

Architectural analysis of buildings in order to choice new functional destinations: an application of computer graphics for Faculty of Architecture's students
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1. Context of the research: a short premise

The research tries to give a little but meaningful answer to the specific context of the Faculty of Architecture of Naples. Such a context presents a delay of teachers and researchers, in their teaching and researching activity, in beginning the CAAD way.

Often the delay is due to a wrong attitude: a too high or too low expectation towards the use of the computer. In such a situation, the chief target of the research is the student of architecture. It is possible and useful to address a clear message, by a simple educational material, just to the student of architecture; not necessarily by producing a software or modifying some existing one, but also applying a given available software to an important architectural question.

2. Aim of the research within the eCAADe *philosophy*

Within the eCAADe *philosophy*, as defined in the Statutes, the architectural design education plays an important role. The exposition of exemplary, even if simple 'cases', to the students by appropriate educational tools (such as series of slides, videos and so on) becomes therefore basic.

In particular, the research deals with the architectural analysis of a building unit (the tannery "Arcucci" in Ercolano, Naples) in order to propose a range of new consistent destinations. Such a study, part of the graduation thesis of arch. Lucia Calandro (1985), is 'revisited' and completed by means of the computer aid.

This analysis is fulfilled processing the images by Autocad, turning on Vectra (or by similar softwares), and translating them in slides by Polaroid technics.

3. Architectural analysis in order to choice new functional destinations: the question (1)

In order to define the new functional destinations consistent with a given pre-existent building (or building unit), it is necessary to analyse the Characteristics, potentialities and 'restraints', of the building itself.

Such characteristics have to be connected with the following operations:

- to define the models of the functional destinations,
- to catalogue the possible project technologies,
- to outline the 'consistency indexes' between pre-existent buildings, project technologies and functional destinations.

With this perspective, five 'keys' in building analysis are individuated: historical, dimensional, topological, morphological and technological (five keys we separate, of course, only for analytical and educational reasons).

The historical key 'opens' the understanding of the growth of the building unit and, so, of the differential value of the parts and elements of the unit itself. In our case, the primary baroque nucleus, a 'villa-farm'; the nineteenth-century expansion; then the new volumes in different periods of this century and with different architectural languages; and lastly the more recent raisings and all the other inner and outside transformations.

The dimensional key -it's a matter of course- makes us become aware of the dimensional limits of the pre-existent building unit, in its whole, parts and elements, in order to value the possible functional destinations by consistent transformations.

The topological key comprises the spatial relations, apart from their morphological characteristics to say, the architectural aspects of distribution and circulation in that they don't depend on specific geometries and shapes.

The morphological key searches either the geometrical matrices or the formal and stylistic peculiarities of the building unit, at all the architectural scales from the whole to the single elements.

Lastly, the technological key gives us consciousness of the static bond and of the material elements and components of the building unit, including all, the technological plants.

4. An application of computer graphics: the features

The central aim of the research -to reach the students of architecture by means of an educational tool concerning either the design education or the definite aid of computer graphics- involved first of all the specification of the output: the educational tool itself.

In the present experience, because of economical and technical limits,

we made our choice for a series of slides, presented by two co-ordinated stereopticons, with lap dissolve. (in the near future we propose to produce videos or films, working by major hardwares and more advanced softwares. The next step, in order to improve the educational aim could be a film showing also the chief operations at the Workstation, and not only their outcome)

The particular importance of the computer graphics appliance consists in the image processing easy and fit for the architectural analysis. Such an image processing can give back, by extrapolation of single from basic stages of the analysis, a synthetical consciousness of building's potentialities and 'restraints'.

Beginning from the complete survey of the building unit, this analysis is developed using simple graphical functions:

- generating multiples of an iterative element or part, mirroring,
- zooming in and zooming out,
- filling surfaces by colours within a wide range and by every kind of transfer's texture,
- drawing perspectives and axonometries from plans, and so on.

In conclusion, this little experience demonstrates or confirms that even the ordinary functions of an ordinary graphic software can make feasible an adequate architectural analysis, and therefore an adequate educational tool for the students.

[1] For a complete treatment of the subject, see: Claudio Cajati, Virginia Gangemi, "Preesisterize e nuove funzioni: un contributo alle tecnologie del progetto" (Pre-existent buildings and new functional destinations : a contribute to design technologies"), in Riabitat - technics and technologies of the recovery, Proc. of the Conference - Genoa, 13-17 June 10-54, Sagep, Genoa, January 1985, pp. 139-145.