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## **Creativity in parametric design**

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While architecture and architectural production are increasingly incorporating aspects of non-human agency employing data, information and knowledge contained within the (worldwide) network connecting electronic devices, the relevant question for the future is not if but how robotic systems will be incorporated into building processes and physically built environments in order to improve everyday life. So, as architects it is very important to know first how we integrate this new system in the designing process. In order to answer this question, we should encode the design behavior. In this text I will discuss one of the most important aspects of design which is creativity in parametric design. In other words, does parametric design support creativity? Of course, it is not a simple question to answer. So, basically, I will work to find a starting point to formally understand creativity in parametric design.

In the first chapter I will begin with definition of parametric design and then I will address some questions in this context and answer them. In the second chapter I will differentiate between two notions of design and creativity and then relate them to parametric design.

### **First chapter: The notion of parametric design:**

First let us remember the most important three aspects of architecture that changed through the time:

- 1- CAD: Automate the process of production (CNC, FEM, BIM)
- 2- Virtual reality: to aid architects in works in presenting, they are second logical step
- 3- Artificial intelligence the most challenging but it complements the first two perfectly

Parametric design has become a global design issue. Schumacher (2009) claimed, using the term of parametricism, that it is a new global style for architecture and urban design. Parametric design explores variations in design. Moreover, many contemporary architects and even the general public are highly interested in the particular forms or unusual styles of built environment designs generated by parametric design.

-Which kind of design falls under the category of parametric design?

To answer this question, it is very important to differentiate between when we use Parametric tools to design, and when we design something and then use these tools to materialise the idea. So, when we design parametrically, we set up the function or a parametric model change variable until we get what we want. We are not clear what we are going to get before we start exploring. On the other hand, parametrically executed (Not Parametric design) is when we know exactly what we want to design e.g. how the facade will look like. That's mean the design phase was done manually. The only problem was how to execute the idea.

-Why is parametric design used rarely today?

This is because the tools are very limited, the tools how ever magnificent they are, they can't come close to human imagination.

-How parametric design term should be in the shadow of programming and automation?

We automate the process of geometry generation or the process of the generation of technical drawings, but we do all of these after the design settle. It is okay to benefit parametric inspiration. The computer can suggest static solutions (in this case it is using not pretending). It helps basically to generate something that we don't generate by our selves. But the tools still limited to be used for design. In other words, Automation pre-existing idea.

## **Second chapter: The good understanding of underlying notions of Design and creativity:**

The word “design” is used as a verb and a noun in the English language. Design can be mainly thought of as a verb denoting activity (Glanville 1999), in which creativity could emerge. Goldschmidt (1992) suggested that creativity is needed for a study of design behaviour to bridge the gap between design process and design outcome. In addition, technical aspects should be approached simultaneously with the aesthetic aspects. However, there is a lack of research on considering both of them carefully at the same time. Similarly, many studies on creativity have started at the reciprocal concept of novelty and value. Creativity would come from a historical, social, and cultural achievement, as well as private and even computational output or process.

Moreover, design, in one sense, can be conceived of as a purposeful, constrained, decision making, exploration and learning activity. Decision making implies a set of variables, the values of which have to be decided. Search is the common process used in decision making. Exploration here is akin to changing the problem spaces within which decision making occurs. Learning implies a restructuring of knowledge. The designer operates within a context which partially depends on the designer's perceptions of purposes, constraints and related contexts. These perceptions change as the designer explores the emerging relationships between putative designs and the context and as the designer learns more about possible designs.

Creativity and creativity in design, in particular, have many interpretations. There is a clear distinction to be drawn between considering creativity as residing only in the artefact and evaluated by society and considering that certain processes have the potential to produce artefacts which may be evaluated as creative. Hence, the relatively new design method of parametric design should be related to these complementary notions of design and creativity.

## **The Conclusion:**

Parametric design may force us to evaluate many variations as well as to use a complex process including mathematical algorithms. That's why most of the variations generated by parametric design may be significantly different to our experience and it is very difficult to evaluate the unfamiliar alternatives. Hence, we should focus on finding a starting point to formally good understand creativity in parametric design. Furthermore, new design strategies should be set to allow both professional designers and design students alike to adopt and explore these strategies for creativity in parametric design. Finally, we can improve our designs by intelligent planning, smart algorithms and eventually digital fabrication. But the most important is to design freely and responsibly as nature does.

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