

Changing Architecture's materiality and meaning through digital culture

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Abstract

(As noted especially A. Picon and A. Razavi)

If **digital culture** has an influence on the city and territories by **the usage and behavior** that it generates or induces, one of its components - 3d architecture design - is involved more directly on the **architectural production** and therefore on the built environment in its identity and its relationship to the mankind.

It is mainly through the emergence of a **new shape / structure paradigm** which manifests itself from the undeniable influence of the computers' use in architectural design. Going far beyond the use of models, and research about shape, the use of appropriated software enables a new form of structural performance which contributes to the **identity** of the project to provide apparent complexity and unique poetic space but also questions the notion of **meaning**.

In this work, we identify several recent projects, witnesses of that culture and its practice. Projects like Denia cultural park (V. Guallart), bus station in Hoofddorp (Nio Architecten) or Phare Tower at la Défense, Paris (Morphosis), Modern art Museum in Graz (P.Cook and C. Fournier), Beijing Olympic stadium (Herzog and de Meuron) , ... allow students to explore **new morphological and spatial dimensions**. This experience is possible by the use of **software** and specifically by **morphogenesis and control of form**.

The notion of **meaning** in architecture is challenged by the presence of such buildings and by new **tectonic and morphological** possibilities.

On the other hand, space and architectural production cannot be considered independently of their environment, in particular in the light of emerging environmental problems.

We present our experience teaching in the training of architects. Students can **discover digital design opportunities**. For example, a design way which allows combining closely shape and structure or exploring **shape vocabulary** which is not *based on traditional references and needs*.

In this perspective, the traditional structure paradigm is outdated, as fixed buildings that can no longer respond to changing needs (energy needs, uses variables or life cycle of materials). **New process design** and new materials are needed to respond to such changes and therefore generate unknown architectural and **urban spaces and features**.

The parametric approach allows a significant morphogenetic flexibility and opens up **another channel between conception and realization**, especially the possibility of making experiments. This gait allows quick **verification** of models but also for the future suggests actual construction of buildings, including **new production tools** with short processes or requiring low energy. In this spirit of applying research, we propose to introduce students to explore parametric morphogenesis (using Grasshopper ®) and geodesic curves domain as a tool for **translating structure from form surfaces**.

Keywords: *architectonic, digital design, Architecture's materiality, meaning, shape – structure paradigm.*

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