

Re-learning for sustainability - An experience toward reformulating architectural education

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ABSTRACT: Despite environmental concerns are on the rise in many sectors of the profession, architectural education and practices are too often devoted to fashionable design and expensive technologies that ignore the deep physical and social roots of architecture. The third world South American country Uruguay is no exception, but its national university's Faculty of Architecture has a tradition and history that makes it well-suited to confront the new challenges posed by contemporary socio-environmental conditions. In 1999 we established a Permanent Environmental Commission, whose aim is to introduce an associated change of perspective within the faculty. The approach we take addresses social, environmental and epistemological issues as a holistic unit in a societal quest for sustainability. Over the past two years, an education experience we tried with students have yielded amazing results. The next step is to institutionalize and insure the dissemination of this enterprise.

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INTRODUCTION

Awareness of the role that buildings and building production have played in the escalating environmental crisis of the late twentieth and twenty-first centuries poses fundamental new challenges for architecture. How are we architects responding to these challenges? Does the architecture we engage in and teach enhance and preserve a healthy environment, or does it contribute to its deterioration? Does it contribute to the development of sustainable societies, or speed their demise? The answer, of course, varies between individual architects, educators, institutions, regions and countries. While environmental concerns are on the rise in many sectors of the profession, a top-design industry continue to spread fashion-centered aesthetics and wasteful technologies that don't actually pay lip service to those concerns. And even among purportedly environmentally conscious groups and individuals the basic concepts of a healthy environment and sustainability vary wildly.

A recent experiment in architectural education in Uruguay has confronted these issues head on, and the results have been illuminating. First, we will address the fundamental philosophical premise of that experiment: what do "environmental responsibility" and "sustainable" mean when it comes to architectural practices? What are the underlying general ideas on how and what sustainability is to be achieved? (Foladori 2005) Next we will give a brief account of the local context for our experiment, and then we will present the project, its outcomes, and our conclusions.

1. ARCHITECTURE AND SUSTAINABILITY

"Environment" and "sustainability" are now obligatory buzzwords in building, architecture and urban planning agendas. We toss around terms like "eco-architecture", "green architecture", "sustainable architecture", "sustainable cities", and "sustainable communities," but have yet to assign them precise meanings. Issues being considered include energy efficiency, water conservation, non-toxic emissions, material- and waste recycling, local and renewable resource use, appropriate technology, life-cycle and ecological footprint accounting, and landscape and heritage revaluing. Some of these issues refer to physical problems. Some concern the economic, social and cultural dimensions. And some address architecture's role in expressing and reflecting societal relationships and the way a society relates to nature. Ideas about which of these issues should be considered, and how and to what extent they should be addressed, vary wildly. Architecture lacks a common definition of goals, responsibilities, or even ideals when it comes to environmental quality and sustainability. The scope of our concern and responsibility in space and time remain undefined.

If, as architects, our concern for energy use is limited to *our buildings themselves*, we may choose materials and technology that produce a highly energy-efficient building, but require more energy for their production, transportation and manipulation than will be saved in the lifetime of the building. If our concern for health is limited to our building's users, we may utilize inert metals and non-toxic paints, but fail to consider the processes required to obtain and process them, which may risk the health of miners and factory workers. Concern about greenhouse emissions and climate change may lead to energy conservation in both building and fabrication, but do we also avoid coastal constructions in areas certain to fall victim to rising sea levels in the next fifty years? Clearly, a practice that is

celebrated as a paradigm of sustainability in some circles, will be seen as a vain or largely symbolic gesture in another.

In the broadest sense, it is the contribution that architecture makes to the sustainability of entire communities that needs to be taken into account. Ideally, we would consider all of the interrelated biological and physical, economic, social, cultural and political implications of our designs in an extended space-time continuum, from production through implementation and use. This, of course, is an overwhelming task for even the simplest project, requiring expertise and knowledge that is far beyond that acquired in the normal architectural education. One might argue that even if we were trained to cope with such considerations, they fall beyond the architect's jurisdiction. For example, we are not usually in a position to decide what types of buildings or structures should be built where. We have little or no control over how much money the customer is willing or able to invest, the availability of materials, building code restrictions, and so forth. Should we then plead ignorance and lack of decision-making power, and ignore the larger consequences of our interventions?

We answer this question with a resounding "no". We are embracing a broad, holistic concept of "sustainability" that simply cannot be addressed by a "limited liability" approach, or by isolated adjustments within fragmented decision-making structures and fields of knowledge. In the last few decades, scholars and thinkers from many different fields of study have been coming to the conclusion that both global social imbalance and environmental crisis are unavoidable outcomes for an industrial, capitalist civilization. Thinkers like Castoriadis or Morin call for a radical subversion of the philosophy and the epistemology embodied in this civilization's power relationships, both within human society and between human society and nature (Castoriadis 1990) (Morin 1993). Some architectural theorists and educators, like T. Dutton and A. Ward, have denounced postmodern disenchantment and its reactionary aestheticism and advocate the reconstructing of architecture's social project (Dutton 1996) (Ward 1996). Others like I. McHarg and S. Van der Ryn call for epistemological changes in the way that design is related to nature (McHarg 1969) (Van der Ryn and Cowan 1996).

In keeping with this trends, we are beginning to question many of the given conditions and the underlying premises of contemporary professional architecture: private land ownership, profit-maximizing logic, business construction, universal design and technical patterns, expert knowledge self-sufficiency, and the cult of the single creator personality. These premises determine the ordinary role, constraints and margins of freedom for the practice of architecture, and they are generally taken for granted in architectural education. As a first step toward fulfilling our role in a societal quest for sustainability, we need to rethink that education.

2. NEW PROBLEMS, OLD PROBLEMS: A VISION FROM THE SOUTH

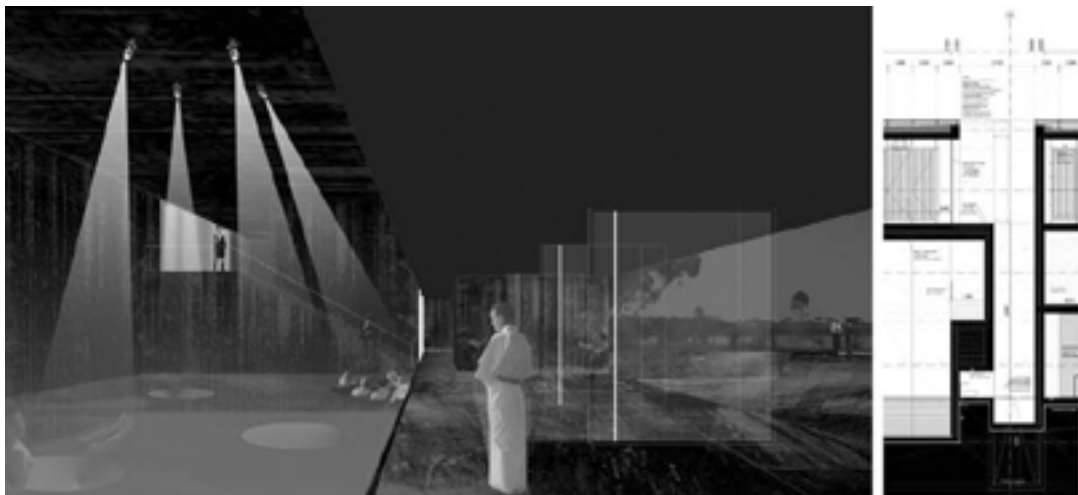


Source: **Museum Torres García web site: www.torresgarcia.org.uy**
Figure 1: A famous sketch by Uruguayan artist Joaquín Torres García.
The inverted map of South America suggests a subversion of the hegemony from North to South. Uruguay is marked by an X.

Unlike much of South America, the Eastern Republic of Uruguay (Fig. 1) came of age as a modern nation with few pre-colonial ethnic or cultural roots, looking to Europe for its model of civilization and progress. In the late 19th and early 20th century we casually achieved a prosperity and a welfare state that put us on par with many first world social indexes. During the latter half of the 20th century, however, that weakly founded prosperity crumbled, our focus shifted from Europe to the U.S., and a chronic economic crisis placed us firmly among the continent's third world countries. In the sixties, a home-grown socio-political movement joined the continent-wide struggle for emancipation and social justice, but in 1973 our heretofore democratic political system succumbed to a brutal and stifling dictatorship, which endured until 1985. As we ended the dictatorship, postmodernism and globalization were on the rise, and as we tried to rebuild the modern society of our history, we unquestioningly embraced many of their tenets: global cultural homogenization; rising consumerism; social disintegration; general ethical, political, and aesthetic

skepticism and pragmatism; and overall neglect of community problems and projects. Unfortunately, the environmental awareness that was also on the rise in first world countries, didn't reach our shores until much later. Our nation's architecture, as well as its Faculty of Architecture, reflect the above history. Just as they adhered to the international style in earlier times, they are now strongly influenced by the scenographic, virtual architecture the international star-system exalts. This lack of sensitivity to both global and local socio-environmental problems is troublesome, particularly as our faculty is, in principle, well-equipped by its modernist tradition to confront the current challenges. Among its main achievements are: an integrated approach to architecture from the detail to the planning scale; scientific support for design, with an emphasis on the physical principles of building techniques and pioneering research on the science of climate as applied to architecture; the usual experience of getting advice from other disciplines; and, above all, the national university's political commitment to serve the populace and society, something typical of many Latin American universities.

These values are still in place, and in a few cases they have produced an environmentalist perspective. But they have progressively lost ground to a post-modern indifference to physical, economic and social realities. This is readily apparent if one takes a look at the sorts of designs that are winning positive reviews and competitions, that our colleagues are producing and our students are learning to imitate (Fig.2).



Source: Dinamo, on-line publication by Taller Scheps, Facultad de Arquitectura, Uruguay www.farq.edu.uy
Figure 2: A design by Uruguayan students that was awarded an Archiprix in 2005



Figure 3: Our students are currently trained to carry out sunshine-path studies on models using a *heliodon*. However, this means is sometimes used just to obtain an impressive image of a blind-to-solar-orientation project.

This is the context our team is intending to work on, with the task of increasing awareness of the new responsibilities and challenges that today's architects face, besides to rescuing the fine inheritance we are losing (Fig.3). This endeavor is inspired by the understanding that both old concerns and new concerns arise from a sense of *the deep physical and social roots of architecture*, to quote Master Justino Serralta.

3. RE-LEARNING FOR SUSTAINABILITY: AN ENCOURAGING EXPERIENCE

3.1. A path towards "environmentalizing"

In 1998 the Faculty of Architecture created a temporary task group on environment, and a year later this produced the Permanent Environmental Commission, known by its acronym in Spanish as CAP. CAP is comprised of professors and researchers from every institute and department of the faculty -Design, Planning, Architecture Theory and History, Building Technology, and Climate and Comfort-. Years of cooperation have produced an integrated

architectural approach to sustainability and an educational program based on that approach, but obtaining a full institutional commitment to implementation has proven much more difficult.

CAP initially focused on the education of the Faculty's professors and graduated students, inviting guest professors from different disciplines and countries to give brief courses and workshops. This is definitely the most accurate strategy to provoke a sustained process, but it is also a long-term one, and it needs much greater institutional support than is actually granted. In 2004 the seven members of CAP decided to try presenting its own course, not as organizers but as teachers. Our first course, "Architecture, Environment and Sustainability," was open to fourth-year architecture students who had already achieved a certain level of knowledge and maturity. In 2005 a second edition followed, and participation was broadened to include students and professors from the Faculty of Agronomy and a professor of Geography from the Faculty of Sciences. Both courses were extracurricular, with voluntary enrollment and no academic credits offered. Even so, the number of applicants far exceeded the limit of 30-40 students, which was all we were able to cope with using our defined pedagogical method. The following discussion synthesizes the most significant characteristics and results of the two courses.

3.2. Purpose and strategy: A change of view

The course was placed between the first and second cycle of the usual 6-year curriculum, and made use of the knowledge already acquired -mostly focused on single buildings- while introducing new concepts relevant to the urban-territorial scale to be followed. Altogether, it was 40 hours long. We did not hope to modify preconceptions and habits during this short time, but rather to activate an impulse to question those preconceptions and to mobilize the interest and inquiry that would lead students to an enduring commitment. We defined our objective as: "recognition of the inherent environmental implications of architecture and its actual and possible contributions to either increasing the environmental crisis, or to creating a sustainable alternative." In short, we sought to instigate "a change of view" in our students. This has become the characteristic slogan of the course.

On the one hand, we simply provided information that is absent from the standard education the faculty provides. On the other, we approached aspects of the existing curriculum in a way that encourages what education psychologist D. P. Ausubel calls meaningful learning (Ausubel 1968). The premise here is that there are lessons in an explicit curriculum that are never effectively integrated in the student's mind and practice, due to a "hidden curriculum" that implicitly enhances certain knowledge and values, while neglecting others. We presumed a knowledge composed of "open certainties" (Follari 1995) and encouraged thinking beyond our discipline's conventional boundaries and certainties, working towards Edgar Morin's "complex thought" (Morin 1986) and Enrique Leff's "new environmental rationality" (Leff 2002). At the beginning of the course we tell the students that we are all there to learn and there is no unique truth to be transmitted or discovered. The learning experience was thus focused as much on method as it was on themes. There was close interaction between all participants, with little division between teachers as knowledge owners and students as knowledge receivers, as Paulo Freire's pedagogical theory emphasizes. Students later expressed appreciation of the value their opinions were given and noted that, though the teachers showed a mastery of the subject, they often seemed to be "just another student".

3.3 Teaching methodology

We combined several teaching methods:

- Conventional expositive lessons with examples and thought-provoking images, movies and texts, reinforced by group exercises and discussions
- Workshops on specific cases or issues, using role-playing, charts and other group-work techniques
- Field observation of selected problem areas or buildings, and encounters with the corresponding stakeholders
- Small groups of 3-4 students produced monographs on specific themes and presented them at the end of the course. In 2005 each group was advised by a team of two professors, one from the architecture faculty and one from agronomy.
- Individual and collective assessments of the experience

A specific heterogeneous land area about 30 kilometers from Montevideo served as a constant reference during the course and for the final monographs. It includes part of a hydrological basin, several rural uses and transformative activities, a little town called Juanicó, and a Faculty of Agronomy experimental station.

Themes were presented in a dialectical context, rather than as a logically construed sequence of topics. We built comprehension of each case and problem at successive levels and depths by moving between the concrete and abstract, the particular and the general, the local and the global, and the theoretical and practical. In order to establish the desired learning atmosphere, we began each course by inviting all participants to introduce themselves and express their interests and expectations. Then we briefly explained the purposes and the plan of the course.

3.4. Program and contents

3.4.1 Turning back to the sources

The introductory part of the course consists of expositive lessons, group exercises and discussions focusing on "the deep physical and social roots of architecture." Turning to the very beginning of architecture as a primordial social work, we emphasize the integral relationship between shelter and agriculture, industry, trade, communications and culture. In this way, the inherent dependence and impact of the "man-made world" (Crowe 1999) on the natural environment becomes readily apparent. With the help of L. Mumford's classic texts (Mumford 1934 and 1938), we take a whirlwind tour of historical developments in the relationship between society and the environment. We discuss examples of the diverse local architectures and settlement shapes that evolved in different landscapes, climates and social systems, and note that even in modern times a major part of the world's built environment is produced without

professional assistance. Then we move on to explore the effects of the great revolutions, 15th century colonialism, and 18th century Enlightenment and industrialization. Here we find the origins of modern science, technology and professional architecture, as well as the roots of the contemporary environmental crisis. Finally, we focus on the urbanization phenomena, megalopolis, oil-spot shaped expansion, and social segregation, as major concentrators and exporters of environmental impacts. A group analysis of our city, Montevideo, serves to explore these topics. By the end of this part of the course, a general framework has been established for the critical analysis of contemporary architecture from outside narrowly-defined disciplinary parameters.

3.4.2 Auto-analyzing

The second, most extensive, part of the course is a survey of the diverse environmental implications of architecture as it is currently practiced. We discuss specific decisions that architects and town planners make and do not make, by performing different professional roles. Students work in groups on real, documented cases, defining the different options available and examining the actual decisions and actions. We employ role-playing, charts and other group-work techniques, as well as field observation of selected areas, buildings, and meetings of stakeholders. The groups then share their conclusions and observations, and we begin to synthesize them into a general conceptual and practical model. Finally, we attempt a systematic review that integrates the biophysical, economic, social and cultural adequacy of professional decisions by designing, directing or controlling of building implementation, planning, programming, and managing. About the middle of this portion of the course, the topics, groups and tutors for the students' monographs begin to be defined.

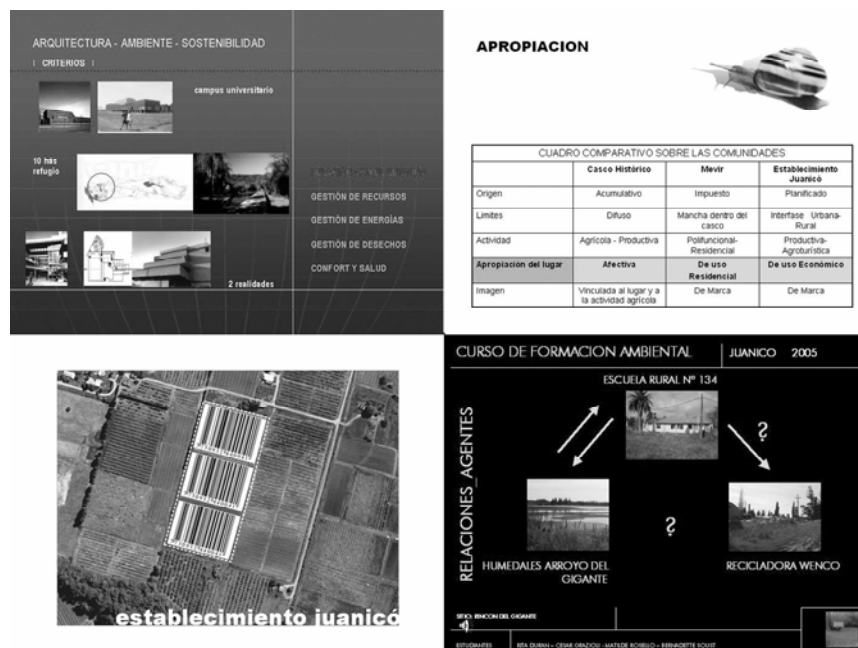


Figure 4: Some slides taken from the students' presentations. The topics they chose ranged from particular buildings or landscapes, to the social patterns of land use.

3.4.3 Concluding

The conclusion of the program explicitly addresses and distinguishes the changing realities and the changing ideas that currently confront architecture as a discipline. We look first at issues that refer to the Earth as an inhabitable planet, ecosystems functions, life cycles, and thermodynamics principles. Then we take a panoramic look at environmental concepts, trends and epistemological approaches, and discuss their application to architecture, contrasting that with the usual disciplinary practices and concepts. Finally, the students present their monographs (Fig.4). They are evaluated, both qualitatively and quantitatively, using categories based on the course's goals, as shown in Table 1. Students were previously informed of the criteria.

Table 1: Evaluation form used for student presentations.

Each item was marked on a scale from 1 to 4, and accompanied by an explanation.

EVALUATOR:			GROUP						
THEME, MEMBERS									
ITEM			%	1	2	3	4	5	6
FORM	30	Coherence, clearness and structure of the exposition	20						
		Adequate use of facilities (photographs, maps, diagrams, texts)	10						
CONTENTS	70	Clear statement of the subject	10						
		Consistent integration of the course's concepts	30						
		Critical reflection, factors accounting, discrimination and discussion	20						
		Final conclusions	10						
TOTAL	100								
COMMENTS									

3.5. Outcomes assessment

After each lesson, the educational experience was closely monitored by the teaching team. At the end of the course, students were asked to write down their opinions and suggestions on the course's contents and dynamics, and to weigh their satisfaction compared with their previous expectations. The teaching team used these opinions to make a final assessment and then discussed this with the students. A detailed report was presented to the Faculty authority and an open workshop was organized with external commentators from the three main fields of the Faculty -design, technology and theory-. In 2005 an additional form was completed as a report on the outcomes for the central university's CSE (Sectorial Teaching Commission), which had supported the program for this year under the designation "innovative projects".

The results of this short experience were amazing, not only in terms of the students' scholarly performance, but in terms of the observed transformations in their behavior and attitudes during the course. Their uncertainty and amused hesitation at the beginning of the course, when they were directed to walk through our familiar Faculty building and view it with new eyes, quickly gave way to excited discussions. The shared experiences of the workshops and fieldtrips generated personal affection, respect and trust that resulted in an extremely productive group learning experience. Participants, instructors included, learned by listening to each other, questioning, self-examination, and brainstorming solutions together. The care that students took in their final presentations and the depth of their observations are remarkable. Students did not hesitate to express their criticisms or offer suggestions on the content and format of the course itself, and these have been helpful in correcting mistakes and improving many aspects. Many participants have asked to collaborate on future editions of the course, and some have already prepared independent research projects and carried out presentations for other students, thus disseminating their new knowledge and awareness.

One of the most valuable results came from listening to the views of actors from other disciplines and local stakeholders. It was useful opening the course to people from other disciplines, who view the environment from a completely different perspective, have different aims regarding its use and care, and even identify different constituents and give them different names. This circumstance also brought home the difficulties we have to transcend our discipline and build a trans-disciplinary perspective. It also triggered an enlightening controversy on what exactly comprises *architecture's own matter* or point of view, and revealed just how widespread the preconception that reduces it to aesthetics is. The workshop with diverse stakeholders in Juanicó highlighted the wide variety of conflictive interests and ideas about land use and shaping that architectural and planning professionals must deal with. The students clearly absorbed this lesson and made its many facets clear in the amusing role-playing workshop that followed later in the course.

In their own assessments of their experience, the students refer to "the spirit of the course," and to the enthusiasm, sense of ethics, and amplified comprehension it engendered. However, the troubled reticence they expressed when we questioned the established concept of "good design" still remained at the end of the course, reminding us of an observation attributed to Albert Einstein that it is easier to disassemble an atom than preconceptions. And students also ask for new certainties, more specific information and instruments, and for the process to be continued: in other words, for more and further education.

CONCLUSION

The experience clearly demonstrates there is a rich fertile field to act on. Young people are avid of ideas, projects and purposes to stimulate them intellectually, morally, emotionally. Maybe to remove them from skepticism about the future? At least some of them, for we cannot forget the extracurricular status of the course meant that those who chose to participate were already eager to explore these issues.

Though the seeds have been firmly planted, it is obvious that, when it comes to architecture a "change of view" is meaningless if it is entirely theoretical. A change of attitude must be put into practice and implemented in our designs. "Re-learning for sustainability" has not yet taken root in our Faculty and this experience will quite likely abort if it remains isolated. Recent sociological research finds that our behavior often depends on real circumstances more than on our acquired values, even the strongest ones (Dahlke 2001). Certainly this is the case for architects: deep changes are required in the social conception and conditions within which architecture performs. Our task and that of our students still awaits us: not only to bring sustainability to architecture, but to bring architecture to sustainability.

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