• Paper / Proposal Title:
Combining Methodologies: Teaching Complexity to Improve Student Design Solutions

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• Abstract (300 words):
The issues facing sustainable architecture are complex, as they derive from relationships and interactions between elements of systems; systems that stretch across scales; relationships that may be unseen. Commonly, designs intended to improve systems can spark new, unintended outcomes. It is difficult to see, let alone understand such interactions; it is challenging to design, let alone teach how to design in such a context. However, it is essential to find solutions to well-being, equality, and carbon emissions. This paper reports on the ability of specific techniques, some of which break disciplinary boundaries, to enhance understanding and how students think of complex issues to improve design in studios. For discussion purposes, these are arranged in three topics: think holistically and dynamically, test rigorously, and adapt transformatively. To think holistically and dynamically, students used two techniques from disciplines outside architecture. The first is the Integral Framework, an approach from psychology with the goal of personal integration. In design, this helps to identify elements that inform or impact the project holistically. The second is systems thinking, an approach from business, which explores the relationships between elements to understand behavior over time. These two techniques together can be very insightful. To test rigorously refers to iterative simulations to quantify and adjust designs. It is a crucial component to know if a design is effective. This process must be cyclical and started during the conceptual stage of the design process to maximize insights and benefits.
To adapt transformatively refers to the need for both design and education itself to adapt. The focus must be to conceptualize and create resilient proposals with the “capacity to continually change and adapt yet remain within critical thresholds”. The use of these techniques over the past years demonstrated an enhanced understanding and changed how students think of complex issues.

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

Robert Fryer is an Associate Professor and Founding Member of the MS Sustainable Design Program at Thomas Jefferson University. His contributions have won awards from the National Institute for Building Science and the USGBC. He is also a Senior Research Associate with the Engineering & Design Institute and a Deputy Director of the Jefferson Center for Injury Research and Prevention.

Among the courses he teaches, Robert oversees the Thesis Sequence, where students undertake research into adaptive sustainable high performance design that spans seven countries. Thesis projects have also led to the creation of over 10 new businesses. His research interests include sustainable design education, systems thinking applied to education, performative building and assembly design, and biophilic senior care. He has presented research at national and international conferences such as PLEA, the Association of Collegiate Schools of Architecture, the World Symposium on Sustainable Development at Universities, and Environments for Aging. His personal practice includes the development of biophilic adult day care centers (with BAU Architects), LEED consulting, charrette facilitation, and sustainable residential design.

Robert has degrees from The Architectural Association (London, UK) and Drexel University (Philadelphia, PA), and is a registered architect.