The teaching-learning process of the language of color in Design

El proceso de enseñanza-aprendizaje del lenguaje del color en el diseño

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◈ Abstract

The article shows a theoretical review and analyzes different projects carried out on the teaching-learning process of the language of color for students of Architecture, Design and Visual Arts in the city of Puerto Vallarta, Jalisco, Mexico, from multidisciplinary experience. Examples of practices that involved university students with their teachers and the community are taken. In these cases, it is observed how significant learning was achieved in the application and perception of color at different scales, to understand it as a design language that is constituted as an element of a cultural construction. In this sense, it is highlighted and argued how the teaching-learning process of the language of color requires a multidisciplinary perspective, highlighting that its study and application cover various areas of knowledge. This approach involves the methodological intersections between art, design, perception, theory and practice. From here it is argued that the understanding of color requires an approach that integrates these disciplines to enrich teaching and the connection with practical experiences that reinforce the achievement of critical learning. The selected case studies show how students relate color to its context and apply it reflectively.

Keywords: color, art, design, architecture, teaching

◈ Resumen

El artículo muestra una revisión teórica y analiza distintos proyectos realizados sobre el proceso de enseñanza-aprendizaje del lenguaje del color para estudiantes de las carreras de Arquitectura, Diseño y Artes Visuales en la ciudad de Puerto Vallarta, Jalisco, México, desde la experiencia multidisciplinaria. Se toman ejemplos de prácticas que involucraron a los estudiantes universitarios con sus docentes y la comunidad. En estos casos, se observa cómo se logró desarrollar un aprendizaje significativo de la aplicación y percepción del color en distintas escalas, para comprenderlo como un lenguaje de diseño que se constituye como elemento de una construcción cultural. En este sentido, se subraya y argumenta cómo el proceso de enseñanza-aprendizaje del lenguaje del color requiere una perspectiva multidisciplinaria, resaltando que su estudio y aplicación abarcan diversas áreas del conocimiento. Este enfoque involucra los cruces metodológicos entre el arte, el diseño, la percepción, la teoría y la práctica. Desde aquí se sostiene que la comprensión del color requiere una aproximación que integre estas disciplinas para enriquecer la enseñanza y la vinculación con experiencias prácticas que refuercen el logro de un aprendizaje crítico. En los estudios de caso seleccionados se muestra la manera en la que los estudiantes relacionan el color con su contexto y lo aplican de manera reflexiva.

Palabras clave: color, arte, diseño, arquitectura, enseñanza

◈ Introduction

For the disciplines that involve art and design, the teaching-learning process of the language of color includes a challenge and a constant search for didactic strategies that involve not only the theoretical approaches of chromatic study, but also accompany practical exercises that invite those involved to a process of experimentation with color. perception and pigments in different contexts and at different scales.

The experiences shared in this text present the opportunity to think and acquire tools for reflection on color for students of the careers of Design, Architecture and Visual Arts, highlighting the results obtained, such as being able to conceive color, its study and its perception as part of an experience that goes beyond the sensory and involves a cultural construction that gives this language a meaning and a sense that can be studied in the different contexts in which they are used, contemplated and experienced.

Thus, three case studies are presented in which students of the Architecture, Art and Design careers were invited to participate in research and community action projects to study the city, its urban edge contexts, and the chromatic intervention of facades in popular neighborhoods, all of them in the city of Puerto Vallarta. Jalisco, Mexico.

The different stages of study and intervention are addressed and the results of the learning obtained in each of the experiences are presented, highlighting how the understanding, management and use of color in the different disciplines involved require, from didactics, an approach that integrate multidisciplinarity and the connection with practical experiences that reinforce the achievement of critical learning. The selected case studies show the way in which students relate color to its context and apply it reflexively.

◈ Teaching and study of color as a language

In the field of art and design, teaching, practicing and understanding the language of color is essential so that students can communicate

ideas, generate congruent aesthetic proposals and express emotions consciously.

Furthermore, as Zhenglei Dong (2017) argues, color, as a basic morphological element in the field of art and design, constitutes a skill for precise application and adequate understanding in the construction of various artistic conceptions. Thus, color has functional effects from the language of communication, visual identity and interactive experience in the context of design.

As Báscones Reina (2019) points out, the teaching and study of color have been very present in the training of students in different art and design schools throughout their history. And, in this sense, practices have been incorporated that seek to explain how color works from theory and try to put it into practice in a creative and consistent way. In this sense, since the 20th century, taking as an example the innovative teaching strategies of the Bauhaus and the following design schools, it has been understood that the role of color must be a starting point and a fundamental element when seeking to communicate visually. . This is what Arnheim (1979, p. 337) specified when he clarified that "Strictly speaking, every visual aspect owes its existence to luminosity and color."

Therefore, the topic of the process of teaching color in design should not only focus on a concept extended from artistic disciplines.

> For example, mainly in the conception of "reappearance" of color and seriously ignoring the subjective practice of color; insist on traditional skills in the formation of pure pictorial languages... As for the teaching of color in design, the objective of which should be to cultivate the qualities of students, it requires changing common practices and breaking the traditional principle of color design to surpass even drawing skills and experiences. (Dong, 2017, p. 450)

Thus, the need to emphasize the analysis of the color element from the design of visual language is highlighted, so that students can rethink their knowledge and develop a learning method that includes comprehensive thinking to improve their ability to express themselves (Dong, 2017).

Hence, it is argued that it is important to find and transmit to students a way of practicing to understand and apply color, so that a meaning can be given and a connection is established between chromatic perception, origin and significance in a context. determined culture.

According to Dong (2017), as a basic subject, color design aims to train students in their ability to observe nature and sharpen the natural observation of colors, that is, train their understanding and application of the emotion of color., as well as practice their subtle chromatic emotion,

understand the universality of chromatic feelings and the personalization of personal color, as well as learn to compare, coordinate and use colors.

This is also stated by Diana T. Witcher (2016), who maintains that, although designers use color intuitively like artists, they also do so instrumentally as a means of communication and creation. Paint mixing teaching models that come from the fine arts have long dominated color education for designers. Although there is much value in traditional color education, Witcher (2016) proposes that today designers need a more complete understanding, including color theory, systems, materials, and management. Just as in this article, Witcher (2016) emphasizes the importance of including in teaching processes more experiences about the use of color in practice, such as color management, color science, and color ordering systems. color (such as cie, Pantone, Munsell and the Color Ordering System or ncs) used today in design, commerce and industry.

In this way, from the examples presented in this article and from the teaching experience, it is important to highlight that color and its didactics will always be linked to the context in which they are taught and learned and, in this sense, it is essential to understand the cultural aspect. of the color. Therefore, it is important to reflect from theory on the relationship between the teaching of color and its relationship with cultural significance.

Michel Pastoureau (2017, p. 241) analyzes the study of color as memory, reflecting on his personal experience in which he emphasizes that "over the centuries, color has been successively defined as a matter, then like a light and, in the end, like a sensation." In the same sense, from the psychology of color, Heller (2000) affirms that colors and feelings are not linked for free, but, on the contrary, are the result of experiences that have their origin in childhood and that We have been strengthening them until they become an essential part of our language and thinking.

In the context of this article it is important to highlight that:

> Our chromatic relationship with the world depends largely on our contact with those first images in time; Visual culture takes on great importance in our way of relating to and seeing the world. The union of the elements that make up the image become visual references; a conjunction of semic elements that come together to form an image with meaning that shows us and teaches us how to relate. (Hernández, 2019, p. 380)

That is why we understand that teaching and learning color as a language is essential to be aware as art and design professionals that "In reality, color is loaded with information and is one of the most penetrating visual experiences that we all have in common. Therefore, it constitutes an invaluable source of visual communicators." (Dondis, 1967, p. 64).

From this point of view we maintain how the practice with color becomes decisive in the current context.

> Colors, as well as the different experiences that we can have with them, culturally and according to the areas of expression, will also take on a particular meaning. The best way to understand colors should be subject to an analysis of a broader spectrum, which places it within a cultural context and relates it to the environment and the cultural object that possesses it. (Pineda Almanza, 2020, p.2)

This being so, we reiterate the importance of the use of color within a cultural context and the need to address it from the various forms of expression related to art, architecture and design.

> Color is omnipresent in nature and always present in our experience, consciously or unconsciously. The earth, the sea, the sky, the cosmos have color in their constituent elements that animals and humans seek to interpret and use, both in material and virtual reality for cognitive, aesthetic, symbolic, cultural, civilizational, psychological, and spiritual effects. and epistemological. (João Durão, 2022, p. 37)

For all of the above, it is so exciting to study color, teach it, understand it and use it with the awareness and meaning that it constructs culturally.

◈ Methodology

Below are the methodologies used for the three case studies carried out from the activities and research projects led by the Academic Body of Design and Innovation at the José Mario Molina Technological Institute, on the Puerto Vallarta Campus, from the year 2015 to the date of this publication.

It is necessary to highlight that, in the three cases presented, we start from qualitative, interpretive methodological approaches, which are aimed at studying the phenomenon of color from multidisciplinary perspectives, with action research and participatory research tools.

1. The study of urban color

This was the first work with Architecture students. His main question addressed the topic of the study of urban color. For their research, the students went from studying color theory, in one of the introductory subjects of their degree: Fundamentals of design, to asking themselves what color the city of Puerto Vallarta was, what aspects defined the colors of a city or the configuration of its urban image and how colors were part of a cultural construction.

The work had a qualitative and interpretive perspective, which focused on the analysis of the meanings that the research subjects attributed to the case study, seeking to interpret what was being captured through the application of the various selected instruments (Odetti, 2019).

The general objective of the students' work and practice was to investigate the relationships in the generation of objective and subjective chromatic palettes of the city of Puerto Vallarta as axes that allow studying the chromatic values identified by the natives, inhabitants and tourists, to reveal their knowledge, experience, multiplicity and perception as results of the urban cultural construction of a tourist city.

The students participated in the application of qualitative and quantitative instruments to analyze two conceptual categories: the objective and subjective color of a tourist city, for which they had to know the different qualities of color, as well as the color systems. color ordering to be able to identify it and analyze the data obtained.

The objective colors were identified through taking photographs and color scans (using the ncs nomenclature): Pallet of tangible colors of the city, identified by representative places of the city; temporary color palette (morning-afternoon-night, and seasonal color palette (spring-summer-autumn-winter).

On the other hand, subjective colors were identified through the application of an interview instrument to the community: Perception of the chromatic identity of Puerto Vallarta by residents and tourists; feelings associated with the color of Puerto Vallarta by residents and tourists; chromatic perception associated with the different places in Puerto Vallarta by residents and tourists; chromatic perception associated with the temporality (morning-afternoon-night) of the City of Puerto Vallarta by residents and tourists; chromatic perception associated with the temporality (seasons of the year) of Puerto Vallarta by residents and tourists; chromatic perception associated with celebrations and/or events in the City of Puerto Vallarta by residents and tourists; chromatic perception associated with the natural landscapes of Puerto Vallarta, by residents and tourists, and chromatic perception associated with the architecture of Puerto Vallarta, by residents and tourists (Odetti, 2019).

The interesting thing about this practice was that, in order to carry out the requested activities, collect the data and process it, the students first had to have cognitive perception and relationship processes around seeing, knowing, manipulating and analyzing the colors and their qualities, to then ask and reflect on their relationship with the senses and the cultural experiences that underlie them. Later, in the results, some of the activities carried out by the students are shown.

2. Color study for city edge contexts

In the second example, already with the background of the first work where the students of the Architecture program and the community were questioned about the color of the city they lived in, a more localized approach and work was carried out and, at the same time , the participatory research methodologies were delved into to make a proposal for rescue and chromatic intervention of the context in which the university campus is located.

To do this, it was necessary to understand the most particular characteristics of the area, located on the edge of a tourist city (a Mexican sun and beach destination), such as Puerto Vallarta, carry out a photographic chromatic survey, and then begin the qualitative research process. and participatory.

The general objective of the proposal was to apply color in selected architectural typologies to generate a clear visual reading of them, forming a community intervention work, encouraging the solidarity action of neighbors, teachers, students and government representatives, in order to generate an image of the area that would remain in the memory of its inhabitants and visitors (Odetti, et al., 2023).

The work in which the students collaborated corresponds to a qualitative study, with an interpretive and action research perspective, which takes into account the analysis of the meanings attributed by the research subjects to the case study, and seeks to interpret the construction of meanings. of color through the application of the various selected instruments.

To carry out the project, the students had to analyze the chromatic elements that constitute the peri-urban image in Puerto Vallarta, characterize and identify the colors of said image, integrate the key actors in the conceptualization of the chromatic design proposal and improvement of the peri-urban image and, finally, participate in the design of the chromatic intervention proposal for the peri-urban image in the selected case study.

The challenge was again to observe the existing color, at different scales, at the facade, street and neighborhood level, and then begin to design color harmonies, to present and reconcile with the key participating actors, presenting proposals, moving from theory to practice. from color management, from the two-dimensional plane to urban reality.

3. Color study for local chromatic and artistic intervention

This last case involved a new approach and, at the same time, the great opportunity to put past experiences into practice, starting from theory and taking students to the real scale. In addition, it meant for the first

time the possibility of involving true multidisciplinary work, in which students from the Architecture and Tecmm courses participated, along with students from the Design and Visual Communication, Visual Arts and Multimedia Design courses of the University Center of the Coast of the University of Guadalajara.

The project involved a methodology of action research and community work, which involved, in addition to the students and teachers of the aforementioned institutions, the businessmen who took the initiative and the municipal government of the city of Puerto Vallarta, as well as the neighbors. of the facades that were intervened.

The initiative arose from the business sector, the owners of the La Tienda Grande restaurant, located on a traditional corner of the Ixtapa neighborhood in Puerto Vallarta, to carry out a chromatic and artistic intervention to transform one of the most emblematic streets of the town.

Color and mural painting became protagonists and a starting point to improve the quality of life and highlight the cultural identity values of the community. In addition, students from both universities, related to the project, benefited in their learning processes and contributed directly to the development of the town.

The proposal for chromatic intervention in the Ixtapa delegation started from the conception of color as a visual element of the urban image and as a component of identity formation and symbolic expression of urban life. In addition, the elements that constitute the objectives of sustainable development were included to integrate them into the design process, specifically with social participation in the development and integration of key community actors.

The fact that in this chromatic intervention, color was the protagonist element of the urban image meant that students could experiment, from a multidisciplinary approach, how color can build the visual memory of an urban area, as well as the living image of the city. . On the other hand, by including in the methodology of this project a space for participation for various actors involved during the planning, design and self-management of the intervention, it allowed the experiences of its inhabitants to be included and how they interact and coexist with colors. Furthermore, the possibility of choosing a color palette to intervene in your living space generated the opportunity to make visible your streets, your squares, your buildings, the natural context, your facades and your textures.

◈ **Results**   Below, the results of the three cases proposed are presented as evidence of the learning processes that the participating students experienced.

In the first case of the study of the urban color of the City of Puerto Vallarta, the exercises included the generation of objective chromatic palettes, which included the analysis of the colors of the urban image (from what we call the chromatic strings of different areas of the city), consisting of the facades, the urban furniture and the landscape context, as a particular setting of a tourist destination, to the study of subjective chromatic perceptions, also expressed in palettes that reveal the urban cultural constructions developed by the natives, inhabitants and tourists. To do this, the students participated in the application of surveys-interviews and subsequently analyzed the results. Evidence of this work is shown in figures 1, 2 and 3.

Figure 1. *Chromatic strings for observing colors in selected areas of the city.*
Source: self made.

Figure 2. *Chromatic analysis of the facades of one of the streets in the selected area.*
Source: self made.

Figure 3. *Application of surveys-interviews to the community carried out by students. Source: self made*

Once this field work was completed, the students were able to collaborate in the chromatic analysis of all the material, learning about tools to identify colors, such as ncs, and generating, as can be seen in figures 4 and 5, the first chromatic palettes for study urban color.

Figure 4. *Chromatic synthesis obtained from the study of the target color and selected areas for the city of Puerto Vallarta.*
Source: self made.

Figure 5. *Synthetic color palette from the objective color study for the city of Puerto Vallarta. Source: self made.*

As can be seen, this work allowed students to ask themselves questions about color from theory to practice, as well as carry out an analysis and measurement, and relate this to the construction of meanings and urban cultural identity.

In the second case, the study and proposal of chromatic intervention for areas on the edge of the city invited students to participate in the analysis of the elements that constitute the urban image of the peri-urban context in the El Coapinole neighborhood. To do this, a photographic survey was carried out that allowed the first urban image diagnosis lanyards to be prepared for the selected area (Odetti et al., 2023). These stringers were the basis for selecting a specific polygon as a case study. In the same way, individual diagnostic sheets were developed, in which the facades to be analyzed, their location and particular characteristics were identified (Odetti et al., 2023).

As in the previous case, the students identified the colors that were repeated in the area with the ncs and generated the predominant color palette for the colony, as can be seen in figure 6.

Figure 6. *Stringers and predominant color palette, for the El Coapinole neighborhood, Puerto Vallarta.*
Source: Odetti et al., 2023.

In this case, an important part for the students was to participate in workshops with the community (neighbors, government representatives and businessmen in the area to intervene). In them, they were able to make the idea of the project known to all the sectors involved. In addition, they detected and discussed the needs of the area and applied an interview instrument to begin selecting the predominant color palettes. Subsequently, they had to gather the results and make the first harmonies and proposals for their application in the chromatic design of the facades to be intervened. This involved the development of new skills and again the use of colors, thinking about their combinations and the impact that these would have on the perception of color at different scales and on the construction of identity. Figures 7, 8 and 9 show the participatory workshops carried out and the first chromatic proposals generated by the students.

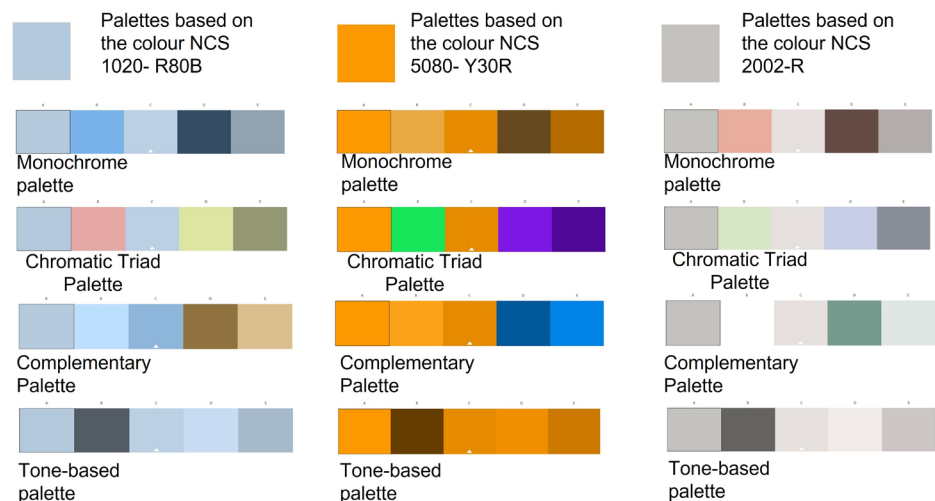Figure 7. *Participatory workshop with students, community and key actors.*
Source: self made.

Figure 8. *Colors selected by the participants and first color palettes designed by the students.*
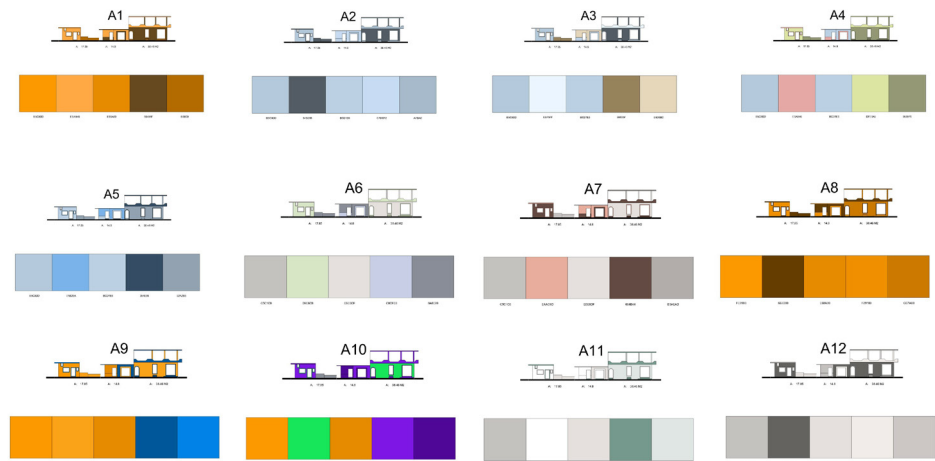*Source: self made.*

Figure 9. *First proposals for applying color palettes and harmonies to facades. Source: self made.*
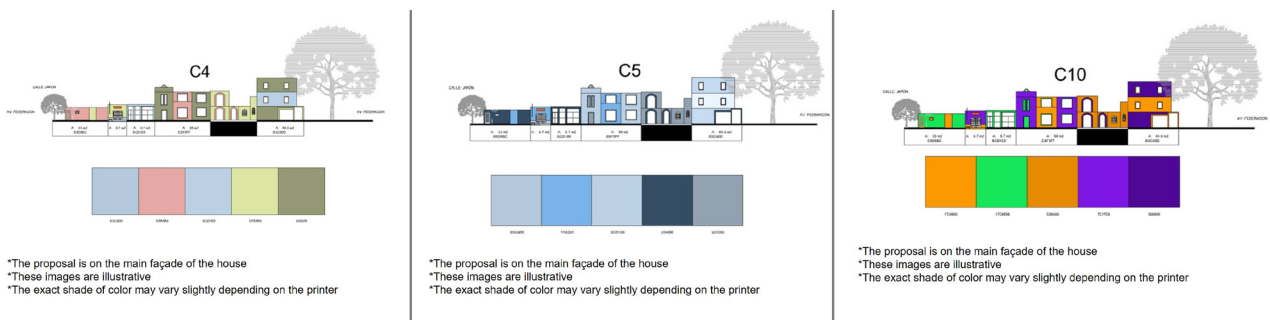

Figure 10. *Final design proposals for the application of chromatic intervention. Source: self made.*

As can be seen in the images, the work had to combine knowledge and practice of various design tools, color language and theory, and communication and teamwork to coordinate the final results.

The last of the three projects selected for this article, and the most recent, represented the opportunity to put into practice everything learned in the previous projects. The difference was that, in this case, the private initiative came forward to request the project, which allowed the students to get involved in it from its conception to its execution.

The main idea was to generate a chromatic and artistic intervention for one of the emblematic streets of the Ixtapa delegation, also the city of Puerto Vallarta. Here the students were able to interview the businessmen, to find out their concerns, preferences and needs regarding providing harmony and color to the street, to revalue it and highlight the identity of the area, through the improvement of the urban image,

from the color, but also adding the design and execution of murals in the restaurant that called for the project.

The first challenge was to select the colors for the intervention. In this case the work was different, since it was based on the colors that the businessmen had previously worked on for the restaurant brand. In figures 11 and 12 you can see the selection of the palette to begin the design of the chromatic proposal.

Figure 11. *Color palette of the La Tienda Grande restaurant. Source: self made.*

Figure 12. *Selection of two main colors for the proposal of chromatic harmonies. Source: self made.*

Once again, the students, in dialogue with the businessmen, selected the color pink as the protagonist to make the first color harmonies and present the application proposals on the facades. In figure 13 you can see the work exercise with the proposed colors and chromatic harmonies.

Figure 13. *Development of chromatic harmonies for the intervention proposal. Source: self made.*

From this point, with the businessmen and neighbors, the proposals for these harmonies applied to the facades were presented and the final proposal was chosen, with which the students carried out the chromatic intervention design, which can be seen in figure 14.
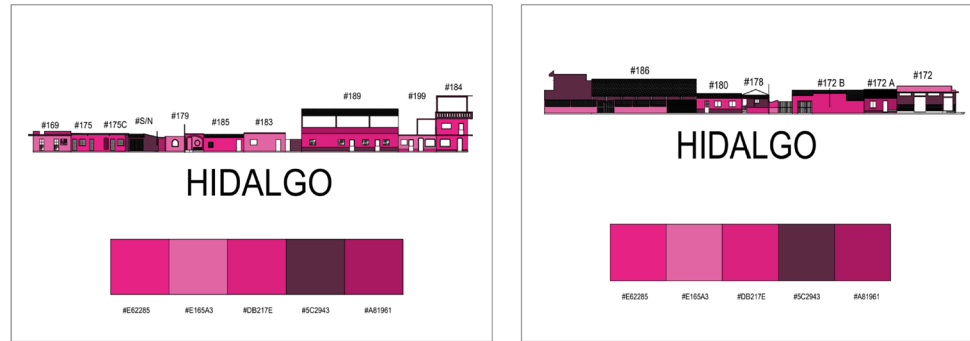

Figure 14. *Proposal for palettes applied to Hidalgo Street.*
Source: self made.

At this point a new challenge arose, which was to generate all the technical sheets and organize the work for the execution of the chromatic intervention, and parallel to this, conduct interviews. The students—of Visual Arts, along with those of Design and Communication and Multimedia Design—interviewed neighbors and businessmen to rescue the traditions and history of the building where the La Tienda Grande restaurant is located today, seeking to generate the proposal of themes for the artistic murals that would appear on the restaurant's façade. Figure 15 shows an example of the technical sheets made by the students.
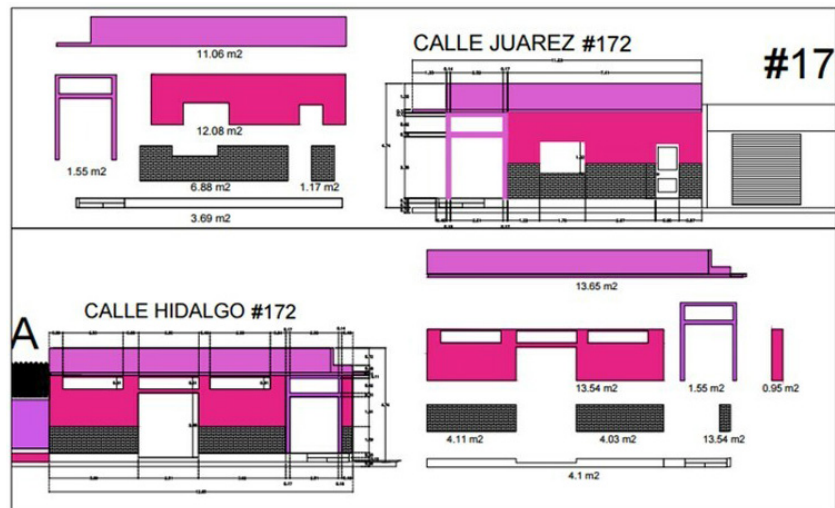

Figure 15. *Technical sheets per facade to be intervened.*
Source: self made.

The exercise of designing the murals and their final application and execution was a new learning experience, in this case, for the Visual Arts students, who had to adjust their designs and execution to a restricted color palette, which allowed They could also think about color and its integration from the scale of the sketch to the large format of the mural, but also the integration with the rest of the urban chromatic design.

Finally, figures 16, 17 and 18 show the final result of the execution of the intervention. They show how the same students who participated in all stages of the project also had the experience of painting, coordinating as a team and generating a solidarity contribution to the community through community work, recognizing, at the time of applying the paint , the power to transform the perception and aesthetics of the urban image through design and color.

Figure 16. *Chromatic intervention on Hidalgo Street in the Ixtapa district. Source: self made.*

Figure 17. *Chromatic intervention on Hidalgo Street in the Ixtapa district.*
Source: self made.

Figure 18. *Images of the murals made on the façade of the La Tienda Grande Restaurant.*
Source: self made.

It should be noted that, after the chromatic execution, the Multimedia Design students developed a video in which they rescued the stories that neighbors, students, teachers and businessmen could share regarding this experience, narrating anecdotes from before, during and after the intervention process. , as well as the reflection on the entire project carried out. Likewise, at the time of writing this document, Architecture students are participating in the application of a project evaluation instrument to reflect on its opportunities and strengths, as well as to record the impact it has generated a few months after its completion in the community.

Conclusions

As can be seen throughout the document, the purpose of this work was to show three teaching-learning experiences of the language of color and its use from a multidisciplinary perspective, which places the main focus on the use of color as a didactic tool to generate in students with significant knowledge and also to highlight reflection on their role as a leading element, which evokes emotions and perceptions, and which, when taken to different scales, accounts for their cultural construction.

It is important to note that in the three cases described, the importance of studying and learning color from a perspective that opens our gaze and allows us to position ourselves as subjects who experiment with colors is highlighted. In this sense, color becomes an element that evokes countless meanings, with which it can be narrated, expressed, communicated and given meaning, through the various disciplines that take it as a protagonist and, ultimately, as an element of cultural construction.

Likewise, when the commitment is made to the participation of students in "applied creation" processes, as mentioned by Josef Albers (2003), it can be observed that these processes constitute effective tools to awaken interest in color from research to production. critical reflection, from individual work to collaborative team work, and the possibility of experimenting and creating situations about color perception that would otherwise be part of theoretical concepts, with little application in professional practice in the different disciplines of the field of art and design.

As Báscones Reina (2019) mentions, in the current higher education system we are faced with the need to establish new methodological strategies for the study of color that allow transversality between theoretical and practical knowledge. And we are convinced that exercises and projects such as those presented in this document can help generate new paths for the study, research and, finally, the learning of color as a powerful resource for art and design in current teaching-learning.

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