The social housing and sustainable design: a teaching experience

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ABSTRACT

The concepts of design that must be attended, especially in developing countries, are social and cultural concerns, as well as questions of environmental comfort and sustainability. The aspects of building construction’s economic and technological viability and function also have continual importance. Contemporary architecture and its urban setting have exerted specific pressures on the design process, and this in turn on formal education of professionals. Design education has however on the whole not found appropriate models to attend to the complexity of all these questions. In Brazil, as well, most schools adopt a formalistic approach to design. This paper describes a design class of the University of Campinas, Brazil, where the traditional paradigms were questioned and where urban design was the driving force of addressing sustainability in the built environment in a social interest context.

1. INTRODUCTION

The search for an appropriate urban form and its impact on populations of cities, planning must touch on environmental variables, especially if one reflects on the size of cities with over one million inhabitants and the problems that such large conglomerations may induce. Urban design recommendations should address many varied issues, be place specific and sensitive to the natural environment. Preserving open space and the quality of both air and water in urban conglomerations must be a primary goal. Comfort is another concern, as is accessibility for all, incorporated in the principles of Universal Design. To attend to these complex issues designers need innovative strategies, paying special attention to the “ecological footprint” of individual projects. As a result, as well, design education must follow suit. This paper presents a teaching experience involving design students with a low-income housing reality of their urban habitat. The experience stimulated the students in their quest to be creative, heightened their social conscientiousness and brought the concept of sustainability into the typical design studio discussions.

2. THE CONCEPT OF SUSTAINABILITY

Studies on sustainability investigate the complex interactions between society and nature and between the symbolic and material dimensions of social practices, which depend on local cultures (Carrión, 1997). The environmental dimension of sustainability is related to water and energy consumption, as well as CO2, methane and other emissions. In the building industry environmental quality is discussed according to a wide variety of perspectives. The development’s footprint, construction density, impermeability rates, materials and soil conservation are typical indicators found in the official lists used by governments (Silva, 2003). Most sustainability indicators have quantitative measures, which permit testing, however many issues are subjective and an inclusive decision making process is essential to permit responsible design. Other concerns are related to green areas, their relative size and distribution in urban built-up areas. The concept of sustainability relates to future usability, quality of life and healing of present, often undesirable or inadequate, conditions (urban or inside buildings). In the last decades most cities have included sustainable development into their urban planning goals, with investments channeled to optimization of space, reutilization of building stock, improvement of open spaces and mixed use zoning propositions. Historically speaking, most cities, and in Brazil this is also the case, grow in locations where geographical, climatic and other natural aspects favor human use. Large urban conglomerations have however caused serious environmental problems, often with direct consequences on human health and the pre-existing ecosystem. Today, cities must regain respect for natural resources, for the sake of the quality of urban life and economic health and growth.

3. SELF-BUILT HOUSES AND THEIR NEIGHBORHOODS

Most large cities combat problems of traffic congestion, air and water pollution and a lack of open green areas, both in urban centers and on their fringes. When poverty is added to urban problems, common in cities of the developing world, including Brazil, crucial questions
must address the quality of housing. Wider strategies and efficient policies are necessary to attenuate not only the specific conditions of the house, but also the neighbourhood and the services and opportunities it offers. In countries like Brazil, the houses built by owner families represent a large percentage of residential constructions and in the literature are often termed the “new vernacular” (Nolasco, 1995; Pina, 1998; Labaki & Kowaltowski, 1998, Kowaltowski et al, 2005). Owner-built subdivisions have grown since the 1980s in Brazil, when the country abandoned its national housing policy. Settlements are situated mostly in outlying areas of a municipality, not part of the continuous urban tissue. Remaining rural areas surround them and their accessibility is precarious. The population of such owner-built neighbourhoods is primarily concerned with providing a home for the family. Most houses are one to two story constructions, with a high built-over area. Gardens are few and residential lots are devoid of quality open spaces. The resulting neighbourhoods, as seen in Fig. 1, provide poor environmental comfort conditions (Labaki & Kowaltowski, 1998).

A self-built suburb called “São José” represents typical examples of owner-built developments around cities like Campinas. (Fig. 2) Campinas is a city of around 1 million inhabitants 100 kilometres from the major metropolitan area of São Paulo, in Brazil. The development occupies a square kilometre area, which is divided into around 20 residential blocks. The shape of these blocks is long and narrow and a north-south orientation along the long axis is predominant. This condition gives residential lots an east-west orientation. The centre of the subdivision has public areas reserved for institutional uses (schools, day-care centre, etc.).

Design education has been largely based on the studio method, with students developing, under faculty guidance, design projects with hypothetical problems, users and locations. Many studies have examined the typical studio design teaching method in relation to diverse aspects (learning experiences, efficiency, quality of design). Schön (1983) and later Brawn (2003) describe design as a reflective conversation with the design situation, addressing the human thought-processes and the language (drawings, models) used to make design decisions. Other studies identified problems in student design communication and the application of computer-aided design in architectural courses (Nicol & Pilling, 2000). Viewing architecture as pure art is another design education difficulty, and investigations on typical professional practices have shown that architects lack knowledge on, or fail to anticipate users’ needs (Salama, 1997). The aesthetic or formal bias is further reinforced by most architectural publications, used as teaching material in design disciplines (Kowaltowski et al., 2006). Architectural criticism is virtually devoid of human content and directed towards the formal aspects of design. Even technical aspects, evaluation results and user satisfaction rates are rarely present in architectural journals, used by students in design classes.
In architectural design the decision making process is hampered by ambiguities, inherent in the design problem. These may be considered “wicked”, lacking precise information and scope limitations. For this reason, design is a reflective activity, based on rational thought, memory, and experience as well as needing time for thought development and creative insights. In the formal teaching of design, setting these conditions have to be simulated or replaced by in-depth dives into specific problem environments, such as real urban complexities. Theoretical and practical guidance is important to enable students to deal with these challenges in a responsible, conscientious and creative way.

To discuss these problems in architectural education and propose new approaches to design studio activities this paper presents an academic initiative, which questioned traditional paradigms in architectural education, substituted with concepts of urban sustainable development.

5. THE TEACHING EXPERIENCE

A teaching experience of the discipline called “Theory and Design: Social Interest projects” of the architecture and urban design course of the University of Campinas, (UNICAMP) is presented here. It took place in 2006 in the São José neighbourhood. Theoretical and practical activities were part of the course. These stimulated the second year architecture students in their design quest and heightened their social conscientiousness.

In a very low-income urban residential development students identified the desires and needs of its inhabitants. From this they constructed architectural necessity programs for the area. Design proposals had to attend the requirements of sustainability, bioclimatic architecture and Universal Design. Student groups were also asked to adopt a participatory design process with the local population. Creativity was considered important, especially when associated with sensitivity towards problems encountered in the specific urban area. Studies have questioned the traditional view that creativity is a psychological phenomenon, vague and mysterious in nature and depending on inspiration, talent and intuition (Silva, 1986). A conscious design process, culminating in concrete solutions was emphasized. For creative solutions to emerge, theoretical concepts of accessible and sustainable and bioclimatic design were discussed in depth with the students. The reflections on reality in a social interest context were seen as important for a more mature outlook of students on the subjects in question. Students were formally introduced to architectural programming (briefing) methods and basic principles of Brazilian urban morphology. They also received orientation on participatory design methods and questions of professional ethics were discussed in class.

Three distinct phases occurred. First, students got to know the neighborhood, questioning the population on their needs, desires and fears. Student groups produced a diagnosis of the area. Local families demonstrated their awareness of the city as a whole and had clear insights and critical views on its problems and solution sphere. In a second phase, physical models of the housing area were produced (Fig. 3) The class as a whole produced a volumetric model, with the SketchUp - CAD software, using images of Google Earth as a base (Fig. 4).

![Figure 3: Student model of the São Jose neighborhood](image3)

The documentation was precise, representing the reality truthfully and could then be part of a participatory design process, to facilitate the population’s recognition of their environment. Proposals for the neighborhood were presented as posters (Fig. 5-7).

![Figure 4: the Sketch-up model of a street in the São José neighborhood](image4)

![Figure 5: Student design proposal of a health and commercial center](image5)
Finally students singled out specific needs and developed preliminary design solutions for a school, a health center and a linear recreational park among some of the proposals. Many projects were directed towards collective spaces, sidewalks, urban infrastructure and services. One student group wrote a handbook to aid families in their housebuilding efforts. Especially the question of construction evolution (change, increase in functional areas etc.) were included in the manual and the aspects of environmental comfort, sustainability and accessibility were transformed into practical applications. The posters were presented to the population and the models were shown at this occasion too. Fig 8. shows the student group in the neighborhood during their analysis and participatory visit.

Results showed that the concrete example was fundamental to the creative process, challenging students to develop viable solutions. All proposals were coherent in their representation of the reality. The question of sustainability was presented to the population as a means of opportunities for financial gains and an improved quality of life. The rational use of energy and water, as well as recycling of trash was explained.

Accessibility was an issue incorporated into the student designs, through the concept of generous dimensions. Street paving details and urban furniture were proposed. Thus, the reality incorporated into the design decision realm, strongly stimulated responsibility and a more profound social and environmental perception.

6. CONCLUSION

Many studies exist which explore participatory methods in urban planning and design processes, but most of these create unattainable expectations. Participation often cannot bridge the gap between population (users) and designers and planners. Understanding of proposals is often erroneous or very low. Detail information is lost in the conversation or written material presented in such processes. As Kaplan (1984) showed: “The discrepancies between what experts know and take for granted, and what people know and hold dear must be examined. Incorporating participation is an effective way to recognize that experts and affected groups have different knowledge, perceptions, and needs.”

To overcome some of these difficulties design teaching must be specific as to its goals and bring reality to the studio. Service education is thus seen as a means of stimulating a more profound social responsibility and an environmental sensitivity in future professionals.

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