

Systems Thinking vs. Systems Methodology

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Opinions

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I have had many conversations throughout my career with a wide range of design professionals, including urban designers, architects, landscape architects, land planners, conservationists, environmental managers, engineers, and program administrators. My most recent conversations (say, within the last 10 years, or so) have been with those interested in, or associated with, the emerging field of geodesign.

One of the common topics, or value sets, associated with those interested in the field of geodesign has been the need for *systems thinking* ... a natural sub-topic when one thinks of the multidisciplinary and often complex nature of most geodesign problems.

I have found that the idea of systems thinking, *as a value* ... as opposed to *as a method*, or set of methods ... has been most frequently expressed during my conversations with students. Today's design students see the need to think in terms of *systems* and, as a consequence, many of them see themselves as *systems designers*, that is, as designers responsible for the design of the whole system.

The unfortunate dilemma is that these same students do not know how to invoke the power of *systems thinking* (through the use of systems methods) and are consequently left naïve, incompetent, and sadly frustrated with respect to their ability, or inability, to function as holistic designers.

The problem lies in the fact that our design schools are not teaching systems methods. They are teaching their students the value, or importance, of *systems thinking* but not how to invoke the power of that thinking through the use of methodology.

Systems methodology, the action compliment to *systems thinking*, is a generic field, much like mathematics or computer science, that finds its application in many domains. Systems methodology is considered by some to be a subset of systems engineering and operations research, placing it beyond the normal interests of "designer" types ... that is, those more interested in the *art* of design as opposed to the *engineering* of design.

The interesting part of this apparent dichotomy is that many of the methods are actually quite straight forward and relatively easy to use. One only needs to know they exist and have the relatively small degree of patience required to learn how to deploy them. Few require the use

of advanced mathematics. Most can be deployed using a little algebra and some numerical accounting.

Some of the more accessible methods include:

- Cross Impact Analysis
- Mapping and Decision Diagrams
- Evaluation Scales
- The Delphi Process
- Weighted Overlay
- Morphological Analysis
- Adjacency Analysis
- Operational Sequence Scenarios
- Linear Programming
- Input-Output Modeling
- Life-Cycle Economic Analysis
- Triple Bottom Line

These methods and others are documented in the [Methods and Techniques](#) segment of geodesignwiki.com.

It is my firm contention that our design schools, most particularly those engaged in the development of geodesign programs, need to include these methods, as well as others like them, in their curricula. In short, they need to balance the art of *systems thinking* with the engineering mentality associated with *systems methodology*.

Design, most particularly geodesign, needs both.