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# Unfolding the Concept of Flexibility in Collaborative Housing Design

## Desplegando el concepto de flexibilidad en el proyecto de vivienda colaborativa

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### Abstract

The article discusses the concept of flexibility in architecture and its application in collaborative housing projects. It explores three key connotations of flexibility - redundancy, technical means, and political strategy - as put forth by Adrian Forty. The design strategies for flexibility in collaborative housing include filter elements to create an intimacy gradient, redundant circulation spaces, programmatic genericness of spaces, and a wide variety of typologies and technical devices. The article also discusses the role of collective decision-making in collaborative housing design and the construction of a shared meaning system to guide future choices.

### Keywords

Flexibility; Housing Revolution; Collaborative Housing; Cohousing.

### Resumen

El artículo muestra el concepto de flexibilidad en la arquitectura y su aplicación en proyectos colaborativos de vivienda. Explora tres connotaciones clave de la flexibilidad - redundancia, medios técnicos y estrategia política - según Adrian Forty. Las estrategias de proyecto para la flexibilidad en la vivienda colaborativa incluyen elementos de filtrado para crear un gradiente de intimidad, espacios de circulación redundantes, genéricos en la programación de los espacios, y una amplia variedad de tipologías y dispositivos técnicos. El artículo también muestra el papel de la toma de decisiones colectiva en el proyecto colaborativo de viviendas y la construcción de un sistema compartido de significado para guiar futuras elecciones.

### Palabras clave

Flexibilidad; Housing Revolution; Vivienda colaborativa; Cohousing.

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The notion of flexibility was conceived in Modern architecture according to a functional and positivist approach. The advent of new construction techniques and the need to respond to the urgent demand for housing due to mass urbanisation have synergistically channelled towards the study of minimal, open-plan housing. Efficiency and flexibility go hand in hand, the latter interpreted as a strategy to allow the most significant number of functions in a limited space, thanks to architectural devices such as sliding or folding walls, furnished walls and foldaway furniture. The *Housing Revolution* – on the contrary - introduces the idea of architecture as an open process in which end users are involved<sup>1</sup>, from the concept, design, and construction, to the post-occupancy phase. The rise of collective and participatory decision-making processes has had a powerful impact on design methods, transforming the architect's role from author to mediator. This is most valid in the design of collaborative housing models, where an intentional community of inhabitants carries out the design of their homes through self-development and self-management. Czischke, Carriou and Lang recognize “collaborative housing” as an umbrella term that encompasses a wide variety of housing forms, the field lacking of a universally accepted categorization<sup>2</sup>. Here the definition of Dorit Fromm is adopted, according to which collaborative housing includes various housing models that share communal space and services while maintaining the privacy of separate apartments<sup>3</sup>. The term refers specifically to housing oriented towards collaboration between residents. Its main characteristics are intentionality and user's collaboration, a common vision, sharing and communing practices, and a high level of end-user involvement.

This paper examines the different meanings of flexibility in architecture, both in a broad sense and specifically in the context of collaborative housing projects. The focus is primarily on the interpretations put forth by Adrian Forty who highlights three key connotations: flexibility as redundancy, flexibility by technical means, and flexibility as a political strategy<sup>4</sup>. The validity of the hypothesis that Adrian Forty's threefold concept of flexibility is applied in collaborative housing projects, supported by several factors, which will be explored in the text and briefly illustrated below. Firstly, the coexistence of public, community, and private spaces necessitates the design of filter elements that create a gradient between public and private, which Christopher Alexander terms an “intimacy gradient”<sup>5</sup>. Secondly, circulation spaces, which serve as threshold spaces, are often designed redundantly, exceeding the minimum regulatory requirements. This design strategy facilitates the future users' appropriation of the space, turning paths into places for social interaction among residents<sup>6</sup>. The programmatic genericness of spaces also favours appropriation by making spaces versatile and adaptable for multiple uses over time. This principle applies to communal spaces, such as polyvalent rooms for playgrounds, parties, assembly meetings, community dinners, and private domestic spaces, based on a de-hierarchised homogeneous module. Flexibility is achieved through a wide variety of typologies and technical and constructive devices, allowing for the adaptation of the housing unit to changing tenant needs. It occurs both at the building scale, such as changing one's dwelling unit with a typologically different one or using a satellite room on another floor, and at the dwelling unit scale, through annexation and subtraction of rooms by means of removable partitions.

Finally, as mentioned above, collaborative housing design processes are characterised by collective decision-making<sup>7</sup>. The architect is an expert and a mediator, acting as a pedagogue to instruct future users regarding possible technical choices and translating the community's demands into spatial

- 1 De Carlo, Giancarlo. “Architecture's Public”. In: *Architecture and Participation*. (London: Taylor & Francis, 3–22, 2009 [1<sup>st</sup> ed.1969]), 15.
- 2 Richard Lang, Claire Carriou, and Darinka Czischke, “Collaborative Housing Research (1990–2017): A Systematic Review and Thematic Analysis of the Field”, *Housing, Theory and Society* 37, no. 1 (January 2020): 10–39. <https://doi.org/10.1080/14036096.2018.1536077>.
- 3 Dorit Fromm, *Collaborative Communities: Cohousing, Central Living, and Other New Forms of Housing with Shared Facilities* (New York: Van Nostrand Reinhold, 1991).
- 4 Adrian Forty, *Words and Buildings: A Vocabulary of Modern Architecture* (London: Thames & Hudson, 2004), 142-149.
- 5 Christopher Alexander, Sara Ishikawa and Murray Silverstein, *A Pattern Language: Towns, Buildings, Construction* (New York: Oxford University Press, 1977), 610.
- 6 Research studies have been conducted investigating which design strategies encourage social relationships between the inhabitants of cohousing projects. To cite the most specific: Williams, Joanna. “Designing Neighbourhoods for Social Interaction: The Case of Cohousing”. *Journal of Urban Design*, 10(2), (2005): 195-227.
- 7 For a terminology of participation in architecture consult: Esperanza Marrodán Ciordia, “De proyecto a proceso. Trayectorias posibles para un proyecto urbano basado en la escucha”, *ZARCH* 20 (junio 2023): 72-85. [https://doi.org/10.26754/ojs\\_zarch/zarch.2023206904](https://doi.org/10.26754/ojs_zarch/zarch.2023206904).

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solutions. This exchange and negotiation of individual instances necessitate constructing a shared meaning system to guide future collective choices. Intentionality is recognised in a collectively stipulated value system that functions as an abstract guide, then materialising into concrete solutions.

The novel contribution of this study lies in the systematic analysis of the implementation of the concept of flexibility, as formulated by Forty (2004), within collaborative housing projects through the examination of exemplary case studies. The article aims to investigate the application of the Fortean concept of flexibility within collaborative housing projects, delineating recurrent design strategies and showcasing their effectiveness. To do so, a research methodology which employs drawing as its main tool is developed.

The article’s structure begins with a literature review on flexibility in architecture. Then, it explores the three aforementioned declinations of the notion of flexibility in exemplary case studies, with a particular focus on collaborative housing projects (table 1).

Project	City	Country	Architect	Year
La Balma	Barcelona	Spain	Lacol and Iaboqueria	2017-2021
Kalkbreite	Zurich	Switzerland	Muller Sigrist Architekten AG	2002-2014
Spreefeld	Berlin	Germany	BARarchitekten, Carpaneto Architekten, Fatkoehl Architekten;	2007-2014
Gleis 21	Wien	Austria	einszueins Architektur	2015-2019

Table 1. List of case studies ‘key information

On the concept of flexibility

Flexibility is a design attribute that can encourage user intervention over time, as well as accommodate compositional variations and interchangeability of parts, which corresponds to the interchangeability of functions and uses. In architecture, flexibility is a term that can have different interpretations depending on the context in which it is used. Adrian Forty in “Words and Buildings” highlights the controversy between interpreting flexible as an unfinished work, partly undetermined, open to future changes and developments, or as a finished work that is flexible from a technical or technological point of view or the point of view of the diversity of uses<sup>8</sup>.

In “How Buildings Learn” (1995), Stewart Brand remarks that almost no buildings adapt well because they are designed, budgeted, financed, constructed, administered, maintained, regulated, and taxed not to, even remodelled not to. However, all buildings (except monuments) adapt anyway, however poorly, because the usages in and around them are constantly changing: function reform form perpetually. To create adaptable buildings, designers must think diachronically about change over time<sup>9</sup>. Brand employs a method called “rephotography” in his study, using a photograph from an archive as a model and trying to photograph the same subject with the same framing to make changes immediately visible<sup>10</sup>. Time analysis of buildings could be made on a time scale of days, months, and years. For example, patterns and paces in moving furniture might suggest what people really want parts of buildings to do. Self-maintenance from its users may increase buildings’ adaptability, especially for maintenance behind the walls.

Anne Vernez Boudon’s study “Built for Change” provides an exhaustive analysis of the Victorian row house as a great example of an adaptable building. Behind the variety of house fronts was a generic plan with a

8 Forty, *Words and Buildings: A Vocabulary of Modern Architecture*, 142-149.  
9 Stewart Brand, *How Buildings Learn: What Happens after They’re Built* (New York; Toronto; London: Penguin Books, 1995), 210.  
10 Brand, *How Buildings Learn: What Happens after They’re Built*, 212-213.

generous hall that could accommodate functions beyond circulation, providing redundancy. Even so, when interviewed by Stewart Brand about whether the Victorian houses were built for change, Anne Vernez Boudon answered, “No, they were just designed to appeal to a variety of tenants”. The rooms of a Victorian house are modest in size, unspecialised in their function, and openings can be created between them<sup>11</sup>. Returning to the room as a module for residential design is necessary to create resilient space, abandoning dwellings as modules of the spatial organisation.

Alexander, Ishikawa, and Silverstein in the book “A Pattern Language” posit that towns and buildings will not become alive unless they are made by all people in society, and unless these people share a common pattern language within which to make these buildings, and unless this common pattern language is alive itself. No pattern is an isolated entity. Each pattern can exist in the world only to the extent that it is supported by other patterns: the larger patterns in which it is embedded, the patterns of the same size that surround it, and the smaller patterns that are embedded in it<sup>12</sup>.

Patterns are not static but evolve through a process, which is language; therefore, dialectic, interactive, and adaptable, capable of changing to suit the needs and desires of users. This approach was reflected in the work of architects like Herman Hertzberger, who believed that housing design should be based on the principles of participation and personalisation. The Dutch architect emphasises that flexibility signifies the absolute denial of fixed, clear-cut standpoints. He argues that flexibility is ostensibly inherent in relativity, but in fact, it only has to do with uncertainty and no daring to commit oneself and, therefore, with refusing to accept the responsibility that is inevitably bound up with every action that one takes. Hertzberger suggests that a polyvalent form - a form that can be used for various purposes without significant alterations - can still provide an optimal solution with minimal flexibility. He explains that the greater diversity in sequences of spaces is due to their inherent polyvalence<sup>13</sup>. Despite the benefits of flexibility and polyvalence, Hertzberger argues that creating wholly neutral and unremarkable spaces would not be productive. Such an approach may lead to paralysis instead of freedom, as it is essential for people to have a limited range of possibilities that they can comprehend and visualise in their minds. Therefore, it is crucial to offer options that evoke associations and can be interpreted in various ways. This approach ensures that users can respond to the offered options in ways relevant to their needs and experiences<sup>14</sup>.

According to Till and Schneider, flexible housing refers to housing that can adjust to changing needs and patterns, both social and technological<sup>15</sup>. The changing patterns that flexible housing can respond to could be demographic, economic or environmental. Demographic changes, such as the rise of single-person households, economic and political issues like housing affordability in urban areas and the shrinking right to housing, and environmental concerns, like the need to update housing to respond to climate change, can all be addressed by flexible housing. Flexible housing works across the life of a housing development. Prior to occupation, a flexible approach will allow future users to choose their layouts. Post-occupation enables people to occupy their homes in various ways, not tied to the specific room designations, and allows them to make adaptations to their homes. During the post-occupation phase, flexibility could be achieved by altering the physical fabric of the building: by joining together rooms or units, extending them, or by sliding or folding walls and furniture. Flexibility thus applies to both internal and external changes, temporary or permanent.

11 Anne Vernez Moudon, *Built for Change: Neighborhood Architecture in San Francisco* (Cambridge, Mass.: MIT Press, 1989), 188.

12 Alexander, Ishikawa and Silverstein, *A Pattern Language: Towns, Buildings, Construction*, XVIII.

13 Herman Hertzberger, *Lessons for Students in Architecture* (Translated by Ina Rike), 7th edition, Rotterdam: Nai010 Publishers, 2016 [1st ed. 1991], 147.

14 Hertzberger, *Lessons for Students in Architecture*, 162.

15 Tatjana Schneider and Jeremy Till, *Flexible Housing*. 1st ed. (Amsterdam; Boston: Architectural Press Elsevier, 2007).

Steven Groak distinguishes the notion of flexibility from the one of adaptability. He defines adaptability as “capable of different uses” and flexibility as “capable of different physical arrangements”<sup>16</sup>. Adaptability is achieved by designing rooms or units to be used in various ways, primarily through how rooms are organised and designated, secondly through circulation patterns. Adaptability thus covers “polyvalency”, the term employed in particular by Dutch architects and theorists, such as Hertzberger, as mentioned earlier, to describe spaces that can be used in various ways, generally without making physical changes. In their book, Till and Schneider use the term “flexible housing” to cover issues of both adaptability and flexibility. They describe flexibility as a “shock absorber, there to soak up the dynamics of living”<sup>17</sup>. They categorise design strategies into “soft or hard flexibility”, where “soft” refers to tactics that allow a certain indeterminacy, whereas “hard” refers to elements that more precisely determine the way that design may be used. Soft flexibility passes control over to the user, allowing them to appropriate the space as they see fit. The architect, if indeed there is one, here plays the role of facilitator, acting as an interpreter rather than a legislator. There is a tension between indeterminate and determinate aspects of flexible housing, and norms may also play a role in how the design is ultimately realised.

The different interpretations of the notion of flexibility outlined above are well synthesised in Adrian Forty’s threefold definition of flexibility as redundancy, by technical means, and as a political strategy. The ensuing paragraph are dedicated at illustrating the design applications of this threefold concept of flexibility on European collaborative housing projects.

**Flexibility as redundancy**

The design of collaborative housing has gained increasing attention in recent years as an alternative to conventional housing models. Collaborative housing models aim to promote social interaction, sharing of resources and facilities, and a sense of community and belonging among residents. One key aspect of collaborative housing design is flexibility, which accommodates diverse needs and preferences among residents over time. Flexibility could be achieved through redundancy, which refers to the provision of surplus space that can be adapted for different uses, as happened in pre-modern buildings, like in baroque palaces where some rooms were not intended for any specific use. This notion incorporates Hertzberger’s “polyvalency” and Groak’s “adaptability” concepts. It lies somewhere in between Till’s binary view of soft or hard flexibility. It is designed in form but not in use, the latter thought of as programmatically unpredictable. The Victorian House, for example, has been proven to possess this property, according to the study by Anne Vernez Boudon.

This paper explores the role of slack space as a design strategy for creating flexibility and redundancy in collaborative housing. Slack space refers to free space provided by the designer, whose occupation is not entirely determined<sup>18</sup>. Slack space can be found at various scales, from circulation spaces to dwelling units.

Circulation spaces are particularly relevant for creating slack space at the building scale. In collaborative housing design, circulation spaces can function as transitions between different uses, creating a gradient of intimacy, mutual extension of private and shared space. La Balma cohousing project in Barcelona<sup>19</sup> exemplifies how circulation spaces can be designed to create slack space. The circulation space varies in width, creating niches between the vertical distribution core and the exterior gallery that leads to the private

16 Steven Groak, *The Idea of Building: Thought and Action in the Design and Production of Buildings*, 1st ed. (London: E. & F. N. Spon, 1992).

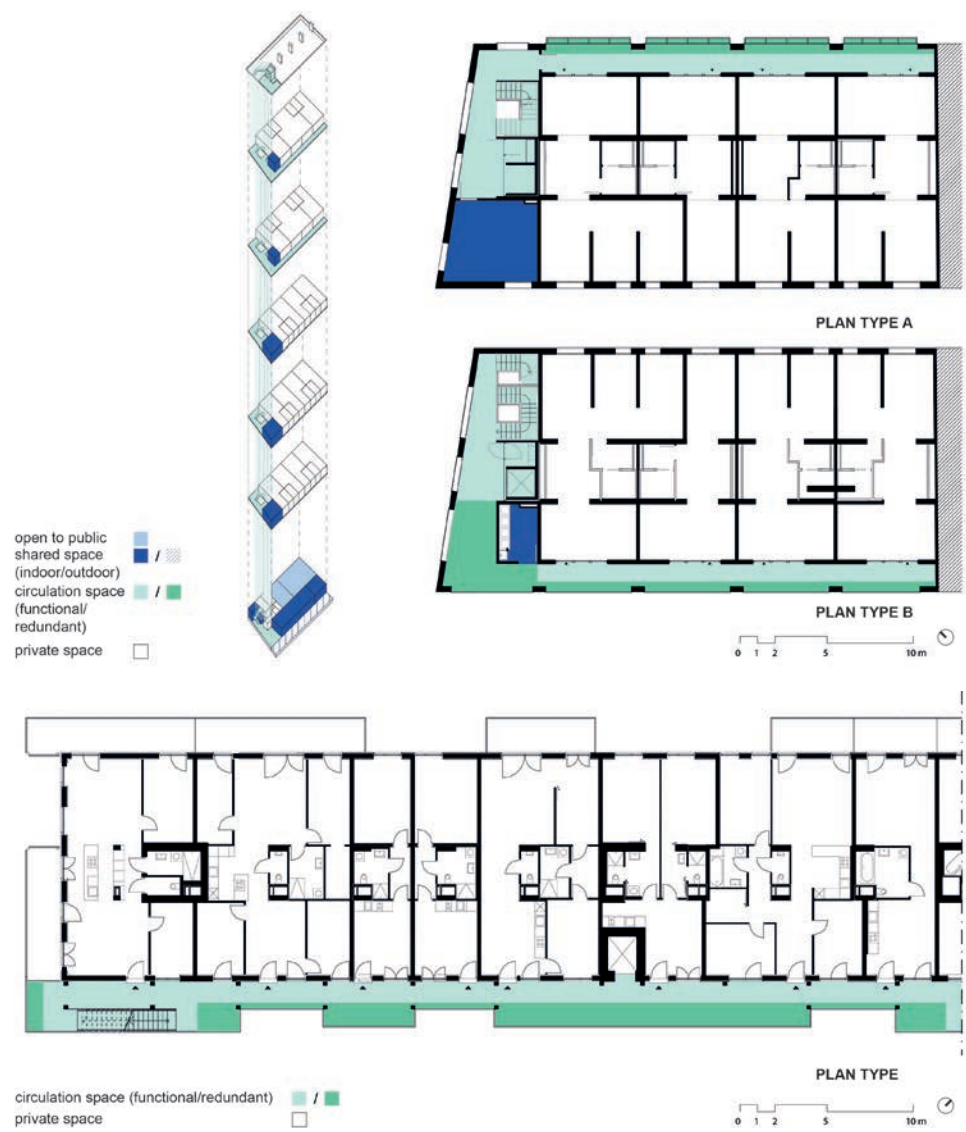
17 Schneider and Till, *Flexible Housing*, 6.

18 Schneider and Till, *Flexible Housing*, 136.



Figure 1. La Balma, Barcelona, Spain, Lacol and laboqueria, 2017-2021. Circulation spaces exceed the minimum size set by regulations and widen, creating niches.

Figure 2. Gleis 21, Wien, Austria, einszueins, 2015-2019. The generous width of the porch with these large balconies allows uses beyond that of functional circulation.



apartments (figure 1). These niches function as extensions of the circulation area, establishing an intermediary zone connecting the private, shared, and public realms. Moreover, their proximity to the shared spaces positions them as an extension thereof.

By increasing its width above the minimum required by law, the gallery becomes a space of being, an open yet covered space to sit and read or chat with a neighbour. It happens in La Balma, Barcelona, but also in Gleis 21, a co-housing project located in Vienna (figure 2). In Gleis 21, shared spaces, which includes commercial activities, are mostly located at the ground floor. The ground floor is designed to be permeable and accessible to all inhabitants of the neighbourhood. It has been intended as an extension of the urban space, creating a connection between the promenade and the park. The dwelling units are located at the four upper floors and are accessed via an open north-west-facing arcade. This arcade changes section, widening to create balconies. It represents an intermediate zone between the private and public realms that offers the opportunity to have a semi-public space with unplanned use, but which enables encounters and relations between inhabitants. As we delve into the section discussing flexibility as a political strategy, it becomes evident that the circulation space’s redundancy fosters its appropriation by the residents.

Slack space can also be established at the scale of private domestic space, providing internal and external free space that can be filled in according to the specific needs of the building’s inhabitants. This principle applies to satellite rooms, also called “joker rooms” or *Schaltzimmer*, which are

19 Further information about cooperative housing under grant-of-use in Barcelona can be found here: Ludovica Rolando, “How Will We Live Together? A Comparative Analysis of Housing Cooperatives in Zurich and Barcelona”, *TECHNE - Journal of Technology for Architecture and Environment*, 24 (July 2022): 157–65. <https://doi.org/10.36253/techne-12871>.

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Figure 3. Kalkbreite, Zurich, Switzerland, Muller Sigrist Architekten AG, 2002-2014. Third floor plan, in yellow the satellite rooms are highlighted.

Figure 4. La Balma, Barcelona, Spain, Lacol and laboqueria, 2017-2021. Modular system of flats, changing from S to L typologies with the addition or removal of satellite rooms.

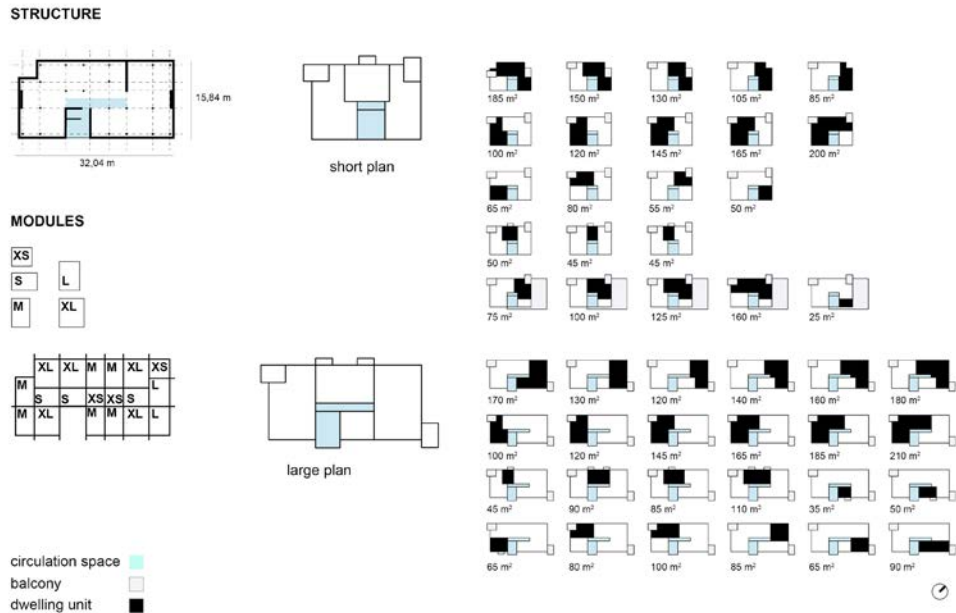
separate and not intended for a specific use but can be rented individually as a workspace, guest room, or extra room for young teenagers who want to emancipate themselves. In Kalkbreite, Zurich, satellite rooms are distinct from the residential units and feature their own entrance, fostering utmost autonomy and flexibility (figure 3).

In La Balma the dwelling units are built according to a modular system where the satellite room form a module that can be attached to or removed from an adjacent flat through the demolition of the non-load-bearing partition. This allows the size of flat to be changed from S to L according to the user's needs (figure 4).

Flexibility as redundancy suggests a correlation between the amount of space and the amount of flexibility. Slack space provides the necessary redundancy for accommodating diverse needs and preferences among residents over time, enabling residents to create their own space and identity within the collaborative housing project. The provision of slack space also contributes to the vitality and sustainability of the project, as it allows for the reuse and adaptation of space over time.



Figure 5. Spreefeld, Berlin, Germany, BARarchitekten, Carpaneto Architekten and Fatkoehl Architekten, 2007-2014. Typological variety of Spreefeld, obtained by a structural frame and a modular generic space.



Flexibility by technical means

Flexibility by technical means refers to the attempts at achieving flexibility involving the design of building elements. First of all, this approach has to do with the construction system. The Modern Movement explored the concept of flexibility as a consequence of the use of new construction technologies, which allowed a punctiform structural system made up of piers and beams with larger spans, creating a free plan. Therefore, it is a question of studying permanent elements that constitute the frame within which change can occur<sup>20</sup>. While the frame is specific, the space inside the frame is general. The architectural frame is determined firstly by the structure, the span between structural elements defining a module, and fixed elements, such as installations. Modularity is a design strategy that allows a wide typological variety of dwellings, starting from a grid or a basic unit. The cohousing project Spreefeld consists of three buildings in an open courtyard plot located in Berlin, between two side streets and the river Spree to the north-east, on the opposite bank of Holzmarkt. The buildings are designed to be composed of modular elements, adaptable by addition or subtraction to the will of the inhabitants and leaving room for customisation of the flats (figure 5). There are 65 flats ranging in size from 25 to 375 m². The variety of types, from more conventional flats to cluster flats, responds to a heterogeneous, intergenerational community with different needs.

The idea of the frame is similar to the one of support theorized by Habraken: “a construction which allows the provision of dwelling which can be built, altered and taken down independently of others”<sup>21</sup>. Stewart Brand uses the term layer to refer to the need to distinguish the different elements that make up the construction in such a way as to act on each one separately<sup>22</sup>.

Flexible spaces can be achieved by starting with a rigid infrastructure, such as a structural mesh or module, and allowing the end user to define the internal layout of their space. This approach was utilized in La Balma project, where the last co-design workshop was dedicated to users’ customization of their living space. Starting from a free plan with only bathroom and kitchen installation, the internal layout, program and use is defined by the end-user during construction.

As mentioned before, designing fix load-bearing structures and more ephemeral non-load-bearing partitions allow for the creation of interstitial

20 Bernard Leupen, *Frame and Generic Space* (Rotterdam: 010 Publishers, 2006).  
21 John N. Habraken, *Supports: an alternative to mass housing* (London: Architectural Press, 1972 [1<sup>st</sup> edition. 1961]), 7.  
22 Brand, *How Buildings Learn: What Happens after They're Built*, 13.

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spaces between two flats that can be added to or removed from one or the other. Movable elements, such as revolving or sliding doors, can provide additional spatial and functional variety. However, these techniques have less impact than a more comprehensive approach to flexible housing design.

**Flexibility as a political strategy**

Finally, the idea of flexibility as a political strategy suggests that flexibility is not a characteristic of buildings per se but rather of spaces that gain flexibility through their usage. This concept is closely related to the criticism of capitalism put forth by the Situationist International in the late 1950s, which focused on capitalism’s tendency to commodify all aspects of daily life. According to Henri Lefebvre, the capitalist control of space, both physically, by imposing functional categories, and mentally, by imposing an abstract scheme, was one of the most invasive acts of capitalism<sup>23</sup>. Lefebvre envisioned a new spatial practice that would “re-establish unity in what abstract space divides: in the functions, elements, and moments of social practice”. By claiming spaces through positive acts of appropriation, the functionalist domination of space can be broken, and flexibility gains its political significance. Use becomes a political act directed against architecture. The idea also involves thinking of space as a process from a diachronic perspective, as noted by Alexander, Hertzberger, Brand, and Schneider and Till’s reference to “soft flexibility”.

In collaborative housing design, flexibility as a political strategy is related both to the notion of indeterminacy as a design strategy and to the construction of a collective social structure<sup>24</sup>. The notion of indeterminacy has to do with the notion of openness<sup>25</sup>, so to leave something undefined and open for future interpretations. As an art or architecture recipient, the user is an active part and collaborates in making the work, acting on it to change its final configuration. The acceptance of indeterminacy in housing design implies an approach that favours layouts with flexible modes of occupancy, unfixed functional arrangements, and floor plans that are intentionally vague in terms of both character and technology. This allows for accommodating not just one specific use but multiple possibilities. In numerous instances, common areas within cohousing developments are established with minimal infrastructure such as electrical and plumbing connections, including for economic or regulatory reasons<sup>26</sup>. Subsequently, users customize these spaces, determining their functions and furnishing arrangements. Often, collaborative efforts, like self-building days, are employed to enhance these spaces, as observed at La Balma, where the do-it-yourself room and furniture were created. Upon their inauguration, both the ground floor room and terrace at La Balma were devoid of furniture, except for the kitchen area. It was only later that specific uses were defined based on the residents’ needs and routines. The multifunctional ground floor room now serves as a kitchen, a playroom for children, a venue for assemblies, and events open to the public (figure 6). Similarly, the terrace is utilized for laying out items, relaxation, children’s play, lunch or dinner gatherings among residents and their friends, and even for open-air cinema screenings (figure 7).

As previously indicated in the section discussing flexibility through redundancy, the inclusion of surplus circulation space, serving as a buffer between individual dwelling units, communal and public areas, facilitates user appropriation. These spaces represent inhabited intervals that assume uses divergent from their intended functions, yet aligned with the needs and routines of their inhabitants. Consequently, the galleries of La Balma (figure 8) and Gleis 21 are populated with furnishings such as chairs, tables, shoe

23 Henri Lefebvre, *The Production of Space*, Translated by Donald Nicholson-Smith (New Jersey: Wiley-Blackwell, 1991 [1st ed. 1974]), 52.

24 Anthony Giddens, *Social Theory and Modern Sociology* (Stanford, Calif: Stanford University Press, 1987).

25 See: John N. Habraken, *Supports: an alternative to mass housing*; Umberto Eco, *Opera aperta*, 4th ed. (Milano: Bompiani, 1997).

26 During the self-promotion phase, constrained financial means frequently hinder the inclusion of finishing touches or furniture expenses. Such expenditures might be deferred or managed through self-building initiatives. Regulatory considerations stem from factors like the case of Barcelona, where, for instance, regulatory guidelines dictate that the roof terrace, due to its non-habitable classification, must refrain from hosting permanent furnishings.



Figure 6. La Balma, Barcelona, Spain, Lacol and laboqueria, 2017-2021. Multifunctional room at the ground floor.

Figure 7. La Balma, Barcelona, Spain, Lacol and laboqueria, 2017-2021. Rooftop terrace.

Figure 8. La Balma, Barcelona, Spain, Lacol and laboqueria, 2017-2021. User's appropriation of the access gallery.



racks, and plants, thus transforming circulation areas into supplementary outdoor rooms suitable for reading, relaxation, conversations, or communal meals. Additional utilization scenarios underscore the demand for unallocated space, evident when inadequate storage prompts residents to repurpose stairwells for this use. This form of flexibility proves to be the most intricate to measure and analyse, primarily due to its inherently unpredictable nature. Its true manifestation often only emerges through retrospective observations conducted across multiple visits to the building over the years, as in Brand's 'rephotography' method.

Flexibility as a political strategy is also related to the design process characterising collaborative housing projects. Cohousing projects are developed through a co-design process. Co-design is a participatory design approach involving collaboration between citizens and technicians. Workshops are held throughout the design process to enable a conversation among the community and between designers and users. During a cohousing co-design process, a new social structure is built collectively. The first step is to construct a shared vision of "home," which is characterised by a set of values. This idea is then translated into spaces through the mediation of an expert figure, the architect. The architect shares his expertise with other agents, especially final users, who express their needs and preferences. Spatial organisation is determined through negotiation among the community members. The percentage of individual versus collective space and the concept of privacy are aspects discussed during this collective decision-making process and have spatial consequences. Co-design processes are carried out through collective decision-making and the result is that of mutual knowledge, a novel and shared structure that shapes the practice of community life, negotiating and determining the use of space and its flexibility.

Flexibility in collaborative housing is a social issue first and then an architectural one.

Conclusions

The text discusses the concept of flexibility in architecture, specifically in the context of collaborative housing projects. The notion of flexibility has been traditionally viewed as a functional and positivist approach in modernist architecture, which focused on minimal, open-plan housing to respond to mass urbanisation. The advent of new construction techniques has allowed a flexible generic plan inside a structure frame and architectural devices to maximize different uses of space.

However, the Housing Revolution has introduced the idea of involving end-users in the design and construction process of housing. This has transformed the architect's role from an author to a mediator, particularly in the design of collaborative housing models where an intentional community of inhabitants carries out the design of their homes through a collective decision-making process.

Here, the focus is on the three key connotations of flexibility put forth by Adrian Forty: flexibility as redundancy, flexibility by technical means, and flexibility as a political strategy. The hypothesis is that the application of flexibility is fundamental in designing collaborative housing projects. The methodology of case study analysis involves the redrawing of cohousing projects using a color-coded scheme that differentiates four spatial usage categories: private, communal shared, publicly accessible, and circulation. The validity of the hypothesis is substantiated by the housing model's characteristics, notably the coexistence of these distinct usages necessitating filter elements to establish a gradient between the public and the private.

Flexibility as redundancy is exemplified in La Balma and Gleis21 cohousing projects by designing circulation spaces with varying widths, forming niches that connect different zones and encouraging communal interactions. Moreover, the inclusion of surplus circulation space fosters user appropriation, transforming these areas into supplementary outdoor rooms suitable for diverse activities. Moreover, Kalkbreite shows how redundancy of extra rooms could increase flexibility and mobility of residents inside the building.

Flexibility by technical means is reflected in Spreefeld and La Balma projects, which demonstrates this approach with modular building elements that enable inhabitants to customize and adapt their living spaces.

Flexibility as a political strategy challenges the conventional notion of flexibility, emphasizing the role of spaces that gain flexibility through usage. Common areas within these projects are often established with minimal infrastructure, allowing users to customize and define their functions over time. Photographs of circulation space of La Balma provide evidence of such user's appropriation.

Flexibility, in its diverse manifestations, facilitates the simultaneous occurrence of various uses. The demarcation between one usage and another becomes blurred: the dwelling is no longer solely an individual housing unit but encompasses the entire building. Furthermore, programmatic indeterminacy enables user appropriation of space, thereby facilitating the building's adaptability to their needs, habits, and preferences.

Moreover, it has been observed that flexibility of usage in collaborative housing projects is propelled by a collective decision-making process. This



process, both during the promotion and management phases of the project, enables the challenging of individual beliefs in favour of a consensual collective vision. The physical environment must be capable of aligning with community changes. Thus, flexibility is not only conducive but also functional in this process of collective negotiation.

In conclusion, the concept of flexibility in housing design has evolved significantly over the last century, with architects and designers exploring new approaches to meet the changing needs and desires of users. Today, with the rise of shared living patterns and collaborative housing models, the potential for flexible housing design is greater than ever before, offering exciting opportunities for architects and designers to create innovative and adaptable living spaces that respond to the needs and desires of users over time.

## Image Sources

Figures 1-5. Drawings by the author.

Figures 6-8. Photographs by the author (21-03-2023).

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