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Las Higueras: An Overture to the Alternation of Customizing Incremental Houses

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Las Higueras: An Overture to the Alternation of Customizing Incremental Houses

Abstract

Incremental housing, supported by governmental funding, denotes a solution for low-income households where dwellings can gradually customized by users. This article examines the process of incremental construction and proposes an alternation of two phases: the basic house design and its customization. When designing houses, government officials and architects should follow three sub-phases: developing the design of the house with households, presenting the final design to households, and supporting families' habitation of the basic house. For the customization process, the professionals should pursue the three sub-phases guideline: inform households about building skills required for customization, discuss the different possibilities for completing the houses, and connect all this with households' financial resources. The outcome is a template for self-building that synthesizes collecting data about the issues during customization for future incremental housing projects. This article is based on fieldwork analyzing "Las Higueras" (2006) incremental housing project in the Santiago Metropolitan Region, assessing the families' capabilities to subsequently customize their houses, and using qualitative research methods in collaboration with Las Higueras, the Chilean Ministry of Housing and Urban Design, and Gubbins architecture studio.

Keywords: participatory design; the base house; sub-phases for design; sub-phases for customisation.

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Las Higueras: una propuesta para la alternancia a la personalización de la vivienda incremental

Resumen

La vivienda incremental, respaldada por fondos gubernamentales, denota una solución para que hogares con bajos ingresos puedan construir su vivienda gradualmente. El artículo examina el proceso de construcción incremental y sugiere la alternancia de dos fases: una de diseño y otra de personalización de la vivienda base. Para el diseño de éstas, los agentes gubernamentales y los arquitectos deben seguir tres subfases: desarrollar el diseño de la vivienda base juntamente con las familias, presentar el proyecto final de la vivienda base y apoyar la vivienda base una vez habitada. Para la personalización de las viviendas, los profesionales deben seguir una directriz con tres subfases: informar a las unidades familiares sobre los conocimientos de construcción requeridos para personalizar su vivienda, discutir las distintas posibilidades de completar las viviendas y conectarlo con sus recursos financieros; el resultado es una guía para la autoconstrucción de futuros proyectos. Este artículo se basa en un trabajo de campo, analizando el proyecto de vivienda incremental "Las Higueras" (2006) en la Región Metropolitana de Santiago, Chile, averiguando las capacidades de las familias para personalizar sus viviendas posteriormente, utilizando métodos de investigación cualitativa en colaboración con Las Higueras, el Ministerio de Vivienda y Urbanismo de Chile y el estudio de arquitectura Gubbins.

Palabras clave: Vivienda incremental; diseño base de la vivienda; personalización; Las Higueras (Chile).

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Introduction

Incremental housing refers to solutions where government have developed programmes of "assistance for owner-builders" (Harris, 1999, p. 295). This housing solution is suitable to situations where the government created an environment favourable to the owner-building of houses, also described as "nuclear families with state support" (Duncan & Rowe, 1993, p. 1338). An incremental house is an unfinished unit that encourages inhabitants to take an active role in the construction process, and this housing solution entails processes that empower "low-income people to acquire, extend, improve, and service their dwellings and neighbourhoods over time" (CHF International, 2004, p. 51). It entails delivering unfinished houses to low-income families who ought to modify them to create completely functional units. These 40 square meter units typically encompass a kitchen, a bathroom, a dining room, and a bedroom. Margarita Greene and Eduardo Rojas described incremental housing as a programme fostered to support "the gradual process of construction, extension, and upgrading of dwellings that is undertaken by many families" (2008, p. 101). It represents a synthesis of functional, formal, and spatial customisation undertaken by low-income households. This housing solution acknowledges the importance of the particular urban location, community organization, mechanism of financing, design strategies and construction methods.

This housing approach of 'build-as-you-go' depends on micro-loans and the self-building process (Turner & Fichter, 1972, p. 135). John Turner defines housing for the less privileged groups in a society as a never-ending process. Incremental construction offers low-income households a means of affordable homeownership, otherwise unavailable to them. This is especially true in the case of urban migrants who incrementally build their house within existing or newly formed neighbourhoods (Boccagni & Brighenti, 2017, p. 3). The idea of incremental construction is concurring with arguments of a liberalised plan so that households themselves could arrange their space on the storey (Broome & Richardson, 1991, p. 172). The main idea of incremental process is to "simplify design and construction of building so that inexperienced constructor and residents [low-income family] could also build houses themselves at low costs" (Gierszon, 2014, p. 55).

The contribution of policymakers, social institutions, and urban planners in developing and executing incremental housing projects is indisputable. However, the article aims to provide support to low-income households' customisation of houses without imposing particular design solutions to them. After looking into the importance of participatory design, the author examines the incremental process of construction and suggest alternation of two incremental phases, such as the base house design and customisation. The hypothesis holds that the enhanced role of architects and government officials engaged in incremental housing projects represents the platform for increasing the direct involvement of low-income families in customisation. Since they are well- informed about the forementioned process, they do not have to hire constructors and strengthen their self-confidence by finalizing the houses on their own.

In Chile, the incremental housing policy is a part of a social programme for accommodating low-income households. According to the United Nations Human Settlements Programme, Chilean government projects assisting the poor in self-building have been common since the mid-twentieth century (United Nations Human Settlements Programme, 2003, p. 24). Since the 1990s, Chilean examples of incremental housing have been represented as a success regarding the quantity of housed families, which is linked with political program for home-making practices (Ossul-Vermehren, 2018, p. 12). Not only was this housing solution promoted by the government, but it was significantly endorsed by architects and NGO sector. This collaboration between public, private and NGO sectors has been praised for its efficiency and transparency by major financial institutions such as the World Bank and the Inter-American Development Bank (Wakely & Riley, 2011, p. 18). Due to the success of building unfinished houses, this programme has had an important influence in developing public housing programmes in other countries such as Haiti, Costa Rica, South Africa, and India.

The author recorded a decline in Chilean low-income households' contribution to the modification of their dwellings, which embodies a significant hindrance to the self-building process evident in their customary practice of involving constructors. Families do not feel that their participation was sufficiently acknowledged by government officials, as they indicate that the architects did not adequately work to establish a set of concrete parameters for supporting the completion of the delivered houses. An example of this practice is Las Higueras housing project, in which homes were designed by the Architectural Office Gubbins and construction was managed by the Ministry of Housing and Urbanism of Chile (acronym MINVU). By examining this project, the objective of this article is to introduce enhancements to the incremental process based on collaboration between the professionals and the households. These enhancements will enable the architect, first, to address the community as a whole by providing advice and instructions, and second, to motivate each household to take active part in incremental construction.

Other than this introduction, the article contains eight more sections: Section 2 presents the background of participatory design; Section 3 examines three existing phases of incremental construction in Chile; Section 4 presents research methods; Section 5 introduces personalisation of Las Higueras housing projects; and Section 6 presents obstacles to customisation of incremental housing projects. Through a critical evaluation of the current incremental process, this section investigates three main issues such as: insufficient participation of low-income households based on a lack of understanding the incremental process; the discontinuity between the proposed plan for customisation and its realisation; and the fact that the customisation process is not adequately presented or explained to the householders. Section 7 and 8 contain additional parameters for designing and customising the base house and strengthening the low-income families' role. Section 9 concludes the article by mapping the recorded issues of incremental process with respect to Rachael Luck' six categories of participatory design. This final section presents the consolidation of incremental construction by augmenting the role of government officials and architects and introduces centrality for low-income households in favour of producing efficient, equitable, and resourceful housing solution.

Participatory design

Participation is often an integrated part of design research, service, and product development (Smith *et al.*, 2017, p. 67). The participatory design was originated in Scandinavia in the 1970s and 1980s and it ensued from a Marxist commitment to democratically empowering workers and fostering democracy in the workplace (Greenbaum & Loi, 2012, p. 82; Spinuzzi, 2005, p. 164) It represents experimental practices that rely on open-ended processes of design and on value-based strategies of engagement which will allow decision-making to emerge in often contentious private and public contexts (Andersen *et al.*, 2015, p. 252; Iversen *et al.*, 2012, p. 91). The practice of participatory design has as its objective to improve communication in the process of design and generate not only responsive results, but also sustained results over time (Frediani, 2016, p. 99). It is closely related to terms like co-operative design, co-design, and design for the common good that represents "collective creativity as it is applied across the whole span of a design process" (Sanders & Stappers, 2008, p. 8). This citizens' participative process improves planning and provision of basic services to households, which is "usually helpful to build liveable environments" (Berntzen & Johannessen, 2016, p. 301). According to principles of participative design, the boundaries between production, consumption and users have become blurred, leading to new narratives of how users are perceived (Hyysalo *et al.*, 2016, p. 21). According to Luck (2018. p. 2); participatory design relates to: *equalising power relations* (empowering invisible or weaker members in organisations or communities); *situation-based actions* (working directly with people); *mutual learning* (finding common ground and ways of working); *tools and techniques* (expressing participants' needs and visions); *alternative visions about technology* (generating ideas about equality); and *democratic practices* (representing role models for equality among participants). The roots of these six categories is "an attitude about a force for change in the creation and management of environments for people" (Sanoff, 2010, p. 1). Although participation is time- and cost- strenuous, it "strengthens the role of the citizens and therefore direct democratic decision processes" (Mueller *et al.*, 2018, p. 182). Participatory design represents "the principles of participatory democracy, in which decision-making is shared and decentralized" (Ravina *et al.*, 2018, p. 209). The author looks at incremental housing as one model of participatory practice.

A rule-of-thumb is to consider a unit as an incremental house if the household is significantly involved in the construction process (Duncan & Rowe, 1993, p. 1338). The users are contributing to "handling of the product or service, ergo its design" (Mueller *et al.*, 2018, p. 183). Their involvement depends on cultural production as opposed to the industrial output of mass production (Kieran & Timberlake, 2004, p. 111). Personalising an idea based on collective creativity and decentralization, as the essence of incremental housing, stems from this notion. This is achieved by disrupting existing, often outmoded forms of provision, and finding new *more adaptive solutions* for personalising public services that "help people to devise their own, bottom up solutions, which create the public good" (Leadbeater, 2004, p. 26). This households' involvement in incremental housing is in accordance with individual needs and capabilities. Low-income families as as non-experts are involved in design process by adopting innovation that is "desirable, viable and feasible" for them (Stimmel, 2015, p. 51). The aim is not only to improve existing and create new building skills of family members, but also to provide

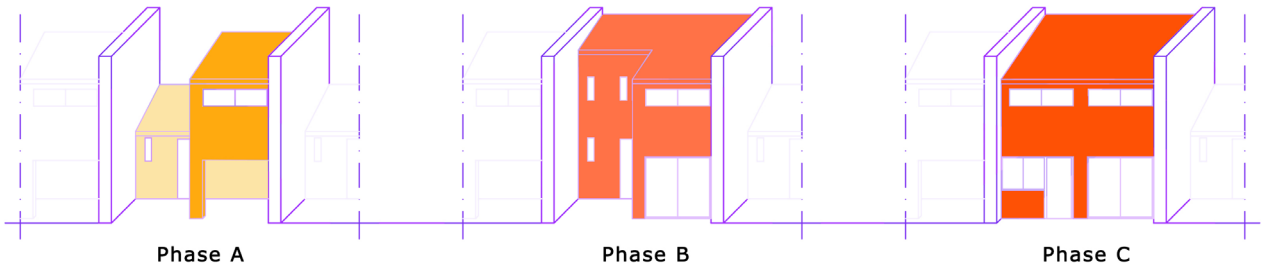
them with their democratic right to participate in design decision process (Bjerknes *et al*., 1987, p. 78). From this background, the success of incremental housing directly depends on households' participation based on the government officials and architects' provision of flexible and adaptable layout for the base house. For generating different building strategies low-income households followed three phases of incremental housing.

Three Phases of Incremental Construction

In Chile, incremental housing has three phases of development. The first phase provides households with the base house (phase A, figure 1); the next phase involves households' investment in extending their unit (phase B, figure 1); and the final one involves the customisation of the base house (phase C, figure 1). Having in mind households' expectation and needs, the architects from the Architectural Office Gubbins followed these three phases. However, the success of this housing process directly depends on the suitability of spatial framework of the base house.

The base house (phase A, figure 1) represents an unfinished house whose completion depends on further investment by low-income families (Ferrero, 1998, p. 8). It contains only the most rudimentary features and is upgraded later, at a pace determined by the financial capacity of the family. The base house is financed by the government and is designed by architects with the intention to create an opportunity for low-income households to leave their informal settlement. The base house represents the first construction phase of the incremental process, and it is the core of incremental construction process (Greene, 2004, p. 5). The idea of the base house originates from the study of *the core house* or *sanitary unit system* for upgrading informal settlements in the developing world (Pandelaki & Shiozaki, 2010, p. 238). According to Joan MacDonald, the core house (Spanish: La Mediagua) consists of a wooden structure, usually with dimensions of 3m in width and 6m in length, and it is located on the periphery of a city where land is affordable for social housing (1987, p. 83). Western Cape Department of Human Settlements acknowledges that the core house "might range from simple basic services all the way to a starter house" (2013, p. 230). In Chile, these wooden structures range from 40 to 60 square-meters. Their form, developed through an informal practice of trial-and-error, supports vitality and diversity in low-income neighbourhoods. The most basic core units contain a bathroom and one room, which are extended and customised over time. Taking into account households' needs to incrementally invest in their homes, this article adopts the definition of the base house as a housing frame which contains a kitchen, a bathroom, a dining room and a bedroom.

Figure 1.
Three phases of incremental housing based on observation from Las Higueras, basic house (phase A), extended unit (phase B), and customized house (phase C).



Source: the author.

In order to complete the basic house, households need to personalise their unit depending on their informal building practice. First, these incomplete units permit inhabitants to invest their time and effort in the extension (phase B, figure 1), which ensures adequate size of the dwellings and represent significant factors behind households' perceived sense of well-being and satisfaction (Bunster *et al.*, 2018, p. 598). Although Jirón *et al.* (2004, p. 43) recorded households' dissatisfaction with the size of the dwellings, incremental construction represents an important aspect for low-income households because of its economic benefits. Since the families create dependence on help from dwellers' kids, friends and neighbours, the construction costs for extending basic houses are considerably reduced. Thus, self-construction depends on active users whose "involvement at different stages of the housing delivery [which] has been shown to potentially result in enhanced residential satisfaction" (Bunster *et al.,* 2015, p. 491). There are three most common extension of houses noted during fieldwork i.e., (i) enlarging living areas, (ii) construction additional bedrooms, and (iii) completing roof structure and ceiling.

Second, for completing the unit households took part in the customisation process (phase C, figure 1) to address construction problem during extensions in order to develop housing unit that meets their needs and aesthetic preferences (Khalili-Araghi & Kolarevic, 2016, p. 233). This customisation of houses allows users to select from different construction models, using traditional and innovative design details, to "support minor alterations to the floorplan or modification of facade elements" (Kwiecinski & Duarte, 2019, p. 361). There were four most common customisations of incremental houses recorded during fieldwork i.e., (i) removal of bedroom walls and altering size of hallways, (ii) removal of kitchen partitions in order to spread the common areas, (iii) glazing of the front facade, and (iv) change from plasterboard to pinewood panels and brickwork.

Methodology

This article is based on qualitative research methods such as semi-structured interviews with low-income families, photo-elicitation, questionnaire, descriptive observation, and interviews with other stakeholders. Interviews using photo-elicitation represent the method of recording the dwellers by means of photos and narrative concerning the modification of their houses. During nine months of fieldwork in Santiago Metropolitan Region, individuals from fourteen low-income households from Las Higueras condominium housing took photographs of good and bad quality aspects of their houses and presented their views of the house. After the photographs were examined, the interviewees were given questionnaires focusing on the dwellers' narrative about settling in the housing units designed by the Architectural Office Gubbins. In addition to these research methods, the argument is also based on interviews with representatives from MINVU and architects from the Architectural Office Gubbins.

Personalisation of Las Higueras Houses

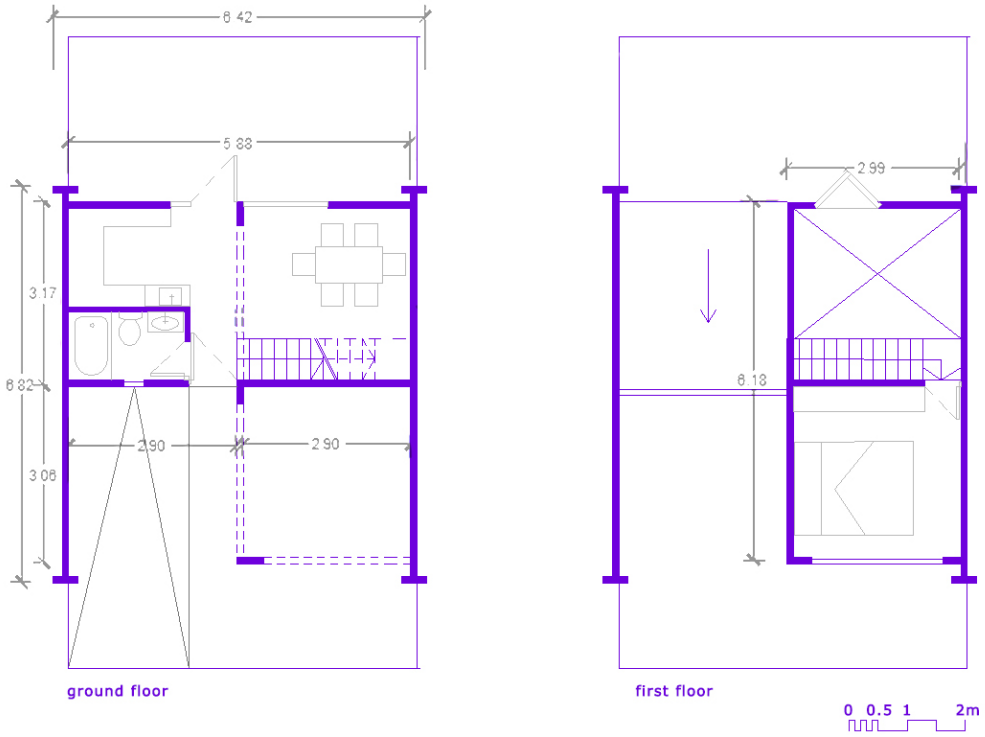
Las Higueras houses are situated near *Avenue Departamental*, on the border of the Peñalolen municipality in the southeast of Santiago. This housing project was a part of the government initiative to house low-income families from the informal settlement known as *La Toma de Peñalolen*, the biggest informal neighbourhood in Chile. According to Rodrigo Salcedo, in 1999 (2010, p. 15), "around 1,900 families, all of them living in Peñalolen municipality at the time, seized a 16 hectares plot". After the families had seized the land, they were building and investing in the quality of their houses over the years. Salcedo reasons that "once they moved out, most, if not all of houses were of decent size (65 - 74 square meters) and had a bathroom, a shower, and some system of water heating" (Salcedo, 2010, p. 16). When they initiated formal negotiation in 2001, both the Chilean government and the residents acknowledged that the only sustainable agreement entailed building subsidised units inside Peñalolen municipality (Sabatini *et al.*, 2006, p. 99). In 2003, Jaime Ravinet, the Minister for Housing, Urban Planning and National Property, and the community leaders reached an agreement where informal residents would save their money (around US$ 350) and apply for the governmental housing subsidy. Since the subsidy at the time did not cover the total cost of a housing unit, residents agreed to "accept a 20-year mortgage in value of around US$ 2,000" (Salcedo, 2010, p. 10). Based on this plan, the government announced the construction of six incremental housing projects in Peñalolen and one in La Florida municipality. These seven projects aimed to house 80 per cent of the low-income families and the remaining 20 per cent of families would obtain different subsidy program (Salcedo, 2010, p. 12). Regrettably, until this date, the supplementary subsidy has never been actualised.

Figure 2.
Las Higueras, before (left) and after extension of houses (right), 2015.

Source: the author.

One of the seven projects delivered to families is Las Higueras, constructed in 2006 and comprising 145 houses, embodies a complex network of streets, such as Las Taguas, Los Tordos, Las Tencas, Los Queltehues and Los Jilgueros. Besides the neighbourhood's complex urban configuration, this project is a very popular one in Chile due to its coloured facades, which gave the project the discreditable name "Las Casas Chubi" that portraits house as coloured candies (figure 2). Nonetheless, it is worth examining the design setting of this project and its importance for incremental housing construction. Initial houses were delivered in a form of four modular units: two on the ground floor comprising a bathroom, a kitchen and a dining room and two modular units on the first floor for a bedroom and a hallway (figure 3). As originally planned by the government officials and architects, most of the families have been able to enlarge and customise their initial house with high-quality materials. All the interviewees believe that they are now living in a fine house with an adequate size of rooms, yet the customisations were not as easy to perform as they had been told they would be.

Figure 3.
Las Higueras floor plan of the basic house, ground floor with two modules dimension 3.2/2.9m containing dining room, kitchen, and bathroom (left), first floor with third module containing bedroom and void within the house (right).



Source: the author.

Families from Las Higueras complained about increased construction costs for completing their houses, which labelled the incremental process as economically untenable for most households. Once the houses were inhabited, owners faced financial challenges, such as supply of construction material and managing building process. All participants expressed dissatisfaction with delayed payments for buying construction materials, and the collected data show that most of participants created a dependence on contractors for completing their base house, which imposed a large portion of the financial burden on low-income families. It was recorded that 82 per cent of interviewees are still in the process of customising the interior, even after more than 10 years of inhabiting the house, and 64 per cent completed the exterior of their houses. This dawdling customisation process is the outcome of limited financial investment in construction and redundant dependence on hired labour. The fact that all participants struggled to understand and perform the customisation process proves that current incremental housing poses a challenge to households' comprehension of design, finance and time management for personalisation. Against this background, and without immediate families' contribution to the aforementioned customisation, the incremental process is prolonged and represents an economically costly housing solution. Everything considered, the author examines the issues of Chilean incremental process with a view to proposing alternation of the base house design and customisation based on the guideline.

Issues with the Incremental Process of Construction

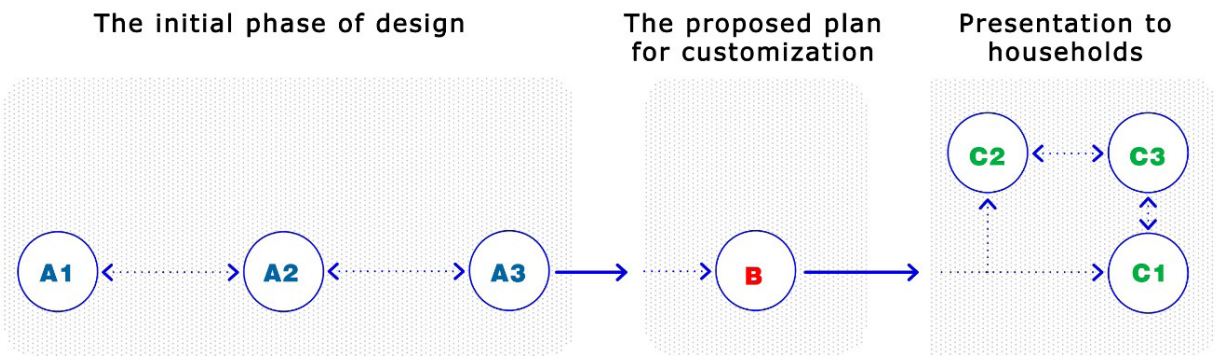
Although the three phases of the incremental process were followed by the government officials and architects, their actions brought about a number of issues for low-income communities. Having evaluated Las Higueras projects in Santiago Metropolitan Region, it is possible to recognize three issues related to the incremental construction process. First, there is a lack of understanding of the process by the representatives from MINVU and the architects, on the one side; and from the low-income household on the other, in terms of joining forces and forming a coalition during the design of the base house. Secondly, it is apparent that there is a discontinuity between the proposed plan for customisation and its final realisation. The third issue is the fact that the customisation process is not adequately represented or communicated to households.

During the initial phase of design, apart from occasional communication with community leaders, the architects did not work directly with the households to prepare them for moving into the base house (A1, figure 4). Interviews with households indicated that living conditions prior to inhabiting the base house directly affected families' expectations of the new house. In addition, families prefer "to be left alone and avoid being marked as poor" (Househead from H2 family, personal communication, February 11, 2015). So as to avoid social stigmatisation, members of family H2 have repainted their facade two times with different pastel colours since they moved in the house. There is a preference of most families to circumvent the coloured

facades (A2, figure 4), which would enable social integration in a new neighbourhood (Househead from H1 family, personal communication, January 08, 2015). These preferences were not addressed in-depth since the representatives from MINVU were pressured by the short-term political cycles (Salazar, A.C., personal communication, October 25, 2014). Consequently, the architect's design solution for Las Higueras condominium was unilaterally imposed on the households (A3, figure 4). Considering households' previous living conditions, most of interviewees were determined to inhabit the base house. Nonetheless, they complained about the lack of understanding of the incremental process, which, in turn, decelerated the customisation of houses.

Figure 4.

Three sub-groups of issues related to the incremental construction process: A1 - the architects did not prepare families to inhabit the base house; A2 – families did not influence the design of facades; A3 - the architect unilaterally imposed the design; B - the proposed incremental phases felt short of addressing the households' capability and motivation for construction; C1 - the customization process is not adequately presented to householders; C2 – families continue to inhabit unfinished houses; C3 – the absence of guide for the completion of houses.



Source: the author.

A second disadvantage observed in the incremental process involves a discontinuity between the proposed plan for customisation and its realisation. For customising the base house, the architect proposed the phases of construction which households needed to follow to complete the base house through spatial extension and customisation (figure 1). However, the proposed phases were perceived to fall short of addressing the households' capability and motivation for incremental construction process (B, figure 4). Members of family H9 stated that "no information was provided where to start building and how to manage the construction site" (Househead from H9 family, personal communication, January 23, 2015). According to this interviewee, the households withdrew from the construction process by transferring the responsibility to hired laborers. As a result, families created unfeasible plans for customization, which means incurring additional building costs. This led to the construction process becoming economically unsustainable for most households. Although the houses were extended to complete the spatial frame provided by the architect, even after more than 10 years of inhabiting the house, it is notable how low the level of interior customisation is. Thus, these houses still do not bear a resemblance to the middle-income houses as intended by the government officials.

The final disadvantage of the incremental process is that the customisation process is not adequately presented or communicated to the householders (C1, figure 4). Essential information concerning the customisation of the base house was not provided, which resulted in households' misinterpreting the spatial capacity of the houses. As a consequence, most households from Las Higueras prolonged the customisation of their houses. This situation inhibited the customisation process and created an additional problem for households by forcing them to inhabit an unfinished house (C2, figure 4), as the current practice does not provide tangible and defined parameters to guide the completion of the house (C3, figure 4).

Current Chilean incremental housing projects are delivered as a base house which has been developed without building consensus among residents in relation to the customisation of the house. The noted three issues related to the incremental construction process suggest that the design of the base houses should be a starting point for negotiations between parties. This means that incremental housing projects, according to Gabriel Arboleda (2010, p. 9): "cannot be designed on an architect's desk, but rather must be developed through a participatory, case-by-case process".

In addition, community involvement and acceptance of the incremental housing process are crucial for the successful implementation of the project. Apart from that, government officials and architects need to assist them in the customisation process. This assistance means establishing a platform for construction strategies that support the households' knowledge of building. Providing additional information about different strategies for customisation of houses would increase households' participation level. Instead of depending on contractors, information about the spatial limitation of the base house would motivate households to invest their time and effort in the customisation process. For alteration of incremental process of housing, the author introduces supplementary sub-phases for improving design and customisation of base houses founded on strengthened communication between the government officials, the architects, and householders.

Altering Base House Design

For examining the phase of designing the base house, the author focuses on refining the current design steps of incremental housing. He argues that during this phase architects should develop their design solution in regular meetings with households. By discussing different design solutions, needless up-front constructions and investments in the base house can be avoided, allowing householders to focus their investment on future extensions and customisation. In this respect, the design of the base house will better reflect the householders' needs and expectations of their homes. In order to incorporate these expectations, table 1 presents three sub-phases for architects to follow, such as: developing the design of the base house with households (a1); presenting to households the final design of the base house (a2); and supporting households' habitation of the base house (a3).

Table 1.

Three sub-phases for designing the base house.

Altered Phase A: Designing the Base House	
sub-phases	aim
a1 developing the design of the base house with households	Present to households the possibility to adjust the design solution based on their needs. Collecting data about households' plan to occupy the base house. Look for the most important part of the house for households.
a2 presenting to households the design solution of the base house	Present to households the developed design solution. Collecting data about households' critique of proposed design solution. After recording households' evaluation of proposed design solution, present the final design of the house.
a3 supporting households' habitation of the base house	The outcome of discussions with householders needs to be implemented when suggesting how to occupy the house Create consensus with families about their strategy to prepare the customisation of the house.

Source: the author.

During meetings with families, architects should present the first design draft of the base house. This draft is provisional and should be adjusted according to the households' requirements (a1, table 1). The households should then be given an opportunity to communicate what is important for them during the moving in the house. Using information provided in these meetings, architects will be able to set priorities for designing the layout. Using the list of concerns and expectations from the households, professionals present the final draft that the households should evaluate in order to finalize the design process (a2, table 1). The final sub-phase of designing is supporting households' occupation of the base house (a3, table 1). During this action, architects should create consensus with families about their strategy to prepare the customisation of the house.

These sub-phases will improve the relationship between architects and householders and provide necessary information for delivering an affordable and adequate quality house. After influencing the design process, the households should be given an opportunity to describe their plans regarding customising the house. In this milieu, the government officials and architects should deliver to families a guideline for customisation with information on incremental construction and motivate the households to participate. The guideline, arguing for the empowerment of low-income households, represents the platform for the re-evaluation of what the families could realistically expect of modified houses.

Altering Customisation Based on the Guideline

Alongside the design responsibilities, professionals should examine the socio-economic position of the low-income households before proposing customisation phases, as the provision of additional construction information would increase their involvement. Instead of depending on contractors, information on different customisation strategies would motivate households to invest their time and effort in completing the houses. For supporting the involvement of low-income households, the author proposes a customization guideline with the aim to prolong the responsibility of government officials and architects during the customisation of incremental housing.

Table 2.
Three sub-phases for customising the base house.

Altered Phase C: Support Households' Customization of the Base House	
sub-phases	**aim**
c1 inform households about building skills required for the house	Examine the challenges that householders face when completing the base house.
c2 discuss the possibilities for completing houses	Record households' plans and strategies for expanding and customising the house. Evaluate households' strategies for customisation and provide consultation.
c3 connect households' construction plans with their financial resources	Group households according to their planned investment in customisation. Inform each group of households on positive and negative sides of the proposed guideline.

Source: the author.

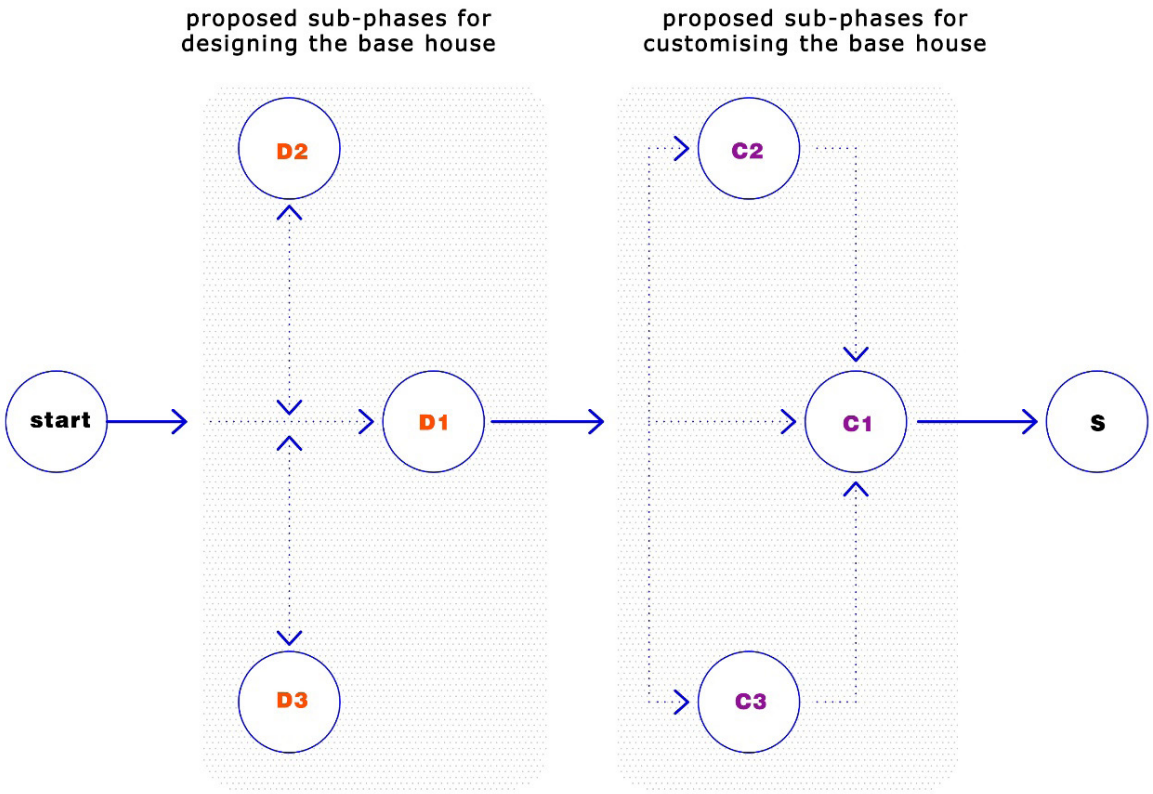
The guideline comprises three sub-phases, such as: inform households about building skills required for the house (c1, table 2), discuss the possibilities for completing houses (c2, table 2), and connect households' construction plans with their financial resources (c3, table 2). Each proposed sub-phase originates from the experience gained through nine months of fieldwork in the Santiago Metropolitan Region and mirrors recorded households' needs and wishes in Las Higueras. The first sub-phase of the guideline is assisting the housebuilding performed by families (c1, table 2). Architects should instruct families on building by relying on recycled or bought construction materials and should deliver to them a construction catalogue listing tools and possible assembly techniques. These suggestions should be explained in stages, so that low-income households could follow suggested methods and use appropriate construction tools.

The second sub-phase of the guideline denotes the responsibility of government officials to discuss different completion possibilities with households (c2, table 2). Government officials should regularly meet with the families in order to define organisational challenges for modifying houses and inform them on all positive and negative aspects of customisation, such as a timeline, management of volunteers for building, and affordable supply of construction materials. The third sub-phase connects households' customisation plans with their financial resources (c3, table 2). Government officials should collect data about households' financial ability to customise their house and use them to group the households according to their plan for low-, moderate-, or high-cost investment in customisation. After examining collected data, architects should provide a set of suggestions for avoiding needless expenditures in houses that will later be replaced or demolished. These suggestions will make it easier for architects to design adequate customisation phases that will offer diverse possibilities for completing incremental housing. Furthermore, it will enable the successful customisation

of the houses, while, at the same time, it will increase the chances of having an affordable and good-quality completed house.

The outcome of this research is to encourage government officials and architects to support the households' customisation process. This support will help the professionals to develop the base house according to households' particular needs, and guarantees a more bottom-up design strategy for incremental housing, which is achieved by introducing sub-phases for designing the base houses. The professionals should listen and observe the households' needs, with the objective to design a flexible unit (figure 5). In addition, by introducing three sub-phases for customisation, architects should support families' plan for extension and modification of unit, and government officials should regularly meet with the families in order to specify organisational challenges they will face during customisation of houses (figure 5). Comprehensive development of two phases, base house design and customisation strengthen the current incremental housing process by relying on an improved cooperation between the government officials, the architects, and low-income households. And, what is more important, the proposed structure of two phases would ensure a more active role of the householders before, during and after the design of the base house.

Figure 5.
Proposed sub-phases for designing and customising the base house: D1 – present to households the design solution; D2 – support households' habitation; D3 – dialogue with households; C1 – connect households' construction plans with their financial resources; C2 –discuss the possibilities for completing houses; C3 – inform households about building skills; S– a template for a self-building.



Source: the author.

For enabling professionals to influence future incremental housing projects, they should store all collected data about families' struggle to complete their houses and publish it in order to influence future incremental housing projects. After examining and cataloguing the issues of customisation, the professional should publish the collected data in the form of a template for self-building (S, table 5). This template will ensure that a better quality construction will be undertaken by the householders. Collected data with diversified strategies for design layouts will enhance the low-income families' confidence to invest and actively participate in the modification of houses. Therefore, by learning from previous experiences they will be better equipped to plan their customisation process and avoid needless investment in the contingent building process.

Conclusion

An incremental house is an unfinished unit that encourages inhabitants to take an active role in the construction process. With the purpose of creating a completely functional unit, low-income households need to modify their initial house, which in most cases comprises a kitchen, a bathroom, a dining room, and a bedroom. This housing solution acknowledges the significance of financing mechanism, urban location, design strategies, and construction methods. The outcome of this housing solution is not a visually appealing object, but rather lessons for better living. Against this background, the article focused on amending two phases of incremental process, such as designing and customising the base house.

The author clarified three drawbacks of Las Higueras, located in Santiago Metropolitan Region and developed by the architectural office Gubbins. The first one is the absence of coalition between the architect and low-income families during the design of the base house. Furthermore, it is obvious that there is the discontinuity between the architect's proposed plan for customisation and its realization as well as the fact that the phases of customisation have not been adequately presented to the households. These issues repudiate three out of six Luck's categories of participatory design, such as: situation-based actions, tools and techniques, and alternative visions about technology. The absence of a coalition between professionals and families obliterated situation-based actions, which constitute working directly with people to help them understand actions and technologies of incremental construction. The disjunction between the proposed plan for customisation and its realisation has led to undermining the importance of tools and techniques that represent concrete and specific solutions for helping different participants to express their needs and visions. Finally, inadequate presentation of incremental process to low-income households hinders *alternative visions about technology* which generate expressions of equality. Concerning that half of Luck's categories are not met, the author expanded the responsibility of the government officials and architects, who, on one side, provided advice and instructions for customisation, and, on the other, motivated each household to take active part in incremental construction.

Keeping in mind the households' expectations for the base house, the author prescribed a series of steps for government officials and architects to take while designing the house. Presented in table 1, three sub-phases for designing were introduced: developing the design of the base house with households (a1), presenting the final design of the base house to households (a2), and supporting households' habitation of the base house (a3). Before developing a masterplan, the professionals should frequently meet with households. Thus, they would be in a position to meet their expectations for their first owned houses by designing them with their endorsement. In this regard, the professionals should listen and observe the households' needs, with the objective of effectively modifying the design solution for the base house.

In order to support the customisation of houses the guideline with three sub-phases was introduced: inform households about building skills required for customizing houses (c1, table 2), discuss the possibilities for completing houses (c2, table 2), connect households' construction plans with their financial resources (c3, table 2). In the first phase, architects should instruct low-income families on building by relying on recycled or bought construction materials and provide the families with a construction catalogue listing tools and possible construction techniques. In the second phase government officials should regularly meet with the families in order to specify organisational challenges they will face during the customisation of houses. For the third phase of the guideline, the government officials should collect data about the households' financial ability to customise their house, and exploit this information in order to classifie families according to their plan for low-, moderate-, or high-cost investment in customisation. The outcome of introduced modification of two phases is a template for self-building that synthetises collecting data about the issues of customisation of the base house for future incremental housing projects. Professional should present to households a template for self-building that represents the opportunity to critically examine and select one customisation strategy that corresponds to their needs.

It is worth mentioning that this article did not consider the importance of NGO sector, urban planners, and financial institutions in developing and executing incremental housing projects, and did not encompass other case studies outside the Santiago Metropolitan Region. By introducing alternation of designing and customising the base house, the author argues for a consolidation of incremental construction by augmenting the role of government officials and architects. Alternation of two phases offers government officials and architects the means to create incremental housing which depends on families' suggestions, construction skills and strengthens the feeling of self-confidence in successfully managing the customisation of houses. This apparatus for supporting self-building demands re-evaluation of families' involvement. As this article has shown, supporting the customisation process of low-income households plays a central role in efficient, equitable and resourceful completion of incremental houses. It also elaborates on the view that there is considerable merit in considering the broader implications of incremental housing construction, such as social, political, cultural, and ecological ones.

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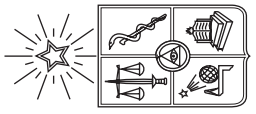

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