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**“The José Villagrán García’s Theoretical Notions
and their Application to the Architectural Project
during the modern era in Mexico (1925-1954)”**

(José Villagrán Garcíaの理論的概念とメキシコにおける近代建築プロジェクトへの応用 (1925年 - 1954年))

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"Everything we are is the result of what we have thought: if a man speaks or acts with cunning, pain follows him. If he does it with a pure thought, happiness follows him like a shadow which never abandons him."

Buddha

With love, to my family

Abstract

The modern era in Mexico represents the historical moment with greater ideological, social, political, architectural, and urban transformation of the country. With the modernization of Mexico, not only industrial innovations and academic openness came, but it also proved to be the ideal moment for the development of new philosophical thinking and to face new social demands.

One of these new philosophical proposals was by the architect José Villagrán García (1901 – 1982), who was a modern architect worried about the lack of identity in the Mexican architecture. Villagrán studied in the National School of Architecture (NSA) (1918 – 1923). Then (1924 – 1980), in the same school, he was Professor of “Elements of composition” and “Theory of architecture” teaching the new notions, concerns, and formal approaches for facing the modernity in Mexico.

The main objective of this study is to clarify the theoretical notions of José Villagrán and its application in the architectural project during the modern era in Mexico (1925 – 1954). To solve the research aim, this research involves a comparative analysis of the different sources of information such as books, letters, plans, sketches, magazines, and interviews.

In the first stage of this research, the historical and academic background related to Villagrán are recognized; as well as the first teachings that Villagrán spread after joining the NSA as Professor. Through the categorization of this information, the origins of his theory could be established. In a second stage the questions and first speeches, raised by Villagrán, were analyzed and arranged temporarily recognizing the development of his thought and determining the correspondence with his architectural works. On that foundation the Villagrán's theoretical notions were identified.

On the another hand, the Plastic Integration Movement (1934 - 1954) is one of the most transcendent historical event within this study. Because it occurred within the Mexican modern era and during the desig and construcion of University City (CU) which is the iconic project that represents internationally the modernity of Mexico. This historical moment allows us to counteract the thought of Villagrán with the philosophy supported by this artistic movement. In this stage two

fundamental notions, ornament and decoration, were examined to synthesize the way in which Villagrán faced the Plastic Integration through his theoretical proposal, on the same way, to establish the characteristics of the CU program and to define the reasons why Villagrán excluded the plastic arts from his projects, specifically from the NSA.

Finally, it was recognized the stage of thought in which Villagrán designed the NSA discussing his historical background being able to establish the correlation between the design methodology and the Villagrán's theory to accomplish the architectural solution.

This study reveals that during the Mexican modern era (1925 - 1954), Villagrán was the architect and theoretician who proposed three fundamental theoretical notions: "modern architecture", "the human", and "modern architect"; which helped him to understand the characteristics, the society needs, and the historical moment that Mexico was facing. In addition, through these notions, Villagrán was able to develop his theory which would give answers to the Mexican architectural modernity and; on the other hand, to raise the new foundations in the teachings at National School of Architecture during the '30s to '50s.

Based on this exploration, also it is possible to affirm that the application of his theory, specifically at NSA project, is directly linked to his practice and to his objectives as the founding architect of the transformation of the parameters of aesthetics. Because, despite Villagrán was influenced by architectural styles and foreign thought of architects such as Le Corbusier, Bauhaus School, Gropius, Giedion; Villagrán managed to reinterpret, from the context of Mexico, functionalist concepts like "the geometrical harmony", "the style", and "the rational logic" but connecting them with the Mexican architectonic tradition. On the same way, Villagrán, avoided to apply plastic works (muralism) to his works in answer to rescue the sincerity and essence of the architecture as an integral plastic art.

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Chapter 1.

Introduction and Research Framework.

1.1 Introduction

According to Rowan Gibson (February, 2016), a notion or idea is configured based on organized thoughts, that is, it is necessary to have previous knowledge and experiences which generate concern about a certain issue. (Gibson, 2016). It means that, the first step in the development of a notion is a question (impulse/motivation) for define the concept which want to be understood.

On the same way, for this study, is necessary to determinate what is *theory*. (Fig. 1) For Max Horkheimer, (Horkheimer, 2003) the theory is equivalent to a set of propositions about a field of objects, and these propositions are so related to each other that some of them can be deduced the others. That is, the theory is the accumulation of knowledge in such a way that it becomes usable to characterize concrete events. In relation to these events the theory will always turn out to be a hypothesis.

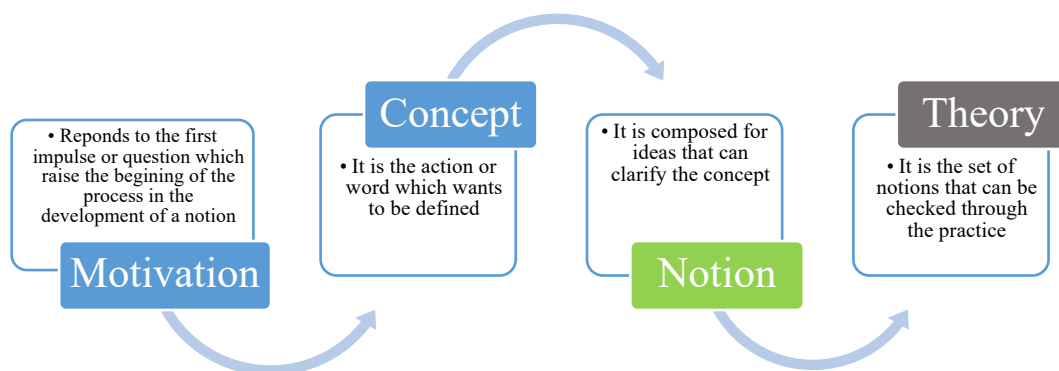


Fig. 1 Scheme of the process in the development of a theory.

In Mexico, the motivation for the development of an architectural theory was determined by the social ideological change during the Mexican Revolution (1910 - 1920) and the introduction of European architectonic styles. This social movement was organized on general guidelines and objectives, excluding specific programs to

reformulate each areas of social life; including the professional practice of architects. The lack of theoretical foundations in the architectural work, the new social needs, and the loss of identity in Mexican architecture inspired to, Mexican architect, José Villagrán García to develop his architectural theory. During the twentieth century, Villagrán settled "his action in the theoretical field formulating the doctrine which was constituted as the guideline of the new architectural practice" (Vargas Salguero, José Villagrán García, *Architectural Doctrine*, 2007) in the modern Mexico.

1.2 Context for the Problem

In Mexico, the problem in the approach of the theory of architecture was in the valuation (architectural value) of the new Mexican aesthetics from the inability of modern architects to solve the social demands of the Revolution and the detachment of the popular class.

At the same time, the opposition of the modern architects, who were profiling against neolitism, was presented. This intention was not intended to constitute artistic progress, nor was it consistent with the content of revolutionary programs. Through this, they demonstrated their unknowledge to integrate into the new culture that demanded transformations not only of the artistic codes but of the ideological foundations of Mexican society. This problem represented, in twentieth-century Mexico, the urgency to develop new theoretical concepts and redefine the architectural principles which would govern the characteristics, function, and objectives of the architecture that would represent to Mexico in international modernity.

On the other hand, there is the emergence and institutionalization of architectural functionalism in Mexico, spanning a period that began in the second half of the 1920s and culminated in the late 1930s. This was the stage of consolidation of the Revolution; in it, the caudillismo would becomes as a style of government to give rise to the establishment of social and political institutions that would carry forward the development project of the Mexican system. (López Rangel, 1996)

It means that the implementation of a theory of architecture did not mean the reclamation of architecture in Mexico; in addition, the presentation of a theory that could be applied to the architectural project was required. Because the introduction of European influences, mainly French, had led to an image that synthesized the Spanish colonial past and the Porfirian Frenchness in an architectural eclecticism; which did not satisfy the primary objective of architecture: to respond to the social needs of a post-Revolutionary population.

Through this brief historical background, can be recongnized six basic characteristics within the context of Mexico between 1921-1954:

- Migration from the rural sector to the city
- Need to provide housing for poor social classes
- Social demands for access to education
- Exponential growth of the population in the city
- Industrial development
- Create an architectural image that responds to the political ideology of the moment

These characteristics are which surrounded Villagrán thought during the exposition of his theoretical notions, in the development of his architectural theory and in his practical application in the architectural project. (Fig. 1)

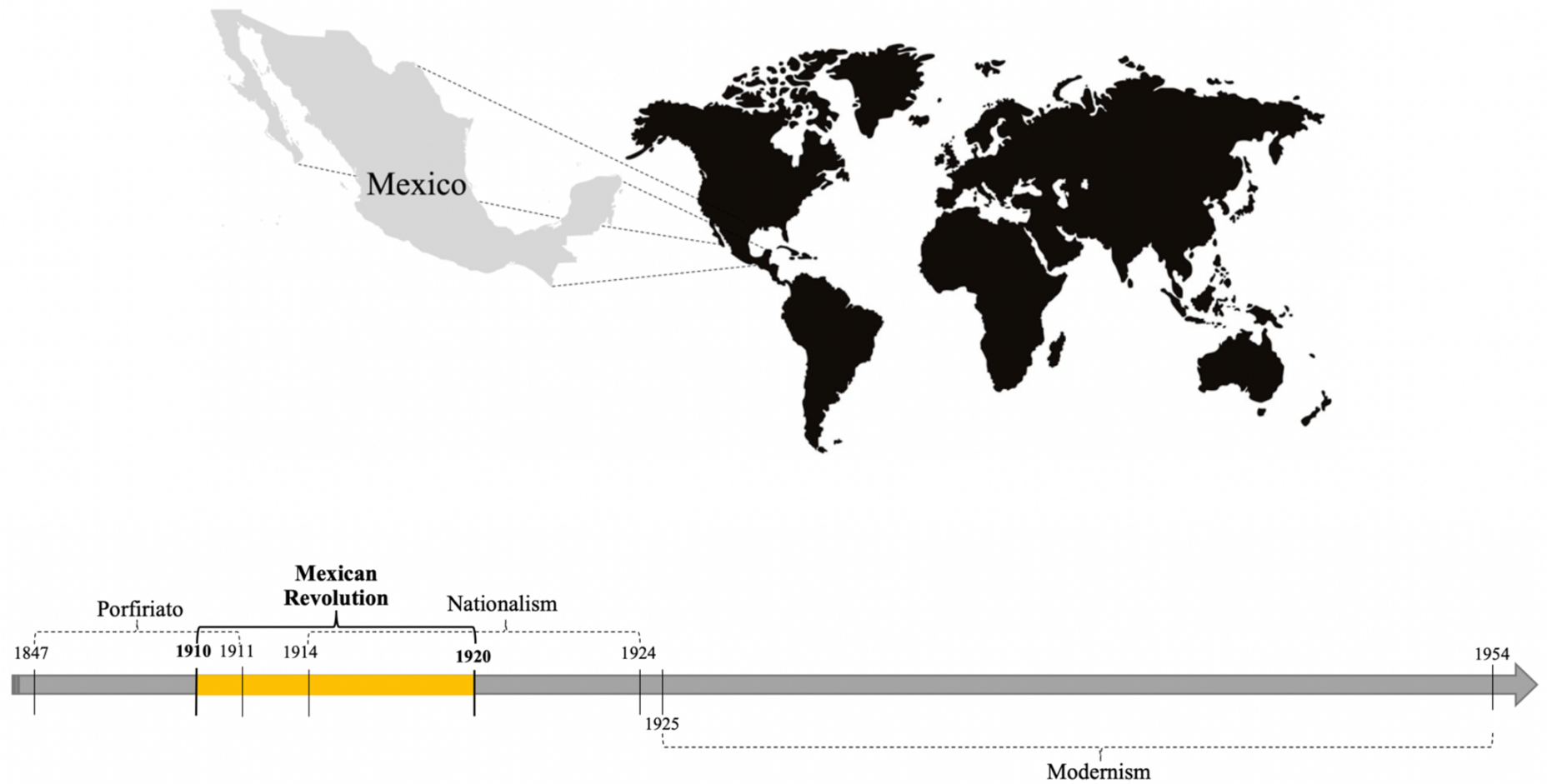


Fig. 2 Geographical and historical context of the problem

1.3 Statement of the Problem

The problems raised by the international architectural modernity represented challenges in the approaches of the theoretical foundations that justify the aesthetic, spatial, and formal proposals of the architects. In Mexico, during 1920 - 1950, (Fig. 3) is the time that represents the period of crisis and strengthening of new approaches to the architectural solutions of the country. The social and political demands are two fundamental axes in the understanding of the theoretical proposals because they determine the culture in which their concepts will be disseminated and applied.

The first proposal by the Mexican architects was to incorporate into the local construction the concept of rationalist architecture, which since the 1920's was valid in the Central European countries, especially with the transformation movements headed by Walter Gropius in Germany (with the design of Bauhaus School) and by Le Corbusier in France; (Fig. 4) who with different local variants formulated theoretical positions based on three elements: a) the need to solve the problem of collective housing generated by population expansion, b) the maturation of the expressed approaches by some architects from the 19th century in favor of a greater expressive sincerity in the construction, and c) the incorporation into the architecture of the theoretical concepts developed by the new European painting. (De Anda Alanís, 2013)

Between 1925-1965, the international style began to become the main influence for Mexican architects. According to Henry-Russel Hitchcock & Philip Johnson (1932), the appearance of mass with static solidity - until now the primordial quality of architecture - had practically disappeared; instead there was an appearance of volume, or more accurately of flat surfaces that delimit a volume (Frampton, 2009). The main architectural symbol was no longer the solid brick, but the open box. In fact, the majority of buildings were and are in essence, and in appearance, simple planes that surround a volume. The architecture became the construction of the skeleton wrapped by a protective screen. In addition, the fact that the international architecture represented a deceptive homogeneity, because its flat and nude forms were modified subtly to respond to different climatic and cultural situations. (Frampton, 2009)

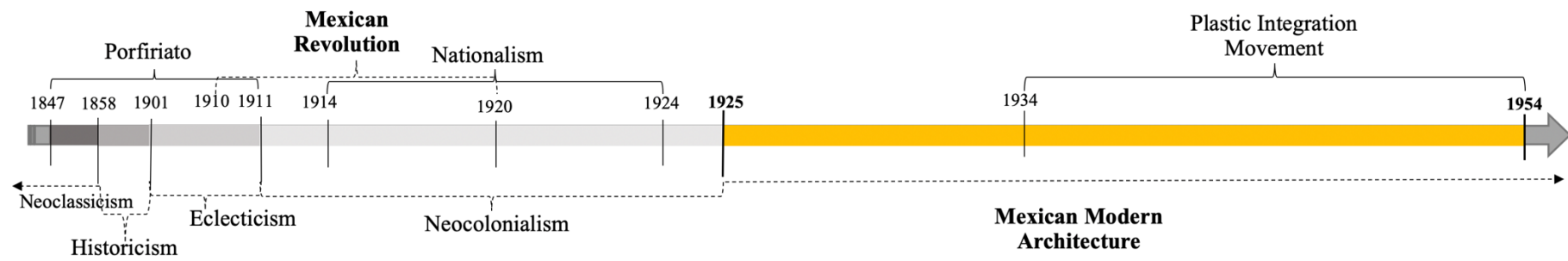


Fig. 3 Temporary statement of the problem according the Mexican history

Chapter 1. Introduction and Research Framework

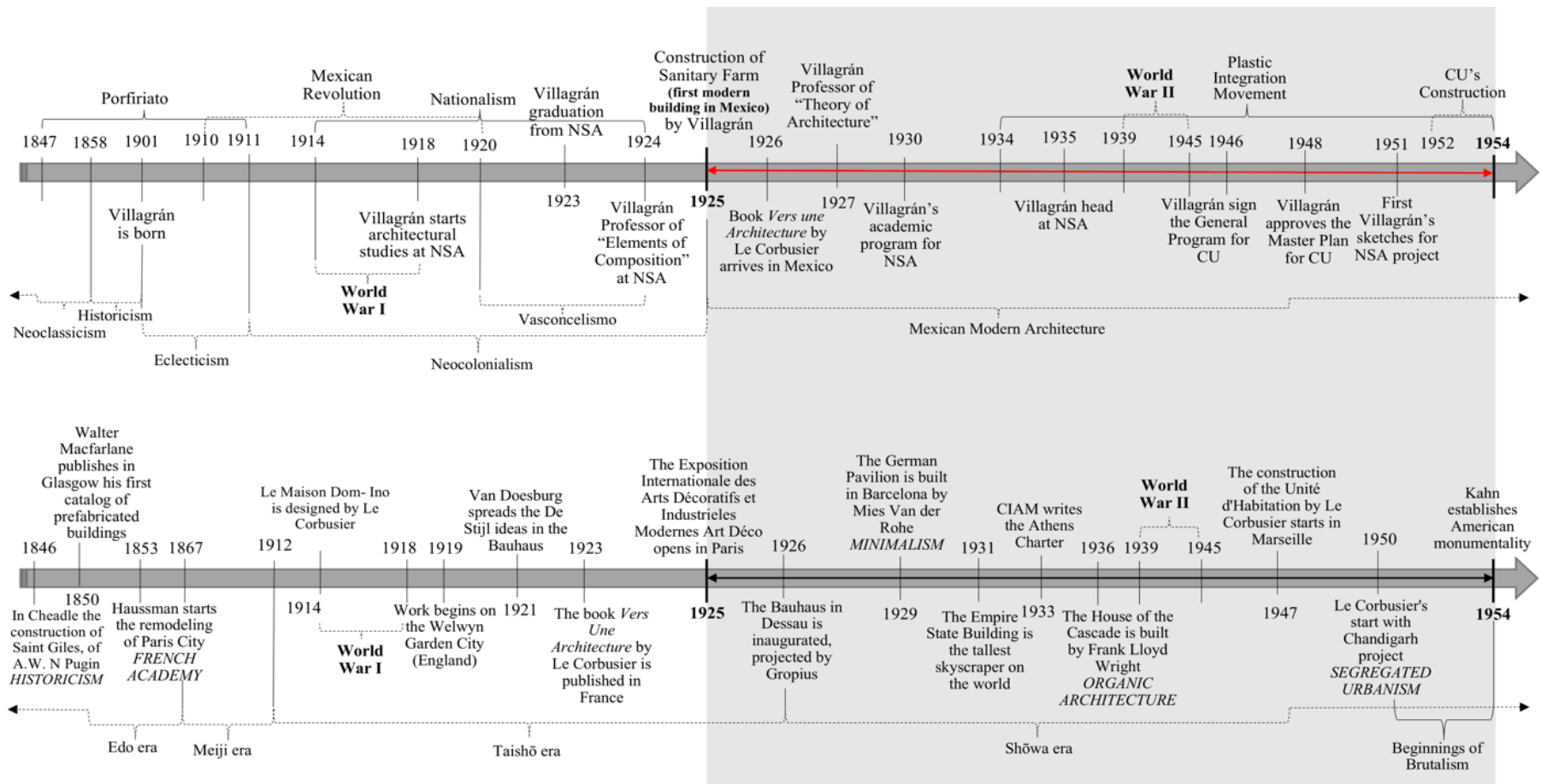


Fig. 4 Historical statement of the problem according the international architectural context

For Mexican architecture, this represented a way in the standardization of modern architecture, forgetting the aesthetic characteristics demanded by society, and copying a pre-established style under a universal language which would propitiating the loss of identity in the architecture developed in Mexico during modernity (1925 – 1954) because there were no theoretical foundations to guide the architect's function. This period coincides with the cycle of social, ideological, political, and cultural reconstruction of the country. For this reason, one aim was to protect the identity in architecture as a symbol of Mexican modernity, trying to rescue the collective memory. Torabi and Braham (2013) affirm that the identity in architecture represents the thoughts of its own people, thus creating distinctive architecture in various periods and locations. This idea accords with the thought of José Villagrán developed in his Theory of Architecture.

The starting point of José Villagrán, predominantly idealist, and the adhesion to the axiology of Max Scheler, made the theme of "values into architecture" (useful, logical, aesthetic, and social) into the central point around which he developed his architectural theory. (Gozález Pozo, 2004) In his theory, Villagrán always affirmed that the architecture is a constructive doing that pursues complex purposes and in which, in addition, the inspiration or the intuition leave a usable margin for the rigorous exercise of the reason. (Gozález Pozo, 2004)

On the other hand, the practical proposal of José Villagrán was based on the understanding of social needs and their rational solution. (Gozález Pozo, 2004) Villagrán, first analyzed in detail the requirements to which spaces should respond and, only then, he continued prefiguring the project.

The discussion of this research is to examine, how José Villagrán managed to establish his theoretical notions about modern Mexican architecture despite the influences imported from Europe, to synthesize the solution to social needs in his architectural theory, and how to link his theory to the architectural practice of the modern era, trying to preserve the Mexican tradition and identity.

1.4 Research Questions and Hypothesis

Through this study, it is examined if the theory of architecture developed in Mexico by José Villagrán, was able to satisfy the social, aesthetic, constructive, and economic needs in the Mexican modern era. In addition, if application of the Villagrán's architectural theory in the practical-creative process, could insert to Mexico into international modernity; rescuing tradition and having as result the architectural transcendence and the transgression of the architectural styles imposed during the Porfirism.

1.4.1 Research Questions

The purpose of the research is to clarify the application of the Villagrán's theoretical notions to the professional practice of modern Mexican architecture (1925 – 1954) and answer the following questions:

- How did Villagrán, developed an architectural theory which allowed architects to satisfy social needs and understand international modernity?
- How did Villagrán manage to generate awareness among Mexican architects through his architectural theory?
- What is the application of the Villagrán's architectural theory?

1.4.2 Hypothesis

The social, political, and cultural conditions of Mexico after the Mexican Revolution (1910-1920) explain the ideological change in the population. The demands in architecture mark the need for new approaches in formal solutions and their theoretical foundations.

Throughout history, there is confusion in the definition of "values" within the construction of the theoretical foundations of architecture (Vargas Salguero, 1993). The ideological development of Villagrán allows understanding that, independently of the axiological problem, it is necessary the introduction of anthropology to the theory of architecture as an indispensable resource in understanding the practical objective of Architecture.

Villagrán proposed his theoretical notions from a "pluralist" approach (Vargas Salguero, 1993), to understand the primary values by demarcating the architectural works of the exclusively aesthetic. Pinocelly (2004) affirms that the theoretical notions of Villagrán are far from the thinking of the theoreticians and architects who, for the sake of modernity, base the creative process on the formal (aesthetic) solution. In addition, Villagrán's theoretical notions, included in his axiological proposal (plastic - aesthetic values), are based on the correspondence between theory and practice.

According to Villagrán, the architecture is constituted by diverse values (social, aesthetic and logical util), not only the aesthetic one. Any design and architectural solution that is not in correspondence with its historical moment and which excludes the understanding of the social, the useful construction, and the logical composition can be considered a sterile work.

Before the dissemination of the theoretical notions of Villagrán, modern Mexican architecture was based on the modification of external appearance, following this trend from the nineteenth-century academicist concept (De Anda Alanís, History of the Mexican Architecture, 2013). Villagrán has the cultural model that meets the social demands in correspondence with the purposes marked by modernity and Mexican tradition.

1.5 Objectives of the Study

Through this research, first, we clarified the social, cultural, and political characteristics during the period of the Mexican Revolution (1910-1920) and the Mexican Post-Revolution (1920-1954), which influenced the first questions and speeches made by José Villagrán during the development of his theory. On the same way, we examine the philosophical and ideological influences on which Villagrán based the construction of his theoretical notions to establish the process and the characteristics of the implementation of his theory as a foundation in the development of the architectural projects of Mexican modernity. In addition, it is determined if the practical application of Villagrán architectural theory turns out to be effective and there is a direct correspondence between them.

In this way, it is determined that this research has three primary objectives:

- Identify the motivations and questions that guided to Villagrán in the process of developing his theoretical discourses.
- To determine the theoretical notions in which Villagrán developed his architectural theory.
- Explore the adaptation of the theory of Villagrán to professional practice.

1.6 Research Methodology

The research methodology (Fig. 5) used for this study consists of: review of literature, specialist interviews, collecting original sketches, plans, and writing made by José Villagrán, and analysis of case. Outcomes from the review of current literature contributed to the development of objectives of this study. Also, literature review evidenced the context that gave origin to the modern movement in Mexico, the historical, social, and political background during the development of José Villagrán theoretical notions.

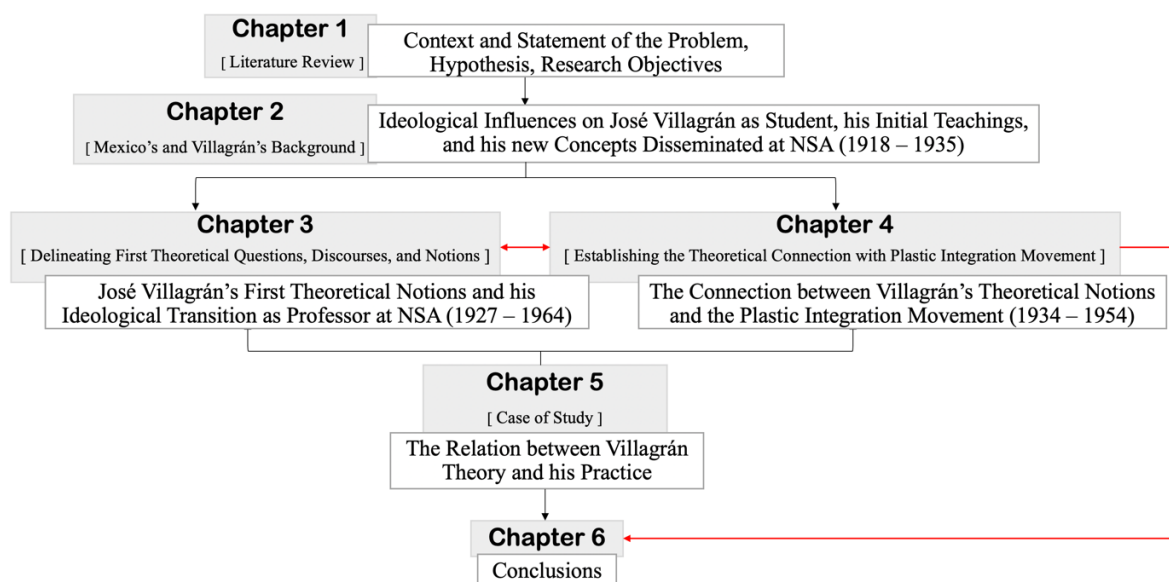


Fig. 5 Scheme of the research methodology

1.7 Literature Review

The literature review is developed according to the José Villagrán's theoretical development and the Mexico's history because some sociopolitical events connect them. There is the creation of theory from two ways: the former relies on the process of induction—from the particular to the general, tangible data to general concepts—while the latter is rooted in deduction—from the general to the particular. (Mintzberg, 2014) The literature reveals that, in the beginning of his theory, José Villagrán García starts his theory, understanding general notions, answering some questions, and finally writing some discourses. (Aguilera Vieyra & Sendai, 2018)

In the Villagrán foundations was fundamental the understanding of “The purpose of the architecture”, (Carreño, 2015) to rescue the concept of “The human”, (Villagrán García, 1940) at the same time to reflect about the dichotomy defining the architecture as science or art in the modernity. (Villagrán García, 1963)

On the other hand, it is important to recognize the influences around the Mexican architecture during the 21st century, for instance, the influence of several French theorists (Guadet and Reynaud) on Villagrán (Dasques, 2008). In this period, the Le Corbusier's influence was transcendental in the thinking of several Mexican architects as Juan O'Gorman, Luis Barragán, Mario Pani, Juan Sordo Madaleno, Augusto H. Álvarez, Pedro Ramírez Vázquez, and Teodoro González de León. (Adrià, Le Corbusier and the Mexican connection, 2013) (Adrià, 2016) However, the dissemination of Le Corbusier's notions only was possible with the Villagrán's role in the National School of Architecture of Mexico (NSA) and also building the Mexican modernity through the designing of public buildings, such as hospitals and schools. (Carreño, 2015), (Vargas Salguero, 2001)

Although, through these studies is possible to understand important data related with the general Villagrán's background, the first steps in the establishment of his theory, and some of his influences received during his academic and professional life; they have not clarified the precise influence received during his academic life, teachings, and how he introduced and disseminated his new concept at NSA in the modern era in Mexico.

Villagrán was Professor for more than fifty years at NSA. He became member of different committees, one of them was the University Committee selecting the Master Plan for the construction of University City (CU) in Mexico and the head of the program. On the same way the literature describes three experiences that architecture students had with him during process of selecting the CU's master plan and some study trips to construction sites where they observed Villagrán's works. (González de León, 2002)

During the construction of CU (1950-1954), Mexico was facing the Plastic Integration Movement, for this reason in the theoretical development of Villagrán the notion of "Plastic Integration" was explored. (Aguilera Vieyra & Sendai, José Villagrán's notion of "Plastic Integration" in the Architectural Design, 2018) About this historical period, Louise Noelle, describe three collaborations in Mexico between architects and artist showing the beginning of the connection concerning architecture and plastic arts. (Noelle, Mario Pani in the Venezuelan Context, 2012) Leticia Torres (2008) focused narrating the history of Plastic Integration in Mexico (1940-1955) from the position of Mexican painters, sculptors, and architects. However, these researchers mainly discuss the Plastic Integration from its historicity avoiding to study the reasons and how the Plastic Integration Movement was taken during the Mexican modernism.

In Mexico, over 20th century, the mural painting was considered as the public art which develop the social memory and identity and the architecture as the canvas for the artist. (Mandel, 2013) But, behind the social aims, the real message of mural painting was based on political interests, trying to change from capitalism to socialism. (Arregui Fernández, 2014) Making a brief comparison between the Plastic Integration Movement in Mexico and the Synthesis of the Arts developed in Europe, it is important to point it out that the aim of both was on the opposite way. As was mentioned, in Mexico the first aim was connected with political ideologies while in Europe the relationship between painting and building was developing with a real social aim. The synthesis of the Arts considers the public spaces as open galleries and museums, providing to the population the art. (Drosos, 2016)

In the case of CU's construction, Villagrán developed the general program (1946) which includes different schools (one of them is the NSA), open areas, laboratories, sport areas, administrative zone, etc. Although the CU's program was established during the Plastic Integration Movement, Villagrán not considered the collaboration between artists and architects; it means, the muralism should not be applied in the CU's building. But, the Mexican painters headed by Diego Rivera, Orozco, Siqueiros, and Eppens developed a project for include the muralism on the walls of CU buildings. Some buildings which included the mural painting are: the Central Library, the Rectory Tower, the School of Medicine, the Stadium, etc.

Responding it, there are previous studies on the Mexican muralism, the Plastic Integration Movement, and the José Villagrán's thought. One of this studies explore the José Villagrán's notion of Plastic Integration during the modern age in Mexico connecting it with the definition of architecture as an art. (Aguilera Vieyra & Sendai, 2018) In relation with this, the Villagrán's theory considers the mural painting as an ornament (Aguilera Vieyra & Sendai, 2018) because it cover the natural appearance of the construction material; that means, the mural painting avoids showing the architectural true. On the same field, Louise Noelle, developed a research on the relationship between the Plastic Integration and functionalism in Mexico. (Noelle, 2001) Still, there are not explored about the theoretical considerations in the inclusion of mural painting in CU by José Villagrán. Because his theory is only related to the architecture, excluding the Villagrán's notions on arts and artistic movements.

Facing this movement, Villagrán applied his theory in the design of the building for the NSA. Concerning this subject, previous studies on NSA have described its location on the CU and the buildings that constitute it, (Cuevas Martínez, 2002) the political ideas, and confrontations that took place during its construction. (Zavala Rivera, 2013) In recent years, Paz discussed the renovations made to the NSA between 1997 – 2000. (Paz, 2004)

After all in the literature review, it is perceive that, prior studies have not discussed about if the Villagrán's theory was applied to his building projects or how he spread his theoretical principles through the architectural design. To explore these

unknown aspects of Villagrán's theory, this dissertation intends to explain the adaptation of Villagrán's theory in his practical work through the specifically study of the architectural design process applied on the NSA's project. In this research work, The Villagrán's theory is analyzed from the recognition of the theoretical foundations which support his proposal, looking to the focal points of his argumentation and counteracting it with the design process.

1.8 Relation of this Study to the Literature

While analyses of theoretical notions of José Villagrán during the modern era of Mexico, are presented as part of the development of Mexican Architecture, the previous studies not to clarify the first theoretical notions and discourses on which Villagrán start with the development of his theory; also the relationship between the Plastic Integration Movement and the José Villagrán's theoretical notions is not explored, on the same way, the lack of discussion about if the Villagrán's theory was applied to his building projects is observed.

It is necessary to explore how and why about the first notions and theoretical discourses of Villagrán to understand the reasons which motivated him during the development and establishment of his thought in the modern era in Mexico (1925 – 1954); as well as, to explain the relationship between Villagrán's theoretical notions and the Plastic Integration Movement, in sequence to understand his thought during the development of CU's general program and the NSA design. It is also necessary to study the design process applied by Villagrán in the development of his project, in order to establish and evaluate the applicability of his theory in the practical context (architectural project).

Thus, it is the contribution to the literature that this dissertation is attempting to do, to fill the gap in the literature about the first notions and theoretical discourses of Villagrán, its relationship with the Artistic Movement of Plastic Integration; in addition, the application of theoretical foundations on the Villagran's practical work.

1.9 Organization of the Dissertation

These research is arranged in 6 main stages:

In the chapter 1, the introduction and research framework is developed, supporting this study. The context and statement of the problem are raised, the research questions and hypothesis are established, the research objectives are pointed out and the literature review is related with this study as mean to the organization of the dissertation.

The second stage (1918-1935) which corresponds to the period of education of José Villagrán at NSA is examined in chapter 2. The main characteristics of the historical and sociopolitical context in Mexico is analyzed, as well as the academic influences on Villagrán's academic life (1918 – 1923), his initial teaching at NSA (1924 – 1930), and his new concepts disseminated through his lectures at NSA (1930 – 1935), in order to explain the general back ground which influenced on Villagrán, and; on the same way, this analysis makes possible to recognize the initial theoretical notions that José Villagrán implemented at the beginning of his professor career at NSA.

In the third stage (1927 – 1964), chapter 3, the first José Villagrán's theoretical notions are examined. His first questions and discourses are analyzed revealing his the three notions on which he raised his theory: “modern architecture”, “the human”, and “modern architect”. Through the Villagrán's theoretical notions I recognize the ideological transition that Villagrán had from architecture student to architect and theorist of architecture.

In the chapter 4, the connection between Villagrán's theoretical notions and the Plastic Integration Movement (1934 – 1954) during the Mexican modern period is exposed. The Plastic Integration Movement is analyzed to recognize the ideological, social, and political reasons which motivated Villagrán in the

development of Plastic Integration synthesis¹ through the concepts of “decoration” and “ornament”. In addition, the mural painting is identify as the main plastic art applied in the Mexican modern architecture in order to analyze the case of University City which relate the Villagrán’s synthesis and the ideology of artistic movement.

The adaptation of José Villagrán’s architectural theory in the realization of the NSA’s project is verified in the fifth stage, chapter 5. The Villagrán works are classified according its temporality and Villagrán’s thought for the purpose of establish the theoretical moment in which Villagrán conceptualized the NSA’s project. In addition, the first Villagrán’s sketches for NSA are analyzed and interpreted with the focus on the methodology applied during the design process for to relate it with the Villagrán’s theory.

Finally, in the chapter 6, the conclusion is exposed in order to establish the discussion of this research determining the future research directions according the precedents exposed through this study.

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¹ Synthesis: The synthesis, refers to the composition of a whole by meeting its parts or elements. This construction can be done by joining the parties, merging them or organizing them in different ways. (Bajo, 2004)

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Chapter 2.

José Villagrán: General Background, his Architectural Studies and First Teaching at NSA (1918-1935)

2.1 Introduction

On November 5, 1785 in Mexico was funded the Academy of San Carlos according to the Royal Certificate by Carlos III from Spain. From 1785 to 1858, the students of architecture received Spanish influences until Javier Cavallari arrived to Mexico introducing Italian references. In 1867 the Academy of San Carlos (Fig. 6) (Fig. 7) changed its name for National School of Fine Arts (NSFA), and in 1910 adopted its final name as National School of Architecture (NSA).

From 1918 to 1923, José Villagrán García studied at NSA. At that moment, having rejected the aesthetic demands of the bourgeois class, students (included Villagrán) of architecture based their thought only on ideologies imported in the nineteenth century from the École of Beaux Arts of Paris, by the Mexican President Porfirio Díaz. (De Anda Alanís, 2013) However, proposals based on those ideologies were no longer a suitable response to actual social needs, because they resulted in the application and use of either classical rules or pure French style solutions that were not affordable in post-revolution country.



Fig. 6 Facade of Academy of San Carlos (no date) (*Vargas Salguero, 2005*)



Fig. 7 Main entrance of Academy of San Carlos (no date) (*Vargas Salguero, 2005*)

Faced by urgent demands to address the basic needs of the working class for housing, education, and health, it was necessary a modification of mindset in the educational system; changing the way that students of architecture and architects conceived the architecture. They were unable to face the challenges that 20th century Mexican architecture presented. In other words, a change in the fundamental theory of modern architecture was essential.

During the 20th century, the modernity in architecture arrived in Mexico through the influence of well-known foreigners. The French-Swiss architect, Le Corbusier (1887-1965) was one of those personalities. Although, at that period, the modern movement included well-known and important architects: Sigfried Giedion, (Heredia, 2014) Walter Gropius, Hannes Meyer, Max Cetto, Richard Neutra, Louis Sullivan, Frank Lloyd Wright, to name only a few. However, Le Corbusier was the most important foreign architect to make contact with Mexico through the arrival of his book, *Vers une architecture* (1926). The publication of his works was shown in several Architectural Magazines (*Arquitectura Mexico and Espacios*), and in the Mexican newspaper *Excelsior*.

2.2 Historical and Sociopolitical Context in Mexico

2.2.1 Historical Context

In Mexico, the nationalism² was developed during the government regimes of Venustiano Carranza (1914-1920) and Álvaro Obregón (1920-1924), its main aim was to finish with the Porfirian eclecticism³. (Fig. 8) It was about rescuing the value of the architecture built during the years of the viceroyalty. The objective of this era was to recover the native artistic essences of Mexico, particularly those of the creole society of New Spain; thus, initiating the process of affirming the nationality as a historical strength capable of sustaining itself against the Europeanizing mannerisms of the Porfiriato, the reaffirmation of the national value, and the beginning of an art derived from the local plastic traditions. (De Anda Alanís, 2013)

According to De Anda (2013) the nationalism meant the possibility of constructing Mexico's new present, becoming aware of all the elements that historically had contributed to consolidate the identity of culture. (De Anda Alanís, 1990)



Fig. 8 Building of eclectic style built during the Porfiriato in Guadalajara, Jalisco, Mexico between 1895 - 1911 (López García, 2010).

² The nationalism was a historical period in which during the first six decades of the twentieth century...the majority of the Hispanic American intellectuals tried to accommodate a European national model to the specific characteristics of their own nation. Their efforts to reach the ideal picture of modernity were, for the most part, unsuccessful. (Marroquín, 2008)

³ Porfirian eclecticism: Eclecticism is the combination of elements of different styles, ideas or possibilities. In Mexico was called Porfirian eclecticism the architectural combinations made by the President Porfirio Díaz (1830 – 1915) (RAE, Dictionary of Spanish Academy, 2018).

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The Mexican architects (Nicolás Marsical, Federico Marical, and Jesús Tito Acevedo) participated decisively in the formulation of the new theoretical parameters which made possible the total transformation of the Mexican architecture (De Anda Alanís, 1990), in order to make it consistent with the humanist culture and with the revaluation of the national historical heritage as a way to consolidate a cultural project of << Mexican essence >>. (De Anda Alanís, 1990)

From 1925, after the end of the Obregón government, gradually the groups of Mexican artists showed interest on the exploration of other expressive instances that sought the faithful reflection of the modern revolutionary circumstance, thus emerging <<los contemporáneos>> and << los estridentistas >>. (De Anda Alanís, 2013)

In Mexico, under these new ideologies, the neocolonial style (Fig. 9) stopped being promoted and began to open to all the European and North American influences that, within contemporary art, favored change. The Mexican architects worked on the return to the adoption of aesthetic resources which would make possible the renovation of the architectural image.

The idea of functionalism, in the modern sense of the word, was seriously considered in Mexico for the first time by the architect José Villagrán García (Fernández, 1937) who in 1925, through the construction of the Sanitary Farm, manifested his functionalist ideas under the solution of symmetrical forms, volumetric arrangements, and the use of reinforced concrete.



Fig. 9 House “Lourdes Macluf” in 1943 designed under neocolonial style in Polanco, Mexico City (Fierro Gossman, 2011).

2.2.2 Sociopolitical Context

Venustiano Carranza became the first president of the new Mexican republic. He was a historical character who was tainted by his association with the President Díaz and his alliance with newer forces of economic exploitation. Carranza opposed the sweeping changes that followed the revolution. Carranza favored political, but not social, reform. Only reluctantly he did accept the provisions of the 1917 constitution establishing basic reforms in landownership, control of natural resources, and labor and social legislation. When he became the constitutional president on May 1, 1917, he did little to effectuate those provisions. His term was marked by continued difficulties with Villa and Zapata (heads of Mexican Revolution), serious financial problems, and general social unrest brought on by his reluctance to institute far-reaching reforms.

Carranza was a nationalist and was involved in serious controversies with the United States. Earlier (April 1914) he had opposed the U.S. occupation of Veracruz. In March, 1916 Huerta had prevented the military expedition led by U.S. Gen. John J. Pershing from capturing Villa, who had raided Columbus, N.M.; and he angered the United States by his efforts (1918) to bring his country's oil industry under Mexican control. This event was fundamental in keeping Mexico neutral in World War I. (Encyclopedia Britannica, 2018)

Between 1920 – 1940, Mexico started a new political and social era, the president Álvaro Obregón, appointed José Vasconcelos as Secretary of Education, who founded *the vasconcelismo* (Fig 10). The *vasconcelismo* has as main objective to propagate the nationalism through the neocolonial style coupled with mural painting; which was based on socialist ideas (Fig. 11). Achieving his objective, Vasconcelos created the Department of School Development, which head was the Engineer Federico Méndez Rivas and collaborating the Architects Francisco Centeno, Emilio Macedoy Arbeu, Fernando M. Dávila, the Engineers Manuel R. Gómez, José F. Domínguez, and architecture students José Villagrán García, Vicente Mendiola, and Luis G. Gutiérrez. (De Anda Alanís, 1990)



Fig. 10 José Vasconcelos’ publication “The Mexican Society is Talking” on Mexican Newspaper (Nov 10th, 1928) (Rangel, 2010)



Fig. 11 Workers’ manifestation showing their agreement with Vasconcelos’s ideas (Espinosa V., 2012)

However, one year after the end of the Vasconcelos’s period, the neocolonial style ceased to be the aesthetic image of the State; allowing some architects, Alfonso Pallares, (De Anda Alanís, 2013) and José Villagrán, to renovate the architecture by means of plastic solutions which advocated a pure forms.

2.3 The José Villagrán’s Academic Life at NSA (1918 – 1923)

José Villagrán García was born in Mexico City on September 22, 1901. From 1918 to 1923, José Villagrán García studied at NSA, which was attached to the École of Beaux Arts (Vargas Salguero, 2005) of Paris. At that time, disciplines taught at the NSA were strongly influenced by Renaissance thought; by emphasizing the

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genius of the great European masters, teachers aimed to transmit their passion for Classical Greek architectural orders and magnificence. Students learnt proper ways of using ornaments and proportions because they would produce beautiful works of architecture. This approach to architecture was derived from Aristotle's *Metaphysics*, which stated that architecture was an art. (Vargas Salguero, 2005) In addition, it was important to build on solid fundamentals when projecting beauty into architectonic work. Plato's philosophy was also taught; it followed Socrates and culminated in the theories of Aristotle, who made contributions to mathematics and studied geometric figures. The students formed in this environment, believed that beauty was one of the resource available "to have access to the true and good." (Vargas Salguero, 2005)

Students, among them was José Villagrán, were also influenced by the principles of Vitruvius and his *Ten Books on Architecture*. In addition, students learned the parameters used in architecture whereby a building was recognized by the society considering that the architecture was a form of art and art of built. (Vargas Salguero, 2005) The influences adopted by the NSA, through which students at the beginning of the 20th century were formed, completely centered around the ancient Greek art. (Vargas Salguero, 2005) This approach implied the acceptance of an eclectic style that would allow students to use and apply diverse architectural styles in the formal composition of projects. José Villagrán was graduated on October 5th, 1923 from the NSA.

The social and political ideas of the Mexican Revolution were part of the academic and professional context which surrounded the development of Villagrán's thought. He was aware of the architectural needs that Mexico would have after the Revolution. He was receptive to the contemporary ideas and his goal was to produce a change in the conception of Mexican architecture. In addition, to receiving a traditional- formal education, Villagrán was also taught about the new educational methodologies that presented a set of new technical problems and sketched out completely different viewpoints. Overall, this made possible to question traditional ideas and propose a new way of understanding the professional practice of architecture, and its teachings.

2.4 The Initial Villagrán's Teachings at NSA (1924 – 1930)

By 1923, José Villagrán, Diego Rivera, and Roberto Montenegro worked in the Department of Building Conservation of the Secretariat of Public Education with José Vasconcelos. (Villagrán García, 1979) During this period, Villagrán held some conversations with Rivera, through them, Rivera showed him that architecture should be considered within the plastic arts, defining it as: *"An art which works with forms and colorful volumes, in other words, a plastic art more complete and more complex"*. (López Rangel R. , 1986) This thought revolutionized the academic ideologies and faced the "commercial architecture" (López Rangel R. , 1986) imported from Europe. This idea incited the architects to achieve a unity between the language of painting, sculpture, and architecture.

After his contact with the muralists, Rivera and Montenegro, Villagrán promoted a similar approach to the Renaissance through developing other lines of creation and producing architectural works which would reflect authenticity and responding to their time and space. Villagrán's capabilities and skills enabled him to become member of the NSA immediately after graduating started teaching "Elements of Composition" in 1924 and, later, "Theory of Architecture" in 1927 at NSA. (Fig. 12)



Fig. 12 José Villagrán at NSA in 1926 (second line, third person from right to left) (Vargas Salguero, 2005)

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At NSA, Villagrán found, early in his career, the right environment for delivering the thoughts and ideas that he had as a student. He also found an opportunity to put them into practice as a professional. At the beginning of his career, from the academic program of 1910, Villagrán learned of a proposal to promote European architectural tendencies, and on the other hand, to design a new form of architecture for Mexico through the Nicolás Mariscal and Jesús T. Acevedo influences. (Table 1, p.35) On the same way, some architects (Guillermo Zárraga, (Villagrán García, 1979), Federico E. Mariscal, Alfonso Pallares, Juan Galindo y Pimentel, Carlos J.S. Hall, Nicolás Mariscal, Bernardo Calderón y Caso, and Carlos Lazo) promoting the idea about the architectural practice needed to be redirected in a drastic way (Vargas Salguero, 2005) toward a new architecture that would allow them to become modern architects without abandoning their national pride.

Also, Villagrán was in charge of presenting the passage of the spirit and principles drawn from architectural treatises of the 19th and 20th centuries. (Dasques, 2008) During his early years as a teacher, Villagrán argued that Julien Guadet (1834-1908) -whose work had become the most read book in every architectural school in the world- closed the cycle of the 19th century and opened a new century (Dasques, 2008). Nevertheless, according to Dasques, Villagrán took two principles from Guadet - rector notion of program and truth in architectonic expression- and used them as a solid foundation, allowing his students and also himself to face modernity from different viewpoint. He focused his lectures on disseminating three treatises by Léonce Reynaud, (Dasques, 2008) which provided convenient ideas to begin drawing up a new proposal for changing the intellectual approach of the NSA. (Table 1, p. 35)

According to Vargas (1993) in 1925, before the beginning of the "Theory of Architecture" course, Villagrán was concerned about new social needs, the recurrence of architects to imitate Prehispanic architecture, and the architectural language which was invalid for the architectural vanguards lived in Europe. On July of same year, Villagrán, attending the new aesthetic and social demands, beginning the construction of the Sanitary Farm (Fig.13)(Fig.14) for the Mexican Hygiene Institute practicing his initial ideas of his theory and incorporating his concerns about a new plastic. Through his practice, Villagrán's, tried to show their students of architecture to avoid the use of ornament designing pure forms and applying the

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cornice as a symbol of his concern to rescue the traditional functional elements.

1926 was an important year for students and faculty members of the NSA, because the book written by Le Corbusier and published in France three years earlier (1923), under the title, *Vers une architecture*, (De Anda Alanís, 2013) had arrived in the collection of books of architecture at the Library of the Academy of San Carlos, becoming a reference book for Villagrán. (De Anda Alanís, 2017)



Fig. 13 Laboratories of Sanitary Farm by José Villagrán, 1925 (Pinocelly, 2004)



Fig. 14 Sanitary Farm by José Villagrán, 1925 (Pinocelly, 2004)

On May 5, 1927, Villagrán wrote a letter to Engineer and Architect Manuel Chacón (Professor at NSA). (Fig. 15) In this document, firstly, Villagrán showed his intentions about modify the NSA's academic program, on the same way, I detect that,

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the first Villagrán's proposal about to modify the academic program were focused beyond the economic-mechanical needs of architecture. It is important point it out that, in this study, the concept of *academic program* is considered as the required and elective courses that lead to a degree or certificate as architect.

Thought his academic program, Villagrán sought to spread between the NSA's students (Vargas Salguero, 2005), the notion about to satisfy the spiritual needs, defining the mechanical and economic needs, as well as, understanding the building harmony as the adequate function of each part of the "architectural organism". From the analysis made to the Villagrán's historicity, we consider that the notion of "architectural organism" was one of the most relevant manifestations in the Villagrán's thought change because he conceived the architecture as a totality which satisfies human needs in a whole way (physical, biological, social and spiritual). Villagrán considered the architecture as an art which is based on the exact sciences and is applied to inexact needs, such as social.

Thinking on the same way, he proposed to see the composition and the harmony as the application of the synthesis of the knowledge acquired to solve a need through the program, producing beauty, and reflecting sincerity, notions which are mentioned by Le Corbusier in *Vers une architecture*. On the other hand, Villagrán's idea was to avoid modeling the solution from the form. This idea allows us to affirm that, this proposal helped him finishing with the Academicism because the students would "verify" the truth in architecture through the acceptance of the building by the society; forcing the students to develop new formal proposals and stop copying the styles established by the Academy.

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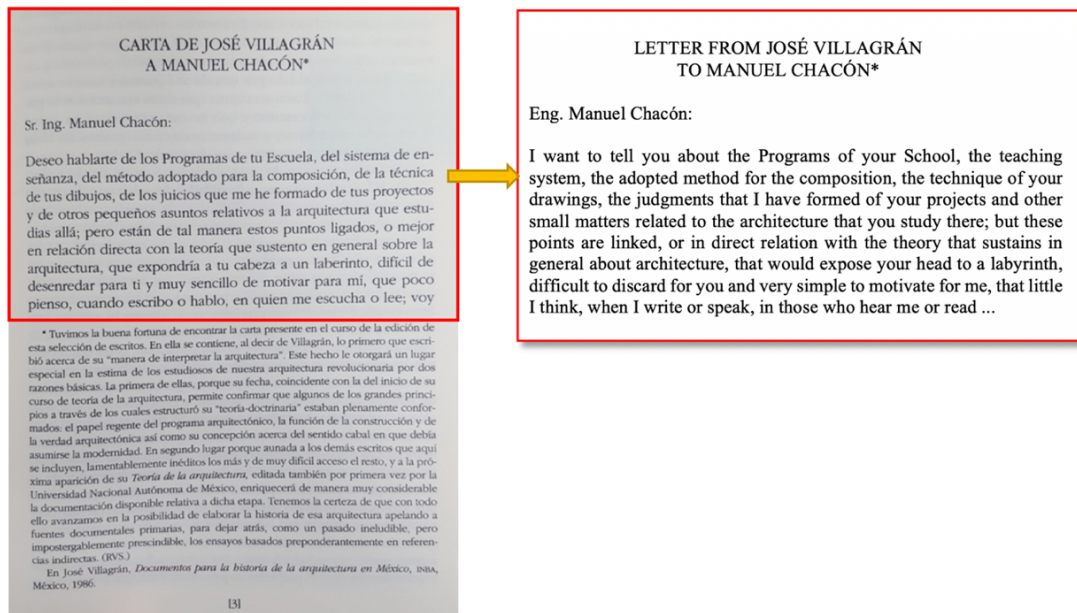


Fig. 15 Extract of letter to Manuel Chacón from Villagrán (May 5th,1927). Through this document, Villagrán showed his first intentions and ideas about to modify the NSA's academic program (Vargas Salguero, 2007) and in the right side the translation to English version

Villagrán based his proposal from a social ideology, stating that if it does not understand the architectural work; the work would be considered futurist or cubist. Also, in his first approaches to the new NSA's academic program, he recommended reading *Apolo* (Villagrán García, 1927) by Salomón Reinach because, through this text, the students could understand the history of the plastic arts and the archeology of art. It helped to Villagrán, influence the students to develop a genuine concern to recover the architectonic tradition from its essence and not from its imitation.

Thus, Villagrán promoted changes in the academic program of architecture by proposing alternatives that simultaneously engaged with the modern Mexican movement and focused on the emergent needs of a new Mexico, characterized by ideological and social changes. The architects of the Mexican Modern Movement in Architecture, led by José Villagrán, introduced new formal and functionalist features into their projects -which reflected society's need to find its own identity, through an architecture that reflected tradition, while also engaging in a dialogue with emerging European architectural styles. These were the challenges facing a new generation of Mexican architects during the first half of the twentieth century.

2.5 Introduction of New Concepts at NSA by Villagrán (1930 – 1935)

After writing his first thoughts on the modification for the NSA's academic program, Villagrán, practiced his reflections for three years through the course of "Theory of Architecture" (1927-1930). In 1930, Villagrán presented to the NSA's Academic Committee his proposal about the new NSA's academic program but it was until 1933 that it was approved and applied. It is essential to clarify that, during 1933-1935, Villagrán was NSA's head; however, in 1935 he was dismissed and replaced by Federico Mariscal. Mariscal decided to return to the old educational system and focus student learning through the copy of the Neoclassical style. During his influence period, Villagrán was convinced that, modern architecture only would develop an authentic and true identity if it were able to evolve from its inherited pre-Hispanic and novo-Hispanic architecture. Thus, Villagrán proposed the following changes to the NSA's academic program (Vargas Salguero, 2005) in 1930: to replace courses on "Graphic analysis of structures" and "Materials", with more modern courses entitled, "Analysis of programs" and "The higher theory of architecture and urbanism." (Vargas Salguero, 2005) The course on "Theory of Architecture" developed by Villagrán consisted of two general themes named: I. Theory, and II. Elements of architecture. (Fig. 16) (Fig. 17)

Villagrán implemented the analysis of the program as an essential requirement on the reflection of the problem statement. On the other hand, Villagrán tried to generate awareness about the peculiarities of the Mexican society understanding the modernity from the characteristics of Mexico. From this idea, Villagrán reinterpreted the Le Corbusier's notion (Table 2, p.35): "*The current architectural things no longer meet our needs*". (Le Corbusier, 1995) proposing that, the students had to conceive two types of needs: a) the generals: the physical environment, the social-economic environment, the psychological-social, the tradition, the social-intellectual environment, the world industry, and b) the particular or directly concerning to the problem solved: economic, operational, capricious, constructive, regional climate, personal conditions of the architect in relation to his client or himself.

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In addition, through the letter sent from Villagrán to Manuel Chacón, I can affirm that, Villagrán considered four basic principles in his proposal: 1) the function of the architectural program, 2) the function of construction, 3) the architectural truth, and 4) assume completely the modernity. To consolidate his thinking through practice, Villagrán disseminated that, the constructive technique was the only one that was worth because the drawing was only a temporally resource and, as architects, they would have three spiritual faculties: intelligence, will, and sensitivity, being governed by the reason and not by coincidence.

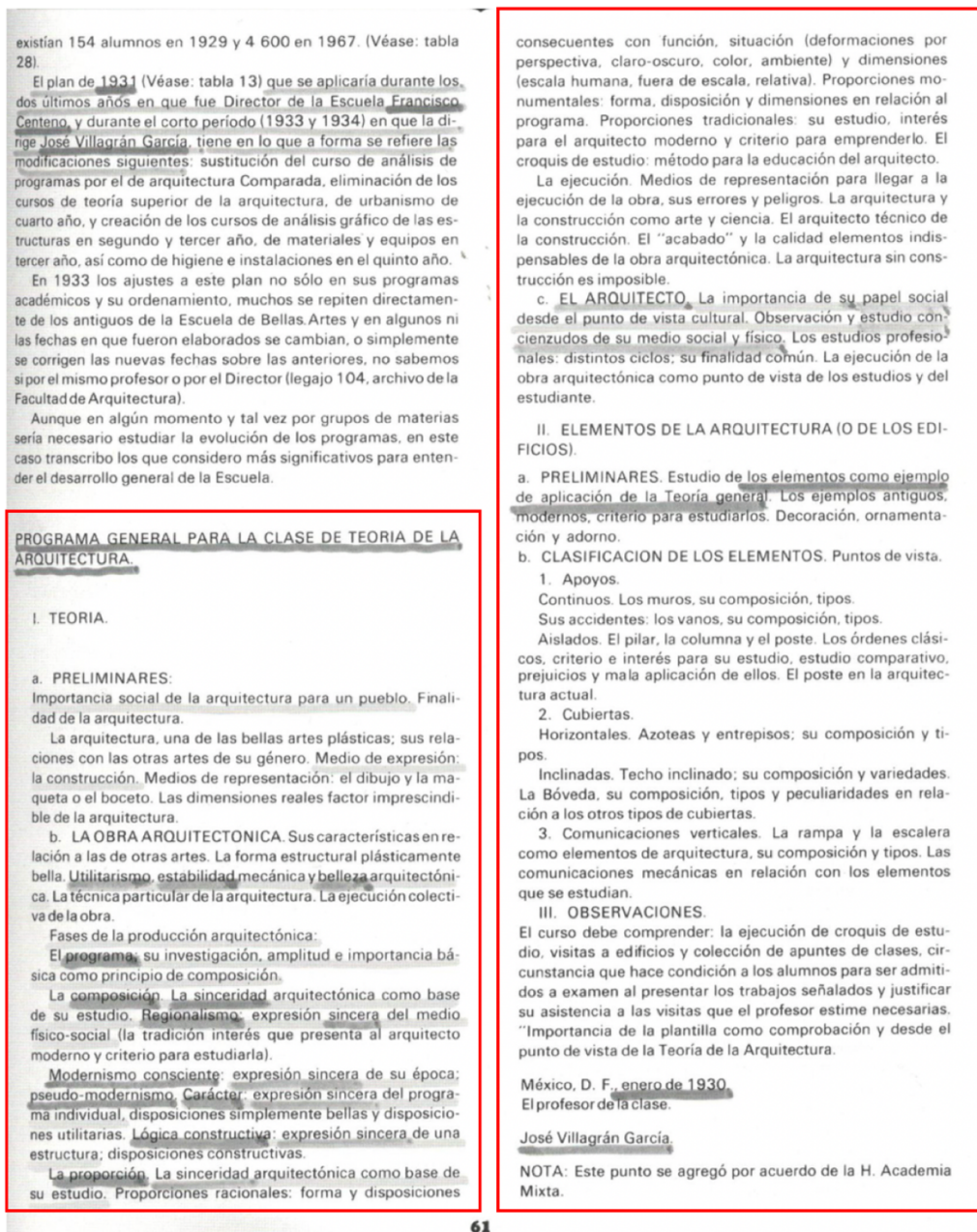


Fig. 16 José Villagrán NSA's academic program 1930 (Vargas Salguero, 2005)

<p style="text-align: center;">GENERAL PROGRAM FOR THE CLASS OF THEORY OF ARCHITECTURE</p> <p>I. THEORY</p> <p>a. PRELIMINARIES Social importance of architecture for a town. Purpose of the architecture. Architecture, one of the fine plastic arts; his relations with other arts of his gender. Means of expression: construction. Means of representation: the drawing and the model or the sketch. The real dimensions are an essential factor of architecture.</p> <p>b. THE ARCHITECTURAL WORK. Its characteristics in relation to those of other arts. The aesthetically beautiful form. Utilitarianism, mechanical stability and architectural beauty. The particular technique of architecture. The collective execution of the work. Phases of architectural production: The program; its research, breadth and basic importance as a principle of composition. The composition. Architectural sincerity as the basis of his study. Regionalism: sincere expression of the physical-social environment (the tradition of interest presented by the modern architect and criteria to study it). Conscious modernism: sincere expression of its time; pseudo-modernism. Character: sincere expression of the particular program, simply beautiful dispositions and utilitarian dispositions. Constructive logic: sincere expression of a structure; constructive provisions. The proportion The architectural sincerity as the basis of its study. Rational proportions: form and consequent dispositions with function, situation (deformations by perspective, light-dark, color, environment) and dimensions (human slalom, off-scale, relative). Monumental proportions: form disposition and dimensions in relation to the program. Traditional proportions: its study, interest for the modern architect and criterion to undertake it. The sketch of study: method for the education of the architect. The practical work. Means of representation to arrive at the construction of the work, its errors and dangers. Architecture and construction as art and science. the technical architect of the construction. The "finishing" and the quality of</p>	<p>indispensable elements of the architectural work as a point of view of the studies and the student.</p> <p>II. ELEMENTS OF ARCHITECTURE (OR OF BUILDINGS).</p> <p>a. PRELIMINARIES. Study of the elements as an example of application of the General Theory. The ancient, modern examples, criteria to study them. Decoration, ornamentation, and adornment.</p> <p>b. CLASSIFICATION OF THE ELEMENTS. Points of view. 1. Supports. Continuous The walls, their composition, types. Its accidents: vain, its composition, types. Isolated. The batteries, the column, and the post. Classical orders, criteria and interest for their comparative study, prejudices and bad application of them. The pole in the current architecture. 2. Roofs Horizontal roofs and mezzanines; its composition and types. Inclined. Sloping roof; its composition and varieties. The Vault, its composition, types, and peculiarities in relation to the other types of roofs. 3. Vertical communications. The ramp and the staircase as architectural elements, their composition, and types. Mechanical communications in relation to the elements studied.</p> <p>III. OBSERVATIONS The course must include: the execution of study sketches, visits to buildings and collection of class notes, a circumstance that makes conditions for students to be admitted to the examination when presenting the indicated works and justify their attendance to visits that the teacher estimates necessary. "Importance of the template as a check and from the point of view of the Theory of Architecture."</p> <p>Mexico, D.F., January 1930 Professor of the class José Villagrán García</p> <p>NOTE: This point was added by agreement of the H. Mixed Academy.</p>
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Fig. 17 Translation to English of José Villagrán NSA's academic program 1930

Table 1 The influences on José Villagrán’s thought during his academic life and beginnings of his professional work (*Aguilera Vieyra & Sendai, 2018*)

Name	Influence on Villagrán's thought
Nicolás Mariscal	He addressed concepts such as program , composition and theory of architecture . The architectural composition is the resolution of a problem posed by the circumstances of a moment (climate, traditions, customs) to meet the common needs for humans
Jesús T Acevedo	He introduced: 1. The idea of a new architecture: the use of iron as a construction material, with all its possibilities to satisfy the demands of industry, railroads and reinforced concrete constructions. 2. The recovery of the colonial past
Julien Guadet	The notion of program and the truth architectural expression
Léonce Reynaud	He considered architecture as an art . The beauty would be the product of a rational study of the uses of space and the stability of the construction. There must be harmony between form and function

Table 2 Villagrán’s influences received from several architectural theorist before and during the development of his theory (*Aguilera Vieyra & Sendai, 2018*)

Name	Year	Influences received by Villagrán	New Villagrán's notions applied to NSA's academic program	Influence period
José Villagrán	1924-1927	Villagrán was lecturer of "Elements of Composition" course. He received influences from Carlos Lazo about Renaissance and History of Art	X	1924-1927
	1927-1930	Villagrán start as lecturer of "Theory of Architecture". He promoted the European architectural tendencies (NSA's academic program 1910), the design a new form of architecture (N. Marical and J.T. Acevedo); and the Julien Guadet, Leonce Reynaud, Vignola, Vitruvio's notions. At same time he developed his first ideas about the new definition of architecture	X	1927-1933
	1930-1933	Villagrán's introduced the new principles of modern architecture which he had received from Le Corbusier.	He replaced the course of program analysis by comparative architecture, elimination of higher architecture and urban planning courses. He introduced courses in graphic analysis of structures , hygiene and facilities and materials and equipment	1933-1935

Table 3 Le Corbusier’s influence on Villagrán NSA’s academic proposal (*Aguilera Vieyra & Sendai, 2018*)

Le Corbusier's notions from the book "Vers une architecture"	Influences on Villagrán NSA’s academic program
"The geometrical harmony"	Villagrán established the analysis of the program as the foundation of the architectural composition by implementing mathematics as a means of verifying the geometrical harmony. Villagrán made a deeper analysis on this topic proposing the division of the program into two phases: the general and the particular programs.
"The style"	This chapter marks the origin of the change on Villagrán’s thought because it allowed him to visualize the obsoleteness of “the styles” that were taught in the NSA, having as a result, the approach of a new academic strategy.
"The rational logic"	Influenced on Villagrán in the establishment of a scientific structure to develop the architectural project. It incited the students and young architects to be have a rational thinking, taking as reference the specific needs of the society (community) avoiding copying the rules established by the classic architectural orders.

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The changes implemented by Villagrán to the academic program enable students to study functionalist thought. Because of his commitment to the extracurricular formation of the students, he motivated them to link practice and the “Theory of Architecture” (Rivera R. , 1964); a modality which was nonexistent at NSA. Villagrán’s students learned about core principles that governed the work of revolutionary architects, understanding the need which would be satisfy by buildings, and the correctly solution of the problem.

Through a functional analysis and understanding the relationship between the function of a building and its physical environment, a logical composition could be developed. This would allow the architects, to determine the specific aesthetic characteristics suited from the social context for which it was designed. The result would be an architecture with adequate geometrical solution to the problem raised, avoiding copying French style. According to Villagrán’s proposal for the NSA’s academic program, Le Corbusier wrote: “*A great time has just begun. The styles are a lie*” (Le Corbusier, 1995) and “*If these volumes are formal and not degraded by untimely alterations, if the ordinance that groups them expresses a clear rhythm and not an incoherent agglomeration ... its facts of just proportions*” (Le Corbusier, 1995)

Villagrán explained, through his lecture entitled "Le Corbusier in 1923", the ideology at NSA and I can perceive and explore the Le Corbusier’s influence on his thought. Villagrán acknowledges: *From the first years of his writings, particularly in 1923 when his book “Vers une Architecture” was published, he convinced to numerous youth groups and as a result, provoked recriminations from other architects who practiced the principles of formal academicism. In 1923, we began in the School of Architecture to establish the great traditional principles which guided us. Those principles came from theorists who had influenced architecture. In the architectural context, we sought to establish the requirements that a human poses from his essential integrity contemplating his physical and biological nature as a member of a community, without including the aesthetic aspect of his demands. In the year 1926, these same ideas matured at School of Architecture through the lectures until they could be analyzed from their scientific structure. This was, in a few words, the atmosphere in Mexico when we first received news of the brilliant*

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French architect. (Villagrán García, 1965) On another hand, in 1963 during his lecture “*Six topics on the architectural proportion*” (Villagrán García, 1963), Villagrán showed the specific Le Corbusier’s influences on proportion, emphasizing *Le tracés régulateurs* and *Le Modulor*.

In the essence meaning of Villagrán’s statements, it is perceived that, for him, the Le Corbusier’s principles were the theoretical and practical means to solve the aesthetic and economic problems facing in Mexico after the Revolution, taking them as a guide to the understanding of social needs as he enunciates in his lecture “*Le Corbusier in 1923*”. Comparing the notions contents in the book *Vers une Architecture* by Le Corbusier and the José Villagrán academic program for the NSA, I can establish three fundamental notions of influence: 1) “*The geometric harmony*” as a generator of the volume: it is achieved only through the order conceived from a mathematical thought and proportion, satisfying the spirit, 2) “*The style*”: the style is in the essence of the time in which the building is designed and not in the ornamental designs that come to hinder the spirit, and 3) “*The rational logic*”: the scientific structure, which is based on the rational analysis of the problem, understanding that, the society determines the functions and needs that give rise to the product. (Table 3, p.35)

Finally, I argue that, even Villagrán understood the Le Corbusier’s notions of “the standardization”, “the mass production”, and “serially design”, he avoided using these concepts in the new academic program for the NSA. Because those concepts, introduced by Le Corbusier, risked importing the European solutions evading the development of new architectural solution and misunderstanding the specifically need of Mexican modernity; for that reason, Villagrán introduced a new version for the functional analysis of needs, emphasizing the importance of avoid the modeling of the solution from the form and understanding the problem raised from social need, the physical environment, and the simplification of forms.

Although Le Corbusier never visited Mexico; (Adrià, 2013) (Adrià, 2016) his architectural philosophy was disseminated throughout the country by José Villagrán García through his own works and in lectures at the NSA. This statement has been confirmed by Olsen (2008), who credits José Villagrán García with introducing the

theory and practice of functionalism, based on the ideas of Le Corbusier. In Mexico, Villagrán represented a new approach to teaching, passing on ideas to the generations that succeeded him, as well as modifications to the NSA's new academic architecture program. Although, in 1979, Villagrán denied the Le Corbusier's influences, through this analysis a clear influence is contemplated during the development of his proposal for the NSA's academic program.

2.6 Conclusions of this Chapter

An analysis of different sources has allowed to conclude that, during his architectural studies, Villagrán was directly influenced by the theoretical notions imposed by the Academicism developed from the NSA's founding to the Porfiriato. However, the teachings that Villagrán received from Federico Mariscal and Jesús T. Acevedo were transcendental in the formation of his thought, which focused on solving the needs of the Mexican society. In addition, the Villagrán's adaptation of Julien Guadet and Léonce Reynaud theoretical principles turned out as the first theoretical notions for establishing his beginnings as professor at NSA.

On the same way, the arrival of the book *Vers une architecture*, published in 1926 in Mexico, marked the beginning of the influence of Le Corbusier's writings and works on the academic career of Villagrán. In fact, before the arrival of Le Corbusier's book, *Vers une architecture*, Villagrán denied the notion of Art as classicism in the Beaux-Arts system, and he has opened the Architecture in the wider social context. On the other hand, the Le Corbusier's influence can not only be traced in the consolidation process of Villagrán's thought, but also in his proposals for a new academic program at the National School of Architecture in 1933. I found that, Villagrán was most powerfully influenced by the Le Corbusier's notions from the book *Vers une architecture*: "the geometrical harmony", "the style", and "the rational logic" because these ideas themselves do not restrict traditional form but help the Villagrán's students conceiving the obsolete of the Academy's proposals and are able to understand the modern Mexican society, projecting a formal expression that reflect its culture.

Through the notion “the geometrical harmony”, Villagrán implemented the mathematics to verify the architectural composition allowing to the architecture students analyze the proportions of their own projects avoiding copying the Greek classical canons. According to “the style”, Villagrán understood its obsolescence and its ambiguity in the application to architectural design. He tried to prevent and finish the copy of French architecture; allowing the students create new architectural forms. Finally, “the rational logic” which helped to Villagrán implementing, at NSA, the practice of the rational thinking taking as a main reference the analysis of the social needs, bringing the uniqueness of Mexico and the universality of modern architecture.

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Chapter 3.

Development of José Villagrán's Theoretical Notions (1927-1964).

3.1 Introduction

During its development, the history of modern Mexican architecture has constant references to the José Villagrán García's thought. Villagrán García was the most important theorist, thinker of architecture, lecturer, and builder in Mexico from 1923 to 1982. There were three circumstances that allowed the consolidation of his influence on the Mexican architectural environment: 1) the appearance of his Theory of architecture and its constant dissemination in his lectures at the National School of Architecture, 2) the building of important hospitals during the twenties, and 3) the recognition of his thought by several generations of students of architecture and young architects. (De Anda Alanís, 2008)

It is important to remember that, the Movement of the Mexican Modern Architecture took place at a moment of social crisis, as Mexico's Revolution or civil war was just ending, leaving a needed nation of an architecture that reflected the changes happening in Mexico, and society's willingness to lead about the country's new direction. In the architectural field, it seemed to implement the new architectonic proposals that were already being applied in Europe and the United States of America.

In Mexico, Villagrán understood that, the neocolonial style did not satisfy the needs of the daily life of Mexican society. The construction systems, the aesthetics, the need for greater lighting in the spaces, and the need to reduce the areas to make their building more flexible (Vargas Salguero, 2004) were some concepts which helped Villagrán in the development of his first theoretical notions.

3.2 Villagrán's First Theoretical Notions

Between 1923 to 1927, Villagrán García recognized the need to establish the functionalist theories (Rivera R. , 1962) which could be applied ad-hoc to the socio-economic reality of Mexico. Thus, Villagrán promoted changes in the foundations of Mexican modern architecture by proposing ideological alternatives that simultaneously engaged with the modern Mexican movement and focused on the emergent social needs of Mexico.

The architects of the Mexican Modern Movement as Juan O'Gorman, Enrique del Moral, Augusto Pérez Palacios, and Enrique de la Moral, led by José Villagrán, introduced new formal and functionalist features into their projects -these reflected society's need to find its own identity, through an architecture that reflected tradition, while also engaging in a dialogue with emerging European architectural styles.

The José Villagrán's theoretical principles, such as architectural values (social, utilitarian, logical and aesthetic) (Fig. 18), represented for modern Mexican architecture the starting point in the process change of the understanding of modernity.

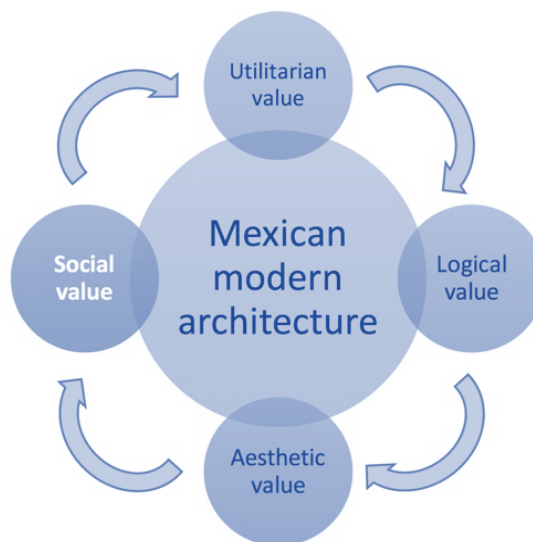


Fig. 18 José Villagrán architectural theory (Aguilera, 2017)

3.2.1 Villagrán, First Questions and Discourses

In 1924, Villagrán started teaching the course of “Elements of Composition”, and in 1927, “Theory of Architecture”. Through this course he began to reflect his first “theoretical proposals” in accordance of a new compositional order, starting with the implementation of a new concept of architecture tending to the radical transformation of the traditional architectural values. (De Anda Alanís, 2013) According to Olsen (2008), Villagrán examined "the definition and objectives of architecture, the science and art of construction, constructive logic, and the identification of beauty with the perfect adaptation to the end" as a first approximation in the understanding of the new values.

Villagrán focused his first theoretical approaches on the discussion of the “value” because in the historical moment in which Villagrán lived, there was a very broad sense of social activism⁴. This moment was characterized by the collectivist idea of solving and offering solutions to the problems of bourgeois class which were opposed to the lived reality of Mexico. This bourgeois reality found no value in tradition, it rejected the colonial historical background and misunderstood the autochthonous Mexican customs. Consequently, the Mexican architects were drawn according to the importation of European ideas and ways of life. This social reality, lead to Villagrán to rethink the value of architecture trying to develop a theory which could be applied on the real problems of Mexican society.

During the development of his theory, Villagrán based his ideas on the scholastic philosophy of St. Thomas Aquinas (García del Valle, 2016). Through this Italian philosopher, Villagrán understood the spiritual needs of man in the architecture, considering them as indispensable in his designs by including a space for worship. On the other hand, he also was based on the French Catholic philosopher, Jacques Maritain (Villagrán García, 1963). Through his influences, Villagrán communed the idea about the science by itself was not capable of answering the existential questions of a vital nature. In addition, he reflected on the understanding of the man from its community dimension (collective). Synthesizing

⁴ Social activism is an intentional action with the goal of bringing about social change. Social activism is linked to socialist ideas. (Amherst, 2018)

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his thought, Villagrán (1950), resorted to the axiology of Max Scheler, raising his architectural theory in four fundamental architectural values: utilitarian, logical, aesthetic and social. (Gozález Pozo, 2004) (Table 4, p.47) Through this philosophy, Villagrán tried to achieve a connection between culture and architecture, understanding the relation between form (architecture), means (spirituality), and purpose (the human).

3.2.2 Villagrán's Notion of "Modern Architecture"

For Villagrán, was fundamental to develop the notion of modern architecture and what represented it in order to show a clear idea about this concept to the young generation of Mexican modern architects. The most important influence of his idea was on: Mauricio Campos, Marcial Gutiérrez Camarena, Francisco Arce, Enrique del Moral, (Olsen, 2008) Juan O'Gorman, Augusto Pérez Palacio, Carlos Vergara, Álvaro Aburto, Jesús Rovalo, Javier Torres Ansonera, and Enrique de la Mora (De Anda Alanís, 2008). José Villagrán thought that, it was a mistake to say that modern architecture had materialist orientations and that it denied the sublimities of the spirit because spirituality is patent from the moment in which the human makes architecture and science.

Another Villagrán's idea was that the modern architecture is the object of the science. Because the modern architecture is based on the scientific process. It means that for Villagrán the modern architecture have a clear utilitarian emphasis. On the same way, Villagrán affirmed that from the ancient architectures the utilitarianism in the architecture has two manifestations: 1) in the constructive, and 2) in the economic. For these reasons, for him, the modern architecture has sources to concentrate its attention and guide its compositions in the sense of its utility, meaning under the characteristic of modern life.

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Table 4 Categories the José Villagrán's thought stages, his architectural works developed in each one, and point it out his theoretical approach during the design of NSA (Aguilera Vieyra & Sendai, 2018)

Year	Affiliation	Villagrán's Theoretical Questions	Villagrán's Theoretical Approaches	Villagrán's Typical Discourses	Works (Practice examples)
1924 1926	Professor at NSA "Elements of Composition"	How to be modern while still being a national?, How to be of your time while remaining in your space?, Are modernity and nationality, exclusive?, What is being modern?, What is the national?, How to transcend the conceptualization of architecture as an isolated work?, What is the role that architects have to play within the process of the new country, more just, more human, more architecturally livable, persecuted by the revolutionary process?	Villagrán, establishes the racional analysis of the program of needs to be solved in opposition to the traditional methodology, establishing the rejection of stylism.	"It is not worth being an architect and creative artist if what we are taught in the School is to manage a file of old forms: nothing suitable to solve our new and own problems" (Villagrán, 1924)	National Stadium, Building for the National Lottery, Altar for the Patricio Sanz asylum chapel, Institute of Hygiene and Sanitary Farm, Departments "San Miguel Num. 83", Project of building for the Federal District Government
1927		What is the architecture and what is its objective?	Architecture is the Art which is based on exact sciences and is applied to things which are very difficult to specify exactly; it is difficult because the needs of a social or individual environment are imprecise. As a basic principle of architecture we must think on THE TRUTH, which is defined as the solution of a need from the theoretical analysis and expressing it under the aprobation of its perfect functioning	"Architecture is the art of building and its aims is to satisfy spiritual, mechanical, economic, social, and personal needs: producing a feeling of harmony through the function of each part and the totality of the architectural organism. The truth is the basis of good architecture" (Villagrán, 1927)	X
1928 1930		How to avoid stylistic reproductions? What is the architect's function?	The architect must understand the architecture and its objective, the science and art of building, the constructive logic and identify the beauty with its perfect adaptation to the end	"Do not confuse the anachronisms* with architecture or architecture with archeology. The history and the tradition are not more than the verification of the theory of the architecture. The architect requires science and perfect execution technique because its purpose is the construction" (Villagrán, 1928)	Sanatorium for Tuberculosis, Dispensary for Antituberculosis, Eulalia Gutiérrez's House
1931 1938		How can be established the architectural work?	The architectural work must be established based on: a)The program, b)To show the physical-social environment through the composition, c)To express the time in which it is designed, d)To think with constructive logic, and e)To apply the appropriate proportions according to the function, human scale, and perspective. (Villagrán, 1931)	"The conscious modernism is the sincere expression of its time, of the program, of the beauty, and the design of utilitarian compositions.The conscious modernism is based on the constructive logic" (Villagrán, 1931)	Winery and house for Carlos García, Eugenio Tena's House, Corina Alemán's House, Departments Elena Lombardo, Elsa Garza's House, Julián Villarreal's House
1939 1940		Who is the modern man?	The man must be analyzed from the physical, biological and philosophical sciences. The man is conformed by four modern attitudes: 1.The truth, 2.The ethical, 3.The religious, and 4.The beauty.	"The modern man lives an intense spiritual life because he is in the systematic and constant discovery of the truth" (Villagrán, 1940)	Mariano Montoya's House, Carlos Robles's House, Belgrade Apartments and Paseo Reforma, Elias Pando's House
1941 1943	Professor at NSA "Theory of Architecture"	Can the abstract and geometric architectonic forms be an expression of such complex programs? Does the architectural form have enough capacity to become part of the culture to which it belongs and to join the community in the hands of the artifice who runs it?	By architectural form, Villagrán, understood the totality of the external appearances of architectural works: it includes not only façades, but also includes the volumes that make up a building or a city up and the open spaces that make up a square.	"The architectural is not just a column, a window or a wall: but the infinite compositions which are obtained from these elements." (Villagrán, 1941 and 1943)	Manuel Martínez's House, 444 Insurgentes Departments, Dr. Manuel Gea's Hospital, Zoquepan Sanitarium, Mundet Sports Park, Jesús's Hospital, Louis Pous's House
1944 1949		What do we mean by modern architecture? Is it possible to manufacture smooth façades, without classic moldings, without sculpted ornamentation, without cornices?	Building architecture means, meeting complex needs and demands from the man. The modernity consists in the architectural resolution of the totality of problems posed by the construction of the scenarios in which the man, as a collectivity, unfolds his life. Making modern architecture is to solve, integrally, the architectural problems of our time and geographical location.	"A volume with holes, it is not architecture the buildings with these characteristics, falsify the raw material, the built form and the optical appearance. These buildings are not comfortable to the integral man, nor even come to solve the most basic architectural problem...the utilitarian" (Villagrán, 1944)	CAPFCE Project, Project for the National Medical Center, Cedral Hospital for Tuberculosis, Commercial Buildings Ghent, Dr. Vertiz's Departments, Mexico University Center, Mundet Maternal Hospital, Galindo's House, Chávez's House
1950 1982		What are the fundamental principles that should govern architecture?	To realize the TRUE ARCHITECTURE it must be considered that: 1.The resources of aesthetic expression are the geometric and the space integrated by the constructions forms. 2.There must be agreement between form, purpose, and means. 3.The form must start from the scientific knowledge and the constructive technique giving solution to the program. 4.All programs should be analyzed from the general and specific needs (the general will include the understanding of the geographical space and its historical time; and the specific, the analysis of the physiognomic functions of the individual problem from the man demands. Consequently, Villagrán established four principles that integrate the <i>architectural value</i> : the utilitarian, the logical, the aesthetic and the social	"The integration of the architectural value, this means, the simultaneous presence of the aesthetic, the utilitarian, and the social value in the architectural work can be verified, only, through a visual formation unrooted from prejudice: can not do it who judges the new architecture through past times solutions" (Villagrán, 1950)	Sala Chopin Theater, Buildings of the National School of Architecture and Art Museum, Las Americas Cinema, Cumbres Rosedal School, Mundet Workers House, Alfonso Noriega House, San Cosme Market, San Lucas Market, Pavilion of Experimental Medicine, Parish Santa Cruz, Offices Building Reforma 87, Hotel Alameda, Nicolás San Juan University Center, naming a few

*Anachronism: a person, thing, or idea that exists out of its time in history, especially one that happened or existed later than the period being shown, discussed, etc.

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From the Villagránian philosophy, the only way that Mexican architects had to make modern architecture was through the science and justified its intervention in architecture as an activity to systematically research of the true knowledge. (Villagrán García, 1939) For Villagrán, through the science, the architects would can understand the true method to demonstrate that, the architectural work gave the adequate solution for the raised problem.

On the other hand, Villagrán connected the arts notion to the modern architecture notion. Because for him the relationship between them was important for understanding the creative process applied by the Mexican architects. He described the arts like, the set of practical means that help the artist to design an object and the result is based on the scientific knowledge because the science improves and facilitates its realization. According this idea, the result of the artistic work was subordinated to the circumstances that surround the architectural object (Villagrán García, 1939). Therefore, next to the scientific knowledge provided to the architecture, he would able to prints his personality applying the art in the architectural solution.

Villagrán decided to support those ideas because with the arrival of the modernity to Mexico, the architecture gradually become a science, avoiding its artistic process.(Fig.19) He observed that, the architecture used electromechanical equipment that modified the way of living, consequently, the functions of the architectural space change and with it, the creative process lost the rational analysis forgetting the tradition and mechanizing the architecture.

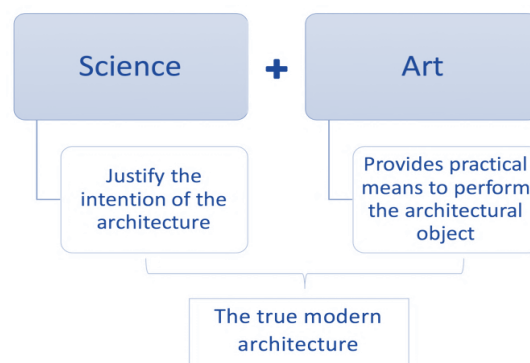


Fig. 19 Scheme of Villagrán's thought about the concept which conforms the notion of modern architecture (Aguilera Vieyra & Sendai, 2018)

Villagrán was worried about the design of architectural works with negative values which detract the authentic modern architecture. For instance, the architects

could fall into counterfeit raw materials through the imitation of the material. From his perspective, some young Mexican architects had forgotten the true optical-haptic properties of the material (transmission of heat, light, sound, etc.), and had replaced them with apparent finishes.

Trying to understand completely this notion, Villagrán explored the modern architecture notion from the originality that its represented internationally. Observing the architectural solution of Mexican architects, Villagrán understood that they worked under formal individualism which impels to the originality through avoiding falling into the false idea of collectivity. Because this concept could universalizes the architectural forms and the living styles. It is important to note that, according Villagrán, the originality is showed into its various formal qualities. He affirmed that, when the architectural forms are imposed into the community language, voluntarily or involuntarily, as a formal pattern leading an original reinterpretation these produce an authentically original work of art.

Villagrán showed to Mexican architects that: “The Mexican modern architecture always possessed and continues to have its own stylistic and original character, even though it has been influenced by other cultures (Euro-American influence). The influence of construction systems, technologies, and forms have been transformed in Mexico by imprinting our own particularity: it is seen in all the artistic manifestations of our country. We have our own way”. (Kappe, 1981)

3.2.3 The Notion of “The Human” as Base of his Architectural Theory

In Mexico, through the change of thought in the society during the first half of twentieth century, Villagrán observed an important problem in the Mexican architects; the lack of understanding the main aim of the architecture. For architects, the main motivation was the aesthetic solution not build and design for the human. From Villagrán's view, the modern architects considered the architecture as an art to build aesthetically but they only considered the human from its biological and physical aspects, but did not from its cultural and social aspects eliminating the symbolic quality on the architectural work. (Fig. 20). In the Villagrán's notion, the

human gives to the architecture its construction sense. Because through it, the architect can provide the architecture with the appropriate spatial proportions. (Villagrán García, 1939)

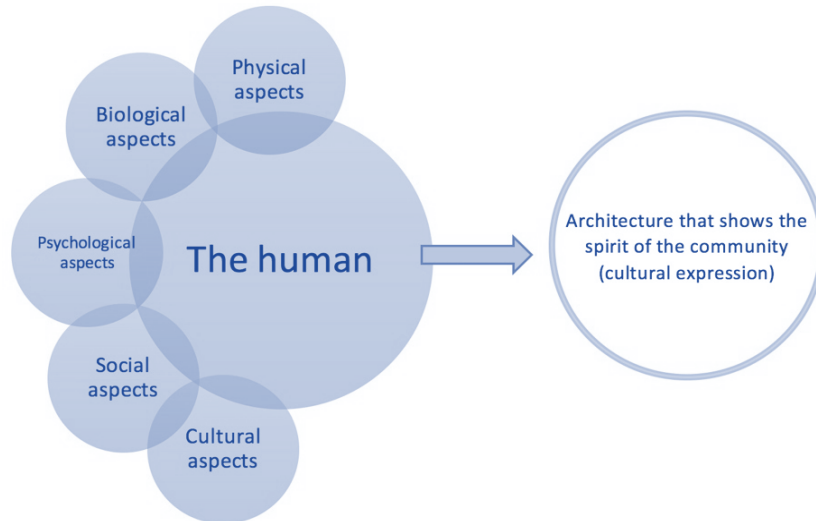


Fig. 20 Scheme of Villagrán's notion of "the human". The aspects which the modern architect need to considered for the understanding of "the human" (Aguilera Vieyra & Sendai, 2018).

On the other hand, Villagrán perceived that, the modern architect had stopped analyzing the historical process of architecture, and is in this where the knowledge of the problem is found; because the problem advances at the same time of the technical improvement of construction. Under this argument, it is understood that, the demands which frame the architectural problem are the same that frame to the human: spatial dimensions, wind, light; as well as, the social, scientific, moral, and aesthetic needs. Therefore, Villagrán tried to reflect the deep human sense understanding him from his organic-psychic-social needs.

In addition, Villagrán affirmed that was important that the modern architect recognized the architecture as part of the artificial environment made by the human. The beginning of this knowledge was to understand that, the human is organized in a society and is integrates in a culture or civilization; having as result that, the architecture responds to the community that creates it. Its quality of cultural expression, would be spread the collective spirit without a temporary expiration of the material nor of the aesthetic with which the architect created it.

Under this scheme and considering the Villagrán's notion, the modern architects had to remember that they had to know the modern human to determine with clarity and simplicity if: a) the aesthetic had disappeared, b) the utility should prevail, c) the economic should coordinate, d) the educational and the social should govern or, e) all concepts should coexist in the modern architecture. (Villagrán García, 1939) for attending the main aim of architecture: develop architectural solutions for satisfy all aspects which conforms the human.

3.2.4 The Notion of “Modern Architect”

For Villagrán it was important to define the role or function of the Mexican modern architect in the development of the new architecture. Because with the influences received from other countries, France and United State of America, the architects developed their architecture based on the copying architectural prototypes. From the Villagrán's notion, the Mexican modern architects should not create the modern forms through "made forms", the architects would research scientific truths. The architects must base their architectural creations from the knowledge of the origin of the elements because the architectural compositions are based on the scientific research that the architect carries out of the problem to be solved. In other words, the creative process must be supported reasoning the problem and solution. (Fig. 21) Because it should be studied from all its possibilities, otherwise, the architect would be incurring in architectural <<neoformalism.>> (Villagrán García, 1939)

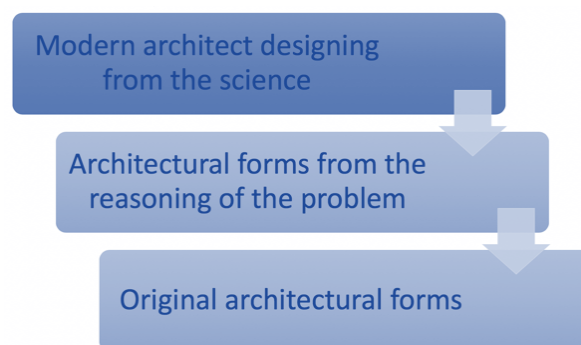


Fig. 21 Scheme of Villagrán's notion of “modern architect”. The relevance of the scientific research of the problem (Aguilera Vieyra & Sendai, 2018)

Chapter 3. Development of José Villagrán's Theoretical Notions (1927-1964)

Villagrán justified this idea from the exigencies existed in Mexican society of the twentieth century and on which the modern architects should be aware as they faces changes in social and constructive systems. For this reason, Villagrán presented the science as the invariable and inexorable means to understand the architectural problem developing a solution. Because for Villagrán, the lack of scientific studies on the proportions was a constant during the architectural composition which supports the development of buildings with identical elements and equal parts having as result the loss of the social meaning.

Another problem in Mexico during the modern era was that, the modern architect's resorted to mechanization through serial and mass production, but although the mechanization was the product of costly research, also becomes a means to determine the new plasticity of architectural forms (Fig 22). The modern architecture had reached its simplification as faced a high demand for production, it would be perfect and cheap, which leads generating a mechanical improvement in the execution.

According to Villagrán, the mechanization and mass production promoted the thought of the modern architect to avoid performing the specific analysis of the architectural program, leading him to design without difficulty. The meaning of this statement is that the Mexican modern architects lost the custom of achieving the perfect through imagination because there was a greater facility to achieve solutions on a whim and not from the establishment of mathematicised conditions or relationships that ranged from the social needs to the material possibilities of the work. For these reasons, for Villagrán, the modern architect, should take a deeper root in the ancient architecture, not in order to copy or revive it, but to feed from its vitality and genius at all levels (artistic, practical, philosophical, etc.).

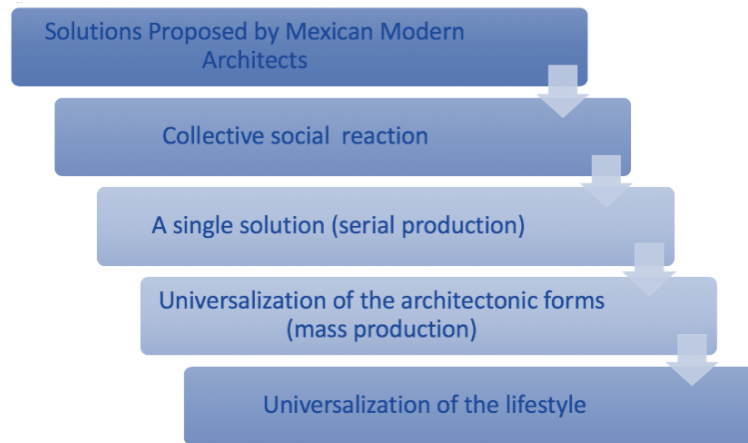


Fig. 22 Scheme of Universalization of lifestyle from the solution developed by modern architects attending the high demand production and forgetting the notions of “modern architecture”, “the human”, and the function of “modern architect” (Aguilera Vieyra & Sendai, 2018).

In addition, Villagrán, the Mexican modern architects should forget the ancient forms because they would be just repeating styles; only conserving the spirit of the tradition that originated them, the architects will be able to understand its meaning for modern architecture (Villagrán García, 1939). The unconscious of the architect would constitute perishable architectures based on the sole purpose of innovating by innovate. The main Villagrán's aim was that, the Mexican modern architects would start, their architectural projects, from conventions replacing the empirical and sentimental ways by the technical and conscious ones which would allow them not to fall into imitation and create a historically conscious work according to a clear ideal.

Finally, through his reflections, Villagrán enounced that, the thought of the modern architect was influenced by the universal culture which imposes its figures, and each architect would choose between: a) a mimetic copy without architectural value, or b) would reinterpret what is imposed, applying three formal qualities: the aesthetic, metrics, and the physical (color, light, and tactile).

3.3 Conclusions of this Chapter

An analysis of different sources allows concluding that, the Villagrán notions developed during the modern era in Mexico were influenced by the aesthetic solution

established in Europe, specifically in France, and the United of America, but they are mainly justify for the demands faced by the Mexican society.

José Villagrán García raised three fundamental notions: a) the notion of modern architecture, b) "the human", and c) the function of "modern architect". Because these three concepts, allowed him to understand, clearly and exactly, the Mexican context rescuing the tradition and presenting the modernity in Mexico from the understanding of the main objective of the architecture. Although Villagrán introduced the notion of "the human" in the thinking of modern Mexican architects; also, raised science and art as indissoluble bases of the design process, creating a new idea about how to perform the analysis and study of the architectural problem.

On the same way, Villagrán observed that the first reaction by the Mexican architects with the arrival of foreign architectures was to copy those stylistic prototypes, forgetting the traditional characteristics which determined the identity of Mexican architecture; having as first consequence the possible standardization and universalization of architecture in Mexico, a phenomenon which occurred in other countries.

Finally, I observed that, through his notions, Villagrán tried to prevent to Mexican architects from falling into mass production and guiding them to the analysis of social needs that seek to result in an architectural adhesion to the culture and tradition of the sites for which they designed.

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Chapter 4.

The Connection Between Villagrán's Theoretical Notions and the Plastic Integration Movement (1934 – 1954).

4.1 Introduction

Villagrán, through his work as Professor, dedicated himself to transform the criticism exposed against the academic tradition. He tried to offer an alternative thought to the new generation of architecture students and architects. Villagrán teaches them to accept the architectural design as a resource for active creation. This proposal was sustained in the cultural context, and whose task was to produce a new response according to social needs.

An important period in the Villagrán's thought was known as *Desarrollo Alemanista*, in reference to the Mexican president Miguel Alemán (1946-1952). During this political period, the Mexican State was in charge of indebted the country to the United States of America, this event disagreed with socialist artists such as Diego Rivera, David Alfaro Siqueiros, and José Clemente Orozco. The social artists sought, through their murals and pictorial works, show their disagreement with political ideology.

In addition, In Mexico, the plastic arts were promoted by the members of the Mexican School of Painting; architects such as Guillermo Rosell, Lorenzo Carasco, Raúl Cacho, and Juan O'Gorman formed part of the group, who from the pages of the magazine *Espacios* worked in the convenience of retaking the integration of the arts to the architecture (Vargas Salguero, 2004)

The artistic movement named “Plastic Integration” began to develop in Mexico after the publication, in New York in 1934, of *Manifesto, Towards the Transformation of the Plastic Arts* wrote by Alfaro Siqueiros (Torres, 2008)

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The Mexican Movement, tried to change the social ideology, ending with the capitalism and introducing the socialist ideas. Even, the Plastic integration Movement could be considered as a political movement. It is important point it out that, the Plastic Integration had an opposed aim to the “Synthesis of arts” developed in Europe. Because it was intended to ‘humanize’ the increasingly industrialized modern architecture providing art as an outside museum or gallery, in the ‘real’ space for society (Drosos, 2016) (Fig. 23)

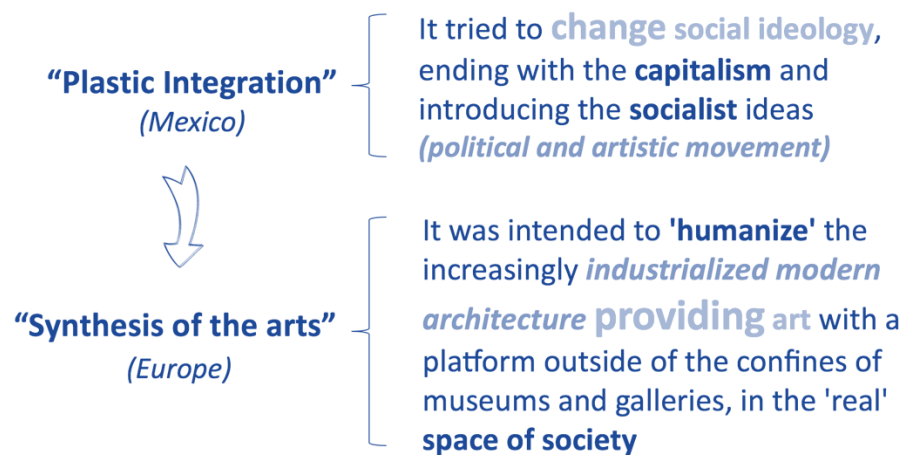


Fig. 23 Differences between Plastic Integration and Synthesis of Art
(Aguilera, 2018)

4.2 Historical and Sociopolitical Context During The Plastic Integration Movement in Mexico

4.2.1 Historical Context

The painting was one of the artistic disciplines that led the Plastic Integration movement, consolidating in a short time the muralist project, starter in 1920, as the option which replacing small-format painting. It presented to the Mexican community the stark picture of its history, its longings for independence, and the triumph of armed struggle begins. The architecture quickly assumed the new commitments of change, orienting itself towards the substitution of the architectural styles inherited from the Porfirian tradition and giving rise to an intense struggle among the young generation of architects who did not believe that the change of plastic appearance was consistent with the revolutionary demands, and the old guard

Chapter 4. The Connection Between Villagrán's Theoretical Notions and the Plastic Integration Movement (1934 – 1954)

of the academy, which maintained the << *aesthetic principle* >> as a fundamental factor of architectural art. (De Anda Alanís, 2013)

In 1929, Diego Rivera (Fig. 24)(Fig.25) was appointed as head of the School of Plastic Arts at National Autonomous University of Mexico. In December of same year, Rivera presented to the university authorities a new academic program based on a deep social scope, which aroused the discontent of the students from the School of Architecture (Torres, 2008). The main aim of Riveras's academic program was to teach, painters and sculptors, that architecture was necessary source in their trade (Torres, 2008)

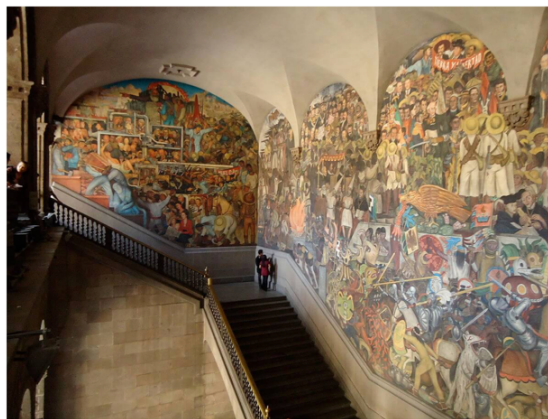


Fig. 24 Mural painting “History of Mexico” by Diego Rivera at National Palace. Rivera began the painting works in 1929 (Lozano & Coronel Rivera, 2007)



Fig. 25 Close up of the episode called "Agrarian Reform" by Diego Rivera at National Palace (Lozano & Coronel Rivera, 2007)

Through the magazine *Ars*, Diego Rivera said that, the first thing built is the architectural work and the architect refrains using mural painting because he doubts if the painter can interpret the spirit of the project and the reasons which gave it life and meaning. On the other hand, Diego Rivera, affirmed that the academic architects

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preferred murals that could not be seen; however, contradicting himself, because he pointed out that a real mural painting was a functional and necessary part because it was the union element between the building and society.

In 1934, David Alfaro Siqueiros through his *Manifiesto, Towards the Transformation of the Plastic Arts* affirmed that, a mural could be painted anywhere and that it should begin to promote the learning of mural painting outdoors, on the street or on the free walls of buildings; however, Siqueiros, did not consider the joint work with the architect.

4.2.2 Sociopolitical Context

The beginning of the social revolution of 1910 demanded the imminent modification of the fundamental schemes of the nation project established by the Porfiriato. The main reason for the social revolution was the claim for an authentic democracy. In addition, questions about the social structure regarding agrarian issues, justice about the distribution of economic benefits, defense of the country's natural riches, and national education began. Consequently, the artistic schemes established during the Porfirio Díaz political regime and its ability to develop a cultural project were seriously questioned and replaced in a short time by alternative programs which corresponded to the historical moment consolidating the foundations of the Mexican culture. (De Anda Alanís, 2013)

During the government of President Lázaro Cárdenas del Río (1934 – 1940) (Fig. 26) the ideals of the Mexican Revolution, equality and justice, were put into practice. Cárdenas was a defender of a modernizing and democratic policy; he promoted education at all grades, stimulated the formation of trade union organizations, renewed public administration and promoted, as no one had done before, agrarian reform. Cárdenas intended these policies to serve as the means of elevating the standards of living of the masses. (Olsen, 2008) His nationalist convictions led him to nationalize the railways in 1937 and, the following year, the oil industry, which was in the hands of British and American companies. His positioning in favor of working classes and peasants against the interests of the powerful and the defense of natural resources against the interference of foreign

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companies gave him a reputation for honesty.

Thus, the Movement of Plastic Integration found in Mexico, in the forties and fifties of the twentieth century, a society which dreamed of industrialization and progress, with economic independence and social welfare; a nation that was between imperialism and capitalism; a country that struggled and based its hopes on the union of its society through nationalist discourses, in order to reach modernity. (Torres, 2008)



Fig. 26 Lázaro Cárdenas approximately in 1937 attending the social demands (*Ayala Cárdenas*).

4.3 The Plastic Integration Movement in Mexico (1934 – 1954)

In 1940, for the first time, the denomination of "Plastic Integration" (Torres, 2008) was given to the artistic movement with political and economic interests whose purpose was to show an unreality of Mexico development. This artistic movement was the encounter between economy, society, politic, culture, and art. The Plastic Integration movement was characterized by trying to integrate painting and sculpture to the architectural work. It could be understood as an integral art because two specialists intervened in: an architect and a plastic artist.

At this moment, the modern architects (Juan O 'Gorman, Juan Segura, José Villagrán García, Carlos Obregón Santacilia, and Enrique Yañez), and plastic artists (Diego Rivera, José Clemente Orozco, and David Alfaro Siqueiros) worked with the most advanced ideas, which allowed them to develop their new forms and concepts

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which would place Mexico at the vanguard of twentieth century. (Rivera R. , 1967)
One of those concepts was to understand the functionality of the mural painting turning it into an element of union between the building and society. (Rivera D., 1934)

In 1942, the need to satisfy the social demands on higher education, led the Mexican State to propose the construction of an University City (CU) (Fig. 27). At this moment, José Villagrán was the architect who had established the theoretical foundations of Mexican modern architecture. For this reason, in 1946, the University Committee appointed to Villagrán for the establishment of CU's general program; and in 1948, he evaluated and decided which Master plan proposal would be built.



Fig. 27 Master plan approved by Villagrán in 1948 (*Lizárraga Sánchez & López Uribe, 2016*)

The construction of CU (Fig. 28) was the fundamental landmark in the history of Plastic Integration Movement (De Anda Alanís, 2013) because is the largest sample of exterior murals exposed in the country during the modern era, even this project symbolizes the materialization of the artistic movement. It will be during this period that the Plastic Integration Movement influenced the Villagrán's thought and his notion about the collaboration of plastic arts in the architectural design.



Fig. 28 The beginnings of CU construction in 1950 (*Kalach, 1999*)

4.4 Villagrán's Thought Facing the Plastic Integration Movement

For Villagrán, in the Mexican modern era, being a plastic artist (Fig. 29) was complicated by the political and social conditions that were lived. He defined the plastic artist as audacious and self-centered because the work of art was for himself without caring about the disdain or incomprehension of popular society. The position of the modern plastic artist was to detach himself from the routine of the past (tradition) and to progress from his own interests (Villagrán García, 1963).

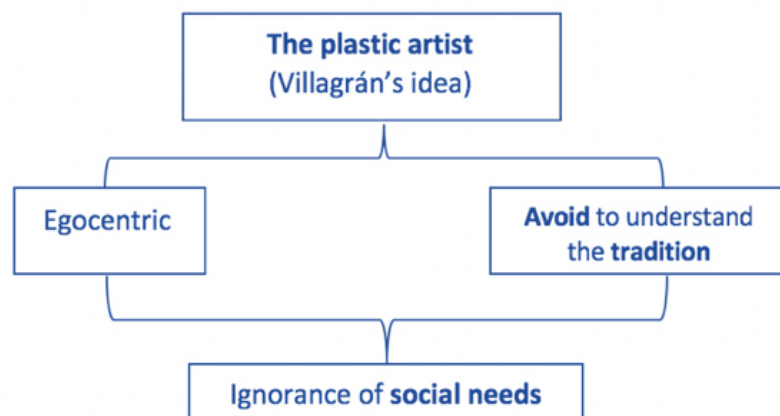


Fig. 29 Villagrán's idea about the plastic artist. (*Aguilera Vieyra & Sendai, 2018*)

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From the Villagránian thought, written in his *Doctrine* (Villagrán García, 1942), two basic foundations should be considered to achieve congruence between art and architectural work:

1. *The beauty*. It satisfies the totality of conditions that the human has consciousness. It covers the spiritual needs, which for each human are different. These are according to their feelings and could be achieved through the correct disposition of lines in the composition: the proportion.

2. *The decoration*. It can be composed of pictorial or sculptural ornamentations (plastic arts). The plastic arts should be included only if: 1) they are inspired by the same aim as architecture, 2) the pictorial or sculptural work was formulated by the same feeling as the building, 3) its composition qualities such as order, simplicity, and congruence are in accordance with the spaces distribution and proportions of the whole design. In the same way, the composition qualities must be manifested in a) the disposition, b) nature, c) the silhouettes, and e) in the dimension of the plastic arts that will be included.

4.4.1 The Villagrán's Synthesis of Plastic Integration Through the Concepts of Decoration and Ornament

The plastic arts (painting or sculpture) were considered by Villagrán as an ornament in the architectural work, for this reason, he decided to be careful with its inclusion in the architectural design. Villagrán affirmed that the plastic arts are an auxiliary, useful, and beautiful tool, but it was necessary to use them with discretion. The architect had to thoroughly control of the plastic arts without allowing them to be confused with architecture. In addition, according to Villagrán, the Plastic Integration consists in the collaboration between the architect and the plastic artist from the approach of the program. (Fig. 30)

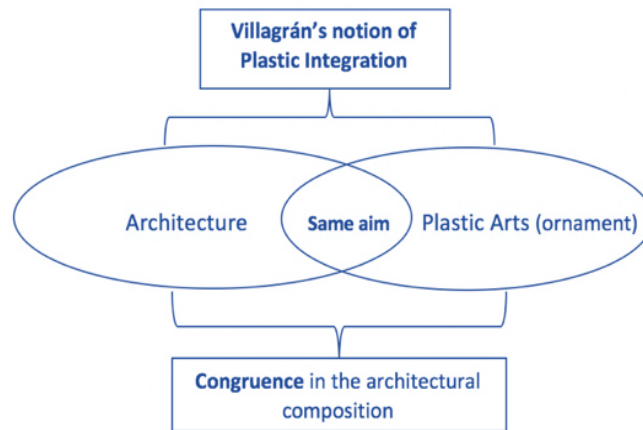


Fig. 30 Villagrán's notion of Plastic Integration (Aguilera, 2018)

In his theory, Villagrán (1942) defined the ornament as: *“all the sculptural or pictorial element which did not form a functional part of the building and that had not been thought from the beginning”*. (Fig. 31)

On the other hand, Villagrán developed the notion of decoration affirming that, it should be planned from the beginning of the design exalting the formal expression of the building. According to Villagrán, the decoration emerges from the order, simplicity, and visual harmony provided by the proportion of the composition. *“The decoration is a useful and pleasant auxiliary, but it is necessary to use it with discretion controlling it thoroughly without allowing it to be confused with the architecture”* (Villagrán García, 1942). (Fig. 31)

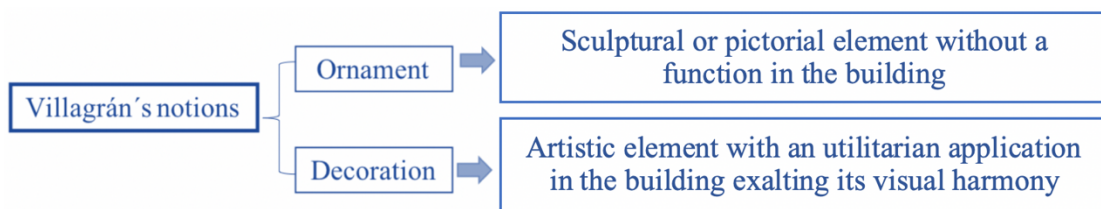


Fig. 31 Villagrán's notion of “ornament” and “decoration” (Aguilera Vieyra & Sendai, 2018)

4.5 The Mural Painting as the Main Plastic Art Applied During the Plastic Integration Movement in the Mexican Modern Architecture

In Mexico, since the Mesoamerican period, the relationship between the building and the mural has represented a means of communication. In the modern era, mural painting turned out to be the medium of expression through which political discourse was shown to the society and to the new generations of students.

In 1921, David Alfaro Siqueiros claimed: "*Building a monumental, heroic, human, and public art*", these words were the antecedent of a whole generation of Mexican artists dedicated themselves to manifest, in the painting, the ideals of the Revolutionary society.

According Arregui (2014), the Mexican muralism appeared in 1922. In Mexico, the muralism was the artistic expression applied more frequently during the Plastic Integration Movement because it allowed the artist to show, through a big format, the political and social objectives imported from the Mexican Revolution which transformed the country during the second decade of the twentieth century.

The muralist period (1922-1955) is temporally connected with the Plastic Integration Movement (1934 – 1954). (Fig. 32) The main themes painted during this artistic movement were the Mexican Revolution's events and the indigenous roots. In addition, this artistic movement proposed a new form of modernism returning to the realism and did not using the modern styles, such as cubism and surrealism.

In 1942, the Plastic Integration Movement found the best opportunity for show its most important external mural works, the construction of CU. Since 1950 to 1954, more than 60 Architects and Engineers designed the CU's buildings with simple shapes and glass surfaces that met the standards of international architecture; while the artists captured political messages that showed the ideology of the President of the Republic, Miguel Alemán Valdés (1948-1954). The construction of CU is considered the a precedent in the architectural and urban project of Latin America in the modern period. Even the CU's project was the conceptual reference in the design of University City in Caracas, Venezuela.

Chapter 4. The Connection Between Villagrán's Theoretical Notions and the Plastic Integration Movement (1934 – 1954)

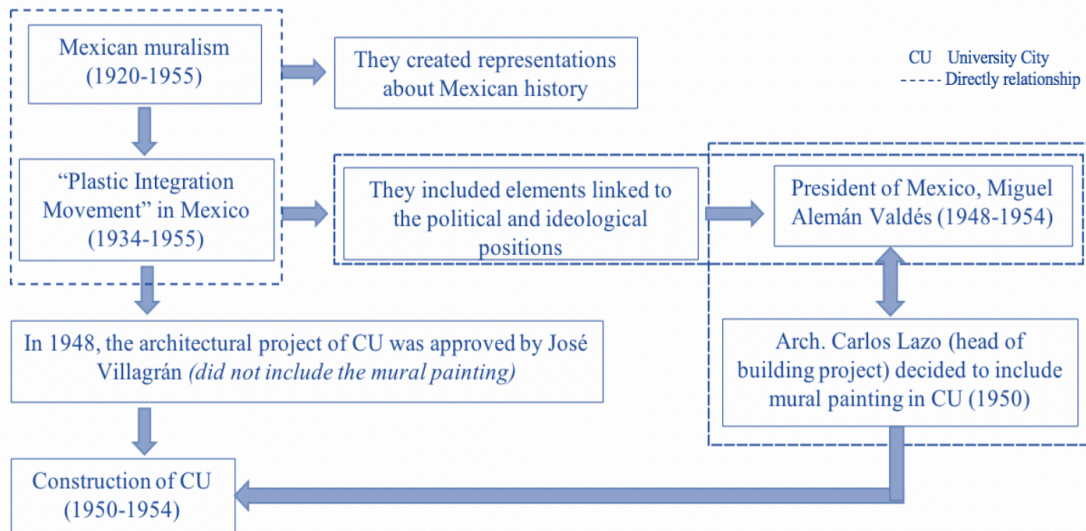


Fig. 32 Scheme of Mexican muralism and its relationship with CU's construction (Aguilera Vieyra & Sendai, 2018)

4.5.1 The Case of University City in Mexico (1950 – 1954)

Historically, in the Mexican architecture the union of painting, sculpture and architecture have become a tradition. This tradition had influences in the buildings of CU because it was the most relevant manifestation of exterior mural paintings in Mexico after the Mesoamerican period. When the CU was built, the opposition of the dominant architectural currents (neocolonial) was raised (Rivera R. , 1967). As mentioned, Villagrán developed the general program for CU (1946) (Pérez Méndez, 2014). In the original program and master plan, Villagrán did not consider the integration of paintings or sculptures; however, according Pérez Méndez (2014), on August 9, 1950, the architect Carlos Lazo, who was the guide of the CU project, decided to include the mural painting. These conditions led the architects to work separately from the plastic artists.

The buildings which included the mural painting in CU, are: the General Library, whose closed walls were completely covered with colored stones by the architect Juan O'Gorman (Fig. 33), who was also the author of the building; Diego Rivera was worked designing a volumetric mosaic on the *taludes*⁵ of the Stadium; Siqueiros (Fig. 34) developed the mural work on of the central volume of the Rectorry Tower, besides Carlos Merida and José Chávez Morado in the auditorium “Alfonso

⁵ Talud: Inclination of the face of a wall or a terrain (RAE, Dictionary of the Royal Spanish Language, 2018)

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Caso”; in the Science School, Francisco Eppens Helguera the overcoming of man through culture in the School of Dentistry and Life, death, miscegenation and the four elements of the same author, in the School of Medicine. (Cejudo Collera, 2014)

The plastic integration concretized a style in the Mexican architecture trying, at the same time as integrating the plastic arts, merging the cultural values that were fundamental for the Mexican society.

Through the work of Plastic Integration in CU (Fig.35), the aim was to consolidate national identity, mixing it with the language of the avant-garde. In its buildings, murals of important artists were expressed the nationalist ideology and the conception of the University as hope for a promising future for Mexico. (Cejudo Collera, 2014)



Fig. 33 Central Library at UNAM in 2016, the mural painting and the reliefs are showed
(Lizárraga Sánchez & López Uribe, 2016)

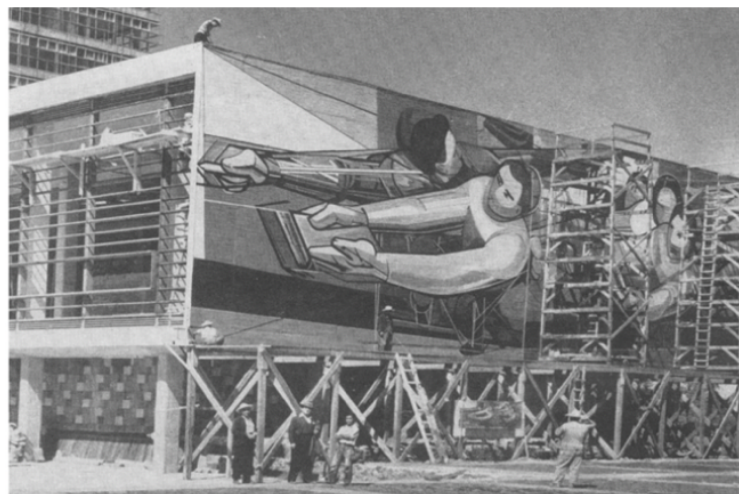


Fig. 34 The mural painting by Alfaro Siqueiros in 1953 is observed
(Lizárraga Sánchez & López Uribe, 2016)



Fig. 35 Location of Central Library and Rectory Tower at UNAM in 2016, the buildings shows the mural works by Siqueiros and O’Gorman (*Laso, 1956*).

During his mural work in CU, Siqueiros (1932) claimed that the Plastic Integration did not mean “*painting on the walls for painting on the walls, as if the objective was to paint large proportions.*” (Alfaro Siqueiros, 1967) He decided paint in large proportion even if CU’s project was not considering the mural paint as an element of its design.

Thru this period, Villagrán (1942) considered painting and sculpture as an unnecessary ornamentation in architecture because both of them are works of art that produce feelings related to beauty. In addition if one does not think of a real plastic integration between painting, sculpture and architecture will be given an assumed in the expression that communicates each one. (Villagrán García, 1942)

Taking as consideration the Villagrán’s notions, the CU’s case should be considered as a pictorial ornament because the architects forced the walls of their projects to support the murals which prevented showing the aesthetic essence of the building. Also, through the mural painting, the architects moved away from achieving the architectural identity looking for the twentieth century.

For Villagrán, the real confluence of mural painting and building would be when the architects and the plastic artists work in the planning and essence of the architectural and pictorial project at same time, never detaching from each other

Chapter 4. The Connection Between Villagrán's Theoretical Notions and the Plastic Integration Movement (1934 – 1954)

because both would lose their character and symbolism. (Fig 36)

Finally, Villagrán (1963) affirmed that: *"In the modern architect, there is a natural will of plastic, considering his social function and using only his own resources to make the work. It means that, the modern architect has a purist tendency, misunderstood by the another one and reserved for themselves"*.

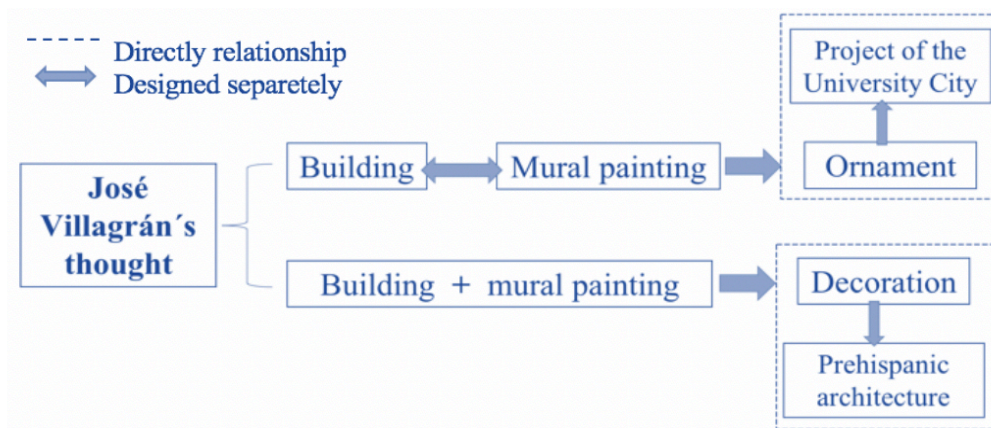


Fig. 36 Villagrán's thought about the different relationship between building and mural painting (Aguilera Vieyra & Sendai, 2018)

4.6 Conclusions of this Chapter

Villagrán was a faithful defender of social needs, the tradition, and the idea of any architectural design should be based on them. For this reason, the application of plastic arts in the architectural work was limited to strict design conditions. One of them was its conception from the same aim. Another restriction in the plastic arts and architecture was that, according to Villagrán, the architect should be able to achieve congruence between the architectural design and the natural appearance of the materials, avoiding cover them.

These conditions hindered collaboration between artists and architects because their spiritual aspirations and symbolism were different. Even, Villagrán, through his theoretical foundations and his professional practice during the 40's and 50's, showed the importance about architects and artists needed to work with the same objective and feeling; his efforts were unsuccessful.

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From his perspective, firstly, architects had to understand the materiality of the architectural object before integrating other arts to the project. Villagrán considered that, the architects who applied mural painting, later to the initial project, were to cover the walls that had not been planned properly and that they tried to cover the mistakes made during the plastic conception of the building.

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Chapter 5.

The Adaptation of José Villagrán's Architectural Theory in the Realization of the Project (NSA).

5.1 Introduction

The social role of the architect is synthesized in the building, understood as the constructed form, combining the utilitarian and symbolic functions (Rodolfo Stroeter, 2013). In Mexico, since 1920's to 1970's, the modern architecture was supported on the Villagrán's theory. According to Cuevas Martínez (2002) and González Pozo (2004), Villagrán, in his professional beginning, was inspired by the new ideas from Tony Garnier and then from the influences of the Bauhaus, Gropius, and Le Corbusier's work because these ideas helped him to abandon the decoration applied on the Mexican architecture allowing to understand the importance of the functional needs of the building.

Villagrán's theoretical intentions focused on responding to the social exigencies which appeared after the Mexican Revolution; for that reason it was necessary to have a new formal conception of the solution. At the base of its theoretical foundations, Villagrán settled the analysis of the programs, general and particular, as a resource to make architects reflect on the specific characteristics of Mexican culture and, at the same time, to understand the new aesthetic proposals presented by European modern architecture.

Villagrán was agree with the thought of Vittorio Gregotti, who affirmed that: *"only with the coincidence between ideology and language of the architectural work there is the possibility of acting as architects and transforming the surrounding world. The architects will never make the social revolution through architecture, but they can revolutionize architecture, and that is the mission of the architect."*

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In 1950, the construction of CU was presented to modern Mexican architects as the opportunity to participate in the urban and architectural project which would symbolize the climax of the modern movement..

In 1948, Villagrán designed the General Architectural Program for CU. He tried to build a campus in which the different schools, including the National School of Architecture (NSA), would be completely integrated and where the concept of "city" guided the solution of the new CU (Pérez Méndez, 2014). Thus, through rational mechanisms the full legibility of space was achieved. In the planning development of both architectural projects, Villagrán's applied his ideas about the humanistic logic, the formal-functional design, and the sensorial expressions (Pérez Méndez, 2014).

The NSA's project was developed by Villagrán after more than 25 years of professional practice, having as a peculiarity that, during its development, various changes happened in Mexico; on one side, the movement of Plastic Integration, and another the ideological renovation and the exponential growth of the cities. These artistic-social events allowed Villagrán, through the NSA's project, to consolidate his theory with practice because the notions that he had raised found the context in which would materialize.

5.2 Villagrán's Professional Practice

The first project designed by Villagrán was the National Stadium in 1924. (Fig 37) In this project, Villagrán still showed the neocolonial influences learned during his architectural studies at NSA. The importance of Villagrán not only focused on the theoretical approaches, but also on the practical exercises. In 1925, he designed and built the Sanitary Farm and the Hygiene Institute. According to De Anda (2013), these projects showed, for the first time in Mexico, an architecture opposed to the historicist norms and the new architectural objectives: a) the satisfactory solution of the functions, and; b) the aesthetics derived from the material nature. The Farm and Institute, as the first modern buildings in the country; becoming the tangible sample of a new architectural theory and a new plastic

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landmark which opened other architectural alternatives for Mexico. (De Anda Alanís, 2013)

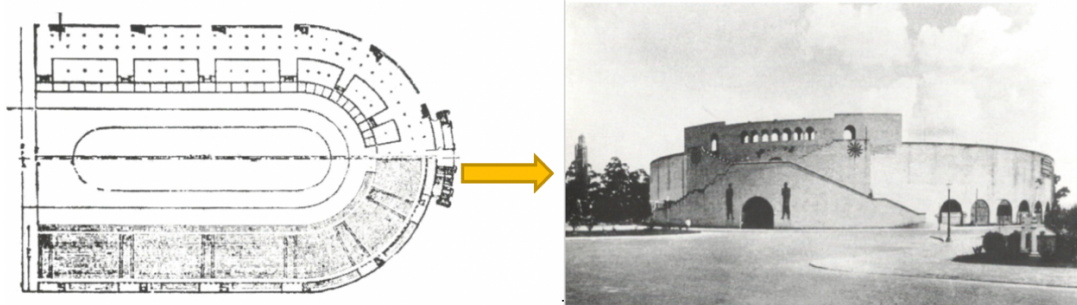


Fig. 37 Project and façade of National Stadium by Villagrán in 1924 (INBA, 1986)

Within his professional practice, Villagrán considered indispensable the relationship between volume and general architectural program (Villagrán García, 1961). Villagrán understood that to be able to carry out an adequate architectural practice it was necessary to understand that, architecture is part of the artificial environment made by the man (Villagrán García, 1961). From Villagrán's thought, the architect must base his compositions on scientific research because he must solve the solution from the whole understanding of the problem. The architect should not start his creation from a style, but from the analysis of the problem.

Villagrán stated that, when the problem is analyzed the architectural program is formulated. For Villagrán (Villagrán García, 1964), the architectural program must have as regent elements the maximum spatial use in relation to the physical and biological human needs. In conformity with Pinocelly (2004), in his practice, Villagrán identified the module which guides the architectural composition, having as main geometrical foundation the understanding of the "site" from three perspectives: the urban, natural, and cultural context. Under these conditions, there are two characteristics in this analysis: 1) The geographic-physical context, and 2) The geographic-cultural context. Applying the Villagránian thought (Vargas Salguero, 1993), we can say that, in his professional practice the modern architect must interrogate the past (the tradition)—because it proceeds the base of experience, but not as a source of formal inspiration to create the future. Neither archaism, nor futurism: actuality.

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Villagrán summarized in three stages the process through which an architectural work is developed reflecting truth: a) the understanding of the theory, b) the application of a design method, and c) the evaluation of each of the stages.

Summarizing, for Villagrán, the practice of architecture should be implemented under the idea that: *“The current architecture should belong to its time not only because architecture has been created in it, but particularly is inspired by the culture of the man. The architects need to express the truly culture which he belongs. The architecture must be of our time and authentic as the ancient architectures applying universal principles as: a) builds for man, b) apply the science of his own time, and; c) the man achieves what the community itself allows.”* (Villagrán García, 1963)

5.3. Villagrán's Methodology Applied in the Design Process

Villagrán indicated that, during the design process finding the geometrical and aesthetical solutions the following stages are important: 1. Approaching of the problem, 2. Interpreting the problem from all its aspects, 3. Establishing the general architectural program, 4. Setting out the specific architectural program, 5. Analyzing the climatic conditions of the place where it will be built and the demands of the man being who will make use of it, 6. Eliminating any prior conception of the form, 7. Basing the formal solution on theoretical foundations and mathematical sciences, 8. Obtaining the best aesthetic and mechanical solution by applying a deductive method, and; 9. Establishing the social impact analyzing the relationships between costs and viability of the architectural work.

Through this study, the Villagrán methodology can be arranged on three main phases: 1. The metric analysis of space needs, is the approach to the problem and the first draft of the program, as well as, the analysis of the spatial metric needs of users who will develop activities in the building; 2. The elements disposition and geometrical composition, in this phase, the architect is analyzing the environmental, geographic, and urban context which surrounds the project, and simultaneously, thinking on the previsualization of the three-dimensional architectural form; 3. The

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evaluation phase, in which, the solution is analyzed to determine if it can solve the architectural problem. (Fig. 38) Indeed, such a cycle may not be a very distinctive methodology today. However, in the social situation of the racialism after the Mexican Revolution, it can be said that, the practice of Villagrán's rigorous theory avoids imitating the finished form and makes Mexican architects aware of the importance of modern Mexican architecture in a regular way.

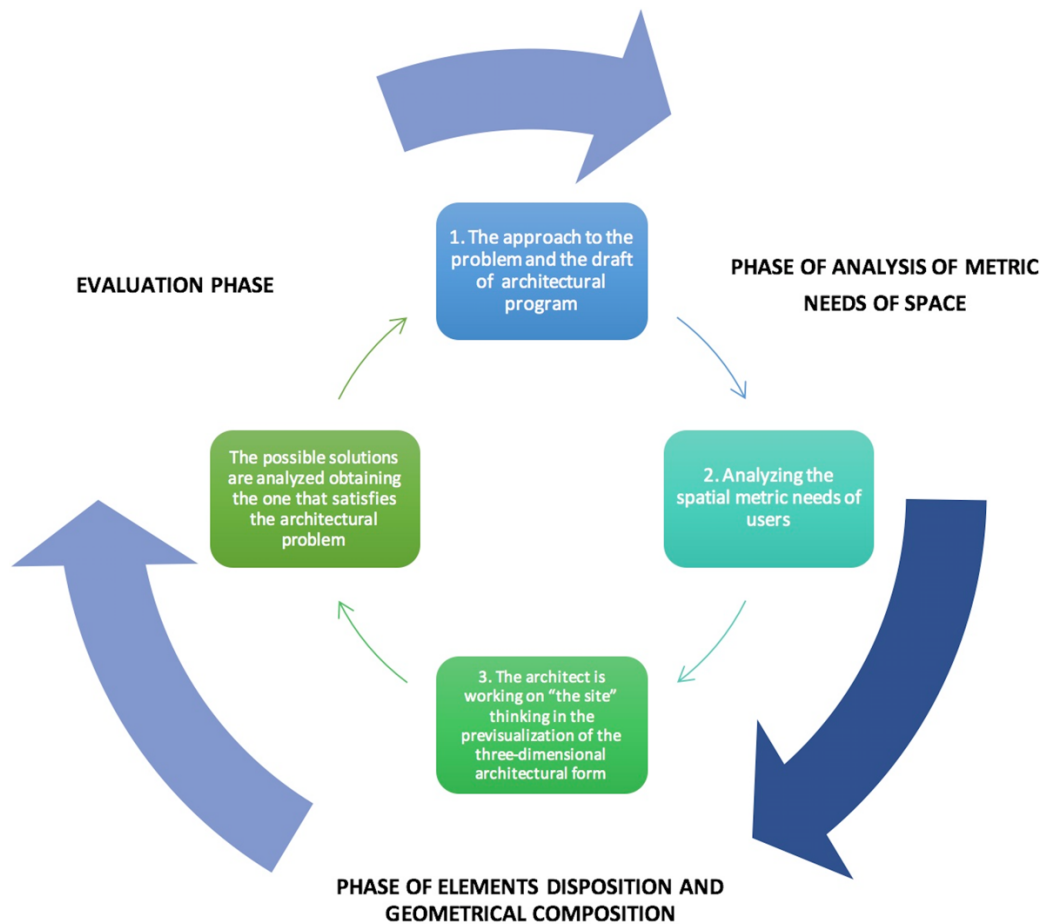


Fig. 38 José Villagrán's methodology applied in the design process
(Aguilera, 2017)

5.4. Villagrán's Project for NSA

5.4.1 Analysis of First Villagrán's Sketches for NSA

Villagrán based his first NSA's design approaches on the understanding of the student's community from their academic needs. According to Del Moral (1956), the NSA's architectural problem arises from its logical and natural bases of the

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composition and proportion, as well as, on its relation among the different spaces as a logical consequence of a rigorist analysis of the general and specific programs. Using a meticulous analysis of the function of the metrical and functional needs, Villagrán, designed a logical form, an adequate and harmonious solution. (Del Moral, 1956)

Villagrán proposed, as base of his analysis for the design of NSA, two fundamental stages: a) the general architectural program, and b) the specific architectural program. These proposals are confirmed by the first notes found on the NSA. Through the figures 39 and 40, it is observed that, Villagrán emphasized, by circled numbers and underlined, the NSA's general architectural program and then he described the specific program for each required space which are related with the social value. On the another hand, I perceive that, considering the aesthetic value, Villagrán drew the first sketches of the metric approximations of the spaces, revealing a preview modulation of the constructive elements and trying to achieve a relationship between geometry of the space and volume. (Fig. 41) Having these first architectural schemes, Villagrán could intuit the mechanical efforts (utilitarian mechanic-constructive value) that the building could withstands and propose the general structure. However, a mathematical study was also realized to rectify the building structure.

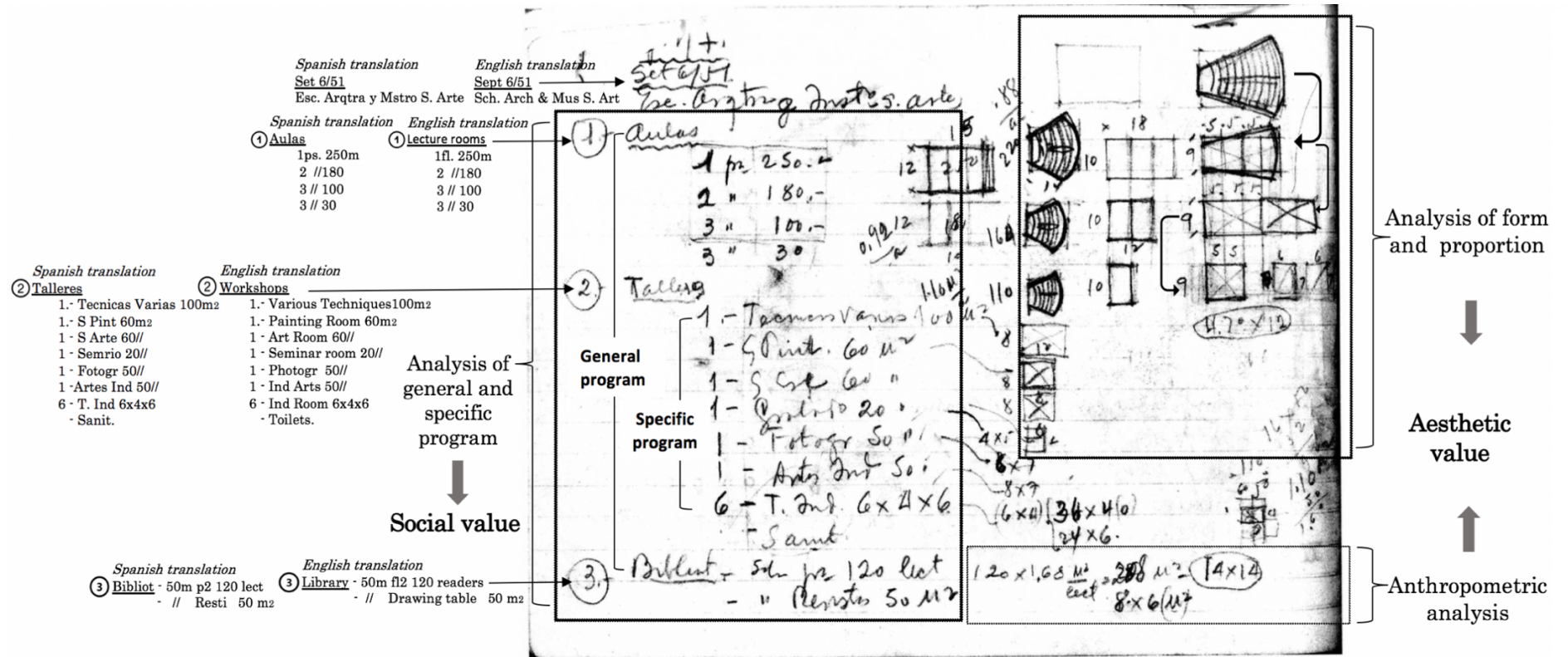


Fig. 39 José Villagrán's first draft for NSA's project (1951) (Aguilera Vieyra & Sendai, 2018)

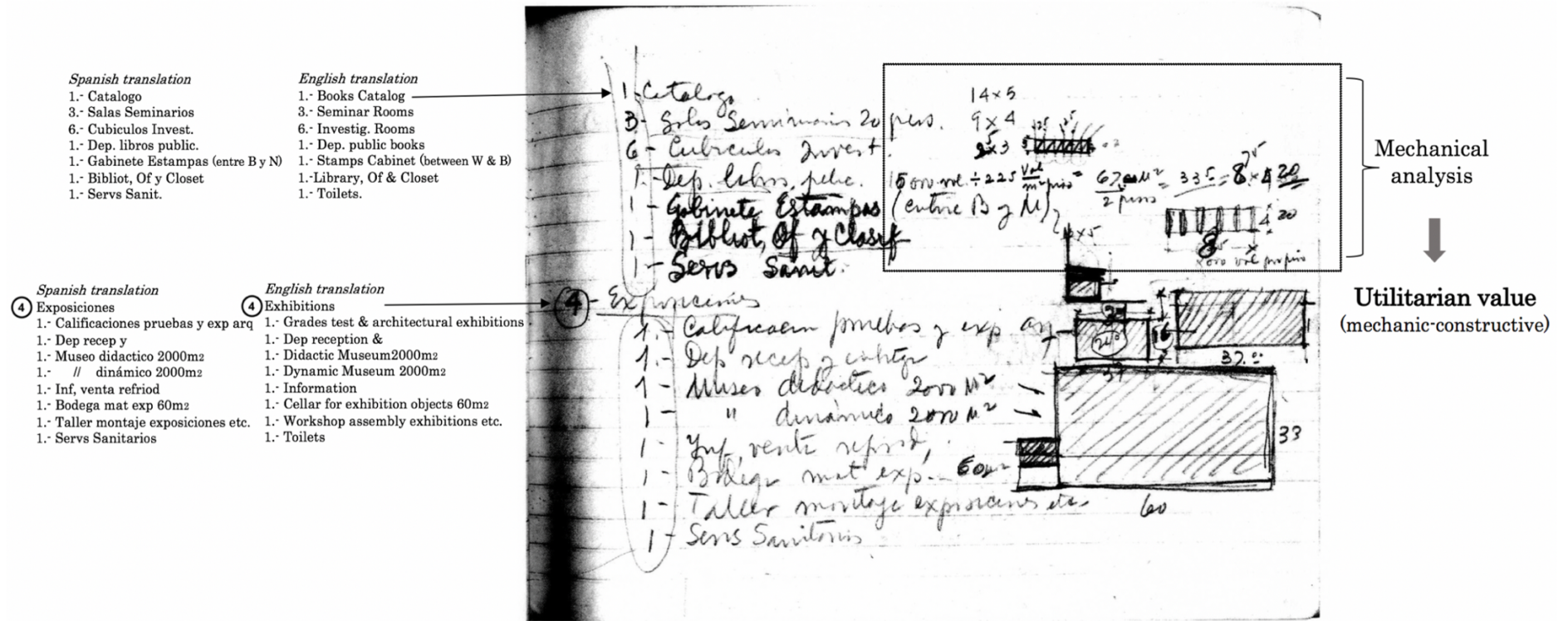


Fig. 40 José Villagrán's first draft for NSA's project (1951) (Aguilera Vieyra & Sendai, 2018)

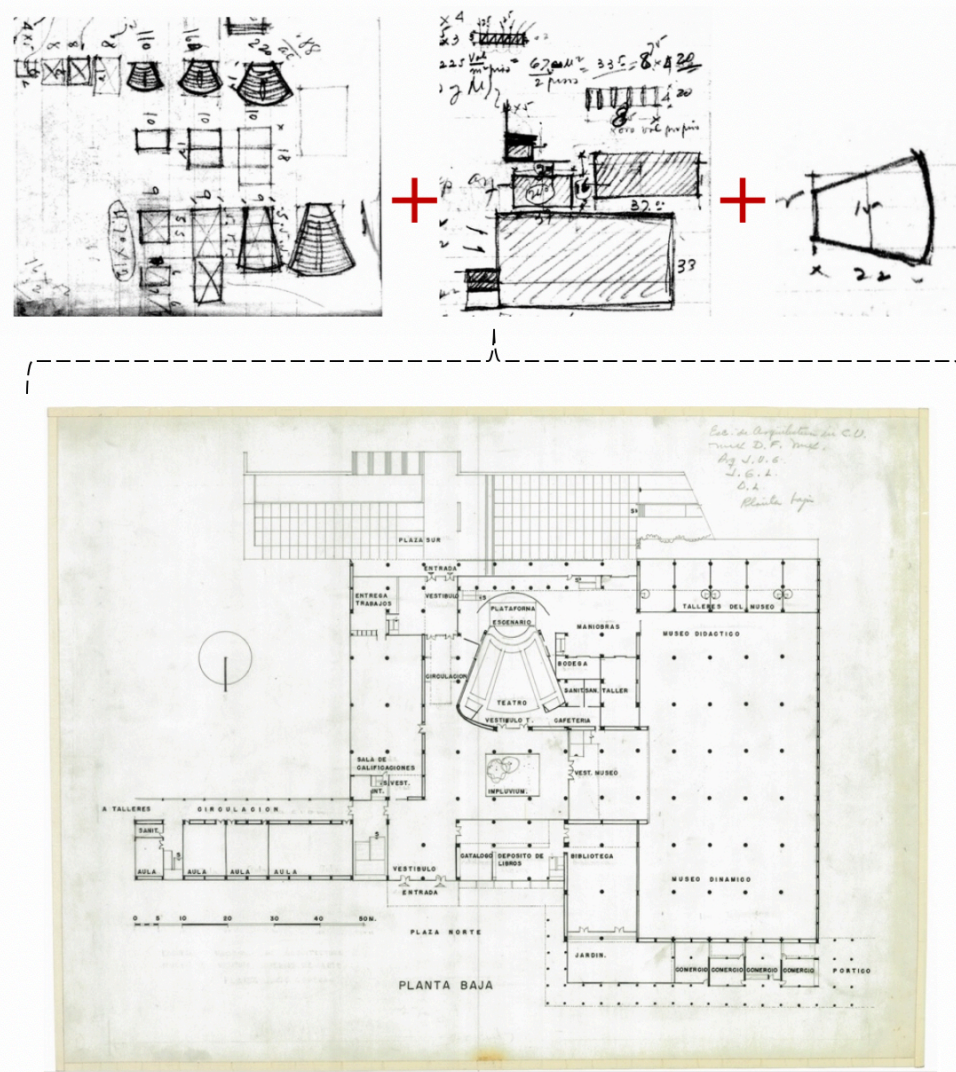


Fig. 41 The connection between the first drafts for NSA and the final project (Aguilera , 2018)

5.4.2 The Connection Between Villagrán's Theory with NSA's Project

In 1949, the Mexican president, Miguel Alemán, assigned Mauricio Campos, Mario Pani, and Enrique del Moral, as managers and coordinators to define the CU's final project and conforming the work teams to develop the projects of the schools which would make up the UNAM's Campus. Finally, in 1951, the NSA's architectural project was commissioned to Villagrán, who brought in his work team to the architects Alfonso Liceaga and Xavier García Lascurain.

According to Villagrán's book of sketches, on September 6, 1951, Villagrán began with the definition of general and particular programs, as well as with the first NSA's metrical sketch. The original architectural plan was composed by a museum, auditorium, library, offices, classrooms, and eight workshops with two plants each one (Cuevas Martínez, 2002). The NSA was situated on the ground in an isolated way (Fig. 42) adapted to the topography and architecturally connected to the buildings of CU.



Fig. 42 Location of ground for construction of NSA(1950) (*Casasola, 1950*)

The NSA's architectural design was influenced by a specific territorial characteristic and a single landscape—it was constructed in the Valley of Mexico, in an area called El Pedregal—. According to El Pedregal's topography, natural, and architectural context, Villagrán designed the NSA's building on several platforms. In addition, he applied glazed surfaces on the façades and in the vertical circulations, allowing the visual contact with the outside and connecting the users with the

Chapter 5. The Adaptation of José Villagrán's Architectural Theory in the Realization of the Project (NSA)

landscape that surrounds the NSA (Fig. 43).

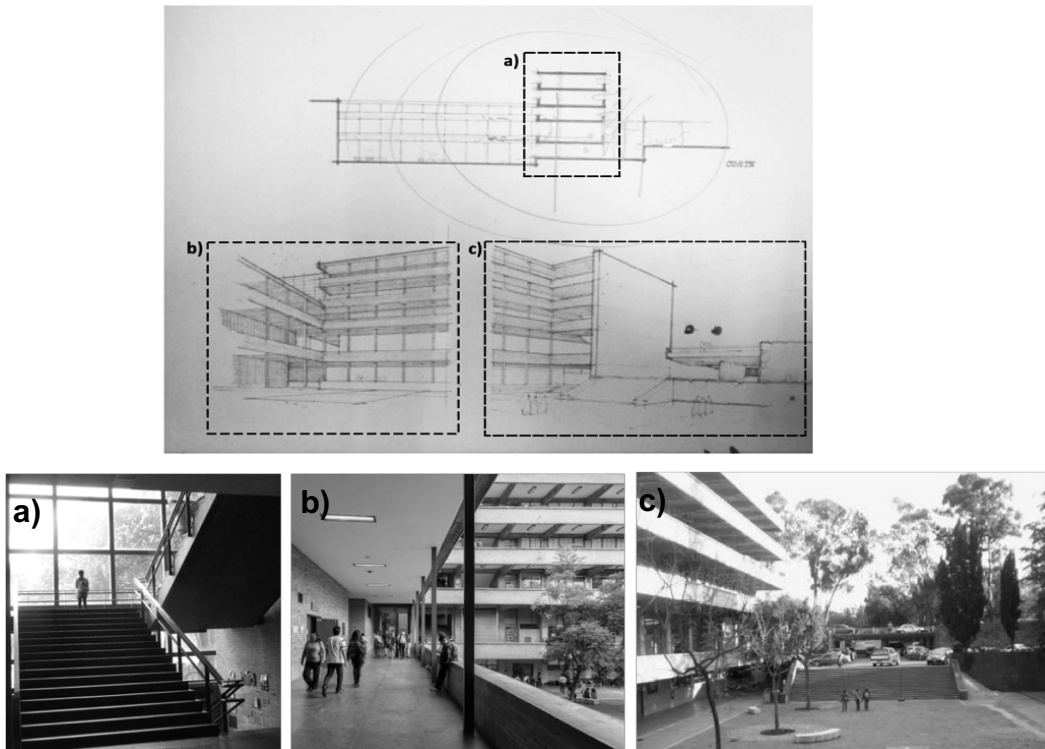


Fig. 43 José Villagrán's aesthetical solution according to the landscape and topography's analysis. a) Vertical circulation designed from the relationship between outside and building b) Connection between building and surrounded landscape c) Platforms according to the Pedregal's topography. *(Aguilera Vieyra & Sendai, 2018)*

In this project, Villagrán implemented his notion of rescuing the tradition by exposing the nature of the materials. For example, he avoided using flattened walls, allowing instead the bricks to appear in their natural state, and simultaneously applied the aesthetic parameters of modern international architecture using the steel, glass, stone, and *béton brut*. (Fig. 44) (Fig. 45)



Fig. 44 Glassed façade of NSA *(INBA, 1986)*



Fig. 45 Open area inside to NSA (INBA, 1986)

The resource applied by Villagrán to verify his theory on his practice, was the constant evaluation of the phases of the design process because it allowed him to understand the problem from a comprehensive assessment of needs. It means that, the NSA's project was designed under a cyclical methodology which allowed to Villagrán validate his theory raised in four practical values: social, aesthetic, logical, and utilitarian. (Table 5)(Table 6)

Table 5 The relationship between Villagrán's architectural theory and practice (Aguilera Vieyra & Sendai, 2018)

THEORY		Social value: Understanding the cultural and geographical characteristics	Aesthetic value: Defining the plastic qualities and proportions of the volume	Logical value: Expressing the true appearance of the material	Utilitarian value: Foreseeing the mechaical and economic convenience
PRACTICE					
The general and specific programs	Approaching of the problem	o			
	Interpretation of the problem	o			
	Establishment of the problem	o			
	Analysis of the climatic conditions	o	o		
Design process	Understanding the funtional needs		o		
	Undestanding the form		o		
	Working on the compostion		o		
	Defining the proportions		o		
Architectural solution	Analysis of raw material according the mechanical needs	o	o	o	
	Analysis of the cost				o
	Analysis of social impact	o	o	o	o

Table 6 The connection between the NSA's design process and the Villagrán practice stages (Aguilera Vieyra & Sendai, 2018)

NSA's design process	Understanding the problem	Raising the programs	Metrical analysis	Understanding the topography and landcape	Mechanical analysis	Defining the material
Villagrán practice (stages)						
Metrical analysis	S	S	S, A		U	S
Geometrical composition		A, U	L	A, S	A, L	A, L
Solution evaluation	All architectural values are re-evaluated					
Values: S= Social, A= Aesthetic, U=Utilitarian, L=Logical						

5.4 Conclusions of this Chapter

Through the NSA's study is observed that, there is a direct relationship between Villagrán's architectural theory and his practice. Both of them (theory and practice) are related to the careful assembly of the "program", next, a group of buildings consisting of museums, auditoriums, libraries, offices, classrooms, etc. are drawn, respecting the natural landscape in the Valley of Mexico and he set up the curtain-wall.

In the design of the NSA, Villagrán avoided the use of flat walls, to make brick appear in its natural state, at the same time Villagrán applied modern vocabulary using steel, glass, and *béton brut*. On the another hand, Villagrán is considering social, functional, and aesthetic factors which intervene in building projects; it means that during the design process, Villagrán focused in the correspondence from theory to practice and from the practice to theory through the application of a cyclical process.

On the same way, at NSA's project, Villagrán resorted to the program analysis, which connects the problem to the solution and in the solution is reflected the architectural values (social, aesthetic, utilitarian, and logical).

Finally, I argue that, Villagrán applied the meticulous study of the program as a mechanism to create awareness among Mexican architects designing modern architecture avoiding the use of foreign styles and, instead, rescuing traditional styles.

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Chapter 6. Conclusions

6.1 Discussion

Through this study, the subject of the theoretical notions of José Villagrán García and its application to the architectural project during the modern era in Mexico (1925 - 1954) was examined. It was possible to clarify the influences, the development process of the Villagránian theory, the relationship between the artistic movement named Plastic Integration and the thought of Villagrán, as well as, to verify if there is correspondence between his theory and his practice.

Basing the discussion on the previous premises, this research encourage to some questions. Although the studies presented in the literature review reveal the influences of French theorists on the thinking of José Villagrán, (Dasques, 2008) also is perceived the exclusion of the influences received during his travels to Europe and the United States of America which left learning and had effects on his professional development.

On the other hand, although the entrance of Villagrán to the NSA in 1924 is presented, (Vargas Salguero, 2005) (De Anda Alanís, 2013) as the event that will determine the beginning in the dissemination of his modernist ideas; the continue interruptions of his work as a Professor are also omitted. The reason for this was the political and ideological conditions under which the NSA's educational system was safeguarded. These conditioning factors in the development of modernity in Mexico are supported by the American writer, Patrice Elizabeth Olsen and by the Mexican writer and critic Rafael López Rangel, which allows us to have an acknowledgment and confirmation of the indisouble relationship that exists in Mexico between architecture, society, and politics. (Olsen, 2008) (López Rangel, 1996) In the same way, through this study it can be recognized that in Mexico the events related with the achitectural changes are usually studied separately, preventing the identification of the political and economic interests that exist behind the architectural works.

Finally, it can be pointed out that the study of the modern era in Mexico, the Villagrán theory, and its application to his practice, opens new perspectives towards the investigation of the arguments that sustain the architectural proposals of

internationally recognized Mexican architects such as Juan O’Gorman, Luis Barragán, Abraham Zabludovsky, Teodoro González de León, mentioning some ones, and their directly relationship with the notions learned from the lectures, theory, and practice of José Villagrán.

6.2 Conclusion of this Research

This doctoral dissertation arises from the need to clarify the origin, influences, dissemination, and application of the different theoretical notions developed in the architectural modernity in Mexico (1925 - 1954); specifically, starting from the writings of the Mexican theorist José Villagrán García. Through this dissertation, it has been proven that modernity in Mexico was founded in principle, by the French influences imported by President Porfirio Díaz (1876 - 1911). Because he introduced the use of the railroad as a the main transport and industrialized the country. However, this research shows that after the Mexican Revolution, it was José Villagrán who developed the new architectural image of the country.

From his beginnings as a student of architecture, it is perceived that, Villagrán understood the concepts of French Academicism applied at NSA, from their meaning to rescue the tradition. For this reason he applied concepts such as proportions, beauty, human scale, and symmetry as base of his compositions.

On the same way, from the construction of the Sanitary Farm (1925) by Villagrán, the formal parameters of the Mexican architecture were transformed; the new aesthetic proposal was delineated by the volumetric and material solution of the architectural complex developed in Popótlá.

On the other hand, it can be affirmed through this study that, Villagrán was careful in the development of his theory and in the application of it. Because despite Villagrán developed the new foundations of Mexican aesthetics, this was not the axis of his theory. The motivation was the understanding of social needs thus achieving the concordance between the problem and the solution. His theoretical proposal was motivated by the economic and social conditions of Posrevolutionary Mexico;

therefore Villagrán rejected the ornaments or coverings on the walls. He supported to apply the materials from their nature as an image and appearance of his architecture because this allowed him to show the poor social context for which he designed.

Through the analysis of the Plastic Integration Movement, it is possible to sustain that, Villagrán managed to reconcile the architecture with the other plastic arts; but from a different perspective. Because he supported the idea of two basic concepts, ornament and decoration. Villagrán rejected the plastic integration if the works had been designed from different objectives. Because this position manifested itself against to the architectural sincerity which is sustained within his theory and supported in its four architectural values: the social, the utilitarian, the aesthetic, and the logical.

Moreover, Villagrán avoided using the walls of his architecture to show the works of plastic artists because they were connected with political ideologies. For this reason, is possible to assume that, in the design of the NSA there is not the mural painting. Villagrán preserved his plastic integration concept through the implementation of a formal, material, proportional, and scale discourse between the NSA's volume and the buildings which compose CU.

Through the application of his theory in practice, it can be proven that Villagrán had as the main contribution the analysis of the general and particular program, achieving through them finishing with the stylistic reproductions and the eclecticism of the influences that arrived in Mexico during previous historical moments. In addition, Villagrán connected his theory not only to the practice, even strategically he managed it to spread a greater awareness, among the young architects of the mid-twentieth century, about the approach and the creation of a Mexican architectural identity.

6.3 Future Research Directions

Despite to clarify the development process of modernity in Mexico, the influences received by Villagran during the development of his architectural theory,

and its application to the practice; in this research, there were some unexplored topics that can be considered in future research.

There are still several questions unfinished, which could be analyzed. For instance, how Villagrán defined his theory in four values. On the same way, although this study is explained the relevance of each one and its definition, it is not perceived exactly what was the process through Villagrán synthesized his thought. Therefore, it is essential to explore whether the evolution of his theory corresponds to the works that he built during his different stages of thought.

On the other hand, it is necessary to begin a comparative research on the difference of the notion of "function" from the perspective Villagrániana and other modern theorists. This is one of the limitations found in this study. Because, although several modern notions are explored, the guiding concept of "function" is left aside.

Finally, the logarithmic application in the vertical circulations devised by Villagrán, in the specific case of the design specialized in cardiology hospitals can be studied.

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List of Acronyms

Abbreviacion	Meaning
CONACULTA	National Council for Culture and Arts
CU	University City
FAUNAM	School of Architecture from National Autonomus University of Mexico
INBA	National Institute of Fine Arts
NSA	National School of Architecture
UNAM	National Autonomus University of Mexico

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