

INCREMENTAL HOUSING IN BRAZIL: RESEARCH AND DESIGN METHODS

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Project Capes/FCT : Modeling and Simulation in Architecture and Urbanism Generative and Performance Evaluation Systems.

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Global University Consortium Exploring Incremental Housing



It keeps getting better!

Topics

Context / Location

- Incremental Housing as a research issue: four decades in Brazil;
- Brief account on different methods and point of views;
- Analytical models and Design Models assessed and discussed.

Survey/Case Study

- Example of 12 houses incremental process in Canoas, Brazil;
- Why and When housing was expanded;
- What has been done at each stage;
- How it was done;
- Ways to anticipate transformations made by dwellers.

CONTEXT

Housing deficit

Brazil: approximately 7million dwellings.

Housing production

before:

Government as direct financial source

now :

Government as a financial source for construction private firms.

Predominant Morphology

Before Occupation > minimum area due to income affordability patterns.

Occupation > enlargement by users/ self-construction.



Cruz Alta, RS.



Porto Alegre, RS. In: Miron, 2008



Porto Alegre, RS.



Porto Alegre, RS.



Cruz Alta, RS.

Florianópolis, SC.



Acelino Flores , in Cruz Alta, Place in Florianópolis. In: OLIVEIRA et al., 2005; In: FIALHO et al., 2006

Incremental Housing as research issue: four decades in Brazil

Approaches

Dweller's Behaviour | Environmental attributes | Building Technology | Design Strategies

51%

Perception of dweller by interview and observation of actions. Iteration between dweller and environment.

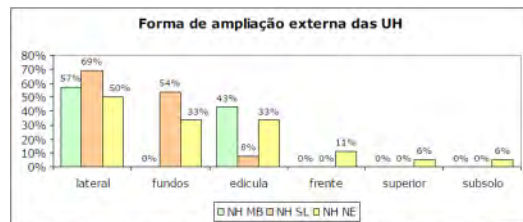


Figura 04: Gráfico com as formas de ampliação externas das residências. Obs: as percentagens não são excludentes.

Photo in: SPANNENBERG, Mariane. Análise de alterações realizadas pelos moradores em habitações Sociais: estudo de caso em Marau – RS. In: II Congresso Brasileiro e I Iberoamericano Habitação Social. Florianópolis: UFSC, 2006.

21%

Lighting, ventilation, acustic, environment sustentability.



Photo in: SATLER, Miguel Aloysio. *Habitações de baixo custo mais sustentáveis: a Casa Alvorada e o Centro Experimental de Tecnologias Habitacionais Sustentáveis*. Coleção Habitare, 8, FINEP, Porto Alegre: ANTAC, 2007.

18%

Building technology, ratio of instalations, economy, costs of built, maintenance.

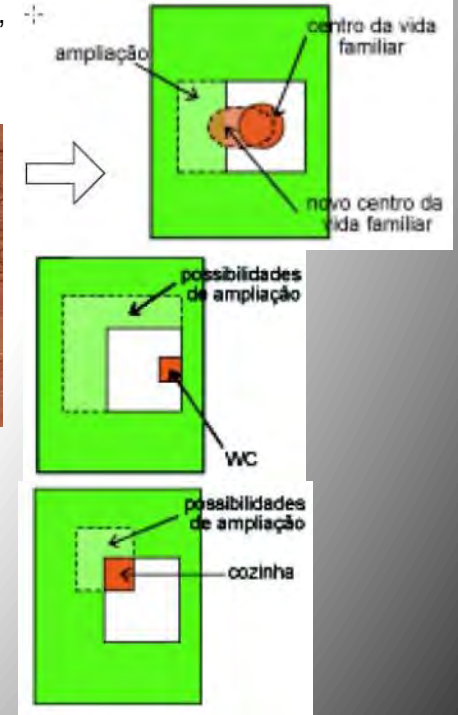


Photo in: FARIAS, Oderon, et al. *Arquitetura e construção com terra, como alternativa mais sustentável para produção de habitação de interesse social rural*. In: II Congresso Brasileiro e I Iberoamericano Habitação Social. Florianópolis: UFSC, 2006.

SZÜCS, Carolina. *Habitação Social: Alternativas para o novo milênio*. In: *IV Seminário Ibero-Americano da Rede CYTED XIV.C*, 2002.

10%

Design strategies of social housing



Research Problem

How to design expandable houses?

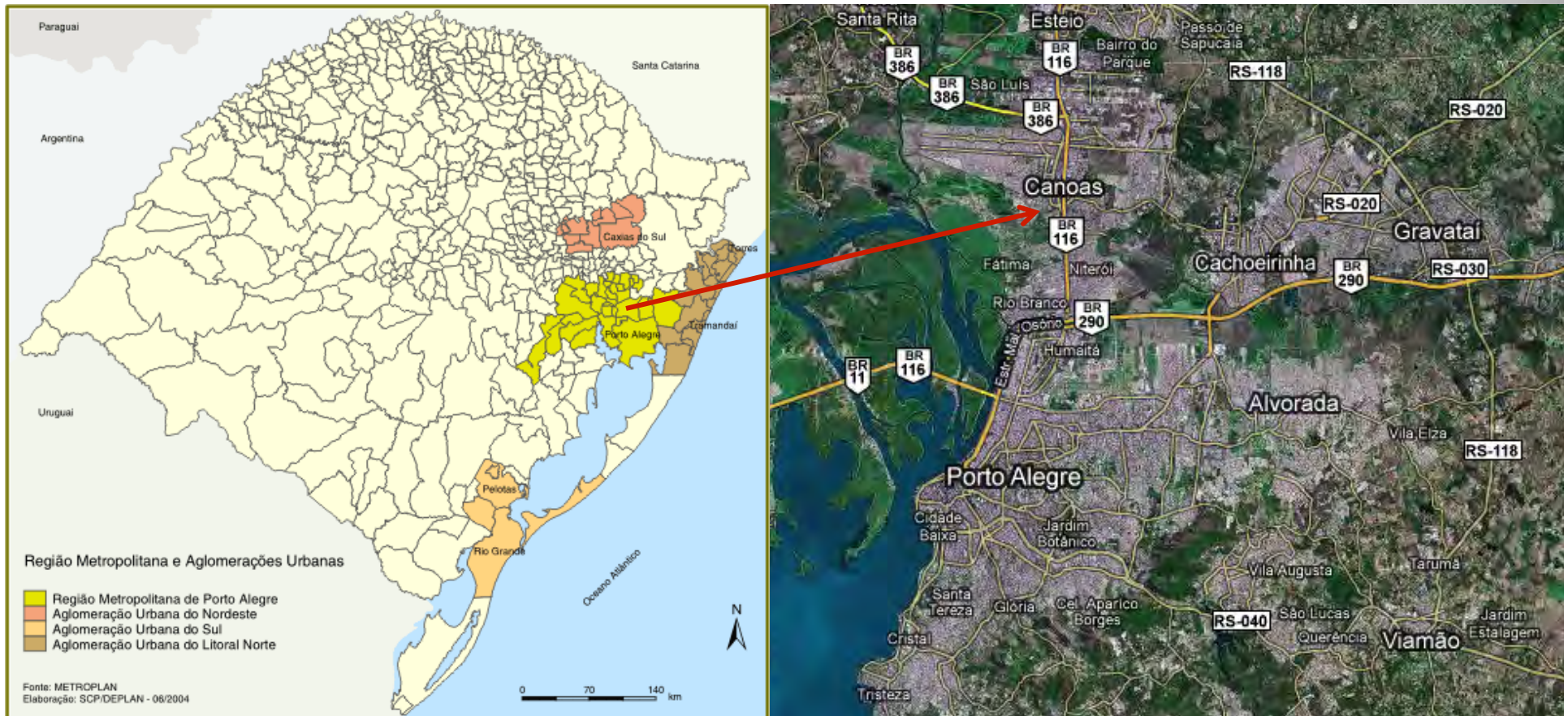
How to design low income houses anticipating enlargement by users?

How to design low income houses with user participation and design control?

How to design low income houses allowing flexibility and, at the same time, searching for more identity?

Spontaneous Growth

Case study – Guajuviras, Canoas, Brazil – sample with 12 houses



Case Study: Guajuviras, Canoas, Brazil



Case Study, Guajuviras, Canoas | 12 Expansion processes



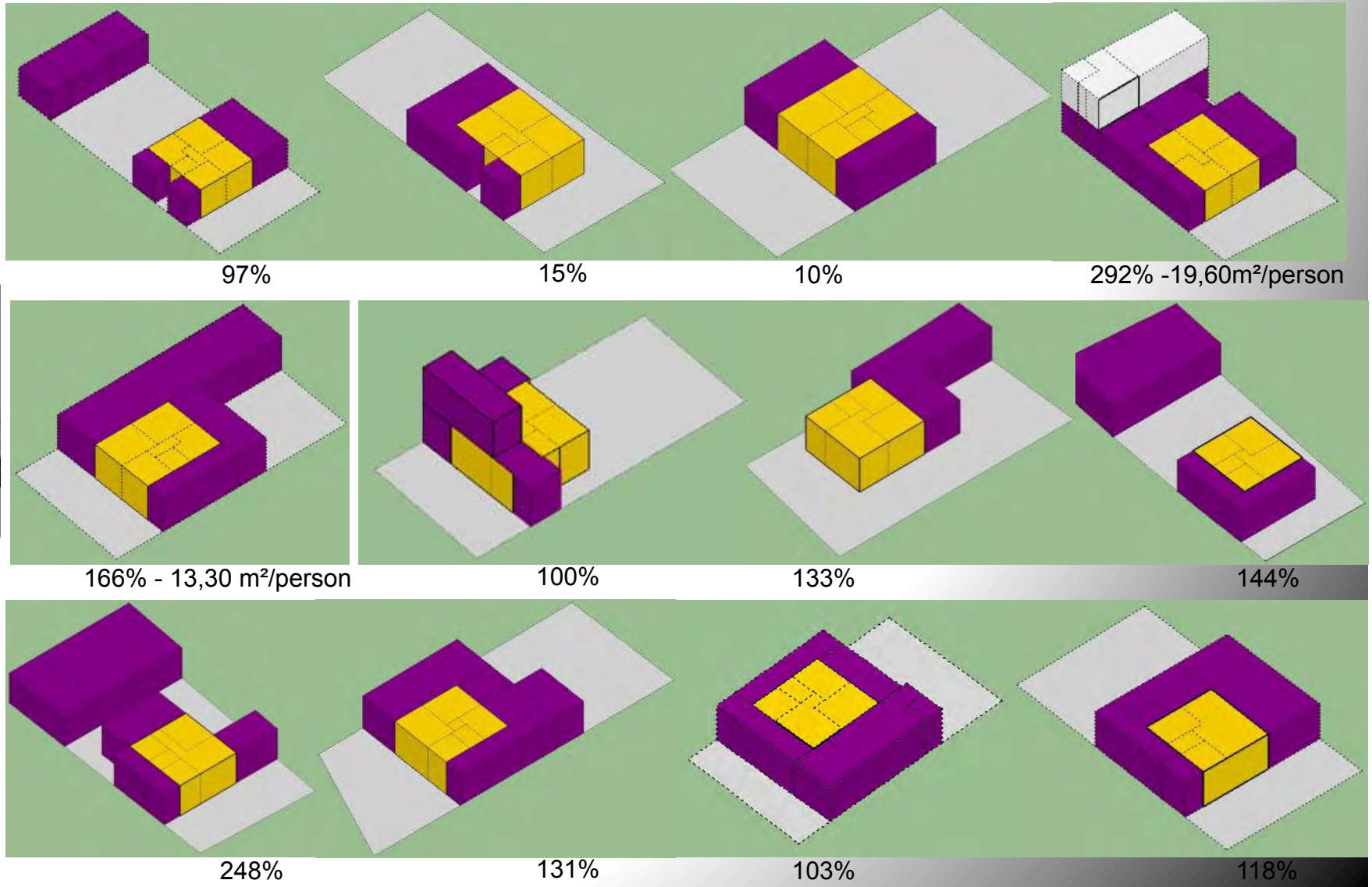
Photos 2003: REIS, Tarcisio e LAY, Maria Cristina. Banco de dados da pesquisa: *Elementos de projeto que afetam o desempenho de conjuntos habitacionais e o grau de satisfação dos usuários*. Porto Alegre: Caixa Econômica Federal, 2003.

Case Study

Self-built expansion of low income dwellings: percentiles.

Yellow: Original Dwelling Purple: Expansion

12 dwellings: Guajuviras, Canoas



Case Study, Guajuviras, Canoas, Brazil

12 Dwelling Plans



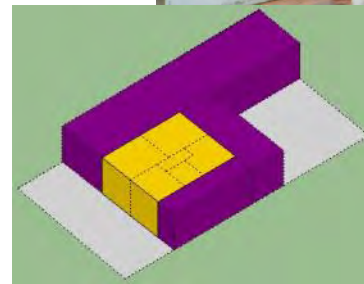
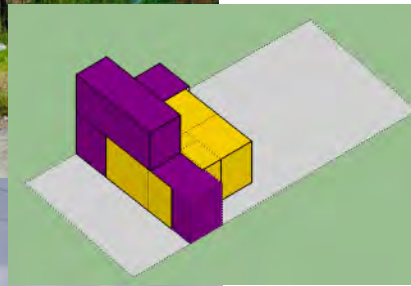
Plans: adaptation of: REIS, Tarcisio e LAY, Maria Cristina. Banco de dados da pesquisa: *Elementos de projeto que afetam o desempenho de conjuntos habitacionais e o grau de satisfação dos usuários*. Porto Alegre: Caixa Econômica Federal, 2003.

Incremental housing – Some examples B1 e A5

Cases without expansion from 2003 until 2010, with few modifications (painting, fence e door).
The primarily alterations happened from 1990 until 2003.



2003

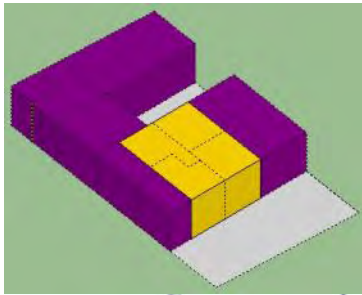


2010

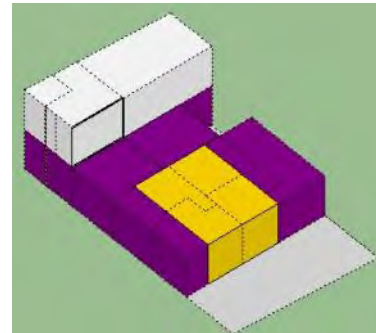


Photos 2003: REIS, Tarcisio e LAY, Maria Cristina. Banco de dados da pesquisa: *Elementos de projeto que afetam o desempenho de conjuntos habitacionais e o grau de satisfação dos usuários*. Porto Alegre: Caixa Econômica Federal, 2003.

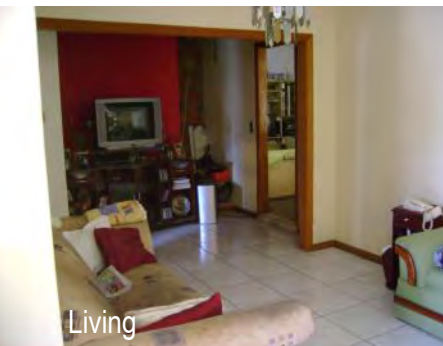
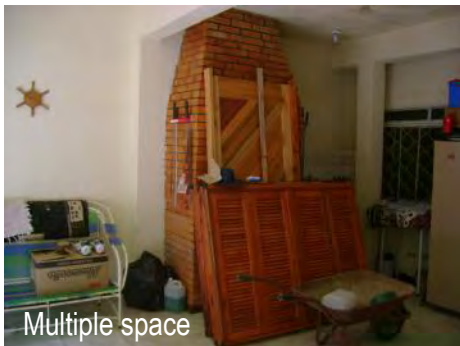
Incremental housing – Example A4, the alterations continue because of the second family.



2003



2010



Incremental Housing in Brazil: Research and Design methods

How predict the evolution of low income housing?

- *Methodology*

Shape Grammars (Stiny, 1972; Flemming, 1987; Duarte, 2005)

- *Cases Studies: spontaneous (1) and planned (2)*

- Shape grammars of Case Study 1 (this presentation)

- Shape grammars of Case Study 2

- *Further studies:*

- Principles for the design of the evolutive low income housing derived from Case Studies

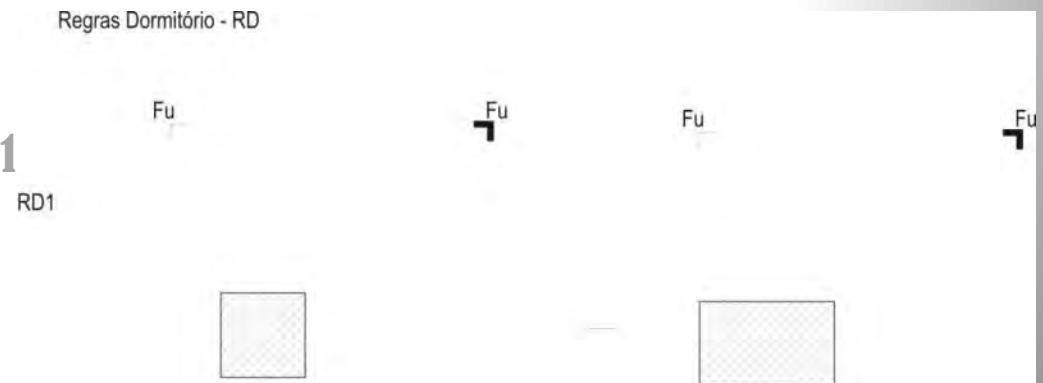
- Shape grammars applied in the design of incremental low income housing

- Automatization of the evolution process aligned with the user participation

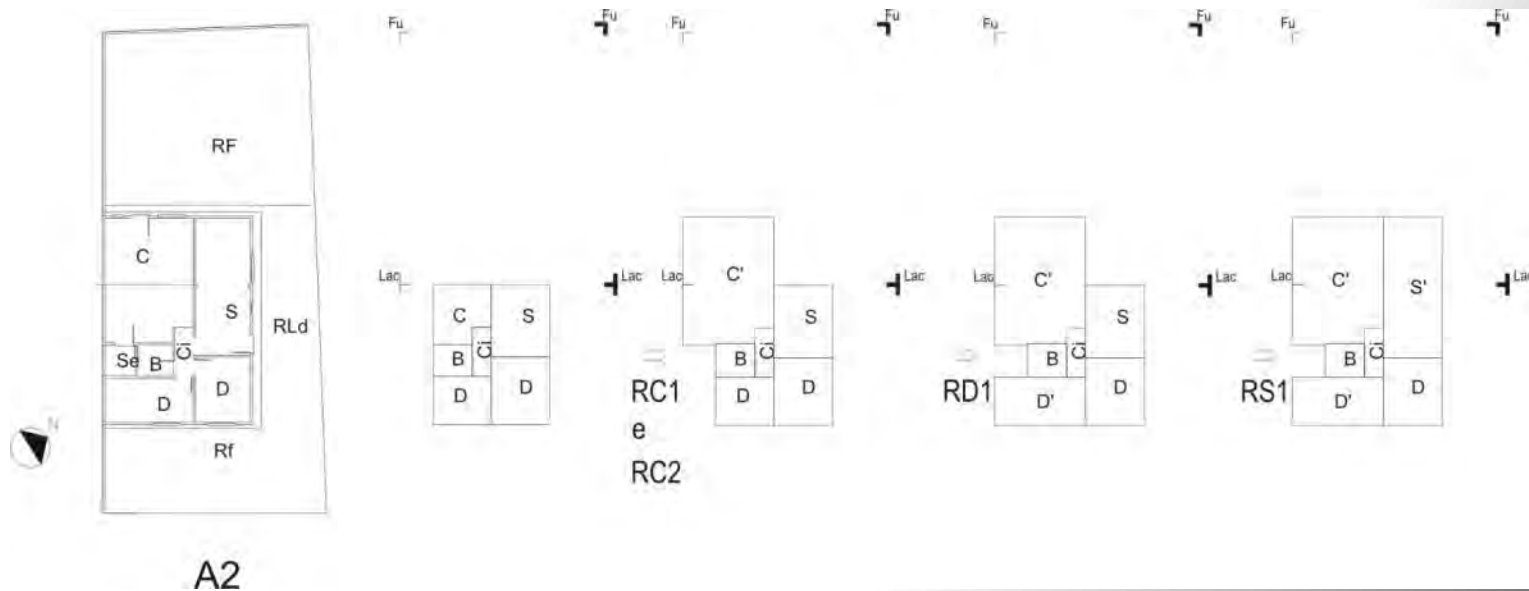
Ways to anticipate transformations made by dwellers

Possible Rules

- **Bedroom's Expansion - example of rule 1**
There are more rules for bedroom
(Labels in Portuguese)



- **Application of rules of kitchen (RC), bedroom (RD) and living (RS) in Case A2**



Preliminary Results

- 1) The kitchen has the higher rate of transformation, predominately in size;
- 2) The garage is the most frequently added space (unexistent before occupation), followed by the laundry space;
- 3) Bedrooms were the most frequently enlarged rooms;
- 5) The general expansion behaviour is to grow towards the two lateral setbacks, predominately to the narrowest setback;
- 6) There are very few alterations in space labels since the predominant alteration is related to the addition of rooms.

The Author

Andréa Mussi is a graduated architect from Federal University Pelotas (1999). Master's degree in Urban Planning at Federal University Rio Grande do Sul (2002), currently developing a PhD thesis on Evolutive Social Housing under Prof. Benamy Turkienicz. Coordinator of the Undergraduate Architecture course at IMED - Passo Fundo, Rio Grande do Sul. Has taught Architectural Design at the University of Cruz Alta (2002-2009) where she was course coordinator 2007. Lecturer at the Specialization Course on Public Administration and City Development and Lecturer at the Specialization Course in Architecture and Urban Planning at University of Passo Fundo (2006-2007). Member of Municipal Councils. Experienced in Architecture, Urban Planning, Urban Modeling and GIS.



Advisor

Benamy Turkienicz Ph.D. in Urbanism from Chalmers University of Technology, Sweden (1982) is a graduated architect from Universidade Federal do Rio Grande do Sul-UFRGS (1976). He is a full professor at the Department of Architecture of the Faculty of Architecture - UFRGS, teaches at the Program for Post-Graduation and Research in Architecture - PROPAR-UFRGS and at the Program for Post-Graduation and Research in Design – PGDEsign-UFRGS). Co-developer of software to support architectural and urban design, of which CityZoom is most prominent. Prof. Turkienicz has delivered lectures in universities in Brazil and abroad. Responsible for Post Graduate evaluation and accreditation in Architecture, Urbanism and Design at Capes, Ministry of Education in Brazil. Responsible since 1995, for the SimmLab - Laboratory for the Simulation and Modeling in Architecture and Urbanism, UFRGS, Brazil and for the NTU – Nucleo de Tecnologia Urbana/UFRGS, Brazil, a joint research group which support municipalities and consulting firms in the planning and assessment of settlements and large scale architectural and urban projects.

