Chapter 4
Generative Design Strategies for Customizable Prototypes: Academic Research and Entrepreneurial Education

Emanuela Lanzara
University Federico II of Naples, Italy

ABSTRACT

This chapter shows some results of academic research and didactic activities about innovative design and productive processes based on modeling and digital fabrication integrated strategies. The results of these experiments are customizable lamps prototypes. Digital modeling is based on algorithmic-generative visual scripting approach and geometric theories to manage primitive or complex shapes and patterns to optimize digital manufacturing. The following paragraphs and sub-paragraphs describe a prototypes collection designed, manufactured, and assembled by students on their first experience in VPL and digital prototyping. Lamp prototypes are made using additive and subtractive techniques according to different shaping approaches. The main goal of this academic approach is to collaborate in design and architectural geometry research field: the main goal is to support training and entrepreneurial activities of students aimed at management of complex data systems according to new potential of digital tools for advanced shaping, new manufacturing processes, and ecological strategies.

INTRODUCTION AND THEORETICAL BACKGROUND

Social Design

Current product design strategies require to put together theoretical notions and sociological dimensions to introduce new sustainable methods and technologies. «*The first digital turn in architecture changed our ways of making; the second changes our ways of thinking*» (Carpo, 2017).

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According to this premise it is important to teach students how to design and evaluate their future professional choices and approaches and to show artisans or companies how to improve their knowledge and production through a renewed ontological definition based on awarness of new tools and strategies.

Main goals of *Social Design* are increasing social literacy; establishing an ethical framework to guide personal practice and learn human-centered design methods to build empathy with and engage people in thinking and doing; creating professional pathways pioneering and innovative in the public, private, non-profit, entrepreneurial and academic sectors. Beyond wealthy academic realities, also organizations, social groups and volunteers often promote available spaces to organize activities aimed to improve life conditions of young people involved in disadvantaged urban and social contexts. The main goal is to promote self-organization and resilience to improve communities (Antonelli, 2012). According to these premises, sharing specific theoretical and applicative contents promote awarness and simplifies design, manufacture and construction approaches by promoting self-entrepreneurial approach in different social contexts. Dissemination of content on the network and current user-friendly digital tools simplify approach to complex applications.

Therefore, "*Social*" dimension of Design is here considered above all linked to the vision of Academy as an "entrepreneurial incubator" aimed at supporting personal and professional growth of students and professionals in design field, but also people interested in acquiring new skills, transversally involving other possible urban or digital approaches that can also improve the conditions of humans beings. According to this approach, main users involved in this activities are students (Academy, primary and secondary schools) and young people attending groups and social organizations. Furthermore, several FabLabs and social organizations distributed throughout our territory, including some in disadvantaged urban areas, are organizing collaboration with University to offer alternatives and services also for disadvantaged people who, through these collaborations, can improve their knowledge and, therefore, their professions, then improving their social condition.

This approach evidently emphasizes the importance of collaboration between different social realities and teaching aimed at work.

«All men are designers. All that we do, almost all the time, is design, for design is basic to all human activity. The planning and patterning of any act towards a desired, foreseeable end constitutes the design process. Any attempt to separate design, to make it a thing-by-itself, works counter to the inherent value, of design as the primary underlying matrix of life. Design is composing an epic poem, executing a mural, painting a masterpiece, writing a concerto. But design is also cleaning and reorganizing a desk drawer, pulling an impacted tooth, baking an apple pie, choosing sides for a back-lot baseball game, and educating a child. Design is the conscious effort to impose meaningful order» (Papanek, 1985).

Many objects are unnecessarily complex, expensive and made of unsuitable materials. Instead, Design allow to find and solve a problem.

Basic geometry, easily communicable, understandable and aimed at achieve sustainable products, is part of *Social Design* approach: the main tools of this research and teaching is Descriptive Geometry and Computational Design to independently realize design objects, according to an user friendly approach.

«Nowadays designer re-establishes the long-lost contact between art and the public, between living people and art as a living thing. […] There should be no such thing as art divorced from life, with beautiful things to look at and hideous things to use» (Munari, 1966).