

THE GUIDELINE FOR CUSTOMISING INCREMENTAL HOUSING BASED ON TWO CHILEAN CASE STUDIES

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Received 13 February 2020; accepted 22 October 2020

Abstract. Incremental housing, supported by governmental funding, denotes a solution for low-income households where they can gradually customise their dwelling. The Chilean government officials and architects proposed phases of construction which fell short of addressing the households' capabilities and motivation to finalise their units. Hereof, this article looks at two incremental housing projects: Lo Espejo condominium (2007) and Las Higueras (2006) in the Santiago Metropolitan Region, Chile, to inquire capacities of government officials and architects' comprehensive assistance to families' housebuilding. The hypothesis holds that the greater responsibility of government officials and architects engaged with incremental housing will enhance motivation of low-income families to customise their house by self-building practice. Arguing for the importance of the self-building the author proposed the guideline for customising houses that comprises four phases: introducing the incremental construction design idea, discussing with families the possibilities for completing houses, connecting households' construction plans with their financial resources, and presenting the customisation design template. This guideline structure is founded on extensive nine months fieldwork in the Santiago Metropolitan Region, carried out in close collaboration with low-income households from two neighbourhoods, the Ministry of Housing and Urbanism of Chile, the Architectural Office Elemental, and "Gubbins Arquitectos."

Keywords: incremental housing, customisation guideline, Architectural Office Elemental, Lo Espejo, Architectural Office Gubbins, Las Higueras.

Introduction

John Turner argues for "housing as a process", which portrays the housing of less privileged groups in society as a never-ending process (Turner, 2007). This build-as-you-go approach constitutes an alternative solution to conventional housing development. With this in view, incremental housing refers to solutions where government have developed programmes of "assistance for owner-builders" (Harris, 1999, p. 285). This housing solution is applicable 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. 1350). It represents an open-ended housing platform that allows individual households to customise their dwellings by empowering them to "acquire, extend, improve, and service their dwellings and neighbourhoods over time" (CHF International, 2004, p. 51). A rule-of-thumb is to consider a unit as an incremental house if the low-income household is significantly involved in the construction process (Duncan & Rowe, 1993, p. 1333).

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. 96). This housing solution acknowledges the significance of a self-build practice, particular urban location, community organisation, micro financing mechanism, design strategies, and construction methods.

After the First World War, incremental housing was first developed in Europe and the Soviet Union as a pragmatic, untheorized and urgent response to a severe housing shortage, and later in the United States (Harris, 1999, p. 301). Reviewing development of this program in different countries, the author identified three prerequisites of incremental construction, such as acquiring state-finance, managing free time of households, and distributing knowledge of building techniques. Since 1920s, Finland housing grants supported owner-builders who used the dwelling

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for their own accommodation (Book, 1928, p. 539). At first, state housing loans were targeted to municipal and other non-profit housing promoters and from 1922 was also directed to housing self-promoters (Kuusi, 1927, p. 8). Housing finance for builders of detached housing, such as the Own-home Fund, was used to impose discipline and standardisation on self-built housing (Ruonavaara, 1999, p. 335).

The second prerequisite is time management which was recorded after the Second World War, in the western regions of France. Economic necessity resulted in collective settlement by the Beaver Movement that was established for producing modest quality homes founded on the mechanism of shared construction expertise (Wakeman, 1999, p. 361). Contract construction crews, hired for a special work, worked regular hours during the week with owner builders filling in after work and on weekends. The third prerequisites for establishing a self-building is construction techniques which should be available to all households. An example of a program constructed around an idea of sharing the build technique between families is the Australian Home Beautiful magazine that from 1925 focused on design, planning of construction, and home management. Although co-operative principles have never been enthusiastically embraced in Australia, this magazine used a commercial environment of the emergence of self-builders and through their columns offer them encouragement, information, and advice (Dingle, 1999, p. 351). Over several months, the magazine provided detailed and illustrated instructions on how houses could be built, making no assumptions about prior knowledge of building techniques (Australian Home Beautiful, August 1953). In context of these three prerequisites of self-building, the author examines current practice of incremental construction in Chile.

In Chile, incremental housing is a part of a social policy for accommodating low-income households. According to the United Nations Human Settlements Programme (UN-Habitat), Chilean government projects assisting the poor in self-building have been prevalent since the mid-twentieth century (2003, p. 24). Since the 1990s, Chilean examples of incremental housing have represented a success regarding the quantity of housed families and involvement of private and social organizations to be involved in the process of providing housing for low-income households (Greene & Gonzalez, 2012, p. 5). Besides the engagement of representatives from the Ministry of Housing and Urbanism of Chile (MINVU) and architects from the architectural office Elemental and Gubbins Arquitectos, it is worth to mention the contribution of Techo/Un Techo para Chile, a Latin American non-governmental organisation. Techo develops projects with the lowest income families following “a community development strategy centred upon community and volunteers’ engagement and participation” (Moye & Horne, 2013, p. 4). For developing an incremental housing project, Techo and Elemental collaborated by taking advantage of micro-financing that “addresses the affordability issue for low-income households” supported by the Inter-American Development

Bank (IADB) (Bouillon, 2012). Techo was responsible for organising households and helping them to apply for housing subsidy, at the very same time Elemental was responsible for urban planning and design of houses. Given this background, major financial institutions, such as the World bank (WB) and IADB, have praised the collaboration between public, private and social organizations for its efficiency and transparency (Wakely & Riley, 2011). By reason of the success of building unfinished houses, this programme has profoundly encouraged developing public housing programmes in W. Europe, N. America, Australasia, L. America and the Caribbean (Duncan & Rowe, 1993, p. 1331; Blanco et al., 2016, p. 3). The significance of the NGO sector, urban planners, and bankers in developing and executing incremental housing projects are indisputable. Nonetheless, the author examines the role of government officials and architects to alter incremental construction process.

The article aims to impart support to low-income households’ customisation of houses without imposing particular design solutions to them. The hypothesis holds that the greater responsibility of government officials and architects engaged with incremental housing will enhance motivation of low-income families to self-building their house. In Chile, the author recorded a decline of households’ contribution to customisation of dwellings elicited by insufficient understanding of incremental built process. For the purpose of analysing this decline, the article considers Lo Espejo housing condominium (2007) and Las Higueras (2006) projects in the Santiago Metropolitan Region, Chile. In both projects, the government officials and architects delivered base houses to low-income households without the indispensable information on how they should inhabit and customise them. This approach resulted in households’ unrealistic expectations from their first owned house, disappointments with spatial limitations, and confusion regarding the customisation of units and consequently the families withdrew from the immediate involvement in incremental construction and dependence on constructors increased. Due to this withdrawal construction process was prolonged, and building costs significantly exceeded the families’ savings. This problem was addressed by representatives from both neighbourhoods, but the local government and architects disregarded it. In case of Lo Espejo, the representatives from MINVU wanted Elemental’s previous design from Quinta Monroy housing, in Iquique, to be implemented, and for Las Higueras civil servants claimed not to have enough staff needed for a large scale project. With this in view, the government officials and architects proposed phases of construction which fell short of addressing the households’ capabilities and motivation to finalise their units. Instead of formulating a customisation guideline, according to Cristian Martinez, an architect from the Elemental Architectural Office, professionals have developed a rigid structure for base houses with a tendency to “articulate restriction on families” (Personal communication, February 5, 2015). To empower low-income households, this article

proposes a customisation guideline that ensures families' greater autonomy over construction process.

Findings obtained from fieldwork conducted for nine months in the Santiago Metropolitan Region, Chile, were the foundation for devising the guideline structure, and the article is grounded on qualitative methods, such as descriptive observation, questionnaires, and semi-structured interviews. After conduct a demographic survey of both neighbourhoods and completing descriptive observation of houses (Marinovic & Baek, 2016, p. 125), the author interviewed one community leader and nine households from both neighbourhoods. The primary cause for sampling these participants was location of their house within neighbourhood and splitting the sample into two age groups, one 25–35 and second 35–50 years old. Interviewee were presented with two set of questions, first set addressed their living conditions during extension of houses, second tackled the customisation process. Following the interview, the respondents were given questionnaires focusing on the dwellers' review of completed house. Together with these research methods, the argument is relying on interviews carried out with architects from the Elemental Architectural Office and Gubbins Arquitectos, and the author's drawings and photos of houses during the fieldwork. Within this framework, to commence rising the families' direct involvement in customisation of houses, the author proposes the alteration of incremental construction grounded on the customisation guideline that represents a re-evaluation of what the families could expect of modified houses. It comprises four phases: introducing the incremental construction design idea, discussing with families the possibilities for completing houses, connecting households' construction plans with their financial resources, and presenting the customisation design template. Other than this introduction, the article contains five more sections: Section 1 contains a theoretical basis of participative decision making and an overview of literature related to incremental housing; Sections 2 and 3 introduce Lo Espejo and Las Higueras housing projects; Section 4 examines obstacles to customisation; Section 5 outlines an in-depth examination of the Guideline for Customising Houses; The last section concludes the article by briefly considering why aiding the customisation process of low-income households plays a central role in efficient, equitable, and resourceful completion of incremental houses.

1. Participative construction and the base house

Participative decision making, or joint decision making (Locke & Schweiger, 1979, p. 265), represent power sharing between hierarchical superiors and their subordinates (Mitchell, 1973, p. 670). In the present study, the author adopts the theory of inclusion in decision making developed by Nishii (2013, p. 1760). She criticises "plural model of decision making" that increases diverse representation although participants assimilate to dominant norms. This assimilation is configured when some group is trying to improve their position while other is safeguarding their advantages. Generated antagonism produces blind-spot in

relation to social inclusion of disempowered individuals. With this in view, low-income households' contribution to incremental construction is limited as long as it succeeds a prerequisite master plan and design of the base house. This is the nexus at which so many attempts to generate participation and nurture diversity in incremental built process have failed (Davidson & Ferdman, 2001, p. 36).

Personalisation of incremental housing is achieved by disrupting existing, often outmoded forms of provision, and finding new more adaptive solutions to personalise public services that "help people to devise their own, bottom up solutions, which create the public good" (Leadbeater, 2004, p. 26). The occupants are contributing to "handling of the product or service, ergo its design" (Muellera et al., 2018, p. 183), which depends on cultural production as opposed to the industrial output of mass production (Kieran, and Timberlake, 2004, p.111). Households' involvement in incremental housing is in accordance with innovation that is "desirable, viable and feasible" for them (Stimmel, 2015, p. 51). The object is not only to improve existing and create new building skills of family members, but to provide them with 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 founded on the government officials and architects' provision of flexible and adaptable layout for the base house. For generating different building strategies low-income households follow three phases of development (Figure 1). In the first place the households are provided with a base house, after which they start investing in extending their unit, and finally, customisation of the house takes place. Having in mind households' expectations and needs, Chilean architects adhered to these phases. Admittedly, the success of incremental construction directly depends on the spatial framework of the base house.

The base house is an unfinished house whose completion depends on unpaid labour provided by the kin and friends of low-income families. It is delivered with only the most rudimentary features and is upgraded later at a pace in accordance with the financial capacities of the family. The idea of the base house originates from the self-built, core house or sanitary unit system for upgrading informal settlements in urban areas (Pandelaki & Shiozaki, 2010, p. 234).

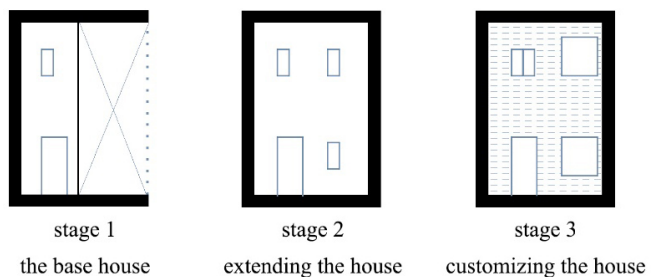


Figure 1. Three phases of incremental housing (source: the author)

According to Joan MacDonald, the core house comprises a wooden structure, usually with dimensions of approximately 3m in width and 6m in length, and is located on the periphery of a city where land is affordable for social housing (1987, p. 83). It “might range from simple basic services all the way to a starter house” (Western Cape Department of Human Settlements, 2013, p. 230). In Chile, wooden core houses range from 40 to 60 square-meters. Taking into account households’ needs to incrementally invest in their homes and the experience of Chilean Government to deliver core houses during 20th century, this article adopts the definition of the base house as an unfinished house that contains a kitchen, a bathroom, a dining room and a bedroom. The base house contains combination of self-building and prefabrication technology that represents the platform for developing affordable houses, and if implemented correctly, this practice can reduce construction costs up to 27.8 per cent (Rowe, 1991, p. 155).

Customising the base house 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). This customisation 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” (Kwiciński & Duarte, 2019, p. 361). Thus, self-construction depends on active users whose “involvement at different stages of the housing delivery has been shown to potentially result in enhanced residential satisfaction” (Bunster et al., 2015, p. 491). Households participation depends on their relationships between families and friends allowing them to manage house building over the long term and “mean[s] insertion in a community of producers where involvement in self-provided projects is an accepted part of life” (Harms, 1982, p. 21). Considering that the underlying motive for most low-income households is “to obtain good quality house at lower cost” (Duncan & Rowe, 1993, p. 1341), this article looks at construction of two Chilean incremental housing projects: Lo Espejo and Las Higueras in the Santiago Metropolitan Region.

2. Lo Espejo condominium

This project is a small social condominium located in a commune Lo Espejo in the south of Santiago. The project was conceived for 30 households who had long lived in the informal settlement Vista Hermosa, a block on the north side of the project. Lo Espejo plot itself occupies 1.000 square meters (Aravena & Iacobelli, 2013, p. 382). The houses are situated in an area which “is almost completely occupied by social and middle-class housing and industries that take advantage of the strategic location of the municipality between the two arms of the Pan-American Highway” (Aravena et al., 2008, p. 25). In order to house families from Vista Hermosa, NGO Techo, MINVU, and Architectural Office Elemental initiated the social housing condominium project. The real estate developer and builder Simonetti that traditionally works for upper-class

housing projects in Chile, “took charge of the construction as part of its social responsibility policy and with it brought unprecedented good construction standards to the social housing area” (Aravena & Iacobelli, 2013, p. 382). Elemental blueprinted a housing structure consisting of one-storey units on the ground floor and duplex units on the first and second floor (Figure 2). The original plan for the ground-floor units included an area of 6 × 6 metres while allowing residents to extend 6 meters outward onto a patio area. Regarding the duplex units, each floor has an area of 3 × 6 meters and a space of the same size between each duplex where they are expected to be expanded in the future (Aravena & Iacobelli, 2013, p. 382). Although the base houses, delivered to families in 2007, were designed to be extended by the dwellers, the building company Simonetti carried out the extensions which were sponsored by the Chilean government in the form of the second subsidy for Lo Espejo low-income households (Figure 3). Afterwards, households customised their living spaces by rearranging doors, windows, and interior walls.



Figure 2. (above) Base house of Lo Espejo, Elemental Architectural Office, 2006 (source: <http://divisare.com/projects/280780-ELEMENTAL-Alejandro-Aravena-Lo-Espejo>); (below) customised houses of Lo Espejo, 2015 (source: the author)



Figure 3. Floor plan of the extended base house of Lo Espejo: (left) first floor house; (right) duplex house (source: the author)

3. 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 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 (2010, p. 8), in 1999, “around 1.900 families, all of them living in Peñalolen municipality at the time, seized a 16 hectares plot”. After families seized the land, over the years, they built and invested in the quality of their houses. Salcedo (2010, p. 8) 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.” One of the seven projects delivered to families is Las Higueras, comprising 145 houses and 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 very popular in Chile



Figure 4. Las Higueras: (above) before extension of houses, 2006 (source: Viviana Peláez, *Villa en el sector Los Microbuseros*, Peñalolén, January 2007, *La Cámara Chilena de la Construcción*); (below) after extension of houses, 2015 (source: the author)

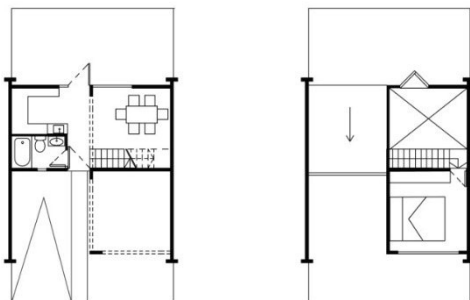


Figure 5. Floor plan of the base house in Las Higueras (source: the author)

owing to its coloured facades, which gave the project the discreditable name “Casas Chubi” that portrays house as coloured candies (Figure 4). Nonetheless, it is worth examining the design setting of this project and its importance to incremental housing construction. Base 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 5). 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 the unit and the rooms, yet the customisations were not as easy to perform as they had been told they would be.

4. Obstacles for customising houses

Throughout low-income families inhabited informal settlement, solidarity and social trust between members occurred at a high level. Any time a household faced a problem, either material or a different one, they could count on the assistance of their neighbours. This alliance between neighbours gradually diminished after families inhabited incremental housing. According to an interviewee from Las Higueras, this fading of social ties between the neighbours and households’ inward orientation stems from the absence of information on how to inhabit the base house (The head of a household H2, personal communication, December 12, 2014). All participants stated that they felt to be forgotten after inhabiting the base house and during the self-building process. An interviewee indicated that families were not informed on how to complete their houses (The head of a household H8, personal communication, February 10, 2015). After moving into a base house, they were given one pamphlet which promoted their new neighbourhood, but did not encourage their settling in houses. Families from both projects highlighted the need for a smoother transition from informal to incremental housing. A former community leader from Le Espejo declared that they needed a preparation steps for successful inhabitation of the base houses (The head of a household E7, personal communication, February 22, 2015). The omitted aspect of preparing households for incremental construction, present in two Chilean case studies, contributes to diminishing of families’ direct involvement in customisation.

In current incremental housing projects, the proposed customisation plan provided by architects felt short of addressing the households’ capability and motivation for housebuilding. Regrettably, an interviewee acknowledged that the proposed phases were not accurately understood so the families lost time and money on speculative housebuilding (The head of a household H7, personal communication, March 5, 2015). Consequently, they transferred the responsibility to constructors instead of investing their

time and savings to personalise a house. Due to the privileged status of low-income families in Lo Espejo, delivered houses had already been extended by construction company Simonetti, hence customisation time was briefer. The rebound from this support is families' unfeasible customisation planning and unrealistic reliance on future government subsidies. An example is E3 household which had unsuccessfully applied three times to MINVU for the additional subsidy in order to resolve leaking roof and customise facade, whilst leaving their house to deteriorate and resemble a unit from an informal settlement (The head of a household E3, personal communication, April 16, 2015). Contrary to Lo Espejo, families from Las Higueras invested more time, effort, and financial resources in customisation attaining autonomously modified houses which are shaping the neighbourhood and portray a combination of diverse housing typologies and facades constructed of various materials. Nonetheless, an interviewee complained about not having knowledge of construction and lacking explanation for managing proposed customisation phases (The head of a household H1, personal communication, January 20, 2015). Other interviewee highlighted the need for linking existing families' savings and proposed customisation of houses, which would support their customisation of houses (The head of a household H3, personal communication, December 8, 2014).

Families from both neighbourhoods complained about increased construction costs for completing their houses, which labelled the incremental process as economically unsustainable for most households. After they inhabited the delivered houses, they faced financial challenges, such as a supply of construction material and the construction management. Most participants from two examined projects expressed dissatisfaction with delayed financial support for buying materials and completing their units, and the collected data show that all participants created a dependence on contractors for completing their base house which imposed a large portion of the financial burden on low-income families. After more than 8 years of inhabiting houses, 80 per cent of interviewees are still in the process of customising interior and 60 per cent completed exterior of their houses. This dawdling customisation process is an outcome of limited financial investment in construc-

tion and redundant dependence on hired labour. The fact that all interviewees struggled to understand and perform the customisation process proves that current incremental housing creates a challenge to households' comprehension of design, finance and time management for customisation. Although families from Las Higueras achieved a customisation rate higher than those from Lo Espejo condominium, the government officials and architects involved in this project failed to provide technical support for increasing immediate involvement of low-income families. Taking this into account, the author introduces a customisation guideline for achieving the consolidation of incremental construction.

5. The guideline for customising houses

During design of the base house, the government officials and architects should have delivered to families a guideline for customisation with information about incremental construction. Professionals should have examined the socio-economic position of the low-income households before proposing customisation phases, and provide additional information about customisation for strengthen 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 proposed customisation guideline aims to prolong responsibility of government officials and architects during customisation of incremental housing without imposing particular design solutions to households.

The guideline comprises four phases: introduce the initial design of the base house (phase a), discuss the design of the base house with households (phase b), connecting households' construction plans with their financial resources (phase c), and presenting the customisation design template (phase d, Table 1). Each proposed phase originates from the experience gained through nine months fieldwork in the Santiago Metropolitan Region and portrayals recorded households' needs and wishes. Following the first phase architects would focus on preparing the layout of the base house, collecting householders'

Table 1. Structure of the guideline for customising incremental housing (source: the author)

The guideline for customising incremental house		
phases	objective 1	objective 2
a) introduce the initial design of the base house	Present to households the first draft of the base house	Collecting data about households' critique of proposed design solution
b) discuss the design of the base house with households	Collecting data about households' plan to occupy the base house. What part of the house is the most important for them?	Present to households the possibility to adjust the design solution based on their needs
c) connect households' construction plans with their financial resources	Group households according to planned investment in customisation	Inform each group on positive and negative sides of proposed self-build strategy
d) present the customisation design template	Introduce different phases of the design template and set the limits of self-building	Support households with construction knowledge for implementing proposed template

feedback, and providing necessary information regarding the design decisions (phase a, Table 1). In addition to layouts, architects would deliver a concise text explaining how to efficiently and affordably inhabit base houses. The purpose of this phase is to assure households' acceptance and ease their moving into base houses. The second phase denotes the responsibility of government officials to discuss with households' different possibilities to complete houses, whereas architects should advise on customisation (phase b, Table 1). Government officials should regularly meet with families in order to provide directions regarding organisational challenges of customisation, such as a timeline, management of volunteers, and affordable supply of construction materials. In addition, architects should instruct them on building by provide the families with a construction catalogue listing tools and possible construction techniques. Following this catalogue, low-income households would be able to follow a selected method and use appropriate construction tools. The third phase connects households' customisation plans with their financial resources (phase c, Table 1). Public servants should collect data about households' financial ability to customise their house and use them to group them according to the plan for low, moderate, or high investment in customisation. The collected data and created groups would facilitate architects to design adequate customisation phases and would offer diverse possibilities for completing incremental housing.

The final phase is designing a template aiding low-income households to adopt one customisation plan that corresponds to their expectations, needs, and financial competence, thus represents a toolbox for embracing the best customisation solution. First, architects should design three or more customisation layouts for demon-

strating to households' different approaches to complete houses. Architects would supply families with a diagram that visualizes these customisation layouts by focusing on construction details. Provided details would diversify design layouts and enhance the confidence of low-income families to invest and actively partake in the modification of houses. Using these layouts households would have an opportunity of taking larger control of self-build practice by addressing the inequality issues that arise from different economical possibilities of households. On the one side, agreeing with their neighbours about set of layouts would restrain the economically prosperous families to extend houses over spatial frame of houses, on the other, this agreement would support the impoverished inhabitants to acquire the benefits of community support for customisation.

The author uses data about customised houses from Lo Espejo and Las Higueras to propose three sub-phases of a design template for future incremental housing projects. Proposed sub-phases empower architects to take additional responsibility in incremental construction without limiting the participation of low-income households. These sub-phases originate from descriptive observation, the author's drawings, and photos of customised houses in two housing projects. The first sub-phase represents recommendations to households that are satisfied with negligible adjustments done within the existing spatial frame of their base house (sub-phase 1, Figure 6 and Figure 7). For this group, architects should offer instructions on recycling materials from their previous living units. During the fieldwork, the author recorded more families who fall into this category in Las Higueras neighbourhood than in Lo Espejo condominium.

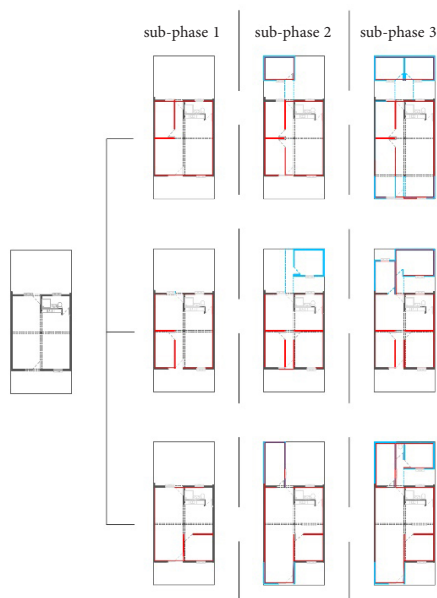


Figure 6. The design template of Lo Espejo first floor houses, customisation within frame of delivered houses (red); extensions of houses (blue) (source: the author)



Figure 7. The design template of Las Higueras, customisation within frame of delivered houses (red); extensions of houses (blue) (source: the author)

The second delineates recommendations for the moderate effort of customising houses provided to households with reasonable amounts of building experience and average finances for customisation (sub-phase 2, Figure 6 and Figure 7). It contains recommendations for the most effective and affordable building techniques that would accommodate households' moderate plan for customisation. This sub-phase informs households to extend their living areas to the front yard of the house and to use the backyard for unfolding the night zones. They should construct the extensions with gypsum boards and sterling boards (acronym: OSB) and cover the interior surface of gypsum with 5 cm thick terminal isolation and plaster, and the external with paint, aluminium boards, or ceramic tiles. This stage of the template would help majority of families from two examined projects.

The final sub-phase is recommendations for the extensive customisation and outlines the ultimate structural, spatial, formal, and functional limit of the base house. It reflects households' needs for high-quality houses shown by their intentions to extend them by occupying the complete area of the front- and back-yard (sub-phase 3, Figure 6 and Figure 7). This sub-phase proposes concrete and bricks as materials for customisation, which should be painted or covered with ceramic tiles. Interior surface of prolonged walls should be covered with 5 cm thick terminal isolation, plaster, and covering materials according to the aesthetic preference of the family members. Any customisation by dwellers that goes beyond this limit would endanger the safety and long-term success of incremental houses. With this in view, each stage of the template strengthens the alliance between government officials and architects and helps families to arrange finance, adopt the design of the base house, and easily organise customisation which involves buying materials, coordinating deliveries and on-site management. Proposing extensive design preparations and discussions with low-income families facilitates the guideline to alter design approach for incremental housing by which the concept of consolidation of incremental construction is attained.

Conclusions

An incremental house is an unfinished starter house that encourages inhabitants to take an active role in the construction process. With the purpose of creating a completely functional unit, low-income household needs to modify their base house, which in most cases comprises a kitchen, a bathroom, a dining room and a bedroom. This housing solution acknowledges the significance of the financing mechanism, urban location, design strategies and construction methods. Against this background, the article focused on empowering households by expanding the responsibility of government officials and architects during customisation of incremental housing. After examining incremental construction in Lo Espejo and Las Higueras, the author introduced the customisation guideline serving as a prototype for motivating families' direct involvement in self-building.

This guideline comprises four phases: introducing the incremental construction design idea (phase a), discussing with families the possibilities for completing houses (phase b), connecting households' construction plans with their financial resources (phase c), and presenting the customisation design template (phase d, Table 1). In the first phase, architects would make clear to low-income households how proposed guideline helps to intensify their adjustment of the base house. During the second phase government officials would regularly meet with the families in order to specify organisational challenges of customisation. After government officials explain the challenges, architects would provide concise text and diagrams to educate families on housebuilding. For the third phase of the guideline, government officials would collect data about households' financial ability to customise their house and group them according to their low, moderate, or high investment in customisation. The collected data will aid architects to develop adequate phases of construction that represents an open-ended customisation structure for low-income households. It denotes a system which enables the families to make an informed choice regarding the completion of their houses. During the fourth phase of the guideline, the architects would present to households the opportunity to critically examine and select one design template of customisation that corresponds to their needs.

It is worth mentioning that this article did not consider the importance of NGO sector, urban planners, and bankers in developing and executing incremental housing projects, and did not encompass other case studies outside of the Santiago Metropolitan Region. By introducing the guideline for customising houses, the author argues for a consolidation of incremental construction by augmenting the role of government officials and architects. This guideline offers government officials and architects the means to create incremental housing that depends on families' suggestions, construction skills, and strengthens the feeling of self-confidence in successfully managing customisation of houses. This apparatus for supporting self-building demands re-evaluation of families' involvement that is in accordance with theory of participative decision making. Examining involvement of low-income families in incremental housing the author identified participants' assimilation to dominant norms which generated blind-spot in relation to their social inclusion and empowerment. Participants' contribution is limited in view of professionals' prerequisites, such as master plan and design of the base house. These preconditions imposed to low-income households reinforce Nishii's theory of inclusion by which subordinates follow sovereign standards. This subordination represent *plural model of decision making* that enables some families to take advantage of incremental process more than others. For promoting horizontal model of decision making, the author introduced the guideline for customisation by which low-income families are better informed and prompted to customisation process. Implementing this guideline would enable households to take larger control of self-build practice by supporting collective decision

making that addresses the inequality issues arisen from different economical possibilities of households. On the one side, collective decision making would restrain the economically prosperous families to extend houses over spatial frame of houses, on the other, they would support the impoverished inhabitants to acquire the benefits of community support for customisation. 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 the view that there is considerable merit in considering the broader implications of incremental housing construction, such as social, political, cultural, and economic ones.

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Notations

Abbreviations

- MINVU – The Ministry of Housing and Urbanism of Chile,
WB – the World Bank,
IADB – the Inter-American Development Bank,
OSB – the sterling board.