

SPATIAL INSTALLATIONS FROM INCIDENTS OF LIGHTS AND SHADOWS APPLIED IN ARCHITECTURE TEACHING

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Abstract

The use of light and shadow as natural compositional elements in art and architecture has been a tradition in the ancient and modern world, constituting part of the understanding of spatiality, the generation of environments and the relationship of the environment with the living space. In recent times, the emergence of technological resources has led to the use of artificial light, as a diversifying device that generates different possibilities of re-configuration of spaces. This has allowed spatial interventions to arise from the reflection of light altering the ways of how it is perceived, communicated and interacted with the architectural and artistic forms ordered by light. These manifestations allow that from the educative surroundings incentive spaces of experimentation that potentiate the spatial thought, from the handling and understanding of compositional criteria and the understanding of the representation of the light and the shade in the architectural space.

Keywords

Architecture, space, composition, light and shadow, perception, installation.

Introduction

Light, far from being a physical phenomenon that alters our relationship with materiality, has become an essential component of designed space, while the natural or artificial combination transforms the perception of shapes, volumes, spaces and environments, a fascinating man from different times and cultures. The spaces designed to meet the needs of human habitation, comfort and leisure take advantage of the variables and characteristics of light as a resource to stimulate the senses and the aesthetic enjoyment from their contemplation, interaction, and mediation.

In architecture, light has become a language that, together with shadow, geometry, and color, constitute compositional pillars in the art of transforming and adapting space to human needs. This influence is reflected

from the first religious and ceremonial constructions; for example, the average age was given in the light qualities of beauty and purity, whose perceptions are maintained until our days.¹In modern times, the use of light manifests itself in a permanent way in architecture, this is how its reinterpretation is seen in the works of architects like Le Corbusier, who expresses in his work the use of light freely, being for he a fundamental basis of architecture². Another example in the use of light as a source of inspiration is presented by Tadao Ando, who found in the light a way of understanding and living architecture³, or Peter Zumthor with his work Therme Vals⁴ where light is combined with the darkness of the materials such as stone, water reflections, and steam. These, among other examples, constitute references of the historical importance of the use of the light and the shade in the architecture.

Hand in hand with technological advances gave way to artificial light, which is present in most buildings and urban and rural spaces. A situation that besides the study of the physical characteristics of light, has allowed configuring the architectural space, understanding the characteristics of the technical and aesthetic elements that intervene between light, space and the observer⁵.

It is precisely this understanding of the use of artificial light that has allowed proposals such as the architects Jean Nouvel with the technological façade at the Arab World Institute in Paris⁶ or the labia with the Dexia towers that in addition to using the led light, generates visual information about the city's climate⁷. In addition to these works, there are different examples especially in

¹ Díaz, *The knowledge of architecture and the arts*.

² Pauly, *Le Corbusier*.

³ Baek, *Nothingness*.

⁴ Hauser, Zumthor, and Binet, *Peter Zumthor Therme Vals*.

⁵ Caveda and Alcojor, *Artificial lighting is architecture*.

⁶ Farrelly, *Basics Architecture 02*.

⁷ «Dexia Towers Rainbow LEDs / Lab-Au».

technological lighting facades that take advantage of the use of artificial light, to generate possibilities from interactive experiences or transmit information.

Architects, designers, and artists around the world have taken up the task of using artificial light at smaller scales, making permanent or temporary artistic interventions. This is the case of Selgas Cano⁸ architects who with their lighting installations play with color, transparencies, and structures to produce different sensations in their viewers.

Understanding the principles of light, both natural and artificial, becomes an indispensable and fundamental knowledge of every architect in training, constituting themselves as conscious subjects of the possibilities that the forms have constructed when interacting with light, allowing them to represent the space more beyond the traditional forms, reconciling in some way the built space with the human scale.

In articulation the previous reflections the teachers of the area of representation of the School of Architecture and Urbanism of the city of Manizales- Colombia, have developed a training strategy based on the execution of a compositional exercise through spatial interventions using light and shadow, which is based on highlighting the articulation potential of some geometric compositional principles developed in the semesters of foundation. This is how the students of the first levels of the architecture career have been sensitized, in the use of light as an instrument that shapes the space, an enhancer of the delimiting materiality and a resource for the enrichment of the interaction with the spaces.

This practice was carried out through the development of a short-term workshop, which allowed the material construction of lighting installations applying the basic concepts of design such as geometry, shape, composition, symmetry, among others and intervening the campus space. The Cable of the University National of Colombia at the Manizales headquarters.

The teaching exercise is described below from the planning, the execution process and the results obtained in this experience.

Antecedents

In the School of Architecture and Urbanism the practice of carrying out spatial interventions as artistic installations, has been carried out since 2016 in a recurrent manner, by linking teachers and students in

⁸«Life after Serpentine».

proposing so-called vertical workshops in the area of representation, in which students apply creative responses collectively for the exploration of compositional concepts and project representation.

Likewise, competencies such as teamwork, planning, and development of projects, the anticipation of problems, creative resolution of situations, coordination of activities and the materialization of ideas are evident. This serves the objective that students of the first levels of architecture training can improve their knowledge in two-dimensional and three-dimensional representation techniques.

The frequency of these transversal training exercises is annual, a situation that has led to the generation of working groups of students of different levels of training, where those who are newly admitted to the program have the opportunity to share and learn from more experienced colleagues; likewise, those with more experience will be able to socialize the knowledge acquired, in a relationship of reciprocity that promotes the exchange of knowledge and knowledge management.

The workshop not only attended the development of a spatial intervention, in addition, but the students who participated also had to register the creative process that they developed jointly through representations such as sketches, perspectives, isometrics, and diagrams.

Method

The vertical representation workshop held in 2018 was proposed under the name *In the Just Measure*, to motivate the development of three-dimensional compositional explorations in which concepts related to space are applied, integrated with basic compositional elements of harmony with light, shade, and proportion.

The premise of the workshop was the use of generative growth patterns based on the principle of the Fibonacci sequence, the coherent and adequate handling of colors, textures, and shapes, as well as the projection of light and shadows on one or several surfaces.

The three-dimensional composition should include a directed light source, continuous, intermittent or multi-directional light; contained in the composition and of autonomous character, which will work without relying on electrical installations or power connections. Students were asked to use recycled materials at a minimum ratio of 90%.

For the execution, it was based on a design process

consisting of three main phases: *Think, project and materialize*, which allowed to unify the processes and guarantee the obtaining of the results. The stages proposed in the exercise were: create, compose, intervene, and had to be recorded in a work log in which they showed the communication of their ideas and where through sketches, elevations, plants, and perspectives, they addressed the themes developed in class and recognized the drawing the value it has within the design process⁹.

Finally, the students constructed three-dimensional objects with self-supporting characteristics, with which they intervened and modified the free spaces of the building. The socialization of the process was carried out by means of an exhibition by groups, which consisted of detailed socialization of the phases, processes, and participation that took place in the development of the project and as a strategy to demonstrate the light qualities of the material exploration. The final exhibition was held in the evening hours with the participation of the academic community of the School of Architecture and Urbanism of the National University of Colombia Sede Manizales.

Results

The lighting installations carried out by the students and which resulted from this workshop focused on highlighting the properties of light and shadow as constituent elements of the presented compositions. The materiality of the constructions included a large part of recycled materials, such as paper, cardboard, and wood. The use of color and modularity, based on the Fibonacci frequency, allowed students to play with basic geometric shapes that, when intervened by light, reflected in the shadow the distortion game that allowed directed artificial light, see figure 1.



Figure 1. Group 10: Andrés F Puerta, Daniel S Morales, Sara G Monsegny, Brayan E Perez, Germán A Roa, Daniel A Morales, Juan F Neira. Own photography.

As part of the creative process, some work groups proposed the use of transparencies and volumes that would allow internal displacement, that is, the realization of a journey, which when installed facilitated the re-signification of the daily spaces of a university building in a sensory experience through the play of lights and colors, see figure 2 and 3

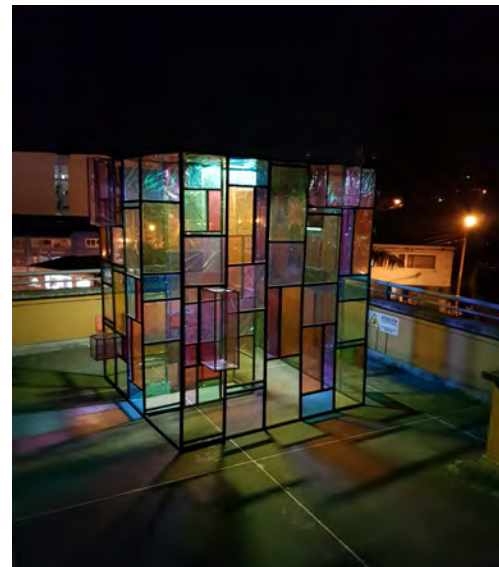


Figure 2. Group 17: Leidy V Jurado, Jhon J Jaramillo, Mauricio C Marín, Andrea C Ortiz, Valeria G Vásquez, Daniel Escobar, Harold Franco. Own photography

⁹xxxxxxxxxxx, «Drawing Teaching Strategies: Representation Medium and Spatial Analysis Applied to the Project Process».

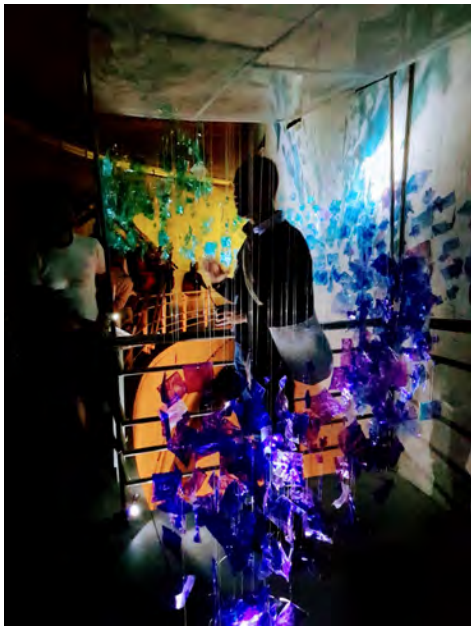


Figure 3. Group 11: María I Parra, Laura C Sierra, Javier A Camayo, Johan M Betancourt, Silvia P Cardona, Mariana Roa.
Own photography

The results of the lighting installations were diverse in relation to their application of the properties of light and shadows in different paths with geometries and unconventional explorations. The possibilities of transformation and intangibility of light, sought reflection on the emotional experience of the observers to interact with each of the works, seeking a renewal of living in everyday spaces in an artistic experience.

This exercise as a creative workshop presented 25 lighting installations made by students of the first levels of architecture, constituting an attractive, applicable and demonstrable training experience, which is replicable in other architectural training scenarios. The experience allowed the academic community in general to appropriate the concepts of light and shadow that are basic in the foundation of the architect's creative process.

Conclusions

The teaching and learning process in architecture requires collective participation exercises that are proposed, structured, developed and evaluated, evidencing the transversal application of the concepts. The approach of a project process generates an awareness of how to approach the creative process and the importance of different forms of representation to develop a project proposal.

Light and shadows are fundamental elements for the understanding of space in students, as they facilitate the

understanding of material subtractions, the projections of bodies and virtual materialities. This resource has been little explored in a formal way and in which interventions tend to be carried out intuitively, as a result of the unconscious experience with light.

The vertical workshops allow the exchange between different participants, a situation that enhances teamwork as a strategy for knowledge management. These are represented as short learning laboratories, where constant collaborative interaction allows us to explore the different possibilities of representing space both in an analogous and virtual way and in a real way through the materiality of facilities that intervene in a space.

The approach of artificial light, as a requirement and the use of the resource of the penumbra, as configurator of the installations, allowed to understand the artificial light as an intangible material that can be manipulated and transformed according to the intentionality of the one who creates or intervenes a space, resources that the architect must welcome as important inputs in the understanding of space as a place for human beings to develop their potential. In this sense, the architect must have the ability to achieve that the spaces created interact with the needs, interests, and capabilities of those who inhabit it, by configuring architecture communication codes, among which light stands out.

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