form of a key question: "Is what I have made really expressing what I had in mind?". The question, taken up by Schönau (2014, p. 306), sealed the experience of the entire *Visual and Plastic Art Design* week, with particular emphasis on aspects of awareness in the visual forms of cultural expression.

It is of relevance that the preliminary exercises in both techniques were widely indebted to the Picassian reference, and that also when adding new interpretative reasons in the final artwork, the 'point of departure for learning' was still clearly traceable (Figure 6).

DISCUSSION

Emerging conceptions

With respect to the objectives of the research (cf. paragraph *Analysis of Cultural awareness and expression competence*) it can be concluded that observing the competences manifested, the aims of a critical approach to cultural

Fig. 4 Student of the *Visual and Plastic Art Design* workshop, *Nuclear clown*, 2021. Charcoal on paper, cardboard, wire, *papier-mâché*.

expression, together with the willingness to be involved in expression from a transversal perspective, have been achieved. In particular, the immersive nature of the artistic-creative experience ('cultural expression') in relation to the discursive intentionality ('awareness') triggered by the theme of art and war became evident. This theme has dramatically imposed itself in the news of Spring 2022 with the war events in Ukraine.

This can be confirmed by reading the statement of artistic intent of the two students authors of the *War Notebook* (Figure 6):

> The work we made in *papier-mâché* represents a hand holding a notebook. Through the work we want to convey two opposite and distinct realities: on the one side, the importance of teaching related to sensitive issues such as war, in order to prevent the recurrence of these atrocities over time. On the other side, people, especially children, living in an extreme situation of

Fig. 5 Student of the *Visual and Plastic Art Design* workshop, *D'après Guernica*, 2021, *papier-mâché*, charcoal on paper, cardboard. Original interpretative element in wings added to Picassian reference.

war, unconsciously learn indelible experiences through survival. Despite this separation between the two scenarios, they share the lessons of war.

Another female student, who plastically depicted a human brain, partially split between the two hemispheres, ascribed a personal meaning that draws from reflection on the non-healable wounds of a traumatic experience. Here, however, the emphasis is also on denouncing the 'unseen enemy' who perpetrated the act of violence, even in *Guernica*, the enemy of Spanish civilians is not represented, although the *J'accuse* is implied and clearly addressed by Picasso. The events in Ukraine have unfortunately accentuated these days the permeability of the military/civilian entity, in a call to arms that no longer has anything heroic or culturally constructive about it: it is just the defeat of reason in the face of decisions that do not take into account any sense of human reciprocity.

An additional emotion I wanted to communicate is the conflict between the rational and the irrational. Very often we are faced with choices and are free to decide whether to listen to our heart or our head. In the case of war, soldiers often have to go off and leave their families behind and fight for their country: but then they actually lose their faculty of free choice. I personally believe that many more people than you might think suffer the psychological repercussions of other people's acts every day. I wanted to be able to represent in my own way this thought that I feel very close to.

Echoes of Arnheim's thought return in these words: "a world where very similar events occur everywhere without a strong unitary organization".

Conclusions

Once again, emotional emphasis is confirmed to strongly contribute to the motivational background and dispositional aspects of the subject called upon to express himself visually; however, it cannot predispose him in terms of the

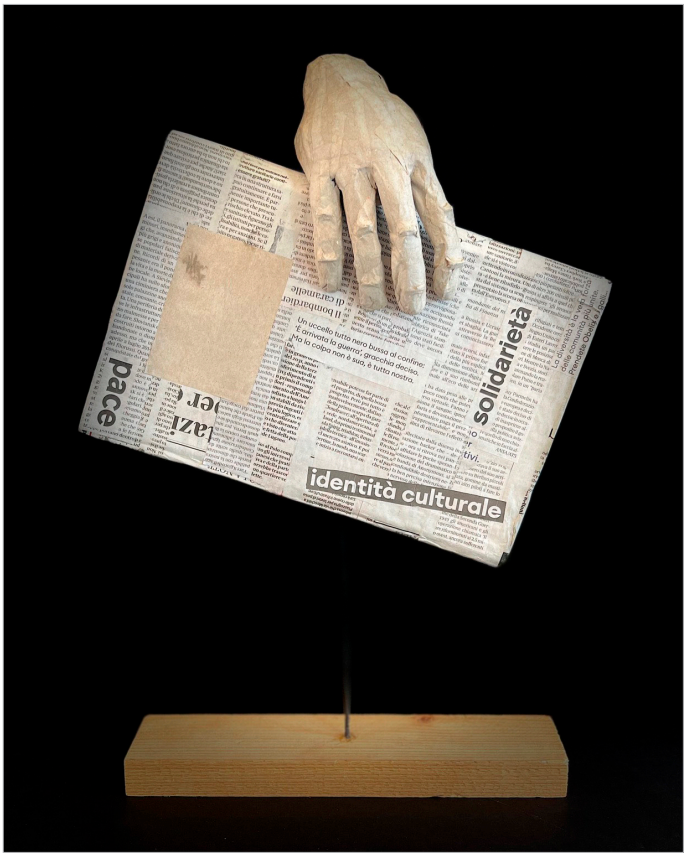

Fig. 6 Student of the *Visual and Plastic Art Design* workshop, *War Notebook*, 2022, *papier-mâché*, wood, wire.

technical-formal requirements that are responsible for the enunciation of a complete expression. For this purpose, the laboratory dimension of the experience in direct contact with artistic materials is necessary, even if the profile of competence recognized by the context of exercise does not aspire to the excellence of the figurative artistic domain.

As highlighted in the literature on pre-service teachers education and their identity development in relation to creativity (Bae, 2014; Barbot, 2018; Bryer & Grimbeek, 2005; Chong et al., 2005; Hudson & Hudson, 2007; Melnick & Meister, 2008; Patston et al., 2017; Zimmerman, 1994), the sense of (in)adequacy towards modes of expression that do not easily fit into the personal framework of perceived self-

efficacy may lead to neglect those disciplinary areas that represent them in compulsory education (Artistic and expressive languages of Art education).

On the other hand, uncertainties remain with regard to the third objective (process C, paragraph *Analysis of Cultural awareness and expression competence*), the overcoming, by students who aspire to become generalist teachers, of a 'professional self-perception' as suppliers of *Best practices*. Some students, in fact, at the end of the 2021 week declared that their expectation regarding the contents of the workshop contemplated, specifically, the didactic transmission of pre-packaged creative/manual activities, usable in the context of primary school. Even if we need to study this empirical result more specifically, we can hypothesize that the demand to manage the expressive issue in the school context by resorting to proven prototypes in the form of *Best practices* is due to the relative unpreparedness for art of a large percentage of the population, which continues to perceive cultural expression as a matter for experts.

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PERFORMING OBJECTS AND INTERPRETIVE TECHNIQUES: TEXTUAL REWRITING AND OTHER METHODS TO RAISE A SET OF LANDSCAPE DESIGNS FOR A RURAL COMMUNITY

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COLLABORATIVE REWRITING
INTERPRETIVE COMMUNITIES
METAPHOR-BASED OBJECTS
PANDEMIC TIMES
SPATIAL IMAGINATION

Based on the concept of 'interpretive community', it is possible to trace how humans can become interpreters (or decoders) of their own reality through, say, written excerpts and architectural works. This chapter is intended, therefore, to report on an interpretive-community workshop where students of three different disciplines (namely, Architecture, Sociology and English Studies) were assigned specific chapters of literary works with the goal of making a collective interpretation through a process of rewriting and restoring architecture. These projects allow students (or any participant, in fact) in their recognition of salient concepts that are not necessarily ascribed to a specific domain; for instance, the understanding of architecture not solely as a construction process, but as a mechanism intended to protect traces of life that are naturally perceived through narration and the use of metaphors.

INTRODUCTION

Spatial imagination constitutes the ability to predict possible worlds: it is used in literature to describe new universes, in environmental sciences to foresee the weather, and in architecture, as a chance to change surrounding spaces (Havik, 2014, p. 24). As a result, there are various academic disciplines that work together towards the inclusion of this permeable creativity. One way of looking at the interconnection of literary works and architecture is by examining the backdrops of stories depicting societies in crisis and the effect of metaphors on the elaboration of restoring architectures. This might constitute, in actual fact, one of the fundamentals of the oft-termed 'interpretive community' (Fish, 1980), which explains "how diverse readers consistently pro-duce similar readings of certain types of texts" (Buchanan, 2010). Stated differently, readers, particularly in pandemic times, become interpreters of their own reality and their interpretive codes can be readily expressed through both the rewriting of long-standing passages and the transformation of their surroundings in the form of architectural works.

Thus, this paper revolves around the aspects of healthcare, nurture and nature. It examines arguments that are extracted from a series of literary works that are set in pandemic times or voluntary confinement. The objective of this paper is to report on an interpretive-community workshop where students of three different disciplines (namely Architecture, Sociology and English Studies) were assigned specific chapters of literary works with the goal of making a collective interpretation through a process of rewriting and restoring architecture. In this framework, literature can be particularly prolific in the use of metaphors that connect the different readers' subjectivities, providing semiotic dimensions when confronted with excessively scientific texts and problems (Pint, 2020).

THEORETICAL FRAMEWORK

Interpretive communities and rewriting: What for?

The interconnection between science, literature and architecture is established through a perceptive-cultural construction (Ellingsen, 2007). What is read is no longer abstract. Thus, reading and rewriting turn into an effective exercise of embracing one's reality and expressing it through visual and literary resources. The interconnection between the concept of interpretive community and the process of rewriting lies, no doubt, in the social interpretation of the same stimuli. When readers decode the fundamentals of a narrative, their individual interpretation of the primal functions of the text moves from individuality (or personal subjectivity) to communality (or group subjectivity). This is, in fact, the gist of this study: showing how interdisciplinary tasks or practices can raise awareness on both the overarching influence of one's perception of reality in the reading process and the benefits of communality in the materialization of in-group interpretations.

From a cognitive point of view, establishing interpretive communities while reading allows for the reinforcement of personal self-awareness towards his/her community, since "one's self image as a reader is the place to begin establishing the image of others as readers" (Gilmore, 1984, p. 6). The realization of such self-image functionally demarcates the predisposition of readers/interpreters to embrace the attitudes and interpretations of others. In other words, it constitutes a necessary journey to oneself. Socially speaking, these practices of interpretive communities (through the process of rewriting classic excerpts) also involve the reconciliation of an individual with his/her community as, "[t]he differentness of an individual somehow sets him apart from the community; the community isolates him or in some other way repudiates that individual" (McFarland, 1992, p. 553).

These cognitive and social functions are not intended to abridge the expression of one's individuality, but rather to enhance the realization (of social individuals) as active participants in the construction and understanding of their community. University students, being subject to degree overspecialization, are generally detached from their natural role in an interdisciplinary community. We believe, as shown by the case studies presented in this project, that interpretive communities can facilitate this transition from 'and now what?' into 'now I know'. This is, to our knowledge, one the (many) values of interpretive communities.

Images and metaphors: At the interface of object design

In architecture, the concept of image can be understood as the visual representation of an event, space or matter, which can be real or imagined, probable or unlikely, previous or evoked. It can also contain imprints of evolution, aging or growth (similar to tree rings), or it can be interpreted as promise, which projects a future (Calduch, 2016). In topology, space is both the dimension, extension, materiality, configuration (Perec, 2001) and the temporal framework where relationships occur.

On the other hand, metaphor refers to a transfer of meaning between two realities, entities, spaces (Van Cleempoel, 2020), which implies a disassociation from the frameworks where these two references are located. In design anthropology, this helps explain the fact that imagination is the ability to "consciously disconnect from known experience and produce symbolic images or representations" (Ingold, 2000, p. 111).

Spatial imagination might be defined, therefore, as the capacity to evoke images by transferring meanings between realities –using metaphors–, through writing (in literature), drawings and models (in architecture) or audiovisuals (in other artistic practices). And, as far as this project is concerned, it is useful to be able to establish links between concepts such as a word and an image, a phrase and a scene, a chapter and a sequence (Mejía, 2020) when

comparing the world of written communication and that of audiovisual production.

METHODOLOGY

As part of the interdisciplinary premise of the project, three groups of undergraduate students have participated in the workshop: English Studies, Sociology and Architecture. It was supervised by Viceversos, a teaching-research group based in the University of Alicante (Spain), which implements interdisciplinary practices on yearly basis, conceived as a laboratory of teaching experiences that is intended to explore the intersection of university syllabuses.

The literary works used in the workshop come from two series of stories:

1. The first one set during the most tragic periods of an acute epidemic, e.g. *The Plague* (Camus, 1947/2018), *Love in Times of Cholera* (García Márquez, 1985/2014), *One of Ours* (Cather, 1922/2014), *A Journal of the Plague Year* (Defoe, 1722/2020), *The Scarlet Plague* (London, 1912), *The Masque of the Red Death* (Poe, 1842) or *Blindness* (Saramago, 1995/2019);
2. The second, on the other hand, in the lives of characters disconnected from society by their own choice, e.g. *Walden* (Thoreau, 1854/2014), *Il Barone Rampante* (Calvino, 1957/1980); or retired in a community of narrators, *Decameron* (Boccaccio, 1353/2020); or confined to recover from chronic ailment, *The Magic Mountain* (Mann, 1924/2020); or migrating in the face of an apocalyptic plague, *The Last Man* (Shelley, 1826/2020).

Only three case studies are shown here (see section 4) due to length constraints.

The workshop is based on a set of creative exercises encompassing the aspects of spatial imagination, interdisciplinary collaboration and metalanguage through four main practical sessions: (a) timeline, (b) repository of beings,

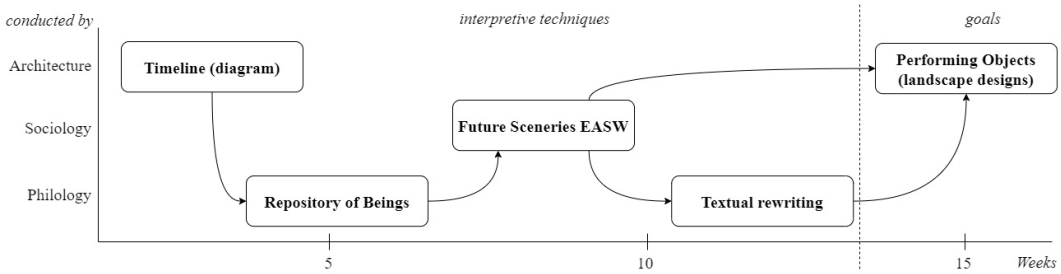

Fig. 1 Jose Carrasco, 2021, contributions that come from each discipline.

(c) future sceneries, (d) rewriting. The assignment of case studies is done through fragments in a blind list, that is, where the author and title are unknown. list, i.e., where the author and title are unknown (Figure 1).

The first activity allows us to order literary excerpts on the basis of practical matters. It is called 'timeline' and is proposed from an architectural perspective. It serves as a first x-ray of the written document that is used as a starting point and uses the *Timetoast* application to order, collaboratively within each team, the text excerpts that may contain issues of interest in categories, equating the time variable to the page number. The categories are, for instance, language within language or how the non-human expresses as if it were, or the relationship between custom and seasonality.

The second activity is called 'repository of beings' and is proposed from a linguistic perspective. It refers to hybrid case studies that are related to how humans are organized before surges of severe or contagious diseases. It attempts to combine reading cases (those of the first activity) hybridizing situations of acute and contagious disease with another that refers to the expertise of individuals in their tasks, who are isolated from society or of human groups that organize themselves collectively in the face of a health crisis.

The third activity is called 'future sceneries' and is proposed from a sociological perspective. It explores the proposals of design based on the parameters of probability or social impact that are represented on a diagram. This is a tool inherent to the field of participatory planning. Finally, the fourth activity follows the process of rewriting and

once again, it stems from a linguistic angle. It is essentially inspired by Kristeva's theories on intertextuality (1980), and the resulting fragments are used by a narrator to describe the imple-mentation of the design into the hypothetical dwelling of a new individual and a new reality. Each of the four activities leads to a rotation in teacher leadership, and students from all three disciplines are meant to collaborate in all activities, with the limitations of diverse backgrounds.

At the beginning of October 2020, the group of students went to the Sella valley (Marina Baixa), to an area surrounded by terraces between which runs a stream of water, sometimes underground, sometimes apparently still. During the field-work days, they could see that, thanks to the work of forest rangers and the dynamic action of the river itself, the paths were changing sides in the riverbed. Each team chose a location along the trail. After those days, the COVID-19 situation forced the work sessions to be online with lessons and practices in dual mode, since only the students of the Degree in Architecture could remain in the classroom, using the *Google Meet* tool to form twenty simultaneous conversation groups. A second modality used was a face-to-face attendance scattered along a kilometer of river path, without online coverage and with the teachers in itinerant mode.

The final performance (January 2021) showed a mix of outdoor fair of artifacts and an encyclopedia of displayed stories, revealing how students struggle to overcome the present-day COVID-19 crisis, convinced that "to live in the world means essentially that a world of things is between those who have it in common, as a table is located between those who sit around it" (Arendt, 1998, cited in Teerds, 2020, p. 23).

The rewritten text of the original literature is the guiding thread to show the meaning of artifacts, the performing objects, made halfway between the digital and the analogical, and that, on a material and spatial level, explore various conditions:

1. With the help of ropes and counterweights, the artifact floats in relation to the natural elements that surround

it, in search of a weightlessness with a minimal footprint dispersed along a kilometer of path;
2. It looks for unique spaces established as natural thresholds, among dry stone walls, fruit trees, monumental trees, reed beds, trails and rocks bathed by the river;
3. It prioritizes a haptic dimension, not a visual one, e.g. honey or perfume being smelled, water being redirected, sugar in a gravity clock, in-cense being sprinkled;
4. A form of empathy is sought between artifact and human, what in science is called transduction (Ingold, 2013) and in philosophy is called resonance (Rosa, 2020), the same thing that occurs when a hand tenses the arrow against the string of a bow, presses the bow of a cello against the strings, or steers the kite with changes in tension in the string that holds it.

THE CASE STUDIES

The collaboration among the undergraduate students has led to two important results:

Objects that were conceived to synchronize with the strategic venue of a riverscape (Sella, Spain);
1. Paraphrased stories that were extracted from the original literary works. We will demonstrate this with a series
2. of case studies (see sections *Case study 1: Italo Calvino's Il Barone Rampante*; *Case study 2: Gabriel García Márquez's Love in Times of Cholera* and *Case study 3: Albert Camus's The Plague*).

Case study 1: Italo Calvino's *Il Barone Rampante*, 1957/1980

The story constitutes a literary parable that shows how, as opposed to Rousseau's *Noble Savage*, the aristocrat Cosimo is accepted by his community in spite of living up in the trees. Cosimo's life is far from comfort and double standards, and it is also uncanny with respect to the archetypes of his time and surroundings: the region of Liguria (Italy) in the eighteenth and nineteenth centu-

ries. It is also an initiatory novel for the teenager who is in need of examples of rebelliousness, imagination and nonconformity. However, Cosimo does not wish to fully detach from society, and from this place he intends to partake in common-interest endeavors to keep wild animals away or to be in touch with intellectuals.

Landscape project: Cosimo is embodied in some children that play in a school's playground which is intertwined with the surrounding nature, among poplar trees and a natural bridge made of fallen trees by the river, located a few orchards away from where Sella's Primary School is located.

Social and restoring function: the natural place where the school stands is also the place where the children are in charge of collecting honey that is made by bees which pollinate flowers that grow in the trees in the nearby terraces.

Manufactured component: a honeycomb is the core of a wooden, bag-sized structure with a lower container that collects the honey drops (Figure 2). The serialization of this object needs specialized cabins for honey collection and storage. The place where the piece stands is used as a visual, scented and gustatory passage of the valley, as well as a feast for birds and river bugs when honey drips out.

Rewriting of a fragment of the book: it is narrated in third person, and it keeps original metaphors such as "the underneath wind moved a wave in him, through the dense foliage, with changing tones of green" (Calvino, 1957/1980, p. 27). The new version also replaces trades such as a treeclimber for the hunter (keeping a wish to love life without knowing how to express it), or living creatures such as the flying insect *Taraxacum officinale* for pollinating bees. An interesting fact is that the little bird mentioned in the fragment, the treecreeper *Certhia familiaris* (which skillfully hides in the broken trunks of the tree) is not replaced, since its skill connects with the feelings of the new protagonists, the children, who are enthusiastic over mysteries and hideouts (by student Ana Riera, 2020).

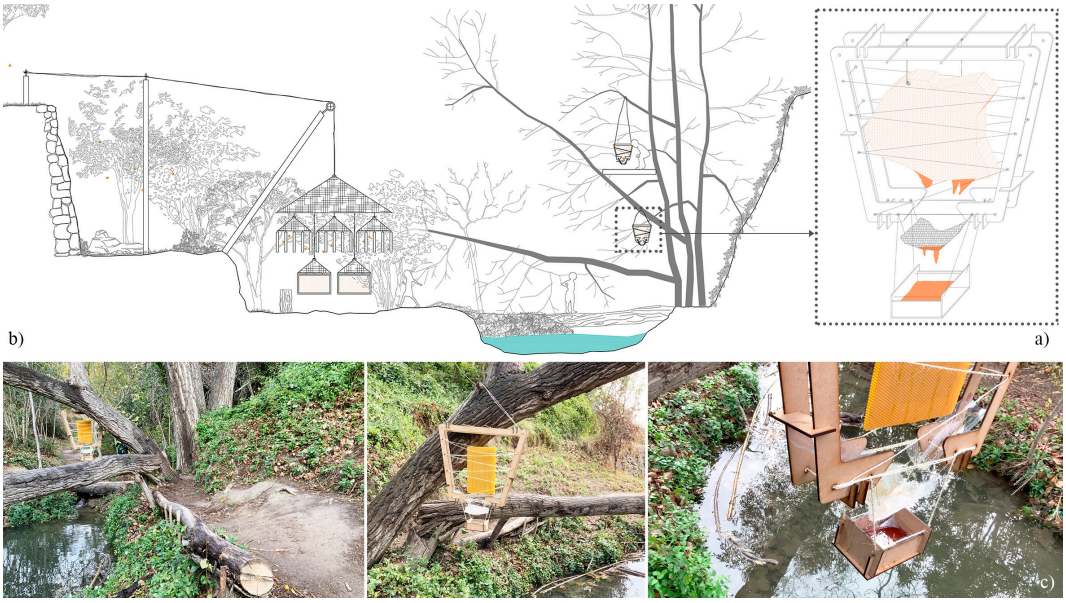

Fig. 2 Italo Calvino's *Il Barone Rampante* (1957/1980, case study 1). Object's design (a); valley's project (b); operational demonstration (c) (by student Riera, A. 2020).

Case study 2: Gabriel García Márquez's *Love in Times of Cholera* ('Christmas night', pp. 191-234)

The excerpt used in the workshop is in the middle of the novel, which starts out in times when doctor Juvenal Urbino is still waiting for Fermina Daza's reply on his love proposal. Various forms of communication are described: the portrait of his cousin at the Belgian photographer's studio at the Portal de los Escribanos; the letter authorizing Juvenal to talk to her father; the job offer to work as a telegrapher that would take Florentino Ariza to Villa de Leyva, once he finds out about Fermina being engaged with the doctor.

Landscape project: a natural dispenser at the birth of the river down the valley, where a natural dam is made, and the first ditch originates. The dispenser becomes an equipped space where visitors keep their last wills or get to know the written memoirs of the deceased. An hourglass system works like a water clock, a metaphor of life, and it controls how the capsules are raised and approached at the edge of the dam to be able to read and write messages (Figure 3).

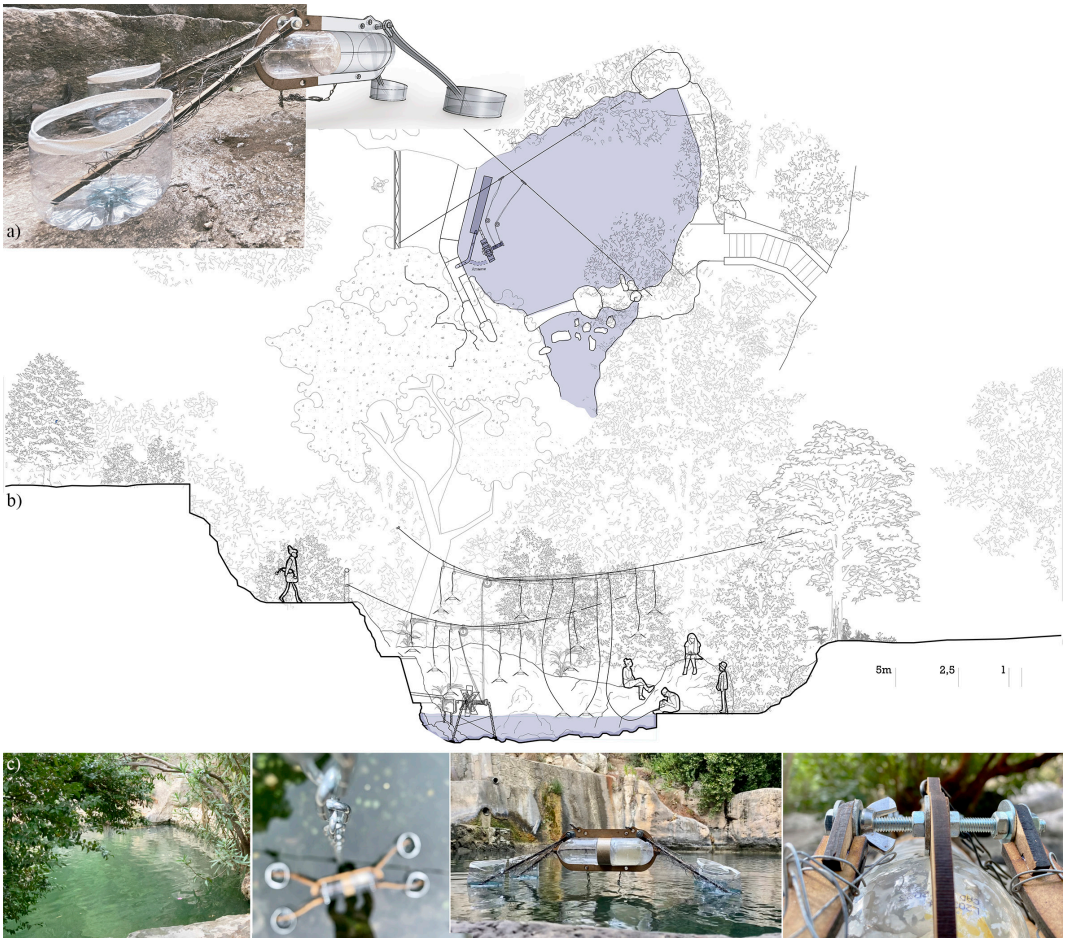

Fig. 3 Gabriel García Márquez's *Love in Times of Cholera* (1985/2014, case study 2). Object's design (a); valley's project (b); operational demonstration (c) (by student Martínez, O. 2020).

Social and restoring function: this part works as a funeral ceremony and a meeting point where relatives get together by the water dispenser. Besides, it works as a means of communicating with the absent and the deceased, as happens with Florentino Ariza, who:

> At times his solace was the certainty that during the intoxication of her wedding celebration, even during the feverish night of her honeymoon, Fermmina Daza would suffer one moment, one at least but one in one event, when the phantom of the sweetheart she had scorned, humiliated, and insulted would appear in her

thoughts, and all her happiness would be destroyed (García Márquez, 1985/2014, p. 210, translated by Edith Grossman).

In this place of Sella's valley, visitors write messages, which is a kind of emotional relief, as happens so many times in the novel by García Márquez.

Manufactured component: various capsules that end up floating on the surface and resembling the river bugs that are all over the river. The capsules float on plastic bottles and their wooden structure keeps all parts joint (by student Óscar Martínez, 2020).

Case study 3: Albert Camus's *The Plague* (1947/2018, pp. 47-75)

The original story talks firstly about the actions that became common practices due to the plague and about the time when the plague was taking place. It is the beginning of the epidemic time, so the people from Oran discover spaces where they are seemingly safe, like religious buildings or open-door spaces and new forms of communication, like a new journal that deals exclusively with the plague's crisis.

Landscape project: It is the area of Sella's valley that becomes technified so that the space becomes adequate for story-telling activities; the space where a small stage is located and some spotlights are installed to benefit from the moon light in summer nights. Twilight is the chosen moment in the drawing, when one artifact announces that the play *La piel del agua* is about to start (Figure 4). Please, take a seat.

Social and restoring function: the selected chapter mentions a doctor's capacity to relate a deceased person's vision, the idea of pain and the discouragement for the fate that the plague that is about to devastate the city entails. There is a specific quotation on the concept of the unforeseeable, as compared to the unavailable (Rosa, 2020).

Manufactured component: It is a box hanging from a carob tree that surrounds the way to the town's canal. The box is an old travel suitcase with a hole at the bottom to project a source of lightning. A mirror in the interior of the suitcase reflects the light and announces the beginning of the play.

It works as an analogic video mapping, spreading overhead projected images on the stone walls. At a certain distance, the mirror is also a hologram.

Rewriting of an excerpt from the book: told in the third person, it translates an excerpt that talks about the sky and the seasons at a time in which a play is about to begin in the valley:

> The lights in the sky and the smells from earth that guide the scenes were sensed, for the first time, by everyone. Each one saw with tranquility that darkness favoured the light's projection, and, at the same time, each saw how the summer settled. The singing of the cicadas in the night sky became higher over the river (by student Paula Morales, 2020).

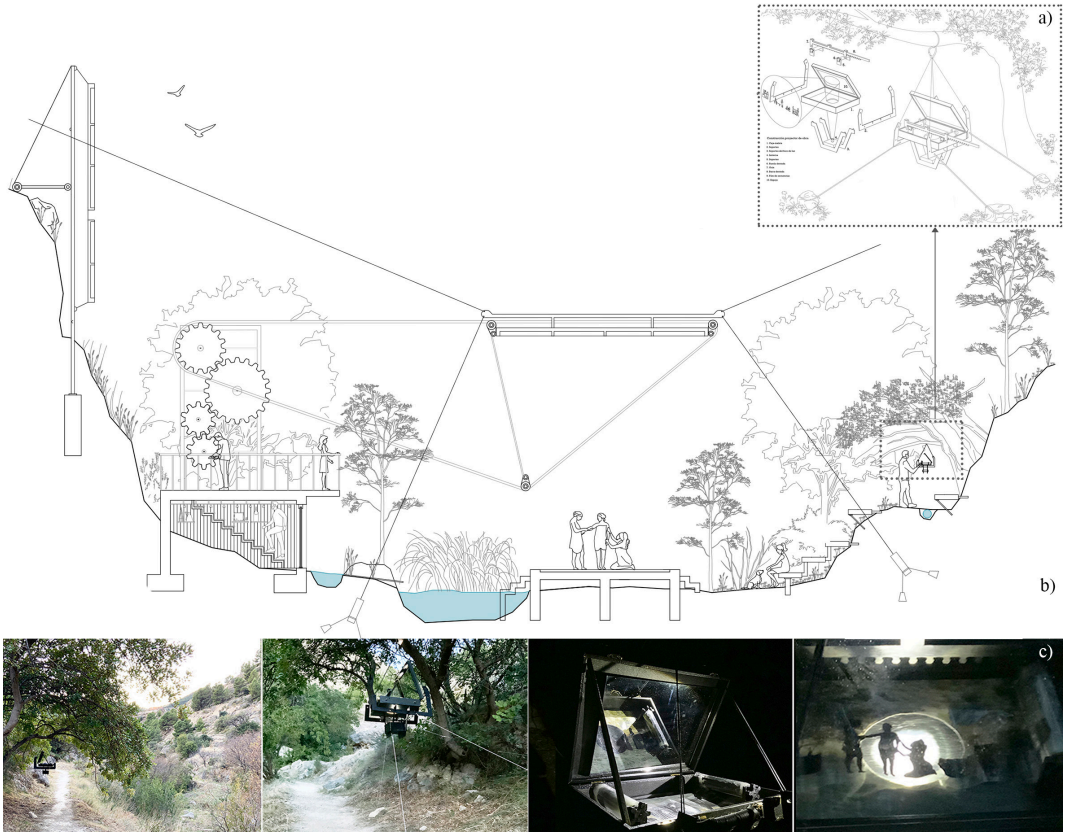

Fig. 4 Albert Camus's *The Plague* (1947/2018, case study 3). Object's design (a); project (b); demonstration (c) (by student Morales Roche, P. 2020).

Case study 4: Henry David Thoreau's *Walden: Visitors* (1854/2014, *Visitors*)

> I had three chairs in my house; one for solitude, two for friendship, three for society. When visitors came in larger and unexpected numbers there was but the third chair for them all, but they generally economized the room by standing up (Thoreau, 1854/2014, p. 149).

Landscape project: The farmer is still harvesting in the cocoa plantation, while one bench below you can see children ready to taste the new variant of chocolate, in the surprising places to sit camouflaged among terraces.It is the cafeteria *Camino de Sella*, a place from where the breezes of the valley will spread the aromas to the walkers (Figure 5).

Social and restoring function: This is a place in the valley that translates the idea learned from Thoreau by materializing several different forms of stay and rest. The small café reconciles the possibility of being a social space as well

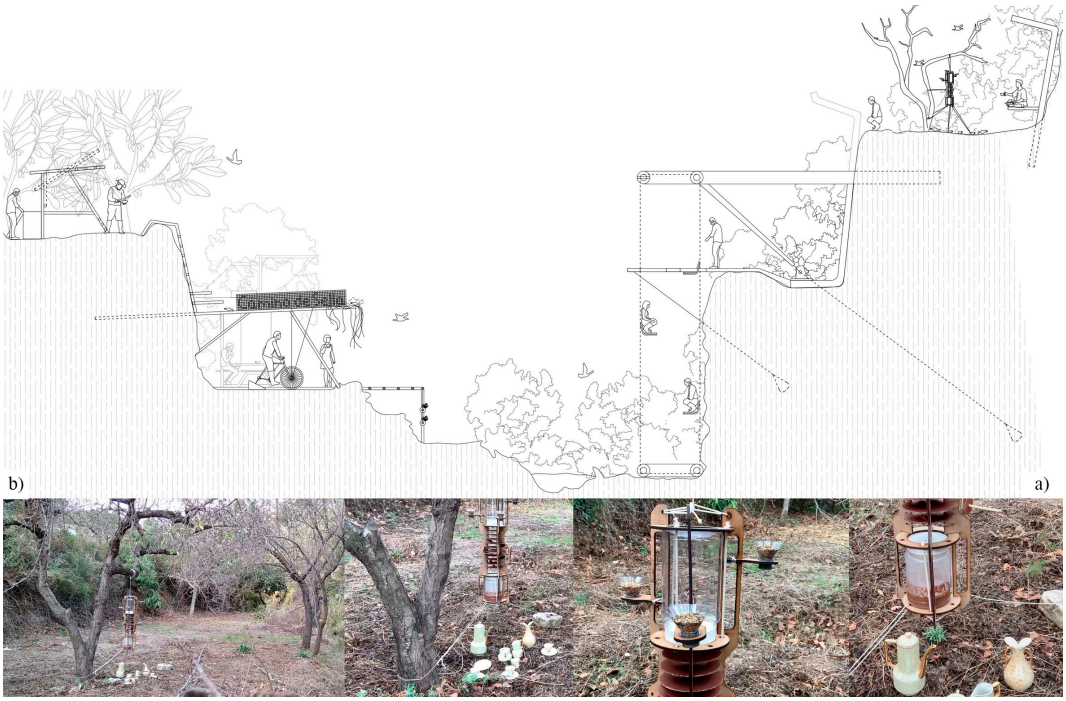

Fig. 5 Henry David Thoreau's *Walden* (1854/2014, case study 4). Object's design (a); valley's project (b) (by student Torres, A. 2020).

as a place to explore the limits of senses such as taste and smell. One of them produces the energy needed to run the small bar while pedalling.

Manufactured component: The student manufactures a small part of the cafeteria, which corresponds to a coffee grinder that in turn is a bird feeder, by means of vertical ribs and rings, hung from the tree bench and stretched to the sides.

Rewriting of a fragment of the book: Narrated in the first person, it retains the use of the imperfect preterite. It also retains the reference to a food space outside the house, introducing the expression of the emotional. For example, the original text reads:

> The waste and decay of physical life, which so often needs repair, seemed miraculously retarded in such a case, and the vital vigor stood its ground. I could entertain thus a thousand as well as twenty; and if any ever went away disappointed or hungry from my house when they found me at home, they may depend upon it that I sympathized with them at least (Thoreau, 1854/2014, p. 151),

is rewritten as:

> The wear and tear and exhaustion of day to day life, so often in need of mending, and there miraculously appeared the aroma of chocolate, and the happy memo-ries remained firm. In this way I could attend to my family and friends; and if any of them left our meeting in a sad or nostalgic mood you can be sure that, at least, their memories did not cease to accompany them (by student Andrely Torres, 2020),

as a form of fiction that helps to explain the project designed for the valley.

DISCUSSION AND CONCLUSION

From historical literatures inspired by pandemics or cases of social isolation brought to interdisciplinary practices, the workshop finds project statements for a valley

in the Marina Baixa (Spain) converted into a discontinuous care service camouflaged in nature for the care of the nearby rural community. As elucidated in the previous samples, the statements at Sella make a special emphasis on the design of those objects that mediate between the natural substrate subjected to its cycles and the humans for whom they have been conceived in the form of a new culture of uses. For example, in the design based on García Márquez's excerpt (see case study 2), there is a delivery system of saved messages for a convalescent or deceased person, which is partly subject to the speed of the flow of the natural fountain, and partly manually operated thanks to pulleys and tensioners.

The set of fabrications constituted the physical part that activated the emotional component of the experience of each project for the valley. Each fabrication plays the role of threshold, a kind of facilitator between social and natural layers of the project. These designs, colloquially called 'perfumes', tested in the valley, turned out to be open designs, in the first place, to the visitor's response, their origin, state of mind, prejudices and culture. They included 'reality clues' (chocolate, honey, sugar, float, etc.) that facilitated interaction. In addition, the design was open to the contingencies of the weather, gusts of air, the flow of water in the irrigation ditches, as well as the allusion to insects and other animals (shoemakers, cats, sheep, etc.).

The set of designs also constituted a fair of artifacts and an encyclopedia of pop-up stories on the final date of the course, in January 2021. Each design was displayed as in a market stall, with the fabricated model hanging from a ceiling of ropes replacing tree branches in the Sella valley (Marina Baixa), and the set worked properly to convene the rest of the workshop members on an open door's day at the Polytechnic School, as well as to understand the whole landscape project for the valley at once. A key transmedia element turned out to be the video, with the narrating voice of one of the project's characters. A final drawing made from the top of the class-

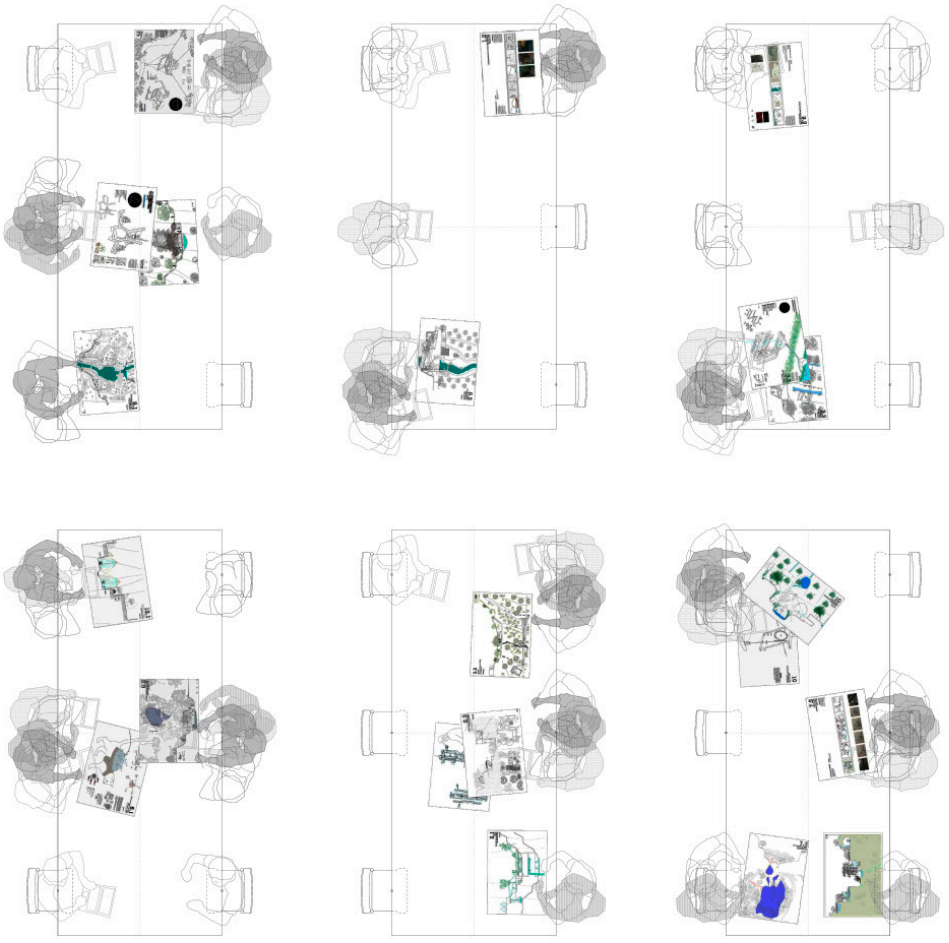

Fig. 6 Jose Carrasco, 2021, the classroom at the end of the semester. Overlapped drawing sheets express the evolution of the proposals.

room shows the evolution of a course in which the students had fixed the place where to discuss, design, complete the artifacts, defend the results, etc. This drawing shows the learning time and the evolution in the designs overlapping, through transparent layers, their status week by week. If nothing appears or the depicted chair looks unoccupied, it means that the learning process fails or that the student has left the course. Likewise, if it appears with more layers, it expresses the number of variations explored with the design, the discards and successes (Figure 6).

What is relevant in these pandemic times is that these knowledge pills reach us through literary fictions, cultural creations in which the authors' capacity to rebuild and relate the settings, the atmosphere, the social profiles of a specific period is remarkable. The fact that one of the selected authors was Henry David Thoreau is not a coincidence. He wrote *Walden* in 1854 to:

1. Make manifest that staying at a cabin near lake Concorde in the United States would be his way of mourning his brother's death;
2. Show how human beings are yet another species in the environmental chain;
3. Demonstrate that natural perception builds images that integrate the micro-scopic, like lichen to the rock, and the macro, like far away trees or railway routes;
4. To confirm that death is but a phase in the natural cycle, like "fallen flowers or the layers of rotten autumn leaves on the floor of the forest who come back to life one year later" (Wulf 2016, pp. 311-324).

It is precisely Andrea Wulf who insists, however, that it is right to delimit the territory of the projected valley with a 'humboldtian' ambition that reinforces the inseparability between nature and humanity; and, on the other hand, that it is right to support all scientific objectivity with a subjectivity of the senses.

Within the regulated framework of the university degrees that were involved in the project, some questions arose. For example: how can we connect these four practical sessions with the development of a regular course on architectural component design for a rural landscape that seeks some sort of performativity or interactivity with its visitors? There is no simple answer to this question. These interdisciplinary sessions (Figure 7) have helped us secure design statements, but they also help to recognize a series of more transcendental concepts for all students involved in the workshop: firstly, the understanding of the Earth as a fragile space, exposed to natural and seasonal cycles in

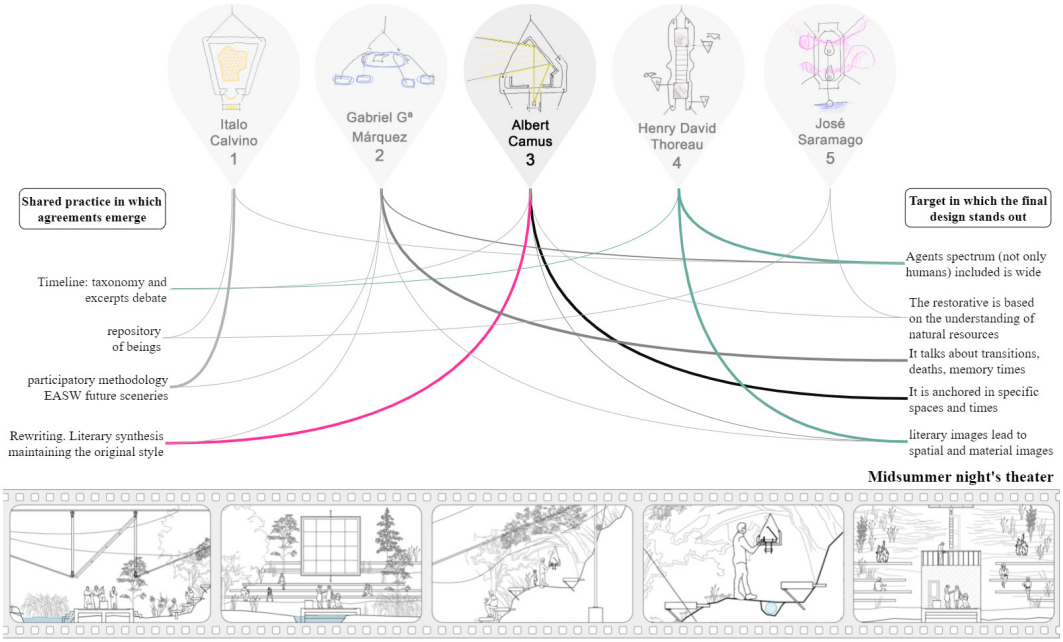

Fig. 7 Jose Carrasco, 2021, shared practices, design targets and design proposal *Midsummer night's theater* (case study 3, Albert Camus's *The Plague*, 1947/2018).

which buildings, furniture and infrastructure are rooted (Teerds 2020; Clément, 2018); secondly, the understanding of the fact that our way of acting is hereditary of our ancestors' way of being, as well as an understanding of the fact that they leave Earth to us so that we can continue it; thirdly, the understanding of the status of non-neutrality of our artifacts and our writings, their haptic abilities and their capacity to materialize stories related to common goods; fourthly, the understanding of architecture not only as a construction, but as a body to safeguard layers of time, traces of life (Teerds, 2020), that recall new stories with which we can identify.

Lastly, the workshop identifies useful issues for communities that are meant to reconnect with these natures through trades and metaphors cited in Boccaccio's, Thoreau's and Calvino's stories, among others: we leave aside the catastrophist part of epidemic stories to focus on forms of survival and social cohesion, those that help us to reinterpret heritage, natural or cultural issues. And, why can

issues related to diseases be useful? The answer has also to do with the opinion of some experts claiming that illness is not only a biological issue (Amezcua, 2000; Fabregat, 1972) but also a form of living, social interrelation, cultural understanding, transit of pain, suffering, and care, which in Anglo-Saxon terms is known as illness or sickness (the socio-cultural effects of suffering).

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SILENT POETRY. IMAGES OF GESTURING ACROSS THE ARTS. PRETEXTS AND THOUGHTS ON A LANGUAGE OF GREAT EDUCATIONAL POTENTIAL

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GRAPHIC IMAGES LEARNING
IMAGE-BASED EDUCATION
HERITAGE EDUCATION
DIDACTIC TRANSPOSITION

The claim –attributed to Leonardo da Vinci– that "painting is mute poetry and poetry is blind painting", authoritatively sums up the topic of this paper. Unlike literary languages, figurative visual arts draw on body language as a medium comprising expressions, postures, gestures, and signs representing gestures.

Based on a conceptualization of gesticulation as a universally intelligible form of communication, we examine dictionaries of gesticulatory movements such as that developed by Bruno Munari or the choreographic projects of Virgilio Sieni, which are both rooted in the transposition of movement into images. In choreography, the act of transposing into images, conventionally signs or drawings, is termed notation and is the instrument via which artistic projects are communicated to dancers and handed down to posterity. It involves marking out an idea, knowledge, or simply a state of mind, fixing it on paper by means of a gesture. The nature of gesturing as a medium and a tool for immediate transposition underpins its valuable role in the field of education.

SILENT POETRY, AN IMAGE-TEXT AS INTRODUCTION

During the Renaissance, it was standard practice for artists, or masters, to engage in rhetorical defence of their art, demonstrating its value and superiority over others.

Thus, critics, art historians, and art manuals have all drawn on and frequently pondered about these written exchanges, which enhance our insight into the different arts and the artists who practised them.

Among numerous such cases, the great master Leonardo Da Vinci wrote a treatise on painting in which he not only theorised about how to create a valid painting, but also argued for the primacy of painting over the other arts, thus offering an ideal synthesis of the topic announced in the title of this paper and addressed in the next sections.

Our specific aim here is to observe the educational potential of gestures, understood as a medium for language and a tool for didactic transposition. Using examples from different disciplinary fields, we shall observe gestures as images.

FROM LEONARDO'S TREATISE TO HUMAN UNIVERSALS

Leonardo conceived of painting as a natural science and, based on his own practice of it, maintained that experience was the best tool for acquiring knowledge. He mainly set out to pass on these precepts to his apprentices, yet by arguing for the superiority of painting over poetry, he offers the consumers of paintings with deep food for thought.

Leonardo's theoretical framework rests on his definitions of painting and poetry, which he returns to several times in the four chapters of his treatise explicitly devoted to the subject. In Chapter 16 (*Part One. The Difference Between Painting and Poetry*), he begins by examining the senses implicated in poetry and painting, namely hearing and sight, by means of which the two arts penetrate the intellect:

> Painting is poetry that can be seen and not heard, and poetry is painting that can be heard and not seen. Therefore, these two kinds of poetry, or we might say two kinds of painting, have exchanged the senses through which they go about penetrating the intellect. […] the deaf born will understand the operations and intentions of the operators, but the blind born will never understand what the poet has set out to illustrate, what he seeks to honour through his poetry; given that one of its noble elements is to represent the gestures and components of stories [my translation from Italian[1]] (I, XVI).

According to Leonardo, therefore, the painter's 'intentions' may be grasped via the sense of sight and artists' depiction of gestures is the means by which they psychologically characterize the subjects of their paintings. Further on, in Chapter 17 on the difference between painting and poetry, he evokes two other foundational principles: the imitation of nature and the durability of experience.

> Painting is silent poetry, and poetry is blind painting, and both imitate nature as much as their powers allow, and both can illustrate many moral customs, as Apelles did in his Calumny. […] But much more will be accomplished by the proportional beauties of an angelic face in a painting, from which proportionality results a pleasant harmony, which serves the eye as music serves the ear [my translation from Italian[2]] (I, XVII).

The memory of the beauty of a painted image lingers longer because the eye can discern all aspects of the image simultaneously, differently to poetry, which offers a theory of elements that succeed one other over a linear timeframe.

> Painting represents its essence to you all at once in the visual faculty, and through the same means that the impressive receives natural objects, and moreover, at the same time, the harmonious proportionality of the parts that make up the whole is composed, which satisfies sensibility. [my translation from Italian[3]] (I, XIX).

The immediacy with which the intellect perceives the harmony of the forms ensures the durability of the information imparted and the subject's pleasure in receiving it without experiencing boredom or annoyance. An image does not need to be constantly replicated like music or poetry, but rather becomes immortal, while the harmony it conveys via sight lacks only its 'older brother', the sense of touch, which

> at the same time, [...] since it will have fulfilled its purpose, does not prevent reason from contemplating divine beauty. And in this case painting, copied from [divine beauty], largely makes up for what the poet's description is unable to supply [my translation from Italian[4]] (I, XIX).

The immediate nature of an image with respect to the sequential presentation of words or sounds, the importance of represented gestures, and the engagement of the senses are all key elements of visual culture. In examining them here we shall draw on W. J. T. Mitchell's approach, which is based on the concept of "imagetext" (1994), recently reformulated as "imageXtext" with a view to filling the space between image and word with a typographical sign (Mitchell, 2015/2018). This neologism, a cornerstone of Mitchell's visual theory, indicates the point of convergence between semiotics and aesthetics, that is to say, the point at which the theory of signs merges with that of the senses: "It is the place where the eye and ear encounter the logical, analogical, and cognitive relations that give rise to meaning in the first place" (Mitchell, 2015/2018, p. 47), the point where the visual and the verbal merge to form a unique combination of meanings and perceptions.

Mitchell's scientific approach to images represents one of the pillars of visual culture studies, a discipline that aims to "restore the gaze to the spectators" by explaining the "visual construction of the social sphere" (Mitchell, 2015/2018, p. 23). It is of value to us to evoke, albeit in passing, this hybrid approach, which is posited on the contamination of media, languages, and the senses that receive information, in order to introduce the case of a scientist who used images linked to gestures in his inquiry and later for the dissemination of

his research findings: namely, Charles Darwin and his T*he Expression of the Emotions in Man and Animals*, first published in late 1872. This text examined the gestures, or rather the attitudes of humans and animals, with a view to describing and understanding the evolution of the species; it represented a first step in the study of the psychology of emotions, given its focus on the aetiology of universal gestures and expressions that are independent of cultural or social factors. As Jonathan Smith points out in *Charles Darwin and Victorian Visual Culture:*

> Darwin faced a very basic visual problem: how could natural selection, a concept almost by definition impossible to illustrate directly, be illustrated, especially when the existing visual conventions of the natural sciences were associated in varying degrees with conceptions of species fixity? (Smith, 2006, p. 1).

As though they were imagetexts ante litteram, Darwin decided to use illustrations, and later photographs, to describe his discoveries and conduct his experiments. After obtaining a large repertoire of images of the expressions of indigenous peoples from all corners of the British Empire, Darwin showed them to the British and asked them to comment on them. Based on this experiment, as well as on the careful study of animal and human anatomy, he defined a set of expressions and attitudes as the outcome of the evolution of species and therefore universal. What generates disgust may be influenced by social or cultural factors but disgust itself and its expression are the same everywhere. In the late 1950s, psychologist Paul Ekman repeated the photo experiment by showing images of North Americans to inhabitants of New Guinea, discovering that highland natives who had retained a primitive lifestyle recognised the illustrated expressions and were able to mimic specific narratives associated with them (Graber, 1981). He repeated and further refined the exercise in other geographical and cultural settings, confirming that certain expressions of emotion are fixed regardless of different social experience. This guarantees the possibility of communication between individuals regardless of the

interlocutors' generation, culture, or status as strangers or family members. This was the beginning of the neurocultural theory of emotions. The many studies that have continued to contribute to this line of inquiry and can usefully inform our discussion include the efforts of the anthropologist Donald Brown –see *Human Universals*– to identify the behaviours shared by individuals from all human societies. Brown identified, in addition to these more general aspects, some of the assumptions underpinning the emergence of cultural phenomena that have been successful at the global level. For example, universal language "consists of those features of culture, society, language, behaviour, and mind that, so far as the record has been examined, are found among all peoples known to ethnography and history" (Brown, 2004, p. 47).

THE GESTURE, A MIMETIC RESIDUE OF A UNIVERSAL LANGUAGE

Unlike verbal languages, figurative visual arts draw on body language as a medium comprising expressions, postures, gestures, and signs representing gestures.

Since the era of Aristotle and Plato, gesture has been seen as the mimetic residue of language. Each individual gesture may be read as a 'clandestine word', albeit of a completely different nature to verbal words, as Elenio Cicchini has pointed out (2017). The gesture represents the visible form of a concept, of an idea in the Platonic sense, still before this is expressed through words. Giorgio Agamben (2014, 2017) defines the gesture as mediality without end; in other words, as an act of pure communicability whose object is the potential knowability of something. The gesture bears immediate meaning, the realisation of something via a process of resemblance to reality, within a defined time and space.

This brief philosophical outline of the gesture requires an effective illustration and summing up, which will lead us to the next point in our line of reasoning.

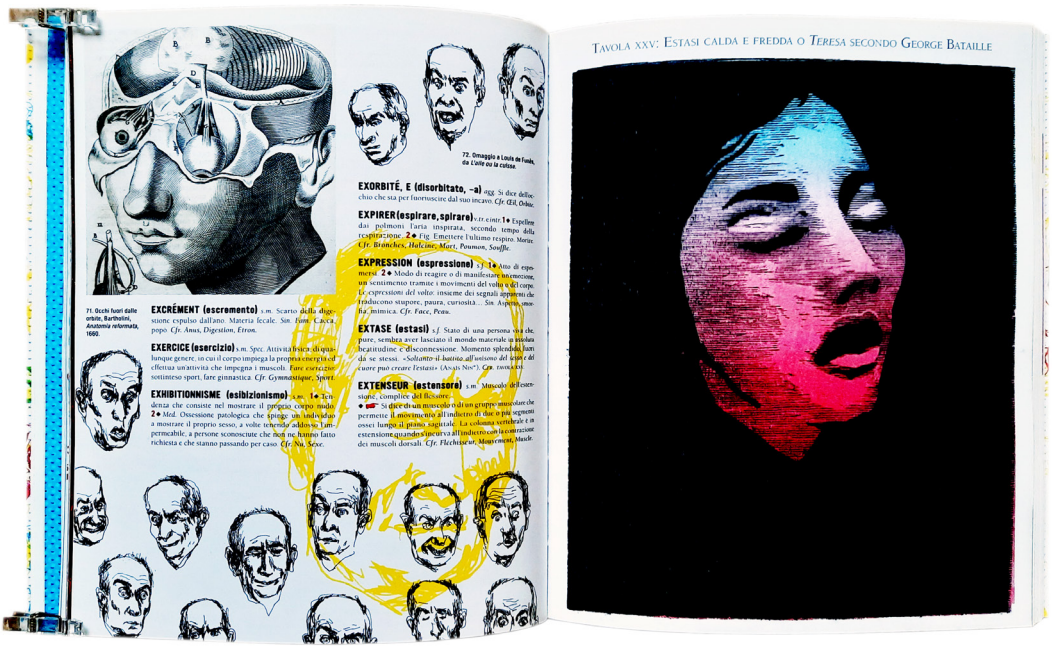

Fig. 1 © Katy Couprie, 2019, *Dizionario Folle del Corpo,* pp. 80, 81. © Fatatrac.

To this end, let us consider a project inspired by ancient treatises, in which an artist (an engraver) and scientist of anatomy worked together to offer readers a more complete knowledge of the theme of gesturing.

In a volume published for the exhibition *Katy Couprie. Dizionario folle del corpo*[5] [An insane dictionary of the body] (Couprie, 2019), the author investigates the body and its representation via word games, metaphors and images originating in the French and Italian cultures. The book's strength lies in its light-hearted use of multiple linguistic registers, from everyday language to the specialist code offered by anatomist Alessandro Ruggeri, whose input prompted the use of iconographic sources drawn from the archives of the Institute of Human Anatomy at the University of Bologna. The work's hybrid nature means that it can appeal to a wide audience, from curious children to experts seeking witty and aesthetically meaningful entertainment. In this example of imageXtext, word, image and typographical

signs –we might say to paraphrase Magritte for our own purposes– penetrate mental space. This exemplifies, as Romano Gasparotti puts it, "a way of thinking that is not only completely incapable of being in tune with the existence of the world, but which stubbornly strives to unravel and dispel any mystery, in full solidarity with mainstream philosophy and Galilean science" [my translation from Italian[6]] (Gasparotti, 2019, p. 15). The *Dizionario folle del corpo* restores for us the unity of thought, in its visual, expositional, and verbal forms. Thus, Couprie characterises the gesture as a "Movement (most often) of the arm, hand or head that speaks without one having to open one's mouth or that betrays something that one wishes to keep quiet" [my translation from Italian[7]] (Couprie, 2019, p. 100) associating it with the lemmas *Expression, Gesticuler, Mouvement*. *Gesticuler* evokes the concept of movement, which in turn is associated with the headwords *Pose*, *Position* and *Posture*. While Couprie defines the pose as an attitude of the body, and position is an attitude that in anatomy may be read as a movement of a body part *vis-à-vis* its three spatial planes (sagittal, frontal, horizontal), posture is defined as "a surprising or artificial position. Posture says a lot about a person's social behaviour or habits" [my translation from Italian[8]] (Couprie, 2019, p.186).

EXAMPLES OF PRETEXTS

Following Leonardo, let us assume that postures, expressions, and gestures are elements of body language, through which visual art expresses the so-called motions of the soul and much more. As zoologist Desmond Morris (2019), reminds us, analysis of body language transposed into images and situated in a context provides us with an account of socio-cultural rituals and conventions, documents the facts, manners and customs of the various epochs, and illustrates forms of perception of reality, including the evolution of artistic styles and movements.

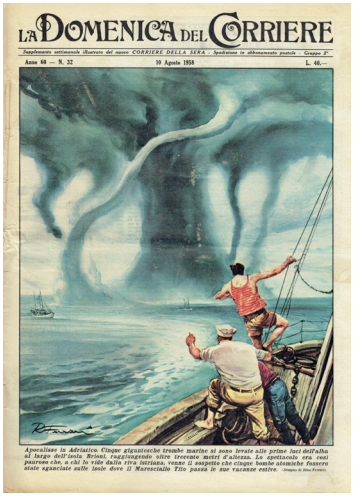

Fig. 2 La Domenica del Corriere, 10 August 1958, *Supplemento gesticolato al dizionario italiano*.

Gesturing, as we have seen, can be a universally intelligible form of communication. This assumption led Bruno Munari to create the *Supplemento al dizionario italiano* [Supplement to the Italian dictionary], initially commissioned as a marketing tool by the Carpano distillery in Turin in 1958.

The booklet, characterised by its author's famous distinctively visual approach, shows photographs of Italian hand gestures accompanied by brief explanations in four languages. Once again, images and words are not merely juxtaposed, but rather used as ante litteram imagetexts, in which images of gestures of ancient origin, especially those used by Neapolitans, which over time came to be used nationally and then internationally, are the protagonists of an intercultural somatic mediation process. Nonetheless, the analysis of these gestures bears a much deeper value.

As mentioned in the 1958 *Domenica del Corriere* article commenting on the publication of Munari's text, Andrea de Jorio, a scholar of archaeology and antiquity working at the [Reale] Museo Borbonico of Naples, published a study in 1832 entitled *Mimica degli antichi investigata nel gestire napoletano* [Mimicry of the Ancients investigated in Neapolitan gestures].

Elenio Cicchini (2017) offers us an analysis of this work, in which he describes the singular methodological process adopted by de Jorio, who drew analogies between images of figures painted on ancient pots from the excavations of Pompei and Herculaneum and the gestures of his contemporaries.

Assuming a grammar of gestures similar to St. Augustine's and Ludwig Wittgenstein's theories about verbal language and its relationship with reality, de Jorio affirmed that "Each gesture can have one or more meanings, as is the case not only with the words of any language, but with the very letters of the alphabet" (Cicchini, 2017, p. 5) and called for the development of a dictionary of these gestures. In Cicchini's view, de Jorio's intention was not to reveal information about the subjects of the vases, but to shed light, via careful observation of Neapolitan gestures, on the attitudes and ways of life of the ancient Greeks. This revolutionary approach that linked cultural heritage with its audiences predated by almost a century the theories on the interpretation of cultural heritage put forward by Freeman Tilden in 1957.

Observation of the mimetic gestures portrayed on ancient pots also features in another line of research concerning a particular type of gesture: the trained, or choreographed, gesture. Beginning in the early twentieth century, proponents of modern dance began a process of imitation of ancient poses based on tableaux vivants. For example, from the letters of Isadora Duncan, we learn that she and Ruth St. Denis primarily studied the ancient pots conserved at the Louvre: Duncan with a view to creating a repertoire of poses to alternate in the flow of action, and St. Denis with a view to assimilating a hieratic attitude spread across a performance of alternating poses forming a slow and suggestive flow of actions. As we are going to approach the *Dizionario del gesto* [Dictionary of gesture] by choreographer Virgilio Sieni, we are treating the body as an object, the protagonist of the images we enjoy. In this instance, in the context of choreographic, the peculiar relationship that is given between the dancers' bodies and the audience's gaze modifies our perceptions of space, transcending the two-

Fig. 3 Arianna Vairo, 2019, pp. 114-115, *Risonanza*, in Palma et al., *Dizionario minimo del gesto. Corpo Movimento, comunità nella danza di Virgilio Sieni*.

dimensional character normally attributed to images. All the more so, because Sieni's inquiry engages communities and ordinary people in his work with professional dancers. For the purposes of the present chapter, we might mention two of his large-scale projects: the direction of the 9th International Festival of Contemporary Dance Mondo Novo - gesture place community (Biennale Danza in 2014); and the *Dizionario minimo del gesto* [Dictionary of Gestures], published in 2019 following a cycle of encounters with the general public organised by the Fondazione Feltrinelli in Milan. The aim of the festival was to create a community, a *polis*, where the artist would be required to engage in the practice of transmission and to integrate his own work/process into a crossroads of experiences. Proximity to the body and gestures of the other, in forms grounded in individual diversity, encourages a thought process that is ever new, and ever in need of confirmation. Drawing on the concept of the 'use and reuse of bodies' –theorised by Giorgio Agamben, who has greatly influenced the work of the choreographer– Sieni started from the positive assumption that impoverished human postures might thus be inspired

to open up to an attitude of presence and listening (Sieni & Tomassini, 2014). This applied to everyone, professional artists and public alike. Alongside this initiative, which with the *Vangelo secondo Matteo* project staged an itinerant workshop involving professional and amateur dancers across various regions of Italy, a further section of the festival, *Aura*, was devoted to the observation of details from selected Venetian masterpieces. Five choreographers chose to explore specific Venetian paintings, taking the life of a detail as their starting point for creating a personal geography of gestures.

The *polis* and the universality of gesture are the key concepts informing the *Dictionary of Gestures* (Palma et al., 2019). Via Arianna Vairo's signs/drawings and the practice of gestures aimed at creating or reviving lexical memory, Sieni sets out to form a community of citizens capable of experiencing spaces with awareness of how their actions resonate with others. Whether in prestigious settings or places of decay, the words that make up the dictionary invite us to inhabit space in a more democratic and sensitive way. For example, the entries include words such as fingertips, automatisms, and waiting.

FROM SEMIOTICS TO DIDACTIC TRANSPOSITION

In choreography, the act of transposing into images – conventionally signs or drawings– is termed notation and is the instrument via which artistic projects are communicated to dancers and handed down to posterity. It involves marking out an idea, knowledge, or simply a state of mind, fixing it on paper by means of a gesture. Paul Valéry, in *Philosophy of Dance*, stated that those who ask philosophical questions about dance "have their ideas immediately complicated and paralysed" (1957-60/1992, p. 77). In order not to run this risk, let us organize our arguments here around the thinking of Rudolph Laban, whose work offers an excellent point of reference to anyone who wishes to learn about the discipline, thanks to three factors:

the elements of radical innovation he brought to Western choreography; his theoretical skills and the care he took with communicating the outcomes of his inquiry; his focus on the use of a specific methodology in education and training.

> As Lucia Ruprecht (2015) states in her comparative text if Benjamin is the thinker of gestural interruption, Laban is the thinker of gestural flow. This flow derives from vibratory energy that now enters centre stage. For the dancer, choreographer, teacher, and dance thinker, dance did not just include gestures; it was a genuinely gestural event and experience, which gave expression to the human condition, and made visible and performed the flow of life. Dance experience makes available insights into a world that gives or discloses itself in the rhythms of gesture. (Ruprecht, 2015, p. 28)

One of the keys to the success of Laban's work is that he sought to describe movement using analytical, almost geometric, explanations, but poetic language. According to Laban, it is only through careful reflection on gesture and movement that the meaning of dance may be understood. For this reason, his analysis is centred around four points that may be summed up as follows (Bermùdez, 2010; Davies, 2006):

1. the use of a particular area of the body, the area that moves;
2. the direction of the body's movement in space;
3. the rhythm of development of the motor sequence and the time in which it is performed;
4. the position of accents and the organisation of phrases.

Dance is a composition of trained and carefully designed gestures, which via Laban's precise verbal and visual descriptions sheds its aura of evanescence to take on deeper significance. For example, by using graphs, it is possible to qualitatively analyse movement in terms of specific parameters, such as expressive, emotional, and mental state, soul, passion, hypnotic quality and vision. Furthermore, two elements spatially define dance: the natural zone occupied by the performer; the artificial zone occupied by the lights, the set and the audience. This approach allows us to explore

choreography through the lens of semiology and to reflect on the two ways in which contents may be transmitted:

1. The reportage, the live analysis, the chronicling of events.
2. The reconstructive analysis of movement via writing, or the decomposition of the movement in order to write a critique of it.

These are the bases of notation and *Labanotation*, a series of graphic symbols that allow a choreography to be defined via drawing. This linguistic code makes it possible to archive choreographic works, and to conserve a memory of them. Furthermore, this code is the basis of the training course created by Laban. Beatriz Bermudez in describing her training according to this method helps us to understand how the analysis of gestures via a suitable form of writing allows us to appropriate the meaning of the movements with considerable awareness and competence.

Translating knowledge into a language other than that of the discipline that generated it, from the point of view of the sciences of education and the didactics of the different subject disciplines, recalls the concept of didactic transposition. The synthetic definition of this didactic methodology may be found in the subtitle of the volume in which Yves Chevallard first published his ideas on the subject: *Du savoir savant au savoir enseigné* (1985). Observing the situation of contemporary teaching, Chevallard noted that the knowledge addressed was artificial because it had been specially constructed for the class. *Transposition is a process of negotiation that allows the teacher to adapt the implementation of knowledge to the level of his students* [my translation from French]. Already in 1998 Philippe Perrenoud noted that although Chevallard's work had been devoted to

> mathematical knowledge and more particularly to the transformations that mathematicians' theories undergo when they become school knowledge, first in curricula, then in textbooks and classrooms, this work has become a reference for other disciplines. It has made an important contribution to associating the notion of transposition with so-called 'erudite' knowledge, that which is claimed by school disciplines such as mathematics, the natural

> sciences (biology, chemistry, geology and physics) and the humanities and social sciences (history, geography and philosophy in particular) (Perrenoud, 1998, p. 487).

What characterises the process of transposition is its strong pragmatic link with the socio-cultural context in which it takes place. It is not a simple change of form or content of the learned knowledge, but a "rebirth of knowledge in a different subject, via the mediation of tasks and interactions. Hence the notion of pragmatic transposition" (Perrenoud, 1998, p. 511).

Studies on the didactic transposition of history, for example, suggest that it shares many of the concepts previously expressed regarding the lexicon of gesture combined with image. In identifying the procedure that teachers may follow, Maila Petrucci (2018), expounds on the possibility of working on multiple dimensions at three different levels: semantics, syntax, and grammar. Alternatively, Ivo Mattozzi, drawing on the work of Chevallard, sees the process as taking place at three levels: 1. the re-invention of scholastic knowledge; 2. the transposition into textual structures; 3. the didactic transposition required to teach how to learn (Mattozzi, 2007).

Foundationally, teachers' transpositional action must follow key deontological principles: 1) the avoidance of bad transpositions; 2) the development of good transpositions for their pupils, given that good learning is generated and starts from appropriate transpositions.

CONCLUSIONS

Ecstasy, repulsion, acceptance, hieraticism, horror, aggression, abandonment, surprise, fear, falling in love, desire [...]. These are some of the possible meanings of gestures transposed into art images. As André Chastel (2002) argued, hand movements are linked to the gazes and psychology of characters, becoming the visible signs of a non-verbal communication. Moreover, to quote Agamben: "The gesture is the exhibition of a mediality: it is the process of making a means visible as such"

(2000, p. 58). In this article, we have made an interdisciplinary excursus on the image of gesture in art; we have used the words of the good master Leonardo da Vinci to interpret this subject as a silent poetry, immediately comprehensible in its unity and for this reason destined to remain longer in the memory. In this regard, it is useful and necessary to refer to Aby Warburg who, at the turn of the 19th and 20th centuries, devoted much thought to the problematic nature of the rendering of movement in images in art and the psychological characterisation expressed through gestures, between Antiquity and the Renaissance, between figurative art and dance. In particular, in Mnemosyne (Warburg, 2021), the atlas of images made up of thousands of photographs ranging from archaeological artifacts of Oriental, Greek and Roman origin to Renaissance and 20th-century culture testimonies, Warburg conceives of the image as an engram, that is, a trace left in the nervous system capable of evoking dormant meanings when new fruitive experiences occur, even distant in time: "thanks to the miraculous work of the normal human eye, for centuries in Italy the vibrations of the soul remained alive for successive generations" (p. 209). Above all, with regard to silent poetry, it is pertinent to recall the structure of the atlas understood as a *machina memoralis*, in which images are juxtaposed in such a way as to favour an open interpretative process that, according to the author's intentions, allows the image to take on the faculty of speech (*Image and Word*, p. 195). Warburg's intention was to illustrate the mechanisms underlying the different figurative traditions. This stylistic-psychological approach (p. 716) shows a very different relationship between image and text than Mitchell theorised through the concept of imageXtext, in which semiotics and aesthetics, sign and sense act together to create new content or, as seen in the cases shown, as a tool to reinforce new theories (Darwin, Ekman, Brown), interpret ancient heritages or define forms and projects (Couprie, Munari, Sieni). In the course of the article, gesture as image was observed through the rapid analysis of some case studies that made it possible to make explicit the educational, formative and popularising value of this language.

The fact that image has always played an educational role down through the centuries has been proven since Gregory the Great, who to head off the risk of idolatry in his thirteenth epistle, pointed out the immense value of painting for the illiterate, who, although they cannot learn through reading, have the opportunity to elevate themselves through images. With regard to gestures and the concrete use of the body transposed into images, Francesco d'Assisi, at the time he invented the first tableau vivant in history for the feast of the Nativity in 1223, stated that it is possible to see with the eyes of the body (Tommaso da Celano, 1228-29/1996). This means not translating events into words or artificial images, but physically reliving them within ourselves. The expression "translation into images" leads us to identify in the semantic universality of gestures, the opportunity to apply didactic transposition not only to visual disciplines, but also to scientific ones. As observed by Perrenoud:

> In the field of expert, professional or common-sense knowledge, the objects of knowledge are not so easily identifiable and are more unstable or controversial. The research problems and practical obstacles to transposition are therefore different. Nonetheless, we are still quite close to a "knowledge trajectory", albeit that, initially, it needs to be "extracted" from practices, unlike academic knowledge, whose formalisation is inherent in the scientific practices themselves (Perrenoud, 1998, p. 508).

NOTES

1 Leonardo da Vinci, *Trattato della pittura* (Carabba editore, 1947). Retrieved July 6, 2021, from. https://it.wikisource.org/wiki/Trattato_della_Pittura_(da_Vinci)/Parte_prima/16._Differenza_che_ha_la_pittura_con_la_poesia.
2 Leonardo da Vinci, *Trattato della pittura* (Carabba editore, 1947). Retrieved July 6, 2021, from https://it.wikisource.org/wiki/Trattato_della_Pittura_(da_Vinci)/Parte_prima/17._Che_differenza_è_dalla_pittura_alla_poesia.
3 Leonardo da Vinci, *Trattato della pittura* (Carabba editore, 1947). Retrieved July 6, 2021, from https://it.wikisource.org/wiki/Trattato_della_Pittura_(da_Vinci)/Parte_prima/19._Della_differenza_ed_ancora_similitudine_che_ha_la_pittura_con_la_poesia.
4 *Ibid*.

5 Palazzo delle Esposizioni, Roma, 22 ottobre 2019 - 16 febbraio 2020.
6 The original text of the quotation is as follows: "di un pensare che non solo è del tutto incapace di porsi in sintonia con l'esistere del mondo, ma che pervicacemente si adopera allo scopo si svelare e dissipare qualsiasi mistero, nella piena solidarietà, tra filosofia mainstream e scienza galileiana" (Gasparotti, 2019, p. 15).
7 The original text of the quotation is as follows: "Movimento del braccio, della mano o della testa (più sovente) che dice senza che si debba aprir bocca o che tradisce ciò che si vorrebbe tacere" (Couprie, 2019, p. 100).
8 The original text of the quotation is as follows: "Una posizione sorprendente o artificiale. La postura la dice lunga sul comportamento della società di una persona o delle sue abitudini" (Couprie, 2019, p. 186).

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CREATING THE (SCHOOL'S) FUTURE.
IMAGINATION, PREDICTION AND ARGUMENTATIVE COMPETENCE

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IMAGINATION
ARGUMENTATIVE COMPETENCE
PREDICTION
FUTURE
TETRADS

This paper proposes notes and reflections on methodological strategies and qualitative outcomes of a teaching experiment that involved a class (5th year) of the primary school of the IC Galilei in Reggio Emilia. The work was carried out within a digitally augmented learning ecosystem capable of a) enabling synchronous and asynchronous interaction practices and b) facilitating cooperation and sharing at different levels of proximity (between teachers and students). In this context, efforts were made to enrich and develop pupils' argumentative competence by working with images and especially by prodding their predictive imagination. Therefore, taking the evolution of technologies as a projectual (and cultural) horizon within which to try to imagine a plausible and desirable future, and conceiving –like Vygotskij –the imagination in terms of a creative and combinatory behaviour, we asked the children to 'create' a probable future. In other words, we asked them to give shape to the school of the future, starting with an analysis of the mistakes and intuitions that a group of artists at the end of the 19th century were able to make in an attempt to predict the year 2000 that the protagonists of this action-research project did not experience. Final objective: to develop in the children an argumentative and linguistic structure capable of supporting a lesson aimed at citizenship in which the pupils themselves would then share their idea of integrating digital technologies at school. The results collected made it possible to positively assess a second edition of the training course, which will see the adoption of a device –McLuhan's Lost Tetrads– with which we will try to further encourage an exercise of imagination (and also of argumentation) capable of designing sustainable contexts and ecosystems (of learning and beyond).

PHENOMENOLOGY OF AN EMERGENCY

The main objective of this paper is to underline, in a pedagogical context, the heuristic value of the imaginative exercise and its potential usefulness in enriching argumentative competence. More precisely, we will report on a teaching experiment conducted at the Loris Malaguzzi Primary School - IC Galilei Reggio Emilia, carried out during the 2019-2020 school year. This was an action-research project (Barbier, 1977) in which the use of digital technology –as will be stressed later– was conceived and managed, on the one hand, to increase the space-time of sharing and comparison, and on the other –in line with what Tim Berners-Lee said, recalling the aims he had pursued in designing the World Wide Web– to "keep under control the institutional memory of a project" (Isaacson, 2014, p. 409). This last aspect is not negligible in the didactic economy of the experiment under examination, since it allowed the children involved (coordinated by the teachers) to retrace, once they had finished the experience, the ideational processes in which they had been protagonists and, consequently, to produce metacognitive reflections on the work done.

The motivation that prompted us to work on the link between imagination and argumentative competence is to be found in the educational (and cultural) emergency of freeing argumentation from the narrower and more intuitive logical-mathematical field (Cambi & Piscitelli 2003) to make it to all effects a transversal competence. After all, this is also the direction suggested by the OECD, which defines argumentation skills in terms of "students' ability to apply their knowledge and skills in key areas and to analyse, reason and communicate effectively while identifying, interpreting and solving problems in different situations" (INVALSI, 2019, p. 15).

And even more supportive of the work done seemed to us to be the "Council Recommendation" of 22 May 2018, which even places functional alphabetic competence at the top of the list of key competences. This is significantly described in the aforementioned document as:

> the ability to distinguish and use sources of different kinds, to search, collect and process information, to use aids, to formulate and express arguments in a convincing and contextually appropriate way, both orally and in writing (Gazzetta Ufficiale C 189, 2018, p. 8).
>
> What is more, the "Recommendation" also states that
>
> a positive attitude towards this competence involves a willingness to engage in critical and constructive dialogue, an appreciation of aesthetic qualities and an interest in interacting with others (Gazzetta Ufficiale C 189, 2018, p. 8).

It is on the basis of these premises that the action-research work in question was conducted in a class group composed of 23 children (13 boys and 10 girls) and the languages spoken –besides, obviously, Italian– were 6: Chinese, Moldavian, Arabic, Portuguese, Yoruba (tribal - Nigeria) and Asante (tribal - Ghana).

IMAGINING THE FUTURE, BUT ALSO THE PAST

The starting point of the training course – as well as the pretext that allowed to set up the exercise of imagination of the pupils of Reggio Emilia– coincided with a reflection initiated in the classroom on digital technologies, on the impact they have (and may have) on society and in particular on school life. The aim of this dialectical discussion (coordinated by Stefano Moriggi) was first of all to investigate (and to prod) the pupils' awareness of the complex discontinuity that the adoption of digital devices in learning spaces could (and will) trigger.

At the same time, Giusi Grasselli, the class teacher, took care of the operational organisation of the project's spaces and times, and in particular of all the digital and analogue tools available to the children for research and documentation, as well as of preparing the Workspace for Education platform. As mentioned above, the setting up of a digitally augmented classroom setting (Moriggi & Pireddu, 2020) was conceived and realised following some of the objectives that

originally guided the conception and IT implementation of the World Wide Web. All this with the intention (explicitly shared with the children) of enabling a space-time of learning and interaction that goes beyond that allowed by the mere physicality of the classroom; and such as to enable active and cooperative work and research methodologies able to compensate for the criticalities and optimise the opportunities of the different levels of interpersonal proximity.

More concretely, the students had to learn to manage (and document) the moments of dialectical confrontation with Moriggi in the classroom, alternating with work phases –coordinated by Grasselli– of in-depth study and cooperative development (both in presence and at a distance). Moreover, the digitally augmented didactic ecosystem set up in this way allowed a continuous interaction between the class group and Moriggi (when he was not in the classroom), as well as guaranteeing a constant updating of the reflections started in the first meeting in presence and a continuous sharing of materials considered useful for the progress of the action-research.

Having said that, it is now a question of illustrating how this reflection on the impact of digital technologies could have triggered an imaginative exercise aimed at developing the class's argumentative competence. But this presupposes some clarification of the term imagination as understood here.

Particularly inspiring in this regard were the writings of Lev S. Vygotskij on imagination and creativity in childhood – and more specifically the identification in the behaviour of the human being by the Belarusian scholar of a "second type" of creative activity (in addition to the "reproductive" one): that is "the combining or creative one" (Vygotskij, 2010, p. 19) which, precisely, for the psychologist from Orša coincides with imagination. Vygotskij writes:

> if human activity were limited to reproducing what is old, man would be a being turned solely towards the past, capable of adapting to the future, only if this were a reproduction of the past. Creative activity is therefore what makes

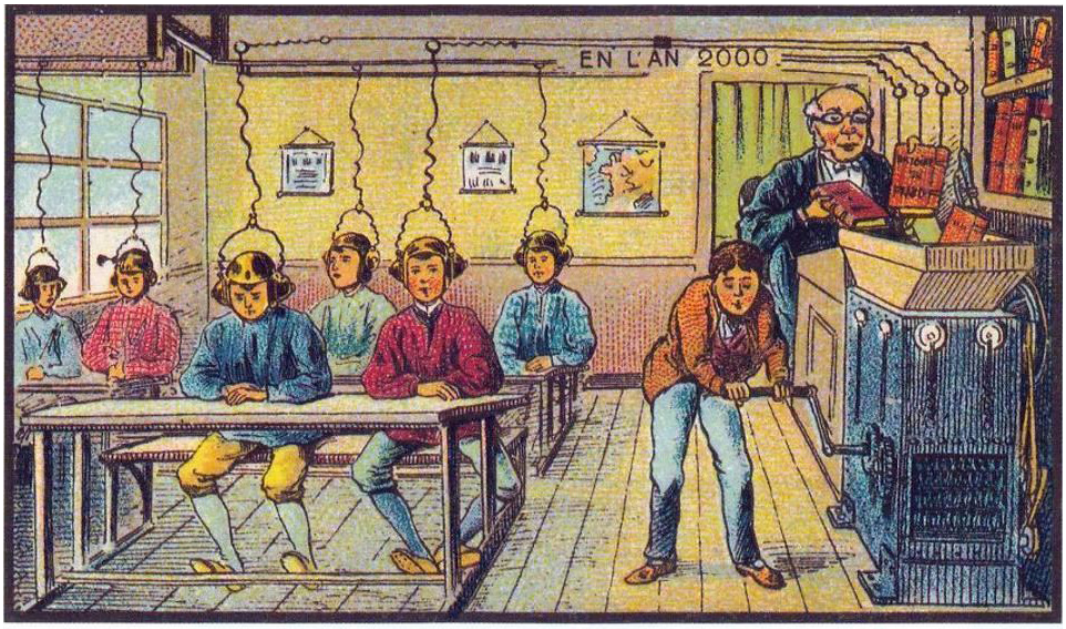
> man a being turned towards the future, capable of shaping it and changing his present (Vygotskij, 2010, p. 19).

However, no less relevant for the structuring of the project under discussion was the consideration that immediately followed, in which the scholar pointed out that

> imagination, as the foundation of all creative activity, manifests itself in all aspects of cultural life without exception, making artistic, scientific and technical creativity possible (Vygotskij, 2010, pp. 19,20).

Therefore, asking the children to imagine how the evolution of technologies could have changed the school and the learning scene, seemed to us to be an opportune planning horizon within which to direct their imaginative (creative-combinatory) effort from the outset.

In this case, the children would have to imagine the school of 2119, substantially replicating what Jean-Marc Côté and other artists did in 1899. On the occasion of the Universal Exhibition in Paris in 1900, they were given the task of predicting



At School

Figure 1 At school it is an illustration belonging to the 87-part series "En l'An 2000" (In the Year 2000) depicting scenes of life in the future. First produced for the Universal Exhibition in Paris in 1900, they were printed as inserts for cigar boxes and then as postcards between 1899 and 1910. Science fiction writer Isaac Asimov discovered a series of them in the 1980s, publishing them in his non-fiction work Futuredays: A Nineteenth Century Vision of the Year 2000, Virgin Books, London, 1986.

the future by making a series of postcards that could project those who would see them *En l'an 2000*.

A selection of these postcards –including the representation of the school in the year 2000 (see Figure 1)– was shared with the class (in the digital environments adopted) and carefully analysed by the working groups into which the children were organised.

And this for a series of interconnected reasons: 1) by analysing these representations, and in particular the mistakes made by the artists in their predictions, the children would have been able –as in fact happened– to understand the difficulty of the exercise that would soon involve them too; 2) the exercise in question should not have been, precisely, a free and fanciful interpretation of the time to come, but rather an attempt to anticipate events, arguing the probability and desirability of some scenarios compared to others. All this –as Simone Arcagni has recently written about George Herbert Wells' futurology– producing "an attentive and motivated observation that combines scientific expertise with a series of social notations" and that tries to "intercept those processes in progress that more than others seem to show privileged directions" (Arcagni, 2021, p. 11); 3) considering that in 2000 the children involved in the action-research were not yet born, the analysis of the abovementioned postcards would have forced them not to remember, but to reconstruct (and therefore imagine), researching and arguing, what they could not see.

As Vygotskij again noted:

> When […] I try to imagine a future event, for example, life organised in a socialist way, or the remote past and the struggles of prehistoric man, in both cases I do more than reproduce impressions […]. I have never actually seen either that past or that future; I can only have a representation of it, an image, a picture of my own (Vygotskij, 2010, p. 19).

And in this vein, adding his own commentary to that of the members of his working group, a child wrote in the

shared digital environment: "We cannot see things from the past with our eyes; you must have some imagination to understand the findings"[1].

THE LOGIC OF CREATIVITY

The analyses and reflections carried out in the first phase of the project contributed to preparing the class to face the future of the school as a problem (Andersson, 2018) to be tackled by trying to calibrate, in a planning logic, a predictive exercise able at the same time to identify plausible and desirable scenarios. And the fact that the work carried out so far has made the children more aware of the complexity of the exercise required of them seems to be quite evident from their own considerations – in which it will not be difficult to perceive some significant assonances with Vygotskij's reflections (not to mention Wells' futurology) from which we started.

Here are some of them: "One can imagine by taking one's cue from things that already exist. From the certainties we have. If you have to think about the future, you try to anchor yourself in the certainties of the present". And again: "We have created new things out of existing things".

If, on the one hand, the children understood that imagination in this sense requires a creative recombination of what we already know; on the other hand, the need for logical rigour (fully compatible with the creative impetus) to go hand in hand with a good knowledge of the tools and devices whose evolution is to be intuited did not escape their attention.

"In order to imagine" –wrote one child– "we had to think logically. Evolutions must be made on the basis of needs". And another added: "When you imagine the future, you have to know as much technology as there is. Usually, you never think of something from scratch".

In this phase of the project –as in the previous one– an attempt was made to maintain sufficient terminological rigour to avoid trivialising the issues and problems addressed. Not

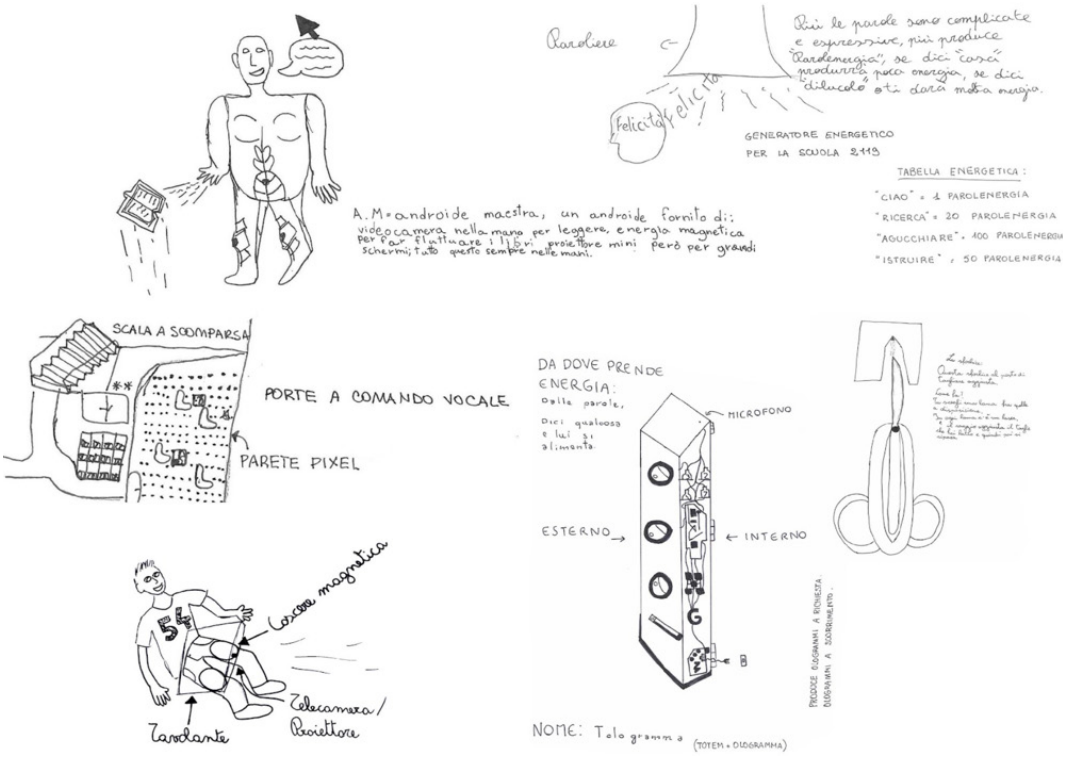


Figure 2 Graphic projects realised by the children of the fifth class of the Loris Malaguzzi Primary School of the IC Galilei of Reggio Emilia.

only that, but with a maieutic purpose, they were asked to give an account of each of their statements or imaginative impulses, sometimes relaunching the theme and bringing to their attention aporias not considered or critical points worthy of further attention. All with the aim of stimulating the creativity implicit in the zone of proximal development (Vygotskij, 1954). More specifically, it was our intention to systematically provoke "that continuous transition between the verbal level, the concrete and perceptual level of objects, and visual representation" that were significantly identified in the children's metaphorical processes (Cagliari & Giudici, 2021, p. 11) and that we found in the dynamics of (their) predictive imagination (precisely, as they themselves declared, "taking inspiration from things that already exist").

The word combinations with which they tried to conceptually translate their graphic projects were concrete and significant evidence of the combinatorial creativity with which their imagination tried to shape a school of the future that was both plausible and desirable. The drawings and captions that populate Figure 2 represent a selection of their projects that deserves some comment.

It seems appropriate to note from the outset their nonchalance in advancing future hypotheses that a subsequent phase of analysis and comparison would have made it possible to evaluate and select. For example, the idea of an 'android teacher' –which represented one of the first shared projects– would later be discarded in favour of a school in which the figure of the traditional teacher (even if technologically enhanced) seemed entirely pleonastic, not to say incompatible.

It was specifically a school in which active and cooperative participation in learning (already experienced in their teaching routines) would have to evolve to the point of contemplating a synergistic ecosystem in which knowledge could become a widespread experience in space and time capable of involving the school structure itself. As we read in the digitised notes of one of the working groups on their new idea of a school:

> Lessons will take place among children, that is, without teachers: thanks to a 'bionic' nourishment that retains the children's comments (as in the functioning of photosynthesis [...]) and for each cycle of pupils it issues them according to the class [...]. In this way the school learns together with the children.

With regard to the aforementioned word combinations, it seems pertinent to focus attention on the *Tologramma* (a totem that transforms voice commands into holograms) and the *Tavolante* (a tablet capable of floating in a vacuum): two examples in which the children worked, arguing the drawings with a combination of words in order to identify a meaningful conceptual compromise between the form and function of the devices in question. In other words, by mak-

ing explicit their principle of sufficient reason, i.e. their future usefulness/sustainability.

And even more significant from the point of view of future utility/sustainability (and therefore of linguistic-conceptual elaboration) is the conception of the *Paroliere*. It is a device that produces 'word-energy' in proportion to the complexity and richness of the meanings of the words it absorbs. The meaningfulness of the words spoken by the children generates the 'lifeblood' that satisfies the energy needs of the learning eco-system. This, evidently, finds its design coherence with the idea of the school described above in which the same school building imagined by the children learns with the students, holding and releasing their comments in such a way as to ensure a balanced sharing of knowledge and skills.

This work on words therefore led the various groups to converge on a project in which the very concept of sustainability found (also from an argumentative point of view) a virtuous declination in a school structure which, without impacting on the environment, would at the same time allow an active, involving and responsible learning experience (given that the production of energy needed by the institute depended on the attention with which the children –no longer needing the teacher– undertook to find the 'right words' to say, and therefore acknowledge and respect, the complexity of the world).

THE 'REDISCOVERED' TETRADS

The conclusion of the project coincided with a conference 'for adults' on the future of technologies (in schools), which was organised by the children of class 5ª A at the Loris Malaguzzi International Centre (Reggio Emilia). This epilogue, declared and shared since the beginning of the project, represented a further stimulus for the working groups to produce an argumentative/expositive strategy able to support (also publicly) the final product of their imagination

exercise. This event, as well as sharing of the work carried out, represented for the class (stimulated by Moriggi and the questions from the audience) a precious moment to take stock of their learning path – and therefore to find the most appropriate words to give an account of their experience and their projects. And the following sentences are a brief but significant selection of the reflections matured and shared during the didactic experimentation that the children decided to submit, commenting on them, to the attention of their parents and of the other adults who attended the final conference: "We learnt some new words"; "I learnt a bit more to express myself in everything I thought"; "I felt free"; "Maybe because we are growing up".

In order to assess the different levels of exercise of argumentative competence in terms of acted knowledge (Wiggins, 1993), we set up observation grids to record each student's data according to the following parameters: personal autonomy, relationship with adults and peers, participation,

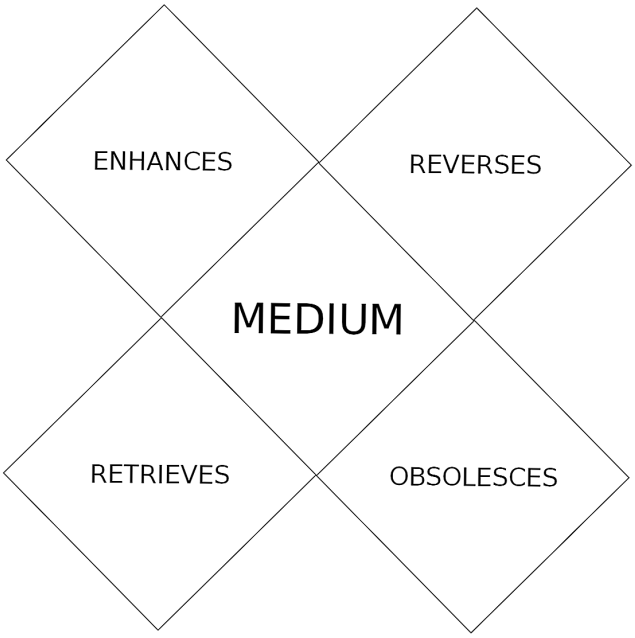


Figure 3 Graphical representation of a tetrad based on the original model developed by M. & E. McLuhan.

individual responsibility, flexibility and awareness. The rubrics of competence, on the other hand, focused on indicators of levels of mastery: that is, performance provided, cognitive and operational processes implemented, attitude towards the experience. The final results show high average levels, which meet the parameters that the OECD advocates for lifelong learning (OECD Skills Outlook, 2021).

Specifically, out of 23, the level of full competence was reached by 14 children and the other 9 were assessed as being in the medium-high range. The results collected –and above all the conceptual/argumentative elaboration developed by the children around the concept of sustainability (relating both to learning and to the environment)– led to the conception of an evolution of the project (and therefore a second edition planned for the 2022-2023 school year) that will integrate a projectual device capable of further articulating the ecological imagination (and therefore the argumentative competence) of the subjects involved.

We are alluding here to Marshall (and Eric) McLuhan's "Lost Tedrads" (McLuhan &. McLuhan, 2019). In order to manage this tool, it is necessary first of all to share the Canadian scholar's idea that every medium –and for McLuhan, every object or concept that (re)mediates our experience of the world can be called a medium– should be understood first and foremost as the set of its practical consequences, the practices that it inaugurates and makes possible (Di Martino, 1998, p. 32). Within this conceptual horizon McLuhan (and his son) came to formulate the "laws of the media" – the tetrad, in fact (McLuhan & McLuhan, 2019, p. 9). Each tetrad consists of four questions (see Figure 3), the answers to which should enable us to reconstruct (and thus imagine) the socio-cultural context (or, in other words, the ecosystem) that a given medium could (or will) contribute to develop.

What does it 'enhance'? What does it retrieve? If taken to extremes, what does it 'reverse'? And what does it make obsolesce?

The very graphic arrangement of the laws is designed to facilitate a synoptic compilation of the tetrad. That is to say,

to facilitate "a cross-reading and analogical" such as to favour a network of connections based on a relationship that on the one hand exploits "the structurally metaphorical value of language" (Lamberti, 2000, p. 165) and, on the other hand, restores the complexity and dynamism of the contexts made possible by the interaction with the medium under examination.

Not to mention the ideational propulsion that could be generated by the possibility –envisaged by McLuhan himself– of comparing alternative, and why not dissonant, compilations of tetrads built around the same medium (the school, in this case). Obviously, precipitating the device in question (the school) within that digitally augmented space-time in which the children of Reggio Emilia have tried to 'create' the future of learning.

NOTES

1 The children's observations –reported throughout the text in inverted commas and in anonymous form– were selected from those available in the documentation collected as they were more representative of the ideas and considerations widely shared that emerged both in the research and in-depth study phases and in those of comparison (both in presence and at a distance).

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REAL ESTATE AND MARKETING RHETORICS.
THE RISE OF HERITAGE IN THE FACE OF GLOBAL FINANCIALIZATION

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HERITAGE
CITY-MARKETING
REAL ESTATE
NEOLIBERALISM
GLOBAL CITY

The contribution proposes to observe the inclusion of symbolic elements linked to the notion of heritage within the images used to promote domestic interiors in regeneration projects. This operation is conducted in two of the most important cities at the forefront of the housing crisis: London and Shanghai, and reveals remarkable parallels between Eastern and Western modes of communication and representation. The financialization of space, which had profoundly transformed the way we value, perceive and desire domestic intimacy opens up issues of space falsification, and distortion of the social models of reference. What these projects present us with are fictitious narratives that select not only materials, but also inhabitants, ambitions and social projections. What is new is the aggressiveness of the process linking the construction of spaces and the shaping of the subject, and the enhanced use of references to cultural elements able to secure economic returns. Their reassuring character stabilizes the perception of investment, forcing us to reflect on how we shape a specific idea of the city through images, and for whom we do so.

INTRODUCTION

In time, images have always been foundational elements for the expression of politics, by virtue of their staged nature and instant influence (Schuppli, 2013). And however, with the rise of neoliberalism, this process brought to a progressive detachment between politics and dominant powers. Now finance, more than governments, benefits from the promotion of urban imaginaries (Harvey, 2005; Žižek, 2009). Their construction and use shadows an increasing aggressiveness in the process of city making that selects and hides chosen parts of the reality through the use of spoken and visual narratives. Their accessibility imposes to go beyond their commercial significance, and to think about vision as a construction that has social and material consequences (Pinotti & Somaini, 2009), because it addresses our understanding of the city, and influences our idea of living in it. As scholars have noted, an image is not merely an archive of information but a force that shapes the present (Rubinstein et al., 2013), which has more to do with its use value than its veracity (Didi-Huberman, 2006): images are objects of spectacle for the masses and of control for the rulers, and are employed by the dominant powers to structure not only the acquisition of information but also its processing and transmission (Schuppli, 2013).

The observation of the global real estate market and the rhetorics that inform its language enable to reflect about who really produces place and for who. Heritage, in particular, is gaining increasing importance as a worldwide rhetoric (Graham & Howards, 2008; Kearns & Philo, 1993; Hall, 1997) supporting the real estate market and the increasing financialization of space (Olmo, 2018; Amin & Thrift, 2017). The rising success of heritage is mainly linked to the fact that it recalls matters of originality and stability in relation to the parallel needs of diversifying the product against levelling aesthetics of the global market (Bauman, 2017), and the one of providing feelings of stability against the uncertainty of regeneration (Lowenthal, 1985). Additionally, the marketing of

urban legacy is a very flexible concept: it can promote stable, enduring qualities and at the same time innovative ones, it can refer to popular restitution and personal ascension, to local and to global public. The images employed to do that are assembled to inform a careful *mise en scène* of the past (Benjamin, 1983) that selects both objects and people in order to shape a new idea of the city (Brown, 2013; Sassen, 2017). The comparison of Western and Eastern models of spatial production pooled by the centrality of heritage in real estate projects, underlines the importance of this theme at the national and international level (Olmo, 2018).

HERITAGE AS A GLOBAL LEADING RHETORIC

Among the most interesting tendencies concerned with the coding of images and the shaping of marketing narrative there's the inclusion of cultural elements, especially where developers want to provide a sense of place to otherwise detached architecture. This notion is an extensive and inclusive field, comprising a number of complementary nuances that span from history to memory, identity, nostalgia, legacy, authenticity, originality, culture; and it is generally referred to as 'heritage' inside promotional materials. Although it is argued that references to heritage have always entered the rhetoric of place promotion and production, the financialization of the city is putting the recovery and promotion of heritage into a new perspective. With nation states desperately active in promoting viable products for the global market, heritage has grown increasingly linked to branding. The market, eager to differentiate the product in order to sell exclusivity, commodified anything bearing a trace of identity and heritage became a vehicle for economic appreciation.

Indeed, heritage occupies a central position in the economic debate concerning real estate. If we observe its inclusion inside the promotional materials of real estate market, we can easily recognize the relevance of this trend at the global scale.

Big pieces of the historic city are bought, re-fashioned and sold at exclusive prices. Often, one or more iconic buildings are serving as a center point for these developments that absorb and reflect the prestige of the old industrial presences. But not only ancient constructions are targeted, also more modern ones are becoming increasingly significant for the real estate market. With them, a series of cool destinations started to attract the interests of investors, promoting quirky styles of life and innovative neighborhoods. In short, the notion of heritage expanded, including social practices besides built artifacts. In all these cases, heritage is glorified through aesthetic redemption before than spatial occupation. Suspended between the tangible and intangible, historic legacy ends up being a place for romantic consumption and exclusive gratification.

This is particularly true in those cities where the real estate market is more aggressive, usually global tier cities at the centre of housing deregulation, as London and Shanghai, which are used here as privileged points of observation. Not only do they represent sites of strategic financial interest for Europe and China respectively, but they are two cities whose economic interests have long been intertwined through the housing market. Over time this has fostered openings, concessions and deals worth enormous sums of money and the gradual approximation of their respective spatial outcomes. London plays a central role in the web of financial interests linked to the real estate sector. Here, property is often used as an economic levy to serve the priorities of neoliberal policies. Shanghai is the financial centre of China and, here, the regeneration of property is very much part of the city's modernization effort (Figure 1). Certainly, the images produced to suit the international property market are actually based on very different political, social and economic contexts. Yet, the similarities of the results are striking: aligned with the global aesthetic, small, medium and large-scale representations of Shanghai can easily be mistaken for London. Picking up from the corresponding cultural deposits of each

Fig. 1 *Office, Shopping Mall, Central Park, Heritage*, 2017, Hoardings around a redevelopment site in Shanghai, China. Photo by the author.

city, historic references are embedded into marketing images of architecture to support the idea of originality and legitimize urban regeneration projects. Especially, heritage is exploited as a symbol which can be easily extrapolated from the context to make sense of a new reality, and becomes a "de-territorialized signifier of lifestyle and identity" (Klingmann, 2007, p. 39), an abstract tale which addresses synthetic recognition. This is also done through the insistence on the aesthetic qualities of heritage, which is particularly significant when observed in relation to the global real estate market: with globalization, when architectural language tended to align to global aesthetics, a renewed necessity to promote the feelings, the emotions and visual stimuli arouse (Moussavi, 2009; O'Sullivan, 2001). In this sense, the reassuring qualities attributed to heritage are often used to pacify possible conflicts over land regeneration and offer a comforting "immediate experience of past time" (Brett, 1996, p. 38).

Through affection, sensations are transmitted immediately, and atmosphere, more than space accessibility and functioning determines the acceptance of the intervention, and people's inclination to see its benefits.

HERITAGE, COMMUNICATION, CONSUMPTION

In order to understand the pivotal importance of cultural narratives, we should assume that heritage is made and not inherited (Graham & Howards, 2008), and that memory "works by reinvesting places with new accretion of significance" (Kearns & Philo, 1998, p. 13). According to Groote & Haarsten (2008, p. 184), we should think that heritage is then used, or consumed: "what is consumed, however, is not so much the heritage itself, in the form of, for example, a building or a cultural landscape, but its representation in the form of historical narrative". It is then easy to understand how the construction and appreciation of heritage become a matter of communication to the extent that certain authors have attributed to it the properties belonging to any other languages: heritage would be a mechanism able to create meanings (Hall, 1997) and a selection process that needs to be considered in relation to a wider economic, political and social context. The reasons for its success involve ideological, cultural and practical motivations: heritage acts as a stabilizing element against the uncertainty generated by transformation because it recalls continuity and stability; these qualities are accompanied by feelings of recognition and belonging, so that the regeneration of heritage becomes a socially relevant operation, and guarantees the acceptance of possible privatizations; at the same time the marketing of authenticity allows the project to be differentiated from the more generic aesthetics of the globalization of places. Marketing images try to hold all these tensions together: thanks to its enduring qualities, heritage extends (over time) the perception of a stable economic value associated with the transformations that include it. Whether the interpretative

power of reading is still encouraged, or whether these images are purely representative visualizations, or even aesthetic taxonomies (Eco, 1987) is under consideration. What needs to be clear is that contents, but also the mechanisms that make contents available, are part of the same strategies that codifies space and make it available.

Heritage qualities: originality and stability

What makes the reference to the past so intriguing is the contrast between the constant changes and innovations that characterize the present world and the attempt to attribute some eternal character to it (Hobsbawm & Ranger, 1983/1987). This is because history lends a sense of over lasting legitimation and therefore the past is appropriated in order to construct the future as required. Overarching projects involving heritage, carefully select a series of values able to build on this promise. Among all the qualities that have been attribute to heritage over time (among which continuity, identity, legitimation, stability, recognition, belonging, comfort and many others), it is particularly significant, for the purposes of this article, to focus on the qualities of originality and stability, which are linked to the world of real estate in a privileged way.

The meaning of originality is two faceted, on the one hand referring to the origins, and therefore addressing an historical past, on the other hand, referring to an imaginative process projected towards the future. Several of the developments in London and Shanghai are original in both ways, a mixture of enduring qualities, and pioneering, entrepreneurial experiences representing a new chapter for the city. Some redevelopments in London are presented as "an opportunity to live inside a piece of history […] a tribute to what the area once was, but in the spirit of evolution and progress, where the past and fuels the power of the imagination" (King's Cross and King's Cross gasholders, London). The sign at the entrance of the marketing suite in Nine Elms, explains: "where heritage reaches new heights" signifying a relationship between the growth of the city and the advertised towers, but also suggest-

ing possibilities of personal ascension. What is implied is that the buyer, by appropriating a piece of history, can contemplate the city at his feet as the lord in the castle did: the legacy on site legitimates his powers while its aesthetic dimension levels the conflicts over appropriation. In Shanghai the promotional advertisements for Better City, Better Life shows this clearly. The slogan belongs to the world expo of 2010, but it is still used by the municipality of Shanghai as a declaration of intents when new redevelopments are started in town. One of them juxtaposes two apparently contrasting pictures from the top: on the left-hand side the image of ancient temples, on the right, the image of an urban landscape at night, where towers and lights suggest the idea of a lively, global city that never stops. The juxtaposition of contrasts (ancient and new, global and local in this case) is a well-proven mechanism of communication (Greimas, 1966; Marin, 2009) used here to mean that there is no contradiction in what you are buying: originality is both linked to the past and the future, a comforting reference and an engine to renewal. But the originality that heritage entails is also a way out of globalization. It is thanks to a detectable character that places can be distinguished the ones from another, and they can be identified. The irreplaceable nature of places is often exploited to brand identity against the homogenized visions of the urban environment that characterize global cities. Especially, the idea of originality is manufactured through cut and paste operations that select and rearrange some fragments from the past to inform bespoke narratives (Benjamin, 1983), often resulting into an artificial assemblage of symbols and codes à la carte (Eco, 1987; Žižek, 2009). Usually, they are quick and easy to understand, prosaic and obvious. No website or leaflet fails to recall the glorious past of the site under regeneration and accompanies archive pictures with extensive historic narrations. In London, red phone boxes, the Big Ben and colored housing doors are included inside advertisements to promote the city to Chinese investors. At the scale of the building, elements of originality are also embedded inside pictures and CGIs. Interiors showing exposed bricks, Victorian

fireplaces, steel furniture and industrial-style windows as a reference to Britishness are countless. Brochures insist to explain that "the architecture embodies the historic legacy, the unique heritage, and the best of British design" (Queen's Wharf, London). The most circulated render of Battersea Power Station redevelopment on the South Bank, depicts the building using the same angle that we can observe on the famous album cover *Animals* by Pink Floyd (1977). The dingy, denouncing tones of the album cover are renovated with much brighter nuances, but it is clear that the intention here is to refer to one of the best-known products of British popular culture. In Shanghai, traditional elements used inside visualizations of newly built apartments include old-style wood furniture with a twist, statues of guardian dragons, or Feng Shui elements. Wallpapers are often in tones of blue and white, reminding of ceramic decorations. Other elements are the abundant use of water features and gardens, red lanterns decorating the corners of the houses, water lilies, bamboos and cherry trees moving into the wind, rocks and waterfalls recalling the landscape views painted by the old masters. Expressions like "harmonious picture of life and nature" (Rockbund, Shanghai) refer to the successful integration of the architecture within the landscape, and promotional videos tend to emphasis the presence of wildlife within the redevelopment.

However, behind the reassuring appearance of marketing images, lays a fundamental uncertainty, resulting from the profound cultural, social and physical transformations of the city. This circumstance activates feelings of nostalgia towards a mythical condition of stability, indented as a "moving desire of continuity within a fragmented world" (Bauman, 2017, p. XI). This "instills in many people the idea of needing a tradition [...]. Besieged by the sense of loss and by the current changes, we hold on what remains of stability not to be disoriented" (Lowenthal, 1985, pp. 134, 135). Thus, due to the promises of continuity that it offers, heritage becomes a way to mark the desire of stability. The way the South Small Gate area in Shanghai is advertised offers a good example (Figure 2).

The site, one of the biggest areas to be regenerated as part of the Huangpu Riverbank redevelopment project, is enclosed by walls but presents advertisements of very different kind depending on the area they are facing. On the main road, the busy six lanes Zhongshan S. Rd., renders of the new development are hyperreal and uncanny at the same time, super detailed and saturated, very little atmospheric. Picture is just information, a projection of a shiny reality that matches the international ambition of the riverfront regeneration. On Xundao St., more than 600 m further inside the riverfront, lays a packed popular area edging with the redevelopment site. As many others of the kind it is in danger of being knocked down and people displaced according to an extensive cleansing logic that underwent the city's renovation in the last decade. On this side of the wall another kind of representation applies: here, local artist painted a landscape scene directly on the wall with rocks and waterfalls amongst the mist. The black and white composition clearly recalls the traditional ink paintings that are part of Chinese cultural legacy, and provides feelings of immediate recognition, mixed with comfort and consolation. The bond with nature, is here even more important because provides an indirect reference to the philosophical concept of harmony between humans and environment.

The specific qualities of originality and stability that we attribute to heritage are thus recalled in many ways (iconic images, cultural references, known clichés). It is now necessary to understand what mechanisms make it possible to absorb these concepts within a more articulated framework of meaning, prepared for the spectator, i.e. it is necessary to dwell on the instruments of representation and the semiotic devices that convey meaning.

From meaning creation to the building of fiction

To achieve desirability, marketing strategies often count on symbolic and synthetic images, that have the advantage of being immediately recognizable, and therefore linked of

Fig. 2 *South Small Gate*, 2017, Hoardings in Xundao St., Shanghai, China. Photo by the author.

feeling of comfort and understanding. At the same time, they leave some space to the reader to enter the interpretation, by activating conscious and subconscious mechanisms of recognition and appreciation (Wunenburger, 1997/1999, p. 402). Advertisement materials are usually plenty of references. The better known are references, the easier it will be for the viewer to imagine the product. The idea of activating cross referential relationship thanks to a collection of images was firstly explored by Aby Warburg through his *Atlas Mnemosyne* (1924-1929). For him, the juxtapositions of images encourage a process of interpretations in relation to preexistences able to rebuild a wider cultural meaning (Centanni, 2002). The process activated in this way is understood, in the words of Didi-Huberman (2006), as a technique for creating meaning: starting from what we see, we initiate our interpretation in relation to the references given. Active memory is sup-

ported by intertextuality and hypertextuality which help us to make sense of the dense and complex connections that every image entertains with the ones that have been produced elsewhere or in the past, and their "relationship of allusion, withdrawal, destruction, distance, citation, parody, and conflict" (Latour, 2009, p. 98).

The set of relationships that we recognize among references is called "intertextuality" (Stam et al., 1992/1999, pp. 264, 269) and guides the spectator in his interpretation. Eco (1978), for examples, talks about intertextual frames as the references recalled by the reader in front of a text. Floch (1990), on the other hand, suggests that the activity of signification is based on the assemblage of elements: cultural references promote new meanings based on both personal interpretation shared knowledge. This idea was derived by the bricoleur of Lévi-Strauss (1958/1963) who stated, already in his *Structural Anthropology*, that the very essence of the myth does not inhabit the single elements that inform it, but the "bundles of relations" that link the one to another (Stam, 1992/1999, p. 32). This means that the combination of images in Warburg's Atlas, as much as in Bataille's Documents and Eisenstein's montages, produces an effect on our conscience, an opening of our mind that kicks off interpretation. Real estate brochures span from the inclusion of modern painting inside CGIs, to the use of Impressionist's landscape for the brochure (Chelsea Waterfront, London). They allude to a cultural icon when showing the Pink's Floyd cover of *Animals* (Battersea Power Station, London), and to Tiffany's Jewels when showing Audrey Hepburn photographs, or to the historical city of Rome when showing models wearing Bulgari's jewels inside the interiors of Suhe Creek redevelopment (Shanghai).

Hypertexturality is another technique widely used to promote a sense of recognition through references. In particular, hypertextuality is intended as the relationship existing between one text and a former one that the first text modifies, extends, transforms or elaborates. This happens, for example,

when the new interiors of an apartment adopt a style *à la manière de* and add an element of innovation. Inspiration is a recurrent word: "Versace Palm Print, translated onto the mosaic walls, is inspired by the Greek and Roman myths that are part of the Versace DNA, and will transport you to the Italy of the Renaissance" states the brochure of Aykon (London), while 190 Strand refers to grand feature architecture when talking about a "classically-inspired colonnade runs along the length of 190 Strand towards the River Thames" (190 Strand, London). Similarly, the masterplan and architecture of Royal Wharf is inspired by the classic great estates of London –most famously forged in the Georgian and Victorian eras– which are "generously proportioned and elegantly finished" (Royal Wharf, London). Projects are infused with aesthetics and values coming from history and the choice of materials is heavily based on allusions. "Traditional york-stone paving, granite setts and laybys, and corridors of plane and oak trees convey the message that King's Cross is an integral part of London" states King's Cross Streetwise, while Keybridge refers to "Timeless brick. London is a city of bricks. Regal terrace houses, robust railway arches, elegant mansion blocks and elaborate warehouses share this humble yet seemingly eternal material. Keybridge is a contemporary addition to this long and proud building tradition." Interiors too, contribute to the visual identity of the places: "architecture takes on industrial cool, is ware-house inspired, and full of those traditional details which have been thoughtfully included in these quintessentially British homes" (Queens Wharf, London). Often, recalling craftsmanship helps to validate the authenticity of the details: "this historic site demands the most impeccable standards of design and craftsmanship that bridge contemporary living and past aesthetics" remembers 190 Strand, while for City Island "the innovative use of strong, distinctive and earnest materials, (is) a nod to the area's artisan past."

The idea that meaning can be created from a collection of images suggests that we should once again look more closely at

Fig. 3 *Heritage assemblage*, 2017, Hoardings around a redevelopment site, Shanghai, China. Photo by the author.

the technique of collage as a tool capable of generating fiction. After all, the promotional images we find in real estate brochures are just that: measured associations of references, calculated assemblages that aim to stimulate associations of ideas, references and sensations in the mind of the subject (Figure 3). However, there are some differences, and collage, a technique traditionally capable of constructing meaning through the reworking of fragments, is observed here in its less provocative evolution. In the marketing montage, images become a tension-free accumulation of visual data in the original sense of "gluing together" rather than an artistic practice that includes an element of critique or judgement - hence tension.

Its in the 1920s and 1930s that the practice of (photo)montage surpasses the visual arts to be experimented in the fields

of cultural critique (Benjamin, 1983; Blöch, 1935/1992; Brecht, 1963; Kracauer, 1963/1982), history (Benjamin, 1983) and history of images. This approach, debtor to a big number of artists and directors, was iconological: the heterogeneous archive of information left to us by history, loaded with objects, facts, actions, people, has been used to elaborate an analysis of history, of meanings, and of representation through the montage (Pinotti & Somaini, 2009, p. 29; 2016, p. XVII). The juxtaposition of fragments was a resource (Schlögel, 2011), a way to take a political position though reworked visions. The collages presented by CGIs, however, are far from the provocative attitude that characterized these studies, and from the intent to create further meaning of social and political relevance. The ironic, permissive and curious attitude of post-modern architects, in particular, "evaluated the ambiguity and the plurality of styles, the historic citation and the vernacular, the collective memory, the contamination among traditional and new" (Gurisatti, 2006, p. 422). Compatibility and freedom of expressions allowed them to play with the masks and signs of history, getting a surplus of expressivity and a great communicational effect (*ibidem*). Robert Venturi and Denise Scott Brown (1972), with a specific take on architecture aesthetics, counterpoised to the pure forms the irony of the impure and heterogeneous citations, a rediscovered identity made of localism and plural meanings. British collage, on the other hand, used the eclecticism of references from popular culture as a way to disrupt the common understating of the same elements and to inspire new visions. A great example is the collage titled *Just what is it that makes todays' home so different, so appealing?* part of the exhibition *This is tomorrow*, occurred in 1956 in London. Hamilton, the author of the above-mentioned collage, recycled cut-outs of form the contemporary newspapers showing objects and myths of consumerism within a modern living room. Placing side by side popular symbols with corrosive irony, the intent was to shake society's imaginaries. Later on, in the 1970s, Archigram produced seductive visualization of futuristic worlds whose

components were assembled through the use of different techniques. These images did not want to be descriptive but evocative and inspiring, they portrayed specific architecture devices and associated them with cut-outs of people and writing from the magazines. They drew non-consequential relations and asked the viewer to elaborate on the fantasy. Equally, other architects who were producing more operative architectural drawings in the same years, employed similar techniques. The Smithsons, for examples, made large use of collage associated with hand drawing when designing Robin Hood Gardens. The intent was to highlight selected pieces of architecture (the streets in the sky, the common garden) and to promote their social function.

The eclecticism of marketing collage, on the other hand, is only superficial, a matter of aesthetic. The representation of the city is reduced to a game of signs, which generates from the allegoric intention of its promoters: the *mise en scène* of an aura, charged in historic significance is, at heart, pure fiction. "The layout's potential for personalization is inspired by the Georgian penchant for decorating a space with a collection of art or artefacts" recites Royal Wharf's brochure, alluding to the richness of references coming from the assemblage of distant pieces of furniture. The representation related to architecture "becomes an accumulation of visual data, each fragment adapted and contextualized by editing of imagination" (Brown, 2013, p. 127). The final images, despite their evocative intent, end up being aesthetic taxonomies of the west (Eco, 1987), collections with no further meaning besides accumulation: the furniture, the pictures on the walls, the materials, the atmospheres. Objects are grasped on their more obvious and worn-out side, while fashion covers the surface with atmospheric marvels. This historic depletion anticipates also a nervous exhaustion: the reconstruction of a desirable world made of fragments is just a fetish to made us think that we found a solution through the dream (Bianchetti, 2011). Its exactness is not only a technical matter but transfers its qualities to the places it depicts, it inhabits

the place and reflects on who lives there (Ferrari, 2012). Differently from the cut-outs of British collage and post-modern architecture that concealed further meaning inside the images, virtual montages want to render everything explicit. While the first ones "played with the signs of city and history to obtain an imaginative and amusing result, bizarre and captivating, humoristic" (Gurisatti, 2006, p. 424), the second ones are extremely serious, because their truthfulness is a proof of value for the investment. The juxtaposition does not produce "constellations of citations charged in expressive tension" (Gurisatti, 2006, p. 425) but simple fiction, which by nature downplays every contrast, moderates any tension. The result is an absolute flatness of meanings behind the colorful surface. Nevertheless, Warburg's hypothesis "that the work of art is a significant symptom and source for a wider cultural reconstruction" (Centanni, 2002, p. VIII) is still valid: marketing collages invent perfect worlds which lean against history but are fueled by economy. It is exactly because economy needs to extract value from the newly created realities, that the specific qualities of heritage are targeted: they represent a resourceful expedient to increase and stabilize both the symbolic and economic significance of place.

CONCLUSIONS

The observation of representative regeneration projects in London and Shanghai showed that heritage is a very flexible concept, able to adapt to the need of city-marketing. The comparison of Western and Eastern spatial production models, coupled with the centrality of heritage in real estate projects, underlines the importance of this topic at the national and international level. In particular, its aesthetization is observed worldwide: with globalization, when architectural language tends to align to global aesthetics, a renewed need arises to promote sensations, emotions and visual stimuli. In this sense, the reassuring qualities attributed to

heritage are often used to pacify possible conflicts over land regeneration and offer a comforting immediate experience of the past. Through affection, feelings are transmitted immediately, and the atmosphere, more than the accessibility and functioning of space, determines the acceptance of the intervention, and the propensity of people to see its benefits. Heritage is thus exploited as a symbol that can be easily taken out of context to make sense of a new reality. The images try to hold this tension together: the reassuring outlook of heritage is built on its perpetual availability as a testimonial meaning made accessible through representation.

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WHEN A PICTURE IS WORTH A THOUSAND WORDS

USING IMAGE-BASED RESEARCH METHODS IN VULNERABLE POPULATIONS AS A CULTURALLY SENSITIVE APPROACH

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IMAGE-BASED RESEARCH
VULNERABLE POPULATION
MIXED-METHODS
PARTICIPATORY RESEARCH

Image-based approaches –visual story-telling, photo-elicitation method, photo-walking, visual auto-ethnography– have been utilized as a novel exploratory tool in psychology and social science for examining visual identities, life histories, and other collective elements of local cultures. Visual and image-based methodologies held significant promise for building bottom-up participatory research designs for inquiries, particularly on vulnerable or disadvantaged individuals and groups. However, due to methodological difficulties, image-based research has maintained a restricted standing within the 'traditional' word-based oriented landscape of qualitative paradigms. The terrain addressed by the current paper includes various applications of image-based techniques as applied in vulnerable groups, as determined by some examples of recent literature. The key findings indicated an original galaxy of empirically based methodologies that may be utilized to incorporate more 'traditional' quantitative, qualitative, and mixed-method designs. Finally, implications from the practical application of this methodological design were discussed, notably in terms of decolonization of research techniques and ethical issues to guide practitioners' research in challenging circumstances and vulnerable people.

INTRODUCTION

Image-based techniques have long been acknowledged in psychology as an exploratory tool for assessing visual identities, life histories, and other collective artifacts arising from local cultures (Reavey & Brown, 2021; Prosser & Schwartz, 1998). Visual storytelling, photo-elicitation, photo-walking, visual auto-ethnography, and other approaches that employ visual elements as a stimulus for participants have been used in social science fields such as sociology, education, political science, and anthropology for decades. The concept that visual may record lived experiences as they emerge as part of our greater human ecology can be traced back to the theoretical stance for employing pictures as data of knowledge (Brown & Reavey, 2015). As researchers, we must combine image-based research methodologies into more traditional 'orthodox' quantitative –e.g., survey, test, questionnaire– and qualitative –e.g., interviews, focus groups– inquiry procedures in response to social upheaval and the learning of new languages. The photograph, according to Collier (1957), may change life into "new, objective, and striking dimensions, and can encourage the informant to discuss the world around him as though viewing it for the first time, independent of personal experience with the materials" (p. 859). Furthermore, the use of images in research has a scientific justification: the regions of the brain that process visual information are evolutionarily older than those that handle verbal information (Harper, 2002). Consequently "images evoke deeper elements of human consciousness that do words; exchanges based on words alone utilize less of the brain's capacity than do exchanges in which the brain is processing images as well as words" (p. 13). In this way, visual approaches enrich data by uncovering extra levels of meaning, giving legitimacy and depth to the process of knowledge creation (Glaw et al., 2017).

The present paper reflects on using image-based research methods as a basis for considering various methodological challenges and strategies associated with conducting visual

research as a culturally sensitive approach, especially with vulnerable populations and children. Even though the highly participatory and practical nature of visual methods appears to indicate their use with young children in child-centered research designs, it is important to test the assumption that visual methods are a natural or best method for engaging young children with the research process (Christensen & James, 2008). In the first part, using literature review devoted to image-based study, it will be discussed that the method is thought to have four specific features:

a. visual materials provide the stimuli for 'deep' interviews;
b. the method favors the inclusion of different types of information within other social science techniques;
c. it addresses the topic of power relations between researcher and subject;
d. it promotes bottom-up participatory approaches to research.

The second part of the paper, which builds on the literature on visual approaches, argues that image-based research methods have a lot of potential in the psychological sector. Such strategies, especially when working with vulnerable persons and children, may increase target population involvement by taking a more culturally sensitive approach based on bottom-up participatory approaches. Finally, the practical implications of this methodological design were discussed, notably in terms of decolonization of research techniques and ethical considerations to guide practitioners' research in difficult circumstances and vulnerable populations.

IMAGE-BASED RESEARCH: A BRIEF REVIEW OF METHODS

For a long time, images have marked numerous sociological and ethnographic study pieces. Over the last twenty-five years, visual research in the social sciences has increased substantially, with an increasing emphasis on the relevance of culture and cultural practices in defining the sense of

human experience (Pink, 2007; Prosser, 2006). Psychology has largely restricted the use of pictures with youngsters and other target populations that are less 'able' to express their ideas and feelings (Reavey, 2012). In this respect, the 'visual' status has frequently been considered as a more naive or unsophisticated method of communication, an alternative to more complex expressive modalities – e.g., language or quantitative evaluation.

The photo-elicitation method developed by Collier (1957) is one of the earliest known attempts to employ images in the context of social science research. It is used in the anthropological discipline. The photo-elicitation approach may be defined as the use of visual stimuli –e.g., photographs, paintings, drawings, or other visual materials– during face-to-face interviews to elicit responses. The primary motivations for adopting such materials in a research context were:

a. producing more detailed replies;
b. expanding the conversation;
c. encouraging spontaneous emerging ideas.

Photo elicitation validated the pictures' polysemic characteristics, putting them at the forefront of a study agenda (Harper, 2002).

The photolanguage approach was a methodology for employing images in psychological research that was similar to the photo-elicitation method (Bessell et al., 2007). Photolanguage is a type of communication intended to allow personal expression and engagement in small groups (Burton & Cooney, 1986). The approach employs black-and-white photographs chosen by the researcher to elicit group reflections and activate memory, emotions, and prior experiences. In the realm of counseling and therapy, photo language methods were widely employed (Caputo et al., 2020; Freire, 1970; Musetti de Schelotto et al., 2012; Rogers, 1986).

The photovoice technique (Wang & Burris, 1997) is a type of visual media photography in which participants take on the role of researcher, generating and interpreting photos with the goal of exposing deeper understandings of their

values and views (Beazley, 2008). Although the concepts of photolanguage and photovoice may overlap, there are substantial distinctions, with the former employing pre-selected shots and the latter placing cameras to the hands of participants and treating them as recorders (Lopez et al., 2005). According to Ruby (1991), photovoice offers the opportunity to perceive the world from the viewpoint of the people "who lead lives that are different from those traditionally in control of the means for imaging the world" (p. 50). In addition, the technique requires a deep engagement of participants, particularly those from marginalized and vulnerable sectors of society (Wang & Burris, 1994).

Another intriguing form of image-based research approach is auto-photography. The practice, also known as self-directed photography (Johnsen et al., 2008), began with Ziller's work (1990) with a group of Navajo Indians who were asked to shoot photographs depicting how they regarded themselves. In reality, during auto-photography, participants photograph their surroundings, "choosing pictures and representations of themselves" (Noland, 2006, p. 2) in an attempt to perceive the world through the eyes of someone else. Interestingly, Thomas (2009) noted that when participants take a photograph as part of a study process, they tend to make deliberate selections about how they wish to portray themselves in the visual situations.

To conclude this brief and insufficiently conclusive review of image-based methods in the field of social science, it should be noted that the increasing use of such data collection methods stems from the realization that more traditional methods –e.g., interviews and questionnaires– create frames within which knowledge is already structured (Walker, 1993). On the contrary, bottom-up methodologies avoid influencing the form and content of participants' narratives in ways that might potentially improve the quality and depth of data obtained. In relation to research with children, their perception and experience of the world, as well as their communication styles, differ from those of adults,

demanding a distinct approach (Thomas & O'Kane 1998). Visual techniques enrich data by recognizing and breaking down power and status imbalances between the researcher and the participant. Adults may assist younger children establish this relationship by boosting rapport building, allowing expression of emotions and tacit knowledge –the unsaid and unexpressed– and fostering contemplation (Pain, 2012). According to Goldman-Segall (2014), there is the need to build a culture for shared collaborative authorship and dispersed co-construction of meaning.

IMAGE-BASED METHODS AS A CULTURALLY SENSITIVE APPROACH WITH CHILDREN AND VULNERABLE POPULATIONS

As societies change, research techniques in psychology must focus on the power imbalance that is characteristic of inquiry and the researcher-participant dynamics. Social science is vulnerable to the active involvement of the observer in making sense of experience, as well as processes of human interpretation and meaning-creation (Miller, 2004). According to this viewpoint, image-based methodologies provided methodological options for increasing the cultural sensitivity of the research process, strengthening understanding of the issue under consideration, and ensuring the ecological validity of conclusions. Because of the possibility to employ bottom-up and participatory methodologies, the use of images as a source of data looked to be especially important with research on vulnerable groups. This part of the article concludes with some examples of image-based strategies used with vulnerable groups and children. For instance, distinct research contexts will be presented: rural populations in South Africa and youngsters living in both community settings and low-warfare situations. Mitchell and De Lange (2011) undertook a participatory intervention called *Izindaba Yethu-Our Stories* in a rural

community in KwaZulu-Natal, South Africa. The project's goal was to create awareness about some community social challenges and to engage communities in seeking solutions to real problems. The interactive approach began with a one-day video-making class and proceeded over many months with follow-up viewings, small group talks, and community screenings. Finally, the composite video was shown to a larger audience for watching and participation in the rural community. Nonetheless, given the South African context, it is worthwhile to notice the work titled *What can a woman do with a camera? Turning the female gaze on poverty and HIV and AIDS in rural South Africa* (Moletsane et al., 2009). The study provided the chance to create a three minute movie realized by women and including instructors, learners, community healthcare workers, and parents within the framework of feminist visual culture and the notion of the female gaze.

Benninger and Savahl (2016) did an intriguing study in Cape Town –South Africa– on how children organise and attribute meaning to the notion of 'self'. The authors employed a participative strategy based on photovoice and community maps with youngsters aged 9 to 12 in this example. The findings revealed that feelings of safety, social connection, and children's spaces were important in how participants built and attributed meaning to the 'self'.

The number of research in the setting of low-intensity warfare –particularly with children– was quite limited, possibly due to both ethical concerns and the difficult circumstances that characterize the field. Despite the limited presence of studies with children living in war contexts or low-intensity conflict areas, more recently several works that have used visual material to elicit young children's responses can be found in the literature. Childhood researchers are increasingly arguing for a shift from research on children to research with children – study that seeks and values children's experiences and understandings (Mayall, 2008). Recognizing the importance of study with children in childhood research has resulted in a surge of interest in child-centered research paradigms that

prioritize children's perspectives and experiences. Kanji (2009) conducted an intriguing study with Afghan refugee children on how they characterize their day-to-day lives in the aftermath of conflict. The author employed hermeneutic photography to obtain data from photographs of the children's choosing. Finally, a conversational technique was employed to explore the images and discover emergent themes. Cavazzoni (2020) performed the second example of image-based research with children living in a conflict setting with Palestinian youngsters living in refugee camps. The approaches used in this case were mostly centered on the use of drawings, maps, and photo walking with youngsters to explore their feeling of agency.

Another recent work was conducted by Shaw (2020) with children from three different schools in the United Kingdom on the topic of defining inclusion directly from children voices. The research involved several children aged four to five years: 40 of them using photo-elicitation and 16 employing photo-voice. The results demonstrate that younger children are capable of expressing their comprehension and experience of their life; they simply communicate differently than adults. They show how visual methodologies can allow children to express emotions; provide the researcher with tacit knowledge – via relationship and rapport building during the six-week data collection period; and encourage them to reflect on images and responses through gentle questioning.

DISCUSSION AND FURTHER REFLECTIONS

Images, photos, drawings, paintings, videos, and other pictographic materials are powerful forms of communication that hold significant pieces of our personal experiences: people we have loved and lost, happy and sad memories, fragments of shared history, but also emotions, representations, and other cognitive processes. Adoption of image-based research methodologies seemed especially relevant at a time when our societies looked to be heading toward the so-called 'realm of

visual' (Freitag, 2002). Lee (2016) stated that modern societies are characterized by a ravenous demand for documenting the visual, with 1.5 trillion images expected to be taken in 2020. The visual environment evolved into a "place where seeing and knowing may be challenged, improved, and re-worked. As new media have been added to the realm, new possibilities for interactions, cross-influences, and additional participants have opened up" (p. 366).

Image-based research may be placed within the framework of multi-modal communication (Higham & Hebets, 2013), a viewpoint that includes many sorts of psychological activities, environmental settings, and cultural artifacts. Multi-modality, from a methodological standpoint, provides the chance to appreciate the intricate interplay between multiple sources of meaning-making that are part of our human experience. Adopting a multi-modal approach entails incorporating visual resources –pictures, drawings, painting, etc.– into more traditional research methodologies in order to investigate psychological elements and the process of meaning-making in relation to events and the locations in which it arises. Some final thoughts about research ethics and methodological issues should be considered at the end of this brief and inconclusive excursus on the image-based research approach. First, as Bird Rose (2008) stated, research ethics, particularly anonymity, are fundamental in visual approaches, as reflexivity is a key aspect of image-based methods. Working with visual approaches, data analysis was about exploring the link between the visual and the social and cultural settings of knowledge creation rather than turning "visual evidence" into "verbal knowledge" (Pink, 2001, p. 96). Second, methodologically, age-based research methodologies have remained underutilized in the 'traditional' qualitative and quantitative communities. Silverman emphasized in 1993 that the use of pictures involves difficult theoretical and methodological concerns. Some of the concerns remained unaddressed after 30 years. However, the incorporation of the image-based method in a more traditional qualitative

or quantitative process should be encouraged because it can provide an opportunity to shift from participant narratives to how participants reproduced their knowledge, particularly in research processes based on participatory culturally sensitive bottom-up approaches involving vulnerable populations. Finally, image-based approaches were used to solve the issue of particular local characteristics (Culturally Sensitive Approaches; Hwgan, 2009). This is done to prevent, as far as possible, the risk of utilizing rules of behavior and intervention forced from on high, with the unavoidable result of prescribing forms of power exercise, more or less conscious, in terms of hierarchical cultural imposition. According to Clemente and Higgins (2010), it is not so much –or only– a matter of selecting methods of inquiry that are compatible and applicable to a specific cultural context, but of reflecting on the issue that such methods "must be designed in order to de-colonize the system of power and control in favor of knowledge production" (p. 188).

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DIGITAL VIDEO EFFECT. THE FOUNDATION OF THE VISUAL IMAGINARY IN ITALIAN TELEVISION IN THE 1980s

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ESSAY 107/06

TV SHOW
ELECTRONIC IMAGE
DIGITAL ARCHAEOLOGY
ITALIAN TELEVISION
PAINTBOX

The article presents some reflections on the status of Italian television in the 1980s, a key period related to the transition from analog to digital images. A period marked by events, broadcasts, personalities and technologies that were at the beginning of the diffusion of computers that took place in Italy also thanks to the contribution of public and private television.

The way and the timing of this transition have been analyzed considering some fundamental steps that the progress of information technology made in the 1980s also in television studios.

While it is true that the introduction of graphic workstations radically expanded the graphic possibilities of the directors of TV, it is also true that 'traditional' visual art has made an important contribution to the esthetics and content of Italian television since the first television broadcasts. In this context, there are not many studies that have investigated the function of television in highlighting the role of information technologies in the construction of a new visual imaginary.

To begin this analysis, we have analyzed, on the one hand, the programs, including radio programs, in which the electronic/digital language has interacted with that of television, and, on the other hand, some incursions on television programming by personalities already known for having explored experimental forms of hybridization between TV, art and computer.

PITTRONICA

Pittronica is the title of a television program created by Massimo Mida and Sandro di Paola for RAI's Center for Research and Experimental Programs in Turin.

It was broadcast in prime time on RAI3 in February 1985. The aim was to show the combinatorial graphic capabilities of a graphic workstation assembled by the RAI Technical Laboratory, equipped with an input tablet and an electronic pen that could be used to draw colored graphic elements on the screen.

The experiment was not particularly successful, since the two artists brought in to test the workstation, the sculptor Emilio Greco and the painter Bruno Caruso, did not fully exploit its potential, reducing it to an instrument capable of faithfully replicating their authorial trait, highlighting only some procedural peculiarities. The program, which focused on their artistic careers, eventually trivialized the use of the computer. In retrospect, therefore, the ways and times that marked the transition from analog to digital television should be reviewed in light of the fundamental steps that the progress of computer technology made in the 1980s.

If information technology already promised to revolutionize all operational practices, the full digital conversion of traditional media would have required a long and arduous process of transitioning the entire television sector to new technological standards. While it is clear that the 'traditional' visual arts have made a strong contribution to the esthetics and content of Italian television since the first television broadcasts and are at the origin of a "technological visuality" (Mari, 2016), there are not many studies that have explored the function of TV to highlight the role of computer technologies in the construction of a new visual imaginary. The article is therefore proposed as a first reflection on the events, shows, television personalities and technologies that are the origin of the diffusion of computing in the Italian TV. Among the proposed case studies, we will analyze

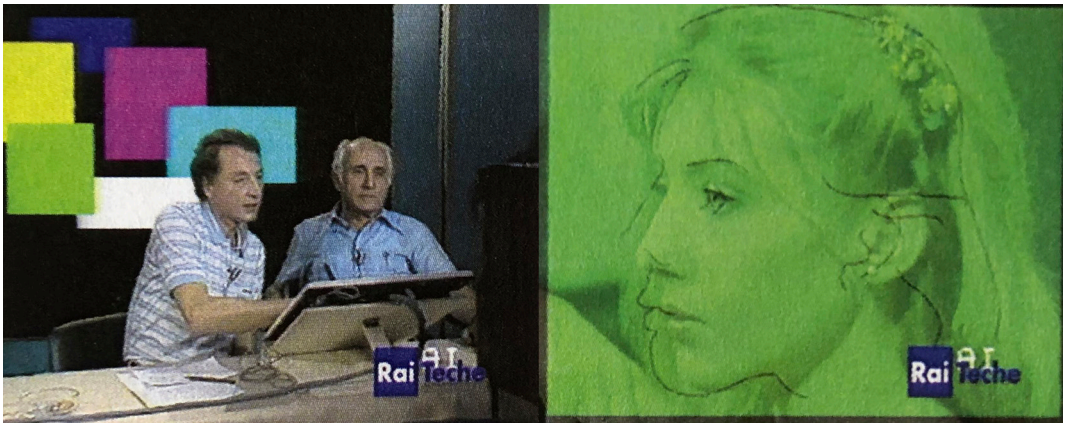

Fig. 1 Frames from the television program *Pittronica* (1985). On the left, Emilio Greco and Bruno Caruso at work with the Tesak workstation. On the right, the rotoscope of a woman's face.

some significant incursions into television programming by personalities already known for having explored experimental forms of hybridization between TV, art and computers, as well as programs and broadcasts, also on radio, in which the electronic/digital language has interacted with that of television.

THE BEGINNING OF DVE

On December 26, 1982, *Time* magazine named the computer Machine of the Year. The Machine of the Year (as defined by the magazine) is unique in the history of the weekly magazine. *Time*'s choice is due to the great success that the PC had during that time, making it an affordable item for many.

The early 80s were an epochal moment for the industry. Companies such as Microsoft, Apple and IBM were founded during this time and gained a competitive advantage that other companies in the industry never had before. Although the personal computer had just come on the market, that is, a home computer that was now available to a large part of the population, it was considered a typewriter that could speed up and repeat certain operations indefinitely, *Time* magazine

decided to dedicate its cover to it because it saw in this device the medium that would accompany humanity in the future. The model on the cover was representative of the time: the IBM 5150, a computer that sold more than 200,000 units in the first twelve months after its launch in September 1981 and that prompted competitors to adapt to the standard and develop IBM compatible personal computers.

In the same period, at least two technological innovations will profoundly change television broadcasting in Italy and in the world. First, the introduction of color transmissions and, second, the simultaneous development of electronic instruments, the precursors of today's graphic workstations, which, through the introduction of Digital Video Effect (DVE) devices, opened the way to the possibilities of so-called videography (Lagonigro, 2018).

Before the introduction of hardware and software systems for the digital manipulation of television images, the technical device that allowed modest possibilities of graphic deformation was the Squeezoom. In Italy, one of the pioneers of this device was Valerio Lazarov. The Romanian director, naturalized as a Spaniard, after a first television experience at RAI, was able to establish himself in Italian private television with Fininvest by Silvio Berlusconi. He was, in fact, the first in Italy to make extensive use of electronic techniques to manipulate television images. Squeezoom, installed in the editing room, was an image processor manufactured by the American company Vital that made it possible to alter a live television image by geometric transformation or multiplication. When Squeezoom was combined with another of the most widely used effects at the time, Chromakey, the result was a kaleidoscope of human figures and psychedelic geometric patterns. The processor, which cost 300 million Italian lire, reached its peak in the hands of Lazarov and shaped the television esthetic of the time, filling television magazines, especially music magazines, with enlargements, split screens, and mirror effects that made it possible, among other things,

to compose entire choreographies with a single dancer who could be infinitely multiplied.

Among the hardware tools that will shape an entire decade is certainly the Paintbox. Launched in 1981, the Quantel Paintbox was a graphic workstation for creating videos and images for television shows. From its first use, the

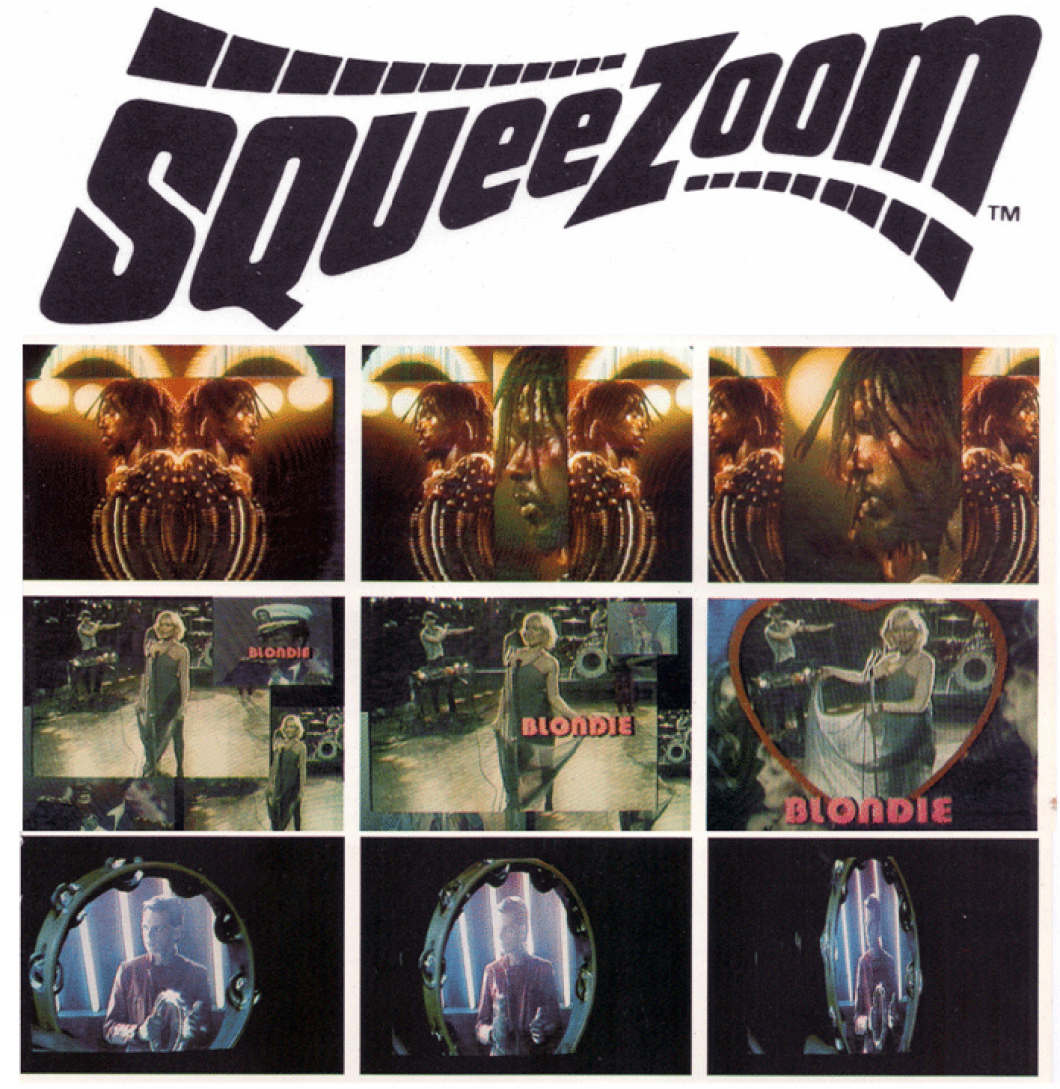

Fig. 2 Vital advertisement illustrating the wonders of the Squeezoom (1980)

Paintbox forever changed the production of TV graphics and, with its effects, shaped the entire TV and video production of the 80s and 90s, especially with regard to the editing of music videos and TV opening titles, introducing, through dedicated hardware, a series of effects and digital filters that allowed both two-dimensional and pseudo three-dimensional manipulations.

The Quantel Paintbox was a broadcast-quality, 24-bit, true-color graphics computer that allowed operators to navigate and click simple menu boxes using the first pressure-sensitive pen and a drawing tablet.

Operators worked directly with an electronic pen on a graphics tablet and checked work progress on the television screen and on a graphical interface with which they could interact directly with the pen.

The Quantum device that came to market after the Paintbox was the Mirage in 1982. It was the first processor capable of manipulating images in 3D space and applying morphing effects based on a 'particle system' to map pixels of one image to pixels of the second image.

The next step came in 1986 with the release of the Harry Model, the world's first non-linear editor that combined the manipulation capabilities of a graphics workstation with the ability to edit images and video directly on a timeline.

As evidence of the importance Paintbox had on the esthetics of television in the early 1980s, here is an excerpt from an interview with Italian graphic designer and artist Mario Sasso, who created the title sequence for the television program Grandi Mostre in 1980, which reveals in part the artist's relationship to multimedia and computer graphics in terms of art communication as well:

> The title sequence for Grandi Mostre was one of those interesting experiences where the artistic quote was flanked by the exploration of the languages of computer graphics. I took a lot of samples, so I made a 20-minute video that was shown at the Venice Biennale "Art and Science". An anecdote: I wanted to leave in the sequence,

> which was actually a video with the whole process of animation of painting, the interface of Paintbox articulated in the progression: the pixel that went to paint, the palette where you drew the color, the menu of colors. When the editors of the program saw this, they were a little perplexed: "This is how you reveal the cards," they said. To me, on the other hand, it seemed like the right choice for an art column: When you interview an artist, you do not cut out his brushes, his paints, his palette.(Bolla & Cardini, 1995, p. 313).

TV critic Omar Calabrese, on the other hand, sees in it an instrument that allows to influence the communicative system of television and to bring it closer to the artistic practices of the *avant-garde*. In fact, he affirms that

Fig. 3 Mario Sasso, frame from opening title Grandi Mostre, RAI (1986).

> the whole television pagination, carried out with the paintbox, is nothing other than a graphic pagination that goes back to Mondrian and transforms the screen from a window to the world, from which the depth of the scene is revealed, into a simple surface, a sheet of paper. The television screen retains a concreteness because you can see the characters, the people, the information and everything else, but at the same time it works on the surface as if it were an avant-garde work. (Bolla & Cardini, 1995, p. 307)

In 1986, when the painter David Hockney was invited by the BBC to participate in a television series entitled Painting with Light, which was intended to demonstrate the possibilities of this innovative graphic system, he pointed out, after eight hours of painting at a stretch, that the Paintbox produced 'honest' images, since the electronic medium in which the artist worked was the same medium through which the viewer experienced his work.

His remarks begin with these words

> That little cross represents the point I'm actually drawing on a just a blank board, and it leaves no marks behind so what you actually seeing is the original. There's no one piece of paper left you're not drawing on a piece of paper, you're drawing actually directly on this TV screen where you're seeing it now, in a way there is no distance between you and the mark being made, actually this is the mark being made on the screen and it doesn't exist in any other form. ("Painting with Lights", BBC2 documentary series)

As mentioned in the introduction, in the early 1980s, the RAI Research Center in Italy, in collaboration with the Italian company TESAK, developed a workstation called EGP 414, which consisted of a computer and a graphics tablet connected to a video recorder, very similar to the Quantel system. The EGP 414 was therefore the system presented in the TV program *Pittronica*, and it was also used for some experiments between analog and digital by 'traditional' artists such as Mario Ceroli or Marco Giacomelli (well-known

book Camerino), but it achieved very different results, for example in some title sequences by Luciano Longo and Mario Convertino (Bordini & Gallo, 2018).

Since the beginnings of Italian public television, opening credits have represented an interesting field of experimentation for the moving image and a particular place of confrontation between graphic design and technological medium (Mari, 2016). There have been rare occasions when entire series of television programs have been dedicated

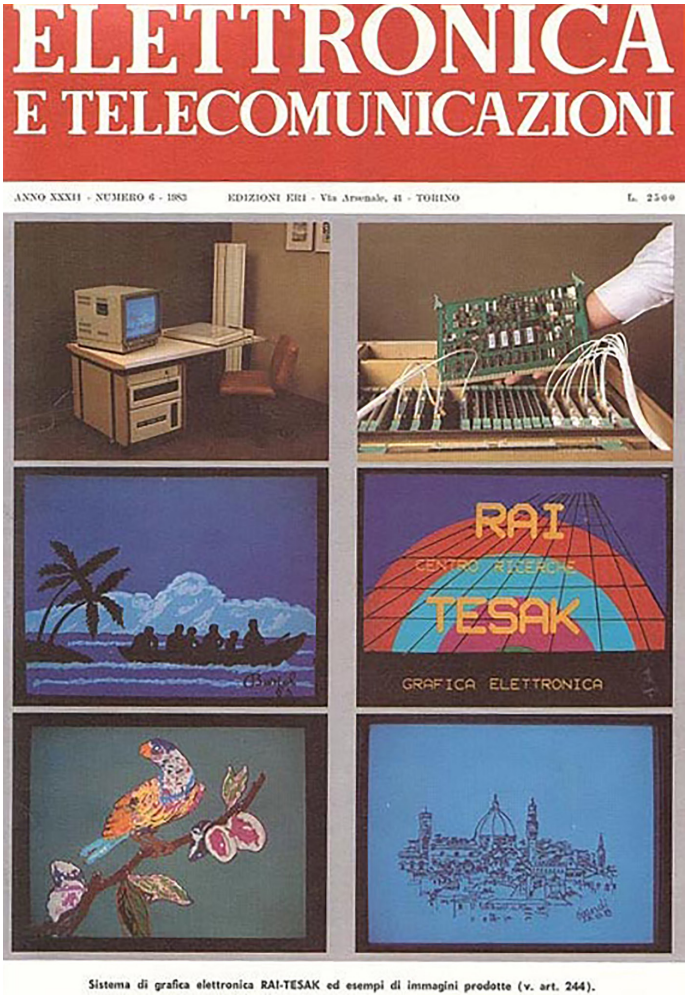

Fig. 4 Cover of the *Elettronica e Telecomunicazioni* magazine, published by RAI, dedicated to the Tesak workstation (1983).

to the promotion of an electronic visual culture capable of proclaiming the amazing possibilities opened up by the computer tools applied to television graphics.

In the context of the Italian TV in the 80s, we remember television programs conceived and broadcast with the intention of popularizing the use of technologies and computer science, among others, besides the already mentioned *Pittronica* (1985): *Radiotext* (1984), *Bit, storie di computer* (1984); *Chip* (1984); *Non necessariamente* (1986); *Immagina* (1987). These programs, although in different ways, pursued the goal of informing the television audience about the computational and graphic potential of personal computers.

In the beginning, however, it was Antonio Grasselli, professor of the newborn computer science course at the University of Pisa, who gave the introductory course in data processing. This was one of the courses of *Telescolastica*, born from an agreement between RAI and the Ministry of Education. *Telescolastica* was a section that included all the school and educational programs broadcast by RAI as part of the general program for culture TV and school integration. *Telescolastica* was transformed a few years later into the *Dipartimento Scuola Educazione*, created by Law No. 103 of April 14, 1975, and then renamed *Videosapere* (from 1995 to 1997), then RAI Educational (from 1997 to 2014) and finally *RAI Cultura*. The *Dipartimento Scuola Educazione*, as well as its successors, was a structure of RAI that dealt with cultural and educational activities, carrying out cultural and educational programs. An excerpt from the 1971 RAI Board of Directors report states

> The agreement signed in June between the Ministry of Education and RAI laid the foundation for a new approach aimed at offering new didactic models beyond the traditional teaching formula and the rigid division of subjects. Last year, the *Sapere* pillar, the heart of the adult education programs, underscored an orientation aimed at giving each program a precise qualification

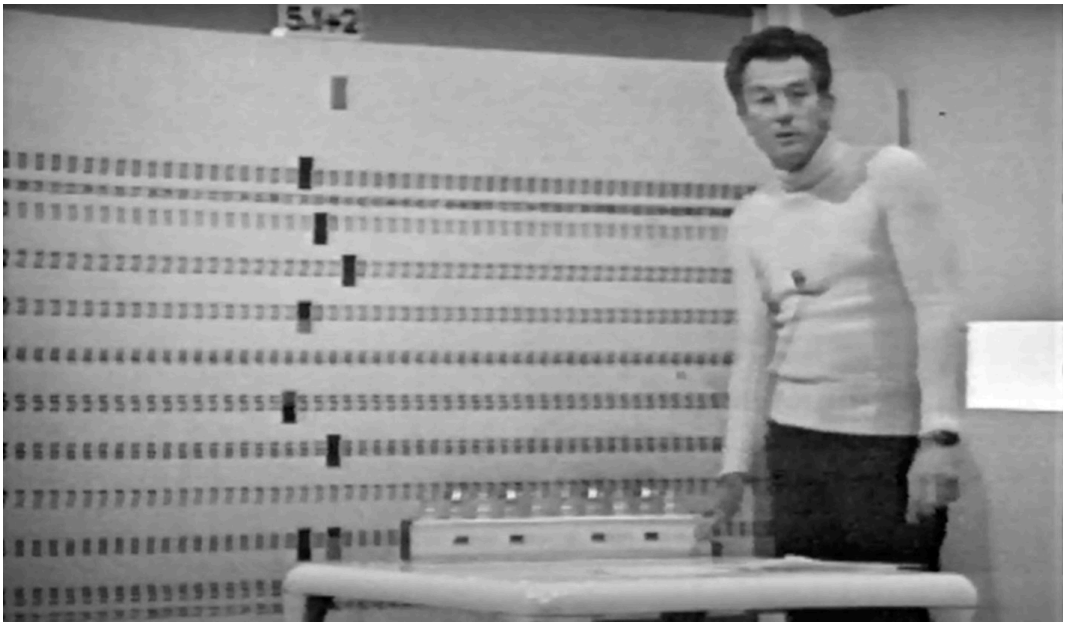

Fig. 5 Frame from the television didactic program *L'Informatica* with prof. Grasselli (1971).

> that balances the requirements of cultural dissemination and critical engagement. The program is divided into three areas: popular topics (to mention just a few titles: *L'Informatica and Storia del nazionalismo europeo*), centers of cultural interest (*La Bibbia oggi, Il minore e la legge, La società post-industriale*), monographs (on topics of current or potential importance to the public). (RAI, 1971)

***Radiotext* (1984)**

Just like the computer courses that Prof. Grasselli taught on TV with the precise intention of teaching, but without any ambition to intervene directly in the visual imagination of the audience, *Radiotext* was born with the specific intention of spreading, or rather transmitting, software over the radio throughout Italy. Eight episodes were broadcast on RAI RadioTre between May and June 1984.

Radiotext thus consisted of two parts: a traditional part, in which radio speakers commented on the main theme of the episode, also with the help of external interviews,

and an innovative part, in which impulses were broadcast. These impulses encoded the different programs one after the other for different types of computers, so that the user could record the programs he was interested in on audio cassette and then load them on the home computer.

The computers to be used were the most popular of the time in Italy: the Sinclair ZX Spectrum, the Olivetti M-10 and the Commodore 64. The offer was primarily aimed at students, teachers and professionals, who had the possibility to use free software for the creation of databases, the creation of musical scores or the definition of tourist routes. It is worth noting the program of the second episode, entitled: Graphic Computers and Bit Comics, in which, in addition to interviews with Bob Noorda, Giorgio Soavi and Milton Glazer, 10 minutes of analog signals were broadcast, dedicated to the creation of a database for collecting magazines, characters and authors of comics, as well as demo software for drawing with the computer (Pachetti, 2014).

***Chip* (1984)**

In an attempt to bring the world of computer science closer to the general public, in 1984 an evening news program was produced entitled *Chip, ovvero quando il piccolo è... grande*! A program that was divided into two different sections. The first part was purely informative and consisted of interviews or external services, the second part had a more playful character and consisted of a quiz in the studio, led by two presenters flanked by a robot called Topo, made by Androbot Inc. by Nolan Bushnell. One of the two presenters, and curator of the program along with Giancarlo Monterisi, was Stefano Gentiloni, who said in an interview with Radiocorriere TV about the program

> Our goal is to explain what computer science, telematics and microelectronic technology is; what electronic processors, satellites, optical fibers and databases are and how they can be used, because this is the emerging world that is changing social and economic relations. Just

Fig. 6 Frame from the closing title of the television show Chip (1984). https://vimeo.com/206463037 last accessed 6/6/2021.

think of the introduction of intelligent robots in factories or computers in offices. (Rossi, 1984, p. 30)

To close the show, the possibilities of computer graphics were explored with a closing title performed by the couple Franco Battiato and Giusto Pio, who performed a song entitled Automotion in a video clip populated by numerous distortion effects and characterized by superimpositions thanks to the use of keying effects.

***Bit, storie di computer* (1984)**

Bit, storie di computer, on the other hand, was the first television program devoted entirely to the scientific popularization of computer technologies on private television. It aired on Italia 1 in 1984 and was hosted by writer, director and actor Luciano De Crescenzo.

De Crescenzo, graduated in hydraulic engineering, studied electronics as an autodidact and was employed for 18 years at IBM before devoting himself to his passion as a popular writer. Precisely because of his double vocation, he directed this program with the aim of teaching pills of

computer science and its various applications: from video games to researches in archeology, medicine, sports, music.

The television critic Ugo Buzzolan wrote in the pages of the national newspaper *La Stampa*:

> the episode I saw the day before yesterday, between 12 and 1 p.m., was pleasant in a friendly, almost varied dimension, and at the same time contained a topical information: the computer with which cartoons are packaged, the missile war […] maneuvered with computers, and maps drawn with the decisive help of the computer, and the personal computer for the use of the young woman who enters the telephone addresses of her heart. So this is a first – and, it seems to me, valid– sign of competition from the networks. Others may come in the near future. RAI keeps Piero Angela close, but at the same time thinks concretely about the development of a sector like this scientific sector, which affects us all directly and daily, in the three networks. (Buzzolan, 1984, p. 23)

Buzzolan attests it a great popularity and, at the same time, criticizes the Italian public television, encouraging it to engage in a field that, in his opinion, is neglected in favor of the history of the past of our civilization.

***Non necessariamente* (1986)**

The program *Non necessariamente*, broadcast in eleven episodes starting at 10 p.m. on RAI1, was defined by the presenter Carlo Massarini (Massarini was one of the creators of Mister Fantasy, a program on RAI1 TV, dedicated for the first time in Italy to video art and music videos) as a techno-variety program based mainly on the manipulative possibilities of the electronic image. Manipulative possibilities explored during the program by, among others, the artist collective *Giovanotti Mondani Meccanici* (GMM), which combined analog and digital technologies and reworked live action images using a graphics tablet and graphic manipulation software, to create *Le Avventure di Marionetti*, or the adventures of a character who, as the pun in the name suggests (in Italian,

Fig. 7 Frames taken from an episode of the television program *Non Necessariamente* (1986). https://www.youtube.com/watch?v=Po4M2WdlGvQ last accessed 6/6/2021.

marionette translates as puppet, while Filippo Marinetti was a futurist writer), hovered between comic situations and futuristic environments. As for the techniques used, we reproduce here the comment of Antonio Glessi (one of the founders of GMM) on one of his videos on his YouTube channel, in response to a user's question about what technique was used:

> There is no clear definition because it was a unique work of its kind. It was a mix of early digital technologies and basic analog techniques. Call it a digital flipbook of digitized and then digitally retouched black and white images. It was all done on an Apple 2 in 1985 and aired on an experimental TV program. The production was very inexpensive for the time, but too tricky and limited to become a standard. Only two years later, the digital

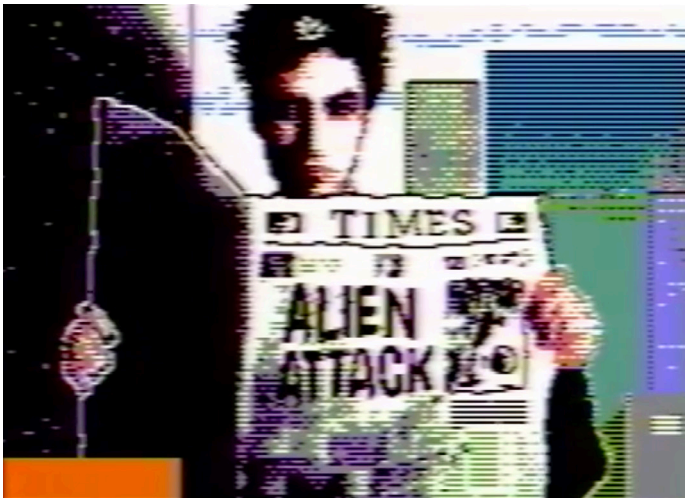

Fig. 8 Frame taken from the TV series: *Marionetti* (1986), performed by *Giovanotti Mondani Meccanici*. https://www.youtube.com/watch?v=fjXqlUpRSzE last accessed 6/6/2021.

> cartoon scene was dominated by the emerging Amiga, which was much better suited for this kind of work. (Glessi, 2019)

The scenography of the entire program was instead entrusted to the intensive use of chroma key, thanks to which the presenter passed through different eras between comic performances and excursions into the past, overlapping with old films or archival images. Although the common denominator was electronics, *Non necessariamente* brought together cinema, music and computer art, staging through a surreal visual journey the fragmented fruition resulting from the use of the remote control, typical of the new television (Gervasoni, 2010).

***Immagina, segni e sogni del nostro tempo* (1987)**

The growth and diversification of experimentation around the electronic image formed the prelude to what was probably the most ambitious television production among those briefly listed here: *Immagina, segni e sogni del nostro tempo*, broadcast on RAI1 between 1987 and 1988. The scenography was designed by one of the most important video artists of the time, Fabrizio Plessi, who drew a

Fig. 9 Frames from the television program *Immagina. Segni e sogni del nostro tempo*. https://www.youtube.com/watch?v=fFtZjPW6b_Y last accessed 6/6/2021.

backdrop that concretized the concept of a 'neo-baroque age' (Calabrese, 1987), as defined by one of the authors of the program, the television critic Omar Calabrese, while the critic Gillo Dorfles spoke of a neo-baroque taste in architecture in the same years. In this regard, Omar Calabresi said in 2006:

> At that time, I started from the conviction that the neo-baroque taste stems from the fact that our culture is a mass culture and, above all, that this mass culture, because of television, is oriented towards forms of surprise and originality at all costs, resulting from the worldwide diffusion of a culture of spectacle, as opposed to the field of information or pedagogy, which are more traditional strengths of public television. (Online interview, Purgar, 2006)

Plessi's scenography therefore consisted of an installation that mimicked the architectural and naturalistic design of the *Trevi Fountain* and consisted of a series of mobile elements. These elements were equipped with a cathode ray tube screen that showed videos of running water or clips from the show. Beyond the addressed themes of art, architecture, cinema, fashion, and advertising, *Immagina* develops a critical discourse on visual communication in the video and computer artworks shown, playing with a double meaning: the images and the imagination that emerges from them (Lagonigro, 2018)

CONCLUSIONS

At the end of the 1970s, the range of possibilities for managing images, sounds and films offered a scenario that was not very mature and fell short of the expectations that the media had aroused in the years before. Television was a medium that had reached its full maturity, but the relationship between television and computers was mainly linked to the possibility, even the necessity, of using the television screen as the video terminal of an electronic computer. In the early 80s, however, the artistic research related to electronic media, exceeds the canons self-referential and underground that had characterized it until a few years ago, and it was introduced in the palimpsest and mainstream television. The time that passes allows us to put a critical distance between us and the events narrated here, which allows us to start writing this story. A history that is also the history of the devices that first enabled the electronic manipulation of TV images. Integrated hardware and software systems that have helped to define the visual imagery of a medium, leading us to a general reflection on the impact of new technologies on changing the relationship between communication and art. A brief analysis of television shows conceived with the aim of educating the popular visual imaginary by introducing to the general public

some borderline experiences related to the use of hardware for digital manipulation, allowed us to place these shows in a cultural framework capable of producing and disseminating new electronic/digital visualities. A path that stretches from the *Telescolastica* of public television to the last productions of this period, in order to find a new field of experimentation between video art and popular television trends.

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