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## Environmental Simulation and Behavioral Response as Means of Enquiry in Multidisciplinary Design Research Procedure

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### Abstract

The paper attempts to discuss the research methodology and research tools pertaining to physical design at all level. It starts with the definition of scientific research and its underlying obligation—on why and how empirical approach proves and derives facts to accommodate good design.. The paper also connects the field of environment and behavior with research approaches in design, assuming that design of physical environment meant to respond to users' daily living behavior, and vice versa. Simulation is thus a crucial tools for cognitive enquiry. A number of research experiences are cited to support such viewpoints.

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### 1. Introduction

Behavioral research in design has long been recognized as a mean of inquiry to understand the user's needs and their fulfillment. Design procedure is also a crucial process, by which most practitioners utilized as an acquiring method towards new knowledge. The environment and behavior paradigm aims to holistically respond to the behavioral need of human livelihood—be it functionality, identity, meaning,

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cultural heritage, sustainability, and building innovation—this paper aims to take this position to describe, in part, the design research methodology and provide some research examples from the author’s personal experience.

Methodologically, the paper attempts to demonstrate the application of simulation by linking several levels of scale ranging from small artifact to larger landscape. The application of simulation could also apply in conjunction with other research tools such as behavioral observation. Physical simulation can be valuable for deriving spatial linkages of activities and area requirement for functionality. Commercial value and customers’ perceptual response can be derived from the simulated visual cue as stimuli. Full scale mocked up and partially mocked up is proved to be a useful tool for spatial and atmospheric problem and remedy. And finally, the paper attempts to describe the usage of simulation on corporate and spatial identity research.

Examples of research using simulation as prime inquiry includes transformation of vernacular objects to modern use, POE as a means of inquiry to derive environmental factors, commercial values pertaining to users’ perception, and spatial issues of architectural design.

Most of all, resultant of design research could be of immediate benefit to improve the existing design, and can be generalized and documented for future use, both of which are crucial for the betterment of the design discipline.

## **2. Environment Behavior and Paradigm Shift**

Most disciplines revolve around the changes of thoughts arising from empirical research. Thomas Kuhn (1970) has been the pioneer attempted to explain the pattern of paradigm shift beginning with the normal belief, practices, and theoretical basis in each of the discipline called “paradigm.” Scholars in a particular discipline work within such normal science, conducting research and pursuing in depth knowledge to confirm and enhance their own theories. The course of research usually discover small contradictions among normal believe, causing minor changes in theoretical settings, which changes call “anomalies”. Major discovery from empirical research, however, causes major alteration in theories and normal believes in the paradigm. Such major changes are referred to by Kuhn as scientific revolution. Innovation and new knowledge are usually acquired through this process (Figure 1).

## **3. Research and Generalization of Empirical Knowledge**

Most behavioral researches are ongoing activities, building upon the existing knowledge. Theoretical foundation is thus assumed the crucial origin for conceptualizing hypothesis and operationalizable measurement in that particular field of research. Empirical value could then be obtained through the observation and/or experimentation process, to operationalize the designated conceptual variables. This deductive process narrows down the broad theoretical argument to the specific case for the convenient of examination, where methodology, approach, and research tools can be applicable to some specific cases. The inductive procedure, on the other hand, attempts to utilize the logical reasoning to associate the case result to enhance the richness of the original theory. Most social and behavior researches thus use the ‘deductive-inductive’ integration procedure in their major methodological approach (Figure 2).

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