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28 November 2026

Exploring Tomás Maldonado

EDITED BY

Pierfrancesco Califano



Fondazione Giangiacomo Feltrinelli

Scenari 45

Scenari

Exploring Tomás Maldonado

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Exploring Tomás Maldonado

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Colour. Codes and Perception through Artistic Practice and Didactics

Federica Delprino, Monica Oddone, Angelica Vandi

Maldonado's Artistic Experience: a Thematic Introduction

The role of artistic practice, according to Tomás Maldonado, constitutes one of the first cognitive and intellectual processes that, although considered a "pure manual and aesthetic exercise" (Maldonado, 1951, p. 21. Translated by the authors), leads human beings to materialise their thoughts in order to explore the space and reality that surrounds them.

Considered one of the protagonists of the mid-20th century Latin American Concrete Art movement, in 1946, through the Inventionist Manifesto, he recognised the close link between reality and art, seeing the latter as an effective tool to enhance life and to place man and the community in the world.[1]

"To surround a man with real things and not with phantoms." With this statement, Tomás Maldonado demonstrated the profound dis-

1 The manifesto is published for the first time in the bulletin "Arte concreto – Invención", 1, August 1946.

tance between concretism and the previous figurative avant-garde movements of the early 20th century focused, instead, on illusion and lyrical abstraction from reality (Maldonado, 1946). If abstract works had reality as their starting point, which they interpret and elaborate, concretism aspired to contribute with the artwork itself to reality.

It also shows a strong influence of the work of the De Stijl and Bauhaus exponents, especially Theo Van Doesburg and Max Bill's. They believed that, in the same way in which man designs tools for material use, the aim of concrete art becomes the production of objects for intellectual and speculative use, based on lines, colours and surfaces that follow a geometric pattern, without referring to any further symbolic meaning.

With the *Asociación Arte Concreto-Invención*, Maldonado also intended to contaminate his artistic practice with design disciplines, including industrial design. Indeed, the roots of Argentine concretism could also be found in Russian constructivism, confirming a functional role of art linked to other areas of production such as industry and technology. The painting was seen as a theoretical project with a solid, educational, and didactic aspect, anticipating the exercises of the Fundamental Course at the Hochschule für Gestaltung Ulm (HfG).

Pursuing the analysis of the intellectual processes arising from the interaction between the work of art, the viewer and societal engagement, Maldonado's essay *El arte concreto y el problema de lo ilimitado. Notas para un estudio teórico* investigated the fundamental relationship between figure and background, with an emphasis on issues related to space and illusion. As a matter of fact, if every figure on background determines space and if this space is within a plane (the canvas), on this surface the space becomes illusory, which is not admissible for a concretist painter. Maldonado and all the concretist artists continually strove to destroy this illusory space, first by trying to dissolve it through the objectivation of the figures in the foreground, then by trying to overcome the narrowness of the figures by "making the ground vibrate" (Huff, 2018, p. 79). It led to a representational situation in

which the "unlimited" was sought within a limited form such as the canvas, committing the error also common to the Futurists.

In this context, colour research became important for Maldonado's artistic practice and didactic design activities. It became a fundamental medium for achieving the aims envisaged by the concretist artistic practice as it favoured games of visual perception and training to perceive space in an unlimited, undefined, closed way. Hue thus became the bearer of visual ambiguity, leading the viewer to seek stimuli for critical thought in the interference between different shades, changes of saturation, light and dark. It is important to highlight that this ceaseless study led Maldonado in his old age to reorientate his convictions on concrete art, considering figuration and non-figuration two practices of mutual stimulation cooperating for the same purpose (Maldonado, 2010).

However, it is important to underline how his research, oriented above all towards the study of the colour role within the work of concrete art, had a direct and reciprocal influence on his role as a teacher at the Ulm School, emphasising and confirming the relevance of art within the design process aimed at the production of artefacts.

The pedagogical itinerary involving the teaching of colour at the HfG confirms the revolutionary significance of the German school as a research institute for industrial production during the mid-20th century. Tomás Maldonado, who moved to Ulm in 1954, represented the culmination of a didactic process in which colour was studied analytically, then experientially, to become a mere design code, aligning with the aims of HfG didactics that were "not limited to the design of consumer goods, but also included the design of elements and systems for the development of construction, science, means of transport and graphic, visual and sound supports for a rapidly expanding media" (Fernández Campos, Sánchez Moya, 2021, p. 179).

In light of this scenario, the principal lecturers of the Visuelle Einfhürung chair, (the core of the visual training subjects in the Basic Course or *Grundlehre*, first year), who had a profound influence on Maldonado's work, are briefly listed and explained below.

The first approach to colour as a methodical design asset comes from Helene Nonné-Schmidt, a former Bauhaus graduate. She constituted Maldonado's first reference as Nonné proposed students to develop a systematic study based on investigating the behaviour of hue, its lightness and saturation (Figure 1). The dissection of colour indeed led to identifying its main components used as a "tool for the generation of coherent palettes with chromatic identity for application in industrial, graphic and construction projects" (Fernández Campos, Sánchez Moya, 2021, p. 181).

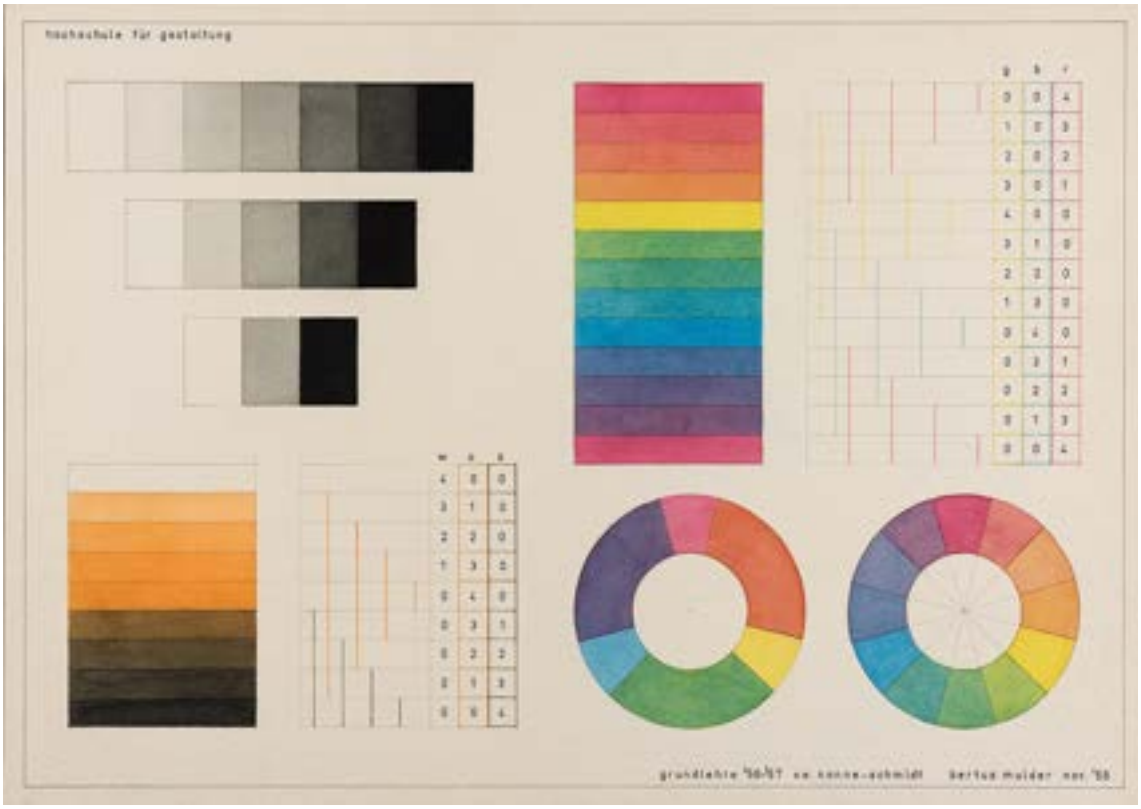


Figure 1. The careful study of the behaviour, lightness and saturation of hue during Nonné-Schmidt's course, 1956-57. From: Fernandéz Campos, Sánchez Moya, 2021.

The second didactic influence comes from Josef Albers and Johannes Itten and their constant research about the perceptual effects resulting from the combination of different colour sets. Both Albers and Itten introduced the teaching of colour contrasts to prioritise the "ability to see colours" over "knowledge of colours" like perceptual alterations as consequences of intersections and interactions: "the title of the exer-

cises anticipated their objective: one colour looks like two, two colours look like one, illusory mixtures and transparency, progenitor colours, intersection of colours, mixtures, transformations, quantity of colour, vibrant edge" (Fernández Campos, Sánchez Moya, 2021, p. 183).

Maldonado began his experience by observing, in a first phase, the work of his predecessors, who were developing methodical and empirical teachings in the Basic Course. This ambivalent reading conveyed in his cutting-edge conception of the design process as a system outlined by scientific reasoning and intuition and synesthetic perception.

These progressive modifications within the course contributed to a profound change in the conception of the figure of the designer who is no longer an artist (a Bauhaus legacy promoted in Ulm School by Max Bill) but an "integrator" with responsibility for incorporating a large number of competencies acquired through educational training, which was seen as a systems-thinking approach embodying both art and science.

The Influence of Maldonado's Artistic Research: Colour and Perception Principles through Ulm's Didactics

We consider that the HfG's contribution to the renewal of education in applying art to the industry is particularly fascinating under the perspective of colour. Tomás Maldonado is indeed one of the key protagonists of this paradigmatic shift.

With Maldonado, the scientific and perceptive properties of colour were integrated into the methodology of design by creating systems of relationships supported by the internal logic of colour, analysed and understood thanks to shape fragmentations.

Maldonado tackled the study of colour not as the main focus of the subject within the Basic Course, but as one of the many generative laws that lead to the relationship between background and figure in a representation. As confirmed by the evidence of William S. Huff, student and professor at the HfG and a leading expert in Maldonado's didactic work, all the generative laws (such as symmetry, topology and

the theory of Gestalt perception) taught in his Basic Design exercises were deeply imbued with concretism beliefs. The colour from simple tonality thus became a code, a design tool used to understand specific visual systems of industrial artefacts, ceasing to be an object of study but becoming a vector for solving the ambiguous perception of the background and the figure in a composition, or the visual balance to neutralise the depth of black (Huff, 2009).

This ideology was materialised through the proposal of a series of Basic Design exercises that followed "the laws of Gestalt, the topological figures of fractal structure, the laws of symmetry and the raster or grid" (Fernández Campos, Sánchez Moya, 2021, p. 184).

Colour was no longer understood as a plastic element of purely aesthetic properties but as a tool integrated into a design system aimed at realising concrete elements. In his essay, Huff listed the series of assignments that Maldonado proposed to the students of the Basic Course in the academic year 1956-1957: there were symmetry and parquetry exercises (Figure 2); exercises related to proximity and similarity based on Gestalt; depth perception exercises based on the overlapping of different grounds and their related ambiguity; Inexact through exact (Figure 3), which gives rise to imprecise figures starting from defined rasters, and vice versa Exact through inexact; Black as colour in a Peano curve (Figure 4), whose challenge was not to turn black into a hole; other perception exercises in which squares were divided in rows that step-by-step shifted into rings with increasingly rounded edges.

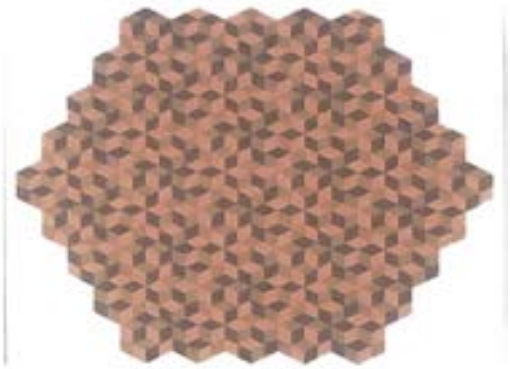


Figure 2. William Huff's assignment Parquetry during Maldonado's course, 1956-57. From: Huff, 2018.



Figure 3. William Huff's assignment Inexact through exact during Maldonado's course, 1956-57. From: Huff, 2018.



Figure 4. Klaus Krippendorff's assignment Black as colour during Maldonado's course, 1956-57. From: Fernandéz Campos, Sánchez Moya, 2021.

From Experience to Legacy: the Mutual Influence between Artistic and Design Practice

As seen above, starting from the analysis of Tomás Maldonado's artistic practice, linked since his debut to Argentine concretism, we can identify how much his conception of painting as "pure manual and aesthetic exercise" had a strong influence on his teaching experience during the Basic Course in Ulm. Meanwhile, his use of colour as a code and his studies on the ambiguity of perception have reverberated in his more recent paintings. As he states: "Every painting is a new experience for me. […] It is not entirely true that my works do not express continuity. The only difference is that it is a less explicit continuity" (Maldonado, 2010, p. 56. Translated by the authors). In these words emerges the importance of artistic practice as a tool for interdisciplinary exploration involving topics that are only apparently unrelated – such as cognitive science, perception, and psychology – and the fundamental role of colour in visual phenomena. Indeed, Maldonado recognizes that colour is an important element of vision, not only based on a double binary – on one side, the abstract-mathematical component and, on the other, the daily sensitive, emotional and creative experience related to its perception – and introduces its virtual nature as a construct present in our brain, indispensable in defining our relationship with reality (Maldonado, 1997).

In design education, it is possible to recognise how School of Ulm's colour exercises anticipate an approach that is strongly linked to digital technology, using a logic of representation that is a forerunner of pixels and raster images. Because of these characteristics, which are not only formal but also conceptual, they are now taken up in the teaching of Basic Design, defined by Giovanni Anceschi (2016) as an activity that "interweaves propaedeutics (teaching how to do) and disciplinary foundation (understanding the theoretical and conceptual articulations involved)". In continuity with Maldonado's work in Ulm, the Basic Design exercises break down the design activity into its essential components, isolating and deepening them through tar-

geted exercises. The exercises on form, perception and colour, initially carried out by hand using techniques close to artistic production (watercolours, pencils, acrylics), are now re-proposed in design courses to familiarise students with modern digital tools, thus defining a discipline called Basic Digital Design.

However, this recent evolution due to technology should not be seen as a complete replacement to the previous one but, in line with Maldonado's thinking, an additive perspective should be adopted within which the new alternatives are placed alongside the previous methods. Indeed, the principles and objectives of the exercises remain unchanged, offering dual experimentation in the field of colour, both material and digital. It allows the future designer to gain awareness in different application contexts, integrating new tools and skills. In this specific case, the computer tool could not only be proposed as a means of re-doing the exercises in a digital environment, but also as a "new prosthesis capable of characterising not only the visible results but above all the forma mentis of the graphic designer and his logical-operative method" (Francavilla, 2011, p. 8. Translated by the authors), in continuity with what was promoted by the Grundlehre in Ulm.

Within contemporary art practice, we find different ways of using colour to echo artworks and exercises related to Maldonado and his school of thought. This tendency of art to offer re-elaborations rather than real innovations is justified by the fact that the great avant-gardes of the 1920s, 1930s and 1940s represented the real turning point in redefining artistic practice: everything that follows can only attempt to reinterpret and deepen what has already been discovered through their language. If this is true from a conceptual and formal point of view, technological evolution, however, has offered artists new tools to express themselves coherently with their ideology: "Different artistic tendencies, albeit with opposing visions, are now gathering around the same reservoir of techniques – techniques of iconic computer production – from which each of them hopes to be able to refuel, without betraying their original programmatic matrices" (Maldonado, 1992, p. 61. Translated by the authors). Thus we speak of New Media Art, "an

artistic movement that uses emerging media technologies that address the cultural, political and aesthetic potential of these tools" (Mancuso, 2020. Translated by the authors). Brushes and pencils are replaced by photographs, video footage, film, print, fax, music, and performance to arrive at more recent experiments between computers and networks (Frieling, Daniels, 2006).

Its application is even more interesting in the discourse on colour, as it has always been a component directly influenced by highly technical aspects such as the availability of raw materials and transformation processes (Ball, 2007). The possibility of having a virtual canvas available – even reaching the point of working on three-dimensional spaces – and millions of colours made accessible by digital media – not only subtractive colours, but also additive mixing with the use of light as material – has multiplied the experimental and expressive potential inherited from concrete art and the exercises from HfG.

The Legacy: Past and Present towards the Future

Maldonado's line of thought and experimentation show that he has always been interested in evolving his approach and techniques based on new technologies and following the social impetus of the moment. In this perspective, we can consider how he left a legacy not only in terms of design notions, but in the very attitude to design and the designer's relationship with contemporary reality. It means taking into account emerging needs and consequently knowing how to evolve his point of view and adapt his methods according to contemporaneity. Therefore, it is interesting to consider the influences between artistic practice, colour, and perception triggered by new multimedia technologies.

Tomás Maldonado had always shown a growing interest in new technologies as essential tools for designing and proposed them in different areas of study, experimentation, teaching and professional work. Incorporating the latest technologies and the consequent de-

velopment of new possibilities does not mean excluding all previous work but rather integrating them into new processes.

This is why it is interesting to observe how artists and designers, over time, seem to work alongside his reasoning and even indirectly pick up his legacy.

From this perspective, colour exercises may find not just a different application from an experimental point of view, but also evolve into a real form of expression.

In the perceptive exercise Antiprimadonna (Figure 5), the aim is to create a composition by means of a sequence of five spot colours and two black and white textures (different and not adjacent), choosing isometric or isomorphic colours and screens so that none prevails over the other (Ferraris, 2014). It was an exercise aimed at training the students' ability to juxtapose colours in a considered way, triggering a critical spirit and thus creating "palettes". This can be done by putting together a series of cards, making textures by hand or creating colour fields using Pantone, watercolours, etc., which can also be of different widths to play on visual weights. Imagine doing the same exercise digitally: the result will be very different as it will be less textured, but it is useful and interesting to compare the same choice of colours with a digital creation.

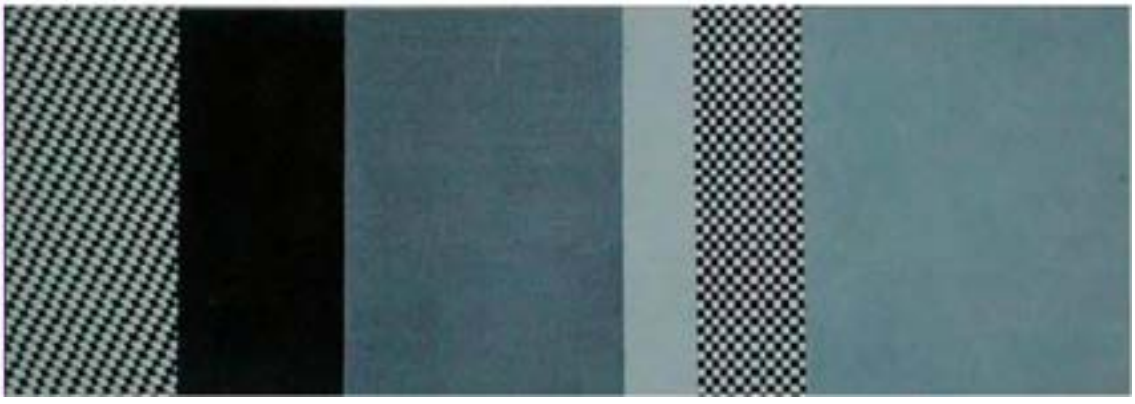


Figure 5. Giovanni Anceschi's assigment Antiprimadonna during Maldonado's course, 1962-63. From: https://www.researchgate.net/publication/43901647_Sviluppo_di_un%27interfaccia_audio-aptica_basata_sulla_profondita_spaziale

What if this sequence of colours was multiplied, enlarged and projected within a space? Olafur Eliasson's I only see things when they move (Figure 6), first set up in 2004, is an installation in which a series of rotating coloured glass panels in the centre of the room create a play of colours by projecting bands of different shades onto the surrounding walls. The Danish/Icelandic artist's aim is to create complex optical phenomena using simple makeshift technical devices such as mirrors reflecting the light beams of reflectors and kaleidoscopes producing coloured prismatic effects (Bee, Heliczer, McFadden, 2013).



Figure 6. Olafur Eliasson, I only see things when they move, 2004. Installation view at Moderna Museet / ArkDes, Stockholm, 2015. Photo by Anders Sune Berg. From: https://www.olafureliasson.net/

In addition to the chosen aesthetics and the immersiveness of the installation, the choice to make the "mechanics" of the work visible is particularly interesting, placing the artifice itself that creates the projection in the centre of the room, explaining the motive behind the choice of title: "I only see things when they move". Indeed, it is a motor that makes the plates turn individually, thus creating a mobile spectrum of colours, of vertical reflections on the surfaces immediately around them.

The work reflects on the relationship between the human being and subjectivity, between the individual and space, creating a fruition of

the same that is not merely passive, but creates a sort of social experience.

Considering Tomás Maldonado's approach, we can identify contemporary figures with him and who have flanked and developed three main themes related to colour, which can then be re-identified in his legacy, picked up and held by modern designers and artists. These are: (i) a mathematical approach to colour, (ii) colour as experimentation with new media, (iii) colour exercises in interactive space.

Taking into account the exercises proposed at the Ulm School, based on geometric models that students had to rethink through rules of variation of given geometric modules (Neves, Rocha, 2013), a mathematical but at the same time a creative approach is clearly shown. The students were indeed called upon to interpret the form creatively, even though they started from well-established mathematical rules. As highlighted previously, this attitude carried out with Max Bill at the Ulm School was already experimented with concretism with the shape of the frame corresponding to the internal motif. Those, depicted in the canvases and with a "coplanar" composition – in which the forms were released from the canvas into space through the use of a grid and harmonisation of colour– can be found in further didactic, artistic, design-related experimentations after the 2000s (Crispiani, 2010).

Giovanni Anceschi, Nunzia Coco and Nicola Vittori reintroduced a Basic Design workshop at the Iuav in Venice in 2006-2007 (Coco, 2010), a multisensory exercise by Moholy-Nagy,[2] which can be traced back to the first experiments on tactility at a quasi-synaesthetic level (Figure 7). It is put into practice a pathway that starts from a sensory experience and turns it into an output with a defined and intelligible form, describable through mathematical forms and proportions.

Concepts such as rarefaction and densification, texture, symmetry and deformation represent fundamental arguments of Basic Design

2 Moholy-Nagy's Exercise, 2006-2007. Iuav PhD in Venice curated the 1st edition of the design pedagogy Seminar/Workshop in 2006. The 1st Edition was titled "Basic Design: la tradizione del nuovo", 2006. The 2nd edition was titled "New Basic Design: il basic dell'interazione", 2007.

that we have seen pass from Ulm with Maldonado, Huff and Bill, and then applied in the extreme experiments of John Maeda at the MIT in Boston. Here the basic themes of graphic syntax are revisited from the perspective of the digital tool through graphic software such as Adobe Illustrator and mechanical hardware (Francavilla, 2011).



Figure 7. Exercise inspired to Laszlo Moholy-Nagy, proposed by Giovanni Anceschi, Nunzia Coco and Nicola Vittori in 2006 at Iuav. From: "Progetto grafico", 12, 2008.

The visual artwork Fireball (Figure 8), for example, was created in collaboration with the Italian company Sawaya Moroni by programming a dedicated algorithm to achieve a specific aesthetic and use of colour, seeking a balance between the use of technology and emotion (Maeda, 2006) of which these practices are a synthesis.



Figure 8. John Maeda, Fireball, 2005. From: Aprile, 2016.

Therefore, colour can be used as an experiment in new media and new technologies, whereby the latter can be integrated to harmonise colour digitally or automate specific processes. This is the case with Crypto-Art (Figure 9) and Generative Art (Figure 10), which focus on generating colours and shapes using algorithms and make it possible for spectators to buy, enjoy and participate in the works in sundry ways.

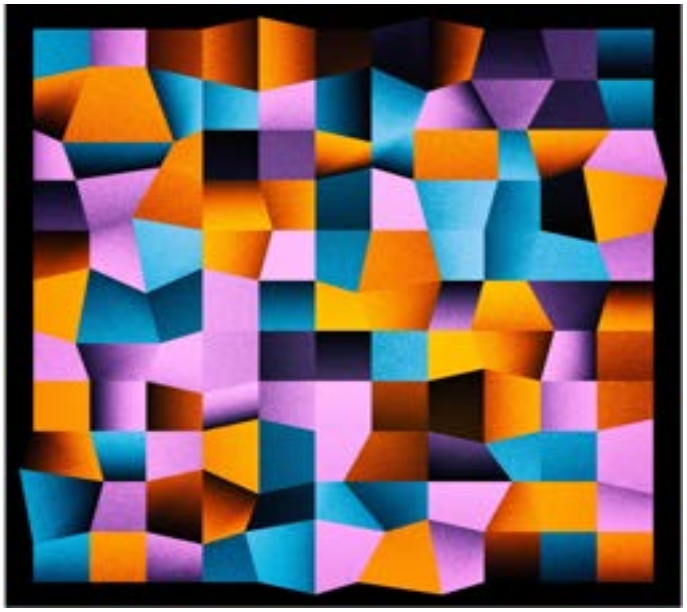


Figure 9. Manolo Gamboa Naon, ddfrctc, 2020. From: https://cryptoart.io/artist/manoloide

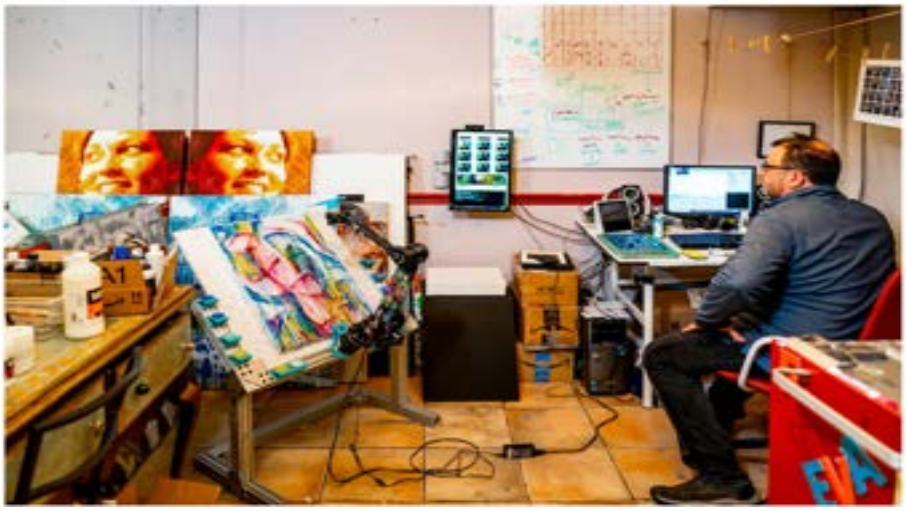


Figure 10. Pindar Van Arman invented CloudPainter and created robots that paint for over ten years using AI, robotics arms and 3D printing, 2018. From: https://aiartists.org/pindar-van-arman

This switch may require mechanical tools and algorithmic processing, but it may also be relevant to a mere change of medium. After a traditional training and a long career based on works on canvas, the artist David Hockney decided to switch to iPad drawings (Figure 11), applying his knowledge and aesthetics to the potential of the new technological medium. Using a "few pounds" application (Franceschini, 2012), the artist appreciates the ability to paint with his fingers on the screen, change the thickness of the brush, mix the colour, change the brightness quickly and conveniently, and the portability and ease of use of the tool. According to Hockney, these features are the ones that many artists of the past would have appreciated: "From Tiepolo to Van Gogh" with "the only disadvantage of not feeling the resistance of the paper to the pencil or brush, an important factor for those who draw or paint, but the advantages outweigh the disadvantages" (Savelli, 2020).



Figure 11. Three works from David Hockney's The Yosemite Suite, 2010-11. From: https://www.nytimes.com/2016/05/02/t-magazine/art/david-hockney-yosemite-ipad-paintings.html

As already seen through the experience of Olafur Eliasson's installations, exercises with colour can be brought into interactive space with fascinating results. New technologies make it possible to practice all those colour games interactively, exploring them directly through one's own body. With Your uncertain shadow (colour) (Figure 12) visitors can bring their bodies into play, reducing them to shadows

and multiplying them during this installation with different colour schemes, pervading the space and interacting with others on the gallery walls.



Figure 12. Olafur Eliasson, Your uncertain shadow (colour), 2010. Photo by María del Pilar García Ayensa. From: https://www.olafureliasson.net/

TeamLab fielded another interesting relationship between body and space through the interactive installation Graffiti Flower Bomb (Figure 13) implemented in 2018 at the MORI Building Digital Art Museum. Here, flowers, drawn on a paper in "Graffiti Nature", appear on the wall and grow in clusters, bloom or disperse by interaction with visiting people who, by placing their hands on the wall, can capture them and make them blossom, while when they move them, they make them disperse. This work is designed to spread awareness about endangered wildlife by connecting people with natural elements. The deployment by people of their bodies can create a positive memory, remembrance and attachment to the cause, a different involvement precisely because they are deployed on a personal level.

The same happens through installations in which the visitor can manipulate elements of the work and the colour itself with his own hands (Figure 14). In both cases the body is involved as an essential part of the installation, and the experience becomes immersive.



Figure 13. TeamLab, Graffiti Flower Bomb, MORI Building Digital Art Museum, 2018. From: https://borderless.teamlab.art/ew/bombing/

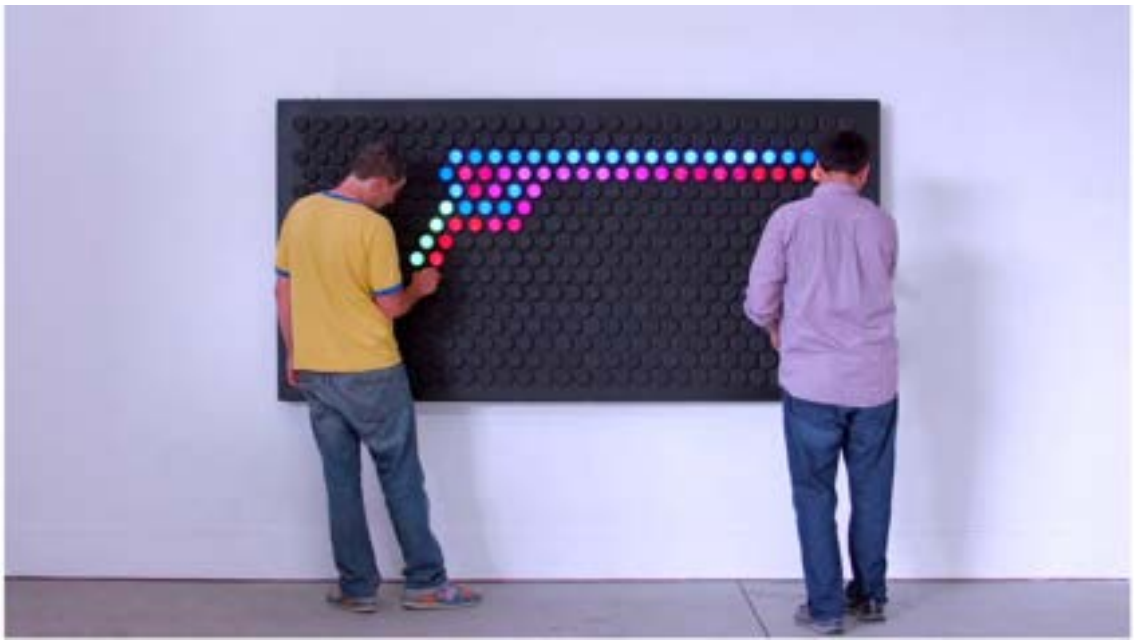


Figure 14. Hero Design, Everbright, 2015. From: https://theeverbright.com/

Conclusion: Future Perspectives and Directions

In interpreting Maldonado's approach to colour, originated in the artistic field and developed in the design domain through his teaching career, practises linked both to contemporary society and the evolution of technological means have been identified as vital inspiration for designers and creative people in the contemporary era. These processes can be traced back to two strands that will characterise the future art and design scene: on the one hand, colour will continue to be used to master the medium (as a simulation in the analogue sphere and as an expressive tool in the digital context), on the other hand, it will seek to overcome technological limits by pursuing the free creation of meaning.

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