The limits of complexity in the built environment

Written paper

Dr. Emilio Garcia (1), Prof. Brenda Vale (2)

(1) The University of Auckland, Auckland, New Zealand.  
(2) Victoria University of Wellington, Wellington, New Zealand.

In urban design and architecture cities are commonly used as examples of complex systems that have a capacity for adaptation and resilience. These are essential qualities for rethinking the sustainable future of contemporary cities in the face of human induced climate change. However, the limitations and implications that the complexity of a city has for its sustainability and resilience is a subject less frequently approached by designers. How can designers use complexity to rethink the resilience and sustainability of contemporary cities?

This paper discusses multiple ways of understanding complexity in the built environment and its limitations. It discusses how designers can benefit from the understanding of complexity in ecology, history and urban design. The methodology employs a comparative analysis of discrete theoretical frameworks that contribute toward the generation of an instrumental theory of complexity in the built environment. The paper
details how complexity has been used in ecology to explain resilience; in history, to explain the collapse of complex societies; and in architecture and urban design, to have a better understanding of how cities work, change and grow. The objective of the paper is to initiate the derivation of a set of key concepts that could help designers to manage the complexity of contemporary cities. The paper concludes by highlighting the importance that concepts of order, density, inequality, diversity and heterogeneity have for understanding complexity in the built environment and for developing an alternative way of looking at the sustainability of cities.

• Author(s) Biography (200 words each):

Dr. Emilio Jose Garcia is an architect and urban designer. Since 2013, he has been working as a Lecturer in Sustainability at the School of Architecture and Planning in the University of Auckland, New Zealand. In the last ten years, he has been teaching, practicing and researching in Argentina, Mexico and New Zealand. He has participated in many international competitions in America, Europe and Asia and won a Holcim Awards for Sustainable Construction in 2008. His latest book, "Unravelling Sustainability and Resilience in the Built Environment" explores what sustainability and resilience means when applied to the built environment, how they are related to each other and why they are still important concepts for designers.

Professor Brenda Vale is an architect and researcher, pioneer and expert in the field of sustainability. She has written books on the subject with Robert Vale and they also ran an architectural practice specializing in award winning low energy and sustainable buildings. They built the UK’s first autonomous house in 1993 and the first zero-emissions settlement in 1998. They have received international awards for their work, including from the United Nations and European Solar Energy Society for their work. They developed the Australian government’s National Australian Built Environment Rating System (NABERS). Their recent work on ecological footprinting has led to a number of books.