

# Chapter 13

## Learning Parametric Designing

**Marc Aurel Schnabel**

*The Chinese University of Hong Kong, Hong Kong*

### ABSTRACT

*Parametric designing, its instruments, and techniques move architectural design education towards novel avenues of deep learning. Akin to learning and working environments of engineering and manufacturing, it offers similar advantages for architects. Yet it is not as simple as using another tool; parametric designing fundamentally shifts the engagement with the design problem. Parametric designing allows architects to be substantially deeper involved in the overall design and development process extending it effectively beyond production and lifecycle. Learning parametric design strategies enhance architects' critical engagement with their designs and their communication. Subsequently, the computational aid of parametric modelling alters substantially how and what students learn and architects practice.*

### INTRODUCTION

Parametric design techniques offer obvious advantages for engineering and manufacturing processes, now architects have emerged to apply these methods in their working environment suggesting solutions and novel designs at an earlier stage of the process. Through the coupling of architectural design with parametric modelling methods, the chapter presents techniques that enhance students' learning and knowledge about

designing and architectural building processes. This allows a deeper comprehension of the design objectives and aids architectural designers in their decisions to find solutions.

A dilemma of semester-based teaching is that students reach their highest level of skills and experience at the end of a term, after which they leave for their break and are therefore unable to apply their freshly gained knowledge immediately. At the beginning of the next following term, however, the knowledge and skills they had gained earlier are likely to be either inactive or not employed, and learning foci may have shifted to other aims.

DOI: 10.4018/978-1-4666-1945-6.ch013

The architectural design studio presented here addressed these issues by integrating the learning experience from the beginning by focusing on parameters that create or inform about the design. The objective of this ‘parametric designing’ was to allow students to understand the impact each step and variable has on the design and follow the impact it has onto the project. Students developed and communicated their design parameters by utilizing their knowledge throughout the design-studio environment. Because of this, students began to think about design problems in different ways. The studio explored design by basing it on parameters and their connecting rules. In order to build up a philosophy around parametric dependencies and relationships, the participants used digital instruments that aided them to create and express their designs. With these instruments, they could develop expertise to engage creatively in designing. The studio cumulated in an architectural art exhibition highlighting the coupling of architectural design with digital modelling and fabrication methods. Students presented architectural solutions that challenged and addressed environmental and programmatic issues, dimension, space and volume, as well as theoretical and conservational topics, resulting in novel designs created with freedom of innovation, interpretation, and definition some of which without any boundaries. The notion of non-conformity added to the core of this collection of works, held together

by the idea of spatial concepts and parametric designing in architecture.

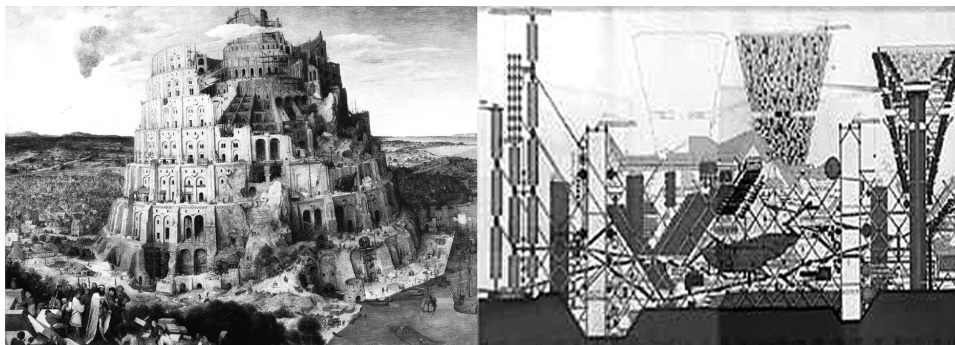
## BACKGROUND

Pieter Bruegel, a Netherlands’ Renaissance painter, depicted a representation of the ‘Tower of Babel’ as a building that is constantly redefining its needs, as it grows larger and more complex (Figure 1, left). The painting shows a tower nearly reaching the clouds and illustrates all the problems then associated with cities, buildings and life within and the constant change and reaction to new situations during the process of building.

The exploration of the relationship between human beings and the natural world, and the subsequent implications of interactions between them, has deep roots in our social and cultural understanding of society. Cities, therefore, are direct reflections of their inhabitants, as their architectural expressions directly influence the living conditions of their people. In recent practice, architects have designed and described buildings through the means of (master-) plans, sections, elevations, or descriptions of render-perfect, complete architectures in which change was not part of the picture. A few, however, have tried different approaches to communicate architecture.

In the 1960s and early 1970s, Archigram already presented an idea that reacted against the

*Figure 1. Right: Pieter Bruegel’s ‘Tower of Babel’. Right: Archigram’s Plug-in City*



12 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/learning-parametric-designing/69284](http://www.igi-global.com/chapter/learning-parametric-designing/69284)

## Related Content

---

### Multi-Criteria Evaluation Approach of Mobile Text Entry Methods

Lanndon Ocampo (2014). *International Journal of Applied Industrial Engineering* (pp. 1-21).

[www.irma-international.org/article/multi-criteria-evaluation-approach-of-mobile-text-entry-methods/138306](http://www.irma-international.org/article/multi-criteria-evaluation-approach-of-mobile-text-entry-methods/138306)

### Application of the Theory of Constraints (TOC) to Batch Scheduling in Process Industry

Dong-Qing Yao (2012). *International Journal of Applied Industrial Engineering* (pp. 10-22).

[www.irma-international.org/article/application-theory-constraints-toc-batch/62985](http://www.irma-international.org/article/application-theory-constraints-toc-batch/62985)

### Grey Wolf Optimization Trained Feed Foreword Neural Network for Breast Cancer Classification

Shankho Subhra Pal (2018). *International Journal of Applied Industrial Engineering* (pp. 21-29).

[www.irma-international.org/article/grey-wolf-optimization-trained-feed-foreword-neural-network-for-breast-cancer-classification/209378](http://www.irma-international.org/article/grey-wolf-optimization-trained-feed-foreword-neural-network-for-breast-cancer-classification/209378)

### Challenges and Enablers for Rapid Product Development

Jordan Verrollot, Arto Tolonen, Janne Harkonen and Harri J. O. Haapasalo (2018). *International Journal of Applied Industrial Engineering* (pp. 25-49).

[www.irma-international.org/article/challenges-and-enablers-for-rapid-product-development/202419](http://www.irma-international.org/article/challenges-and-enablers-for-rapid-product-development/202419)

### Widespread Adoption of RFID Technology

Nova Ahmed (2012). *Handbook of Research on Industrial Informatics and Manufacturing Intelligence: Innovations and Solutions* (pp. 297-314).

[www.irma-international.org/chapter/widespread-adoption-rfid-technology/64726](http://www.irma-international.org/chapter/widespread-adoption-rfid-technology/64726)