Chapter 19
The Pattern of Repetition and the Quest for Creativity

Manalee Sunil Nanavati
Oxford Brookes University, UK

ABSTRACT

A common application of parametric design is observed in the field of generative processes. Offering the possibility of incorporation of variety along with multiplicity, parametric has presented new ways of creatively employing such repetitive patterns. However, the application of this creativity is often restricted up to formal characteristics, with a complete neglect of perceptual qualities of the composed space. In this reference, the chapter primarily questions whether creativity is only applicable to the formal attributes of the repetitive pattern in parametric design; and further aims to examine how parametric design can undertake a repetitive pattern to simultaneously achieve remarkable creativity in its formal as well as perceptual attributes. This aim is addressed here by proposing a particular approach of assemblage; an approach that can enable the designer to visualise the constant interaction between organizational qualities and perceptual qualities of the composition; and in turn to achieve the desired attribute of the compositional whole.

The paradigm shift from ‘mass production’ to ‘mass customization’ opened up a whole range of possibilities in the realm of production. Quite similarly, overcoming majority limitations of preceding computer-aided generative design techniques, the field of parametric design has revealed a potentiality for new intricacies in architecture; attainment of which was difficult with the traditional design tools. A chief reason for the popularity of parametric design in such generative processes is the opportunity of incorporating variation along with repetition (Jabi, 2013). Moreover, the immediate implementation of any local change on the entire composition offers an unprecedented speed of designing as well as visualizing the generative pattern as a whole. This speed, nonetheless, has proven risky causing a divergence in the focus of design from spatial qualities to plainly formal qualities. It is often observed that although the resultant compositions illustrate remarkable creativity in formal layouts, they entirely underplay the perceptual qualities of the composed space (Moussavi, 2009).

Furthermore, apart from the speed, a probable reason for this gap could also be the conception of parametric to be an antithesis of the assemblage process. For instance, as Allen (1997) indicates, the para-
metric is commonly considered as a ‘field-making’ process, ‘moving away from [the assembly of] cubist spaces’. This conception, indeed, is quite easy to form as the process itself operates on parameter-based algorithmic thinking (Ceborski, 2010). Consequently, on exceeding a certain limit of scale, the process, rather than the designer, starts to control the design; which eventually leads to an under-emphasis on the spatial qualities. Parametric, which is programmed as a bottom-up approach, starts operating as a top-down approach (Allen, 1997), and in turn produce unperformed results. Thus, to utilize all the potentials of the parametric design system, it is crucial to bridge the contradiction between the two approaches and instead, understand the parametric design process through a step by step approach of assemblage.

With this aim, this chapter will study the generative process in the simplistic form of repetitive pattern formed by linkage among its component parts. Correspondingly, variation will be studied as difference in these parts or in the pattern of linkage. Herein, the motivation behind pinning down such a complex concept of repetitive pattern in this simplistic form is to clearly bring out the close relationship between its organizational and perceptual qualities; based on which, the study will discuss the potentials as well as weaknesses of a repetitive pattern. Furthermore, how variation can be incorporated in the repetitive pattern, and how it can help eliminating the weaknesses of repetition will be explored. Thus, building on a step by step approach, the chapter will suggest an alternate approach of ‘making architecture’ through parametric design that simultaneously and creatively operates on not only formal but also perceptual qualities.

The Repetitive Pattern

‘Repetition’, originally ‘Repetre’ in Latin, is a combination of two words: ‘Re’ meaning ‘again’ and ‘Petre’ meaning ‘Go towards’. In simple terms, it is defined as an act of recurrence (Oxford dictionary); based on which, an array formed by the recurrence of an entity is conceived as a repetitive pattern (Rangnathan, 1990). Remarkably, owing to this act of recurrence, a repetitive pattern can also be construed as the manifestation of ‘similarity’.

Furthermore, similarity is convincingly substantiated to be the primary criterion for human perception by Bohm (1987); which leads to a close relationship between a repetitive pattern and human perception as below:

According to Gestalt school of psychology, the field of human perception is directly dependent on the field of memory (Kepes, 1944; Piaget & Inhelder, 1967). ‘What we know’ has a strong bearing on ‘what we see’. Hence, our encounter with any new pattern primarily gets compared with our memory built by previous experiences. Successively, the similarities are separated from differences; and based on this categorization, the new perception takes place (Piaget, 1967; Bohm, 1987). For instance, once a particular figure is recognised as ‘column’, we identify all columns in any pattern based on their similarity, and establish a relationship among them. Consequently, any different looking element is perceived as “not column”, or ‘difference’. In this reference, the perception of a repetitive pattern is an encounter with all similar entities. Owing to their similarity, these entities establish a relationship among one another and form a new perception of the composition, which is different than that of the individual entities themselves. This point can be well understood from the figure below (Figure 1):

More such examples can easily be studied through softwares such as shapeshifter, where by changing even a small parameter, the resultant pattern demonstrates a different configuration with different attributes.
Related Content

World-in-Miniature Interaction for Complex Virtual Environments
www.igi-global.com/chapter/world-miniature-interaction-complex-virtual/64047?camid=4v1a

An Investigation of the Relationship Between Intellectual Capital and Knowledge Transfer: An Exploratory Case Study of Taiwanese Bands
Chia-Wen Tsai, Pei-Di Shen and Nien-En Chiang (2012). *International Journal of Art, Culture and Design Technologies* (pp. 43-56).
www.igi-global.com/article/investigation-relationship-between-intellectual-capital/70394?camid=4v1a

3D Printed Glitches: Learning From Manufactured Errors
James F. Kerestes (2019). *Interdisciplinary and International Perspectives on 3D Printing in Education* (pp. 70-93).
www.igi-global.com/chapter/3d-printed-glitches/217043?camid=4v1a

Digital Images: Interaction and Production
www.igi-global.com/chapter/digital-images-interaction-production/64054?camid=4v1a