

# Multifamily Housing of Progressive Development: An Example of Flexible Housing

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**Abstract:** The family dynamic is characterized by its constant change over time due to different aspects in itself and the context that influences it, therefore it is not surprising that the number of family members living under the same roof varies. It is here where housing often requires flexibility in its spaces to adapt to these changes, so that it can last over time and increase its life span. An example of flexible housing is progressive housing, in which homes are built and improved at a rate determined by changes in the household. In Venezuela, as in many countries in Latin America, and even Europe, this phenomenon of residential space transformation towards progressive building, occurs both in low-cost and middle-income single-family or multifamily housing, though motives differ in each case. In this paper, we will focus on analyzing the characteristics of flexible housing and its relationship with progressive multifamily housing, in the case of middle-income families that live in urban environments, as an example of physical and space housing transformation, which also answers to sustainability principles through resource and energy reduction, avoiding the building's obsolescence. This way, progressivity in residential buildings could be considered as a tool in the production of flexible homes, adapted to its inhabitant's space needs throughout the building's life span.

**Key words:** flexible housing, progressive development, multifamily housing, space transformation

## 1. Changes in Family Dynamics

According to Gallego (2012) [1], family dynamics are governed by a series of rules, hierarchies and roles that enable any family to function. In this sense, this dynamic varies constantly in relation to both internal changes that develop naturally within the household and external aspects concerning the context.

As Saul Franco points out, in Gallego (2012) [1], families' organization, as well as their dynamics, have changed through time, and these changes are linked to the historic and social period to which they belong. In Venezuela, particularly, we have gone through several stages of change in family types. In the case which concerns this paper, it is in our interest to highlight the manner in which current middle-income households,

with access to goods and services (a determining factor in the success of this family type) have in some cases the motivation to transform the space they inhabit.

A frequent change observed in the Venezuelan family is the increase and/or decrease in the number of members residing in the same home over a considerable amount of time, or for the family's entire existence. These new residents usually establish themselves in predetermined spaces and begin to move within it, adjusting to its physical boundaries. A home is the result of a process in which the user/inhabitant makes decisions [2].

Following this premise, the possibility exists of adapting physical space to these changes, so a home should then be flexible in order to accommodate different scenarios within the family household through time.

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Further on we will see what is known as flexible housing, under what concepts we can modify such housing, and how some have approached its design.

## 2. Flexible Housing

When we talk about flexibility, we talk about the possibility of change, of adaption without significant inconveniences, of variation or even transformation, but when we transfer this concept to housing, a more comprehensive definition is necessary. Galabert and González [3] present flexibility as the potential that allows the evolution of a home to develop over time, by favoring change and transformation during its life span. In this sense, this flexibility can be linked to the common objective of optimizing spaces in a home, thus capable of adapting to its inhabitants and changes in the family dynamics throughout a given time.

This concept, in any case, leans towards the handling of space in accordance with its use, during a certain period of time, without the rigidity of a finished work, which presents rooms designed for a single use and purpose, that does not accept changes nor admit its inhabitants' personal rendering throughout time.

A flexible home is conceived, in this case, as one that is transformed through time depending on the needs of those who inhabit it, like a dynamic object, that contains and combines a diversity of uses, personas and activities [3].

However, Till and Schneider (2005) include in this flexibility concept the option of choosing different housing designs, while incorporating new technologies and even changing the use of the building from residential to something else.

In their work, they present one of many methods to accomplish housing flexibility, known as the determined design, through "hard" systems or elements, and the indeterminate design, through "soft" systems or elements. The former, entails the idea of planning or predetermining the use of spaces through time, contingent, of course, upon the intervention of the designer or architect; whilst the latter entails a more

relaxed planning of spaces and use of technology, less controlled, leaving more responsibility of change in the hands of its inhabitants, by means of their participation and rendering of space.

Till and Schneider's determined and indeterminate design does not escape the use of technology to accomplish it, becoming an indissoluble aspect, which is why the same distinction is made between hard technology and soft technology in the structural aspects, material, building components, among other, that enable the execution of each of the proposed design types.

As for Habraken, he proposed in 1965 another design method for what he called "adaptable housing": the design of supports, based on the coordination between "infills" and "supports". In this method he included the notion of decision-making for both the inhabitant and the community, thus separating areas in which each of them could intervene. Therefore, the inhabitants were able to decide upon the equipment, spaces and uses of the separable units, while the community had a say in the so called "supports". The structure, for example, would be the support, but it would only be so when planned to receive flexible separable units.

In both cases, certain physical elements are kept that are changeable, while others less so, depending on their function, use, location and even on who has the capacity to change them.

Now, despite the obvious benefit of flexible housing, especially its adaptability, it is convenient to highlight another reason closer to current issues as is sustainability.

When one suggests buildings, in this case residential, with the capacity to adapt to changes through time, it is an undeniably desirable quality that the building adapt and renew itself, keeping in mind the dynamics of its inhabitants, their relations both as individuals and as a group, the use of materials, the design of its components and the handling of joints, among other things. These last three factors are considered in the

movement “design for disassembly”, better known as: deconstruction, which proposes to dismantle rather than demolish.

To understand the life cycle of buildings and to plan, design, build, keep, and even deconstruct and recycle them, could be considered a contribution to the environment in terms of resource consumption and consumed and embodied energy. This way, renovating buildings via the adjustability of its spaces depending on the needs of its inhabitants, might very much ensure the increase of its life span.

### 3. Progressive Housing

Progressive housing seems to fit perfectly within the general concept here seen of flexible housing, for it has been conceived to adapt to certain scenarios that diverge from its original phase; in the words of Cilento, it is that which is built while consumed [4].

Cilento considers progressive housing as a solution to new and complete housing (in terms of spaces and minimum facilities) traditionally built, which exhibit an inability to adapt to the needs of the families that inhabit them. His approach is aimed at proposing homes that can grow and improve in quality, making the most of the initial investment.

Based on the logic of precarity, progressive housing has been presented mostly for low-income families, building only what is to be used immediately, leaving no room unused.

Barroeta, meanwhile, defines a double process in progressivity: growth and consolidation, the former being the stage in which room expansions take place, while the latter refers to the improvement regarding the quality of finishes and services carried out in the building [5].

Progressivity refers then to a gradual process, associated to progress, which implies improvement, advancement. Construction-wise, we could say that progressivity refers to the enhancement of habitable spaces through their expansion, or construction of new

spaces, or consolidation of existing spaces by improving their conditions and quality.

This concept is redefined in current and sustainable terms, no longer through the logic of precarity as a purely economic need, but as a response to social dynamics and environmental protection, given the optimization of resources, with which an increase in the building’s life span is also sought, avoiding obsolescence through renovations, changes, and enhancements that keep it up to date. This can only be achieved in a flexible building, with the capacity to adapt to different situations, some determined and some undetermined, to which it will be exposed.

#### 3.1 Types of Progressivity

As we have already seen, progressive housing is flexible housing, and can be achieved in different ways.

Depending on the approach, we can differentiate several types of progressivity. However, they do coincide in the general aspects of the building’s first stages and differ in the final or developing stages for those who consider progressivity as a constant process of transformation.

Nevertheless, there are coincidences in the general terms of creating extra rooms or spaces. In any case, we find a first stage that can be proposed under a determined and hard design for the structure and basic facilities, and indeterminate and soft for the other spaces, considering indeterminacy not as an absence of a completely open design.

The first stage can start with a support system or a proto-house<sup>1</sup>. In a second stage, both types of design and their hard and soft components may coexist, and expand rooms outwards or inwards, consolidating the first stage.

Most authors agree in classifying progressivity in two large groups, according to their form of growth or expansion: outward progressivity and internal or inward progressivity.

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<sup>1</sup> Proto-house (Protovivienda in Spanish): Concept proposed by Cilento (1999) [4] to define progressive housing in its basic stage.

However, there is another classification [6] based on building stages, in which we can find:

- The seed type: a basic nucleus, which Cilento calls “proto-house”.
- The shell type: the house in which the exterior is built to then begin “filling” it internally.
- The support type: when the basic structure and facilities are built and then the living spaces are completed through time. This is the case described by Habraken.
- The improvable type: when the house is improved in terms of materials, ensuring better living conditions. Some authors match this type with the consolidation stage seen in progressive housing.

These two authors also categorize housing by use flexibility or design, in:

- Open space housing: without any interior partitions. A single space, except for service areas.
- Neutral enclosures housing: consists of fixed spaces with potentially interchangeable uses.
- Variable space housing: contains more fixed components but allows the integration of several spaces. Moving components are generally used as interior partitions and furniture.
- Growing house: more related to the idea of progressivity, because it is the one that expands or grows, horizontally or vertically, beyond the first stage.

Oteiza et al. (1989) [7] make a classification in their study in the city of Maracaibo (Zulia State, Venezuela), of informal single-family homes, in which three types of progressive housing were identified, according to the state of consolidation, based solely on the building and physical aspects. These types are as follows:

- Housing in the formative stage: characterized by the use of waste materials as building materials, without finishes.

- Housing in the development stage: post-formative stage. Characterized by a combination of building systems and transitory materials.
- Housing in the consolidation stage: pre-finished stage. It may have both finished areas and others under development.
- Finished house: characterized by durable materials, with finishes.

Although Oteiza’s work is about informal single-family homes, the formative, development and consolidation stages, as concepts, might be extrapolated to other types of homes with other characteristics.

As can be seen, there are many ways to categorize progressivity, depending on the aspect on which we concentrate on, according to the stages of construction or transformation, by the way in which it is produced or conceived and, we could include, by whether it is planned or not. In any case, the analysis of progressive housing must take into account these and other aspects such as, for example, the environment in which they are developed, who promotes, finances and builds them, whether the initiative is individual or collective and the actors involved.

Thus, the object of study is presented in progressive housing and how it can be considered as flexible housing, since it allows changes in its spaces, when in the motivation of the inhabitant prevails the need for space due to a change in their family dynamics, especially an increase in the number of family members, in a middle-income social stratum in the city of Caracas.

#### 4. Multifamily Buildings

Residential buildings or multifamily dwellings refer to the vertical grouping of housing units, which we can classify according to their height and density, leaving aside for the time being the type of management for their construction, maintenance or even their type of occupancy.

Medium and low-rise housing tends to benefit compared to higher-rise and higher-density housing, among other things, because of the costs associated with the maintenance of the building and its services, and the social relations among them, especially those associated with a high number of inhabitants.

Pluri-family buildings, on the other hand, have been explained by Cilento [4, 8] as buildings that group housing units vertically and horizontally, with medium-high densities but low height. This type of housing is on the rise, at least within the preference of some architects and planners, since it solves the problem of high density of inhabitants in a concentrated area, but with lower maintenance costs than a high-rise building.

Multi-family and pluri-family buildings are associated with an urban environment, mainly because of the use of land, which is usually scarce in urban areas. This characteristic confers importance to this type of building, because beyond having been planned or not, they are structures with the calling to generate cities, and their lack of control can contribute to urban vulnerability, among other things.

Living in condominiums requires a minimum of legal order to contribute to the issue of coexistence. If the only thing that the inhabitants of these multi-family buildings (without condominiums) know is the application of the law of the strongest, there is a risk of transgressing willy-nilly the environment [9].

The construction of multi-family or pluri-family buildings must count with the participation of professionals in the area, to guarantee the control of vital aspects such as structure and services, since we are talking about high-rise buildings, which entail a greater risk against natural hazards such as earthquakes (unlike a single-family house of one or two stories) that could lead to a possible collapse and put a greater number of people at risk.

Now, it is worth asking at this point: Do the changes in family dynamics discussed above only occur in single-family dwellings or in low-income families? Do

the inhabitants of multifamily buildings not require changes in their spaces?

Faced with these and other questions, many have dedicated their time to study, so we will address the most salient issues.

If we combine all these characteristics of residential buildings with the possibility of progressive development, the result will be a building that will require more careful attention, in terms of planning, design, construction, monitoring, maintenance and management.

So far, the possibility of progressive growth in multifamily buildings has been studied, though very little, under two main strands: those in which progressivity is conceived within the project and the intervention of the designer is determinant and in greater proportion to that of the inhabitant, and those in which, although progressivity has not been planned, the inhabitants implement it sometimes without a logical pattern and even without established rules.

These situations are inevitably linked to the figure who carries out the initial construction plan, who promotes and who decides whether or not to allow progressivity and how it is carried out, and who provides technical follow-up to ensure less vulnerability in the stages after the initial one. So far, the study of these situations has focused on buildings constructed with the participation of the State and for low-income families, which, as we know, is very different in contrast to buildings constructed with private funds for middle- or high-income families.

And presumably it is low-income families who, faced with the impossibility of affording another house when the number of family members increases, opt for the progressive growth of their homes, since in some way they save on supplies, given that the new construction is a dependent fraction of the original building, sharing enclosures and services. However, as we saw at the beginning, changes in family dynamics are not exclusive to low-income families, and often the level of income is not the only factor that determines

whether a family remains united in the face of these changes and decides to progressively expand and/or increase space in their homes.

Although it is in poorer sectors (specially in Latin America) that cases of progressive housing abound, with or without control, such situations have also been observed in middle-class housing: the outwards expansion of rooms, or interior works (mezzanines, new rooms or bathrooms) without foresight, and in other cases, apartments conceived as a single large space with basic facilities such as bathrooms and kitchen, where progressivity is internal, to consolidate or improve conditions. These later stages of construction are almost always financed and managed by the owner of the housing unit or apartment, who decides to do what he wants, what he needs or what he can.

For this particular case, Barroeta presents several types of progressive growth in progressive development multifamily buildings, which are presented below:

- Multifamily building with inward growth
- Multifamily building with growth by means of balconies
- Multifamily building with internal growth using the floor slab
- Multifamily building with growth on terraces and adjoining land
- Three-story multifamily building with growth on adjoining land (1st and 2nd level) and the roof for the third level

## 5. Cases in Venezuela

In Venezuela, cases of progressive housing are well documented, especially those promoted by the State, all of them for single-family or two-family housing, subsidized, from the planning stage. However, with regards to the case presented here, progressivity in multifamily buildings has been specially studied by architect Rebeca Velasco, who investigates the possible causes that lead to progressive growth in

working class low-rise multifamily buildings, years after their construction, executed by their inhabitants, according to their needs. The study is based on buildings erected by the Venezuelan State for low-income families, in many cases without the figure of a condominium, in which growth was not planned, constituting a problem not only because of the uncertainty in the construction process and design criteria, but also because of the impact it has, in some cases, on the building and its surroundings.

It is not surprising that the cases of progressivity in middle class multifamily buildings have been scarcely studied, because as we saw earlier, this growth of spaces is associated, and with good reason, only to lower class or low-income families, but it is not exclusive. The reasons for expansions or the building of a second stage go beyond the economic aspect, at least in this sector of the Venezuelan population. Additionally, it is not as widespread a practice as it can be in single-family houses.

In some areas of Caracas, traditionally recognized by their inhabitants as middle class, one can frequently observe buildings that have made use of the roof, balconies, terraces and patios to build extensions of the apartments on the top floors or on the ground floor. In these types of buildings, the construction of additional spaces, external to the facades, at intermediate levels of the building, has rarely been seen. It must be assumed that this type of extensions entails a higher risk, and therefore the economic increase in their planning and construction becomes an important element to be considered, as well as the agreement between neighbors, aspects that are usually suppressed.

This type of progressivity, of expansion, which profits from the existing support of the built structure, is not usually planned or determined, at least not by some authority; on the contrary, they are the result of the inhabitant's decision in what he considers to be a profitable space, but in any case, they constitute informal developments, which go beyond the law established in the municipalities where they are built.

It is uncommon to find the participation of the designer or any technical assistance in expansion or “growing” type interventions in high-rise buildings in working class and low-income areas, and even in middle/high-income areas, because usually the inhabitant is protected by the safety provided by a “filling” expansion with “soft” elements, in which the structure of the building is not intervened, therefore, they must assume that no greater danger is incurred, unaware that these fillings without planning result in a completely different structural behavior, even without directly altering the structural members.

However, it should be noted that the intervention of the architect or designer does not guarantee a better suitability of the spaces to the needs of the families, but it does guarantee to a large extent the compliance with mandatory regulations and a lower vulnerability of the building and its occupants.

Another type of progressivity that has been observed is the internal progressivity in apartments, in new, multi-family and medium-rise buildings, which, responding to the idea of a shell of each apartment, in many cases without internal divisions, even without finishes, is delivered to the owner, in what we know as “shell and core” or semi-finished construction, so that the investment needed to pay for the completion of the house is fully transferred from the builder to the future inhabitant, as well as the decisions associated with the design of the internal growth.

In every case, it is clear that the solutions given by the inhabitants of these buildings to their lack of space, or need for expansion or renovation of their homes, have been of an individual nature. Few are the projects managed by the inhabitants themselves, directed in a collective manner for the entire building.

## 6. Conclusions

As we have seen throughout this paper, progressive housing can be considered as flexible housing due to its characteristics, especially its adaptability to space and functional changes over time; its application does not

respond only to an economic factor, but also to the lack of space or the need to improve it, because, in the absence of flexible spaces or spaces suitable for the needs of the family, the inhabitants make the decision to grow, modify or consolidate their home. The population has often no access to the real estate market for complete housing, sometimes due to scarcity, economic inaccessibility or even low production of such housing.

Although Pressman tells us that in Latin America, we do not have a large middle-class population (compared in proportion and quantities with developed countries),<sup>2</sup> largely due to government policies, it is a sector of the population that is underserved in many respects. Studies aimed at construction in this sector of the population should not be neglected, since the middle class is associated with the development of a country.

The capacity to modify existing homes is much greater than the capacity to produce new ones. As Cilento [10] states, this capacity for reproduction has a high sustainability content since it reduces the negative effects of new developments on the natural environment and prolongs the life of existing buildings and their use by new generations.

There are numerous examples in Venezuela and abroad, where this type of building has been planned and built, with a specific design for the first and subsequent stages; however, the applicability of progressivity in multifamily buildings from the beginning, as well as the participation of the inhabitant, has been scarce. The studied cases of multifamily housing with progressive development within the Venezuelan territory have mostly been produced in low-cost housing under an undetermined design and under the control of the inhabitant and/or the community, but, as we have seen, this phenomenon

<sup>2</sup> According to EHM, in González A. (2014) [11], in its measurement of the population distribution based on social classes in Venezuela, as of 2011 the middle class comprises 19.7% compared to 5% of the upper class and 39.4% of the lower income or poor class, leaving the surplus for a vulnerable class.

also occurs in other spheres such as in higher income sectors, like the middle class, with different motivations but sharing the same objective.

This practice in residential buildings, often self-managed, has been contributing to a change in the housing paradigm, in terms of the importance of the participation of the inhabitant in the habitat construction process, a complex process that shows that inhabiting is part of a social process.

The participation of the inhabitant in the design of his home is a viable alternative that can be put into practice; however, rigorous control is necessary in certain aspects that should at least be supervised by professionals in the area, especially to reduce vulnerability, particularly if it is a high-rise building. However, progressive construction in residential buildings requires a detailed study of the particular conditions of each building, from the design and planning stage in new works, as well as in existing buildings, since the behavior of the building changes with each addition of elements, as well as its relationship with the context, among many other aspects.

## References

- [1] A. Gallego, Recuperación crítica de los conceptos de familia, dinámica familiar y sus características (Critical recovery of the concepts of family, family dynamics and its characteristics), Revista Virtual Universidad Católica del Norte, N°35, febrero-mayo, Colombia, 2012, p. 326.
- [2] N. Habraken et al., *El diseño de soportes (Variations: The Systematic Design of Supports)*, Barcelona, España: GG Reprints, 2000.
- [3] D. Gelabert and D. González, Vivienda progresiva y flexible. Aprendiendo del repertorio (Progressive and flexible housing. Learning from the repertoire), *Arquitectura y Urbanismo* 34 (2013) (2) 48-63.
- [4] A. Cilento, *Cambio de paradigma del hábitat (Habitat Paradigm Change)*, Caracas, Venezuela: Consejo de Desarrollo Científico y Humanístico, Universidad Central de Venezuela, Colección Estudios, 1999.
- [5] J. Barroeta, Sistema constructivo con estructura de entramado metálico para viviendas multifamiliares de desarrollo progresivo (Construction system with metal framed structure for multifamily housing of progressive development), Trabajo de Grado (Maestría), Instituto de Desarrollo Experimental de la Construcción (IDEC), Facultad de Arquitectura y Urbanismo, Universidad Central de Venezuela, Caracas, 1999.
- [6] D. Gelabert and D. González, Progresividad y flexibilidad en la vivienda. Enfoques teóricos (Progressivity and flexibility in housing: Theoretical approaches), *Arquitectura y Urbanismo XXXIV* (Abril 2013).
- [7] I. Oteiza et al., La producción informal de viviendas: Caso Maracaibo, Venezuela (The informal production of housing: The case of Maracaibo, Venezuela), La Universidad de Zulia, Facultad de Arquitectura, Maracaibo, 1989, available online at: <http://digital.csic.es/bitstream/10261/92889/1/Informes%20de%20la%20Construcci%C3%B3n%2041%28403%29%2017-31%20%281989%29.pdf>.
- [8] A. Cilento, Construcción sostenible. Piezas para la investigación y la acción (Sustainable construction. Pieces for research and action), Caracas: Instituto de Desarrollo Experimental de la Construcción-IDEC, Facultad de Arquitectura y Urbanismo, Universidad Central de Venezuela, 2015. (CD-ROM)
- [9] R. Velasco Di Prisco, Crecer en el viento. La transformación de la vivienda multifamiliar de baja altura del BO-Inavi (Growing in the wind: The transformation of the BO-Inavi's low-rise multifamily housing), Trabajo de ascenso a la categoría de Asistente, Universidad Central de Venezuela, Caracas, 2009.
- [10] A. Cilento, Hogares sostenibles de desarrollo progresivo (Sustainable homes of progressive development), *Tecnología y Construcción* 18 (2002) (III) 23-28.
- [11] A. L. González, La clase media en Venezuela. Falta de oportunidades e insatisfacción (The middle class in Venezuela: Lack of opportunities and dissatisfaction), *Revista SIC* (2014) (764) 163-171.