

Assignment 3: Simon's "Architecture of Complexity"

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1. Name the two most important things/concepts that you learned from the reading the chapter "The Architecture of Complexity"

The most prominent feature of this chapter is that the author correlate various scientific areas to present the structure of complex systems. Another thing that I learnt is "how complex or simple a structure is depends critically upon the way in which we describe it".

1.1. give one paragraph explanation why you consider these concepts important

Simon uses many examples across different science fields. One reason is "complex systems" has common contents without precise definition. But only with insightful observations and thinking can an author construct these sporadic evidences to a persuasive theory. And it is not hard to identify how powerful it is when there is no walls among sciences.

I agree with that "most of the complex structures found in the world are enormously redundant" and "to achieve the simplification, we must find the right representation". I believe it is something that I should keep in my mind. For me, there are two following up questions: what is redundant and how to find the right representation when nobody knows what it is?

1.2. are the concepts relevant to your work, to your interest, – if yes, why?

I think it is a good habit to always relate what we are doing to other areas or disciplines. About this idea, there is a Chinese old saying "A stone from other hills may serve to polish the jade of this one" (I hate translation of sayings or poems though).

2. Analyze what other researchers think about this essay? Pick one of them (the one which is of greatest interest to you) and discuss her/his most important observation!

When I read this chapter, several questions emerged:

- 1) It is a chapter from the book "The Sciences of the Artificial", while most examples Simon used are from natural sciences.
- 2) Why did he say a complex system without being hierarchic may escape our observation and understanding? What are complex systems without

hierachy?

3) About human problem solving, Simon said "We pose a problem by giving the state description of the solution. The task is to discover a sequence of processes that will produce the goal state from an initial state". Is it possible we carry on processes without the blueprint and finally we would achieve a goal? – I think it is possible.

In the paper - Hierarchy and History in Simon's "Architecture of Complexity" (<http://polaris.gseis.ucla.edu/pagre/simon.html>, Philip E. Agre, *Journal of the Learning Sciences* 12(3), 2003), the author discussed some issues I am interested (he cited the 1969 version). The author reviewed Simon's theory in the context of history. I should say there are many noticeable observations – many of them are citations. For example, he casts doubts on the watchmakers' story:

“..... he also embraces the systems theorists' assertion that the properties of wholes cannot easily be predicted from the properties of their parts. Yet this is nearly the opposite of the way that engineers such as Hora -- or Simon himself -- use hierarchy in practice. A system whose overall functioning cannot be predicted from the functionality of its components is not generally considered to be well-engineered.”