Application of Spatial Design Ability in a Postgraduate Course
Isaac Abadí Abbo (iabadi@ceea.arq.ucv.ve)

Universidad Central de Venezuela (LEE), Venezuela

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Abstract
Spatial Design Ability (SDA) has been defined by the author (1983) as the capacity to anticipate the effects (psychological impressions) that architectural spaces or its components produce in observers or users. This concept, which requires the evaluation of spaces by the people that uses it, was proposed as a guideline to a Masters Degree Course in Architectural Design at the Universidad Autonoma de Aguascalientes in Mexico. The theory and the exercises required for the experience needed a model that could simulate spaces in terms of all the variables involved. Full-scale modeling as has been tested in previous research, offered the most effective mean to experiment with space. A simple, primitive model was designed and built: an articulated ceiling that allows variation in height and shape, and a series of wooden panels for the walls and structure. Several exercises were carried out, mainly to experience cause-effect relationships between space and the psychological impressions they produce. Students researched into spatial taxonomy, intentional sequences of space and spatial character. Results showed that students achieved the expected anticipation of space and that full-scale modeling, even with a simple model, proved to be an effective tool for this purpose. The low cost of the model and the short time it took to be built, opens an important possibility for Institutions involved in architectural studies, both as a research and as a learning tool.

Introduction
The Universidad Autonoma de Aguascalientes in Mexico decided to offer a Master Degree Course on Architectural Design starting September 1998. They consulted our web page describing the activities of the Centro de Estudios del Espacio Arquitectónico (CEEA) and showed interest in working together in the framework of the Course. Two members of their Centro de Ciencias del Diseño y de la Construcción visited Venezuela and appraised our work specially on the use of full-scale modeling as a research resp. learning tool. They proposed a joint venture choosing as a guideline to the Masters Degree Course our experience in relating Environmental Psychology and

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Spatial Design Ability with architectural design, which means to consider the user as a decisive factor in the evaluation of the effects (psychological impressions) of architectural space.

Postgraduate Course and Participation of CEEA
This course, which is the first one offered by the Universidad Autonoma de Aguascalientes, lasts for four semesters. The first semester is intended to provide students with basic knowledge about the role of the architect as interpreter of the needs of the user, i.e. about the interaction between man and architectural space and about the importance of the user as a factor to be considered in the appraisal of spaces. The other three semesters consist of a series of exercises of growing complexity in which extensive research is carried out on spatial quality and character of buildings. There are a number of theoretical subjects and a Design Workshop (4 semesters) - in which theory and research are used - supported by appropriate models and evaluation techniques, in such a way that the students acquire competence in intentional design.

The CEEA was responsible to provide the theoretical background, relating architectural space and the user as well as the Design Workshop during the first semester, which took place between September and December 1998. The exercises proposed for the first semester the manipulation of different types of models in order to experiment with variables such as textures, openings, forms and details. Full-scale modeling was indispensable in exercises of Spatial Design Ability, because the evaluation had to be performed by people different from the designer and variables as real dimensions, scale, proportions and lighting had to be perceived as similar as real spaces as possible. A simple, rather primitive full-scale model was proposed and built in one of the buildings of the University. It consisted of:

- An articulated ceiling made of light wooden frames covered with canvas (6x6 m) and a maximum height of 3.20 m. Its movements are controlled by 6 pulleys and allow variations in height, slopes and shapes;
- A series of hollow wooden panels: 16 columns of 0.3x0.3x2.8 m, 8 panels of 0.3x0.9x2.8 m and 8 panels of 0.3x1.5x2.8 m. They were provided with wheels to make easier its manipulation. This model only cost $2500 and took less than a month to be built and installed.

First of all, psychologist Luis La Scalea (member of the CEEA-staff) gave a series of lectures on Environmental Psychology. The objective was to provide students with research methods (e.g. observation, interviews and evaluative research), psychological processes (e.g. perception, cognition and evaluation and regulatory processes (e.g. privacy, territoriality and attachment).
Fig 1  Articulated ceiling

Fig. 2  Modules.
Then the author joined the team to continue with the theoretical background and to start the Design Workshop; Lesmes Castañeda joined him in the second week. The theoretical background referred to *Spatial Design Ability* in terms of visualization, evaluation, conjectures, experiments and concepts as well as architectural space with its components resp. characteristics. Two exercises were carried out on visualization using drawing as models. Then, the participants appraised the classroom using the IMIP (Instrument for Evaluation of Psychological Impressions) and modified it according to the evaluation. Later on research into four types of spatial character was conceived: serenity, dynamism, mysticism and chaos. Graphic material describing the character was presented and after that a space with this character and solutions were appraised by a sample.

Now the participants started to research on volume and proportions and had to counter following questions:

- Which dimension (height, width, length) affects more the impression of size or volume?
- How can one change the perception of a room so that it may seem lower, higher or wider?
Form and pressure were investigated by means of regular and irregular forms, corridors and virtual spaces. The participants finished three further exercises discovering thresholds and how they affect psychological impressions.
After that spaces with different characters were designed introducing following topics: “dynamic and mysterious” resp. “static and mysterious”.

Fig. 6 Corridor 0,60 m wide.

Fig. 7 Corridor 1,20 m wide.
As a summary of these experiences on architectural space and Spatial Design Ability, the participants had to design and evaluate a particular space, in this case a dining room in a Benedictine convent.
Conclusions

Although the group of students (14) were all educated as architects, some of them (6) with already a Masters Degree diploma and extensive experience in architectural practice resp. teaching, they recognized that concepts such as Spatial Design Ability, Environmental Psychology and Full-scale Modeling were new to them. They, however, prove very useful for the purpose of evaluation of space by groups of people in order to allow constructive confrontation between their anticipation of how the spaces were going to be appraised and how the users actually perceived them. The exercises were rather simple but also very demanding, due to the need to elicit concepts that could be useful in their architectural practice.

The participants stated that the full-scale model, although primitive and with many limitations, acted as a powerful tool to investigate cause-effect relations between architectural space, its components and characteristics and the impressions they produce in the people’s mind. At the end of the experience, they proposed certain changes in the model in order to make it more effective, mainly cutting the columns and panels so that they could have heights of 2.20 m and 2.70 m. Also to build other components as windows, doors, sills, beams. It would be very interesting to incorporate color by artificial lighting in the model. The low cost of the model and the time it took to be installed make it possible for many schools of architecture or research centers to possess this effective and indispensable tool.