Complexity and Social Simulation

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Social phenomena are complex in similar ways as are other phenomena. So that many of the same issues arise as elsewhere - in particular, models, including complexity models, have many different uses including: explanatory, illustrative, predictive, analogical, exploratory, mediating, and communicative. A conflation of these uses explains many of the disagreements and difficulties in complexity modelling in the social sciences.

However with social phenomena there are additional factors involved, including: the social embedding of actors; the pre-existent, rich social understanding we have of other actors and their motivations; the innate reflexivity of social understanding; the existence of a cultural evolutionary process; and the social origins of the self. These give social phenomena and the understanding of social phenomena a distinct flavour.

The complexity of social phenomena has necessitated the use of complex means of representing them. These representations have diverged in two directions: towards informal, but rich natural language descriptions and toward increasingly intricate computational simulations. In either case the representations can themselves be difficult to understand, leading to further representations to deal with them. In general the "Sciences of Complexity" have entered the social sciences via intricate computational simulations. These have tended to be individual-based simulations where there is a relatively straight-forward mapping between the observed phenomena and the model, with separate parts in the model corresponding to separate entities in the phenomena. This allows a more transparent representation that in turn allows for the exploration of complicated interactions between the parts.

This approach to understanding social phenomena has consequences for the kind of knowledge that is gained. The complexity of the models themselves means that they are difficult to understand which may well lead to models of the models etc. or else to clusters of models as envisaged by Giere. The difficulty of combining the rich qualitative and the formal/quantitative representations of social phenomena has lead some modellers to shift from a representational mode of simulation to one which is more of an intervention or communicative tool - where the relevant stakeholders/experts are intimately involved in the model building process or the simulation plays a part in the communication between parties (mediating between them). An alterative to the involvement of people in the modelling process is an acceptance that modelling has to be an in-context activity which leads to a greater focus on specific contexts, denying that such models might have a general applicability (confusing abstraction with generality). The context-dependency encodes the richness into the identification of the context so as to allow the formal modelling within context. The same context-dependency also explains the nature of "modelling noise".

Finally there is the fact that science and social science are examples of the complex social phenomena themselves, and hence amenable to study. One thing that such models might suggest is that formal models are important, not because they are individually good at representing knowledge but that they can be developed by a community of researchers in a way analogous to biological evolution. Another tentative conclusion is that some social processes can act to make knowledge more reliable and general and others act to introduce systemic biases.