Title: Models, simulation and convergence in the polity: An essay

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Highlights

- Ubiquity of models and simulation, and their disentanglement from reality
- Convergence of engineering, science and technology
- Notion of the 'improvement of human performance'
- Influence of models and simulation on existence vs. extinction

Abstract

The essay sets out to illustrate humanity's dependence on the ubiquity of modelling and simulation. As such, the essay raises issues that are inherent in modelling and simulation now and others that are likely to in the future. The emphasis will be on the ubiquity of modelling and simulation, and not on any instance of its practice. It does not describe the outcome of a particular research project but describes situations that are likely to face modelling and simulation as the polity searches for guidance, no more, on the degree of relevance, reasonableness and robustness modelling, and simulation may offer on the conduct of life in a world now showing signs of overcrowding. The polity often assumes that modelling and simulation represent reality more closely than they actually do leading to important differences between the real world occupied by all life on Earth and the world portrayed by models and simulations. The rapid advance of computer power has led to increasingly complicated models whatever their form. The boundary between complication and complexity is fuzzy, but once crossed the guidance sought from modelling and simulation becomes increasingly opaque. Complexity involves dynamic interactions (situations) between six themes (social, technology, economics, ecology, politics and values/norms (the STEEPV acronym)) creating the notion of convergence related to situations. The essay makes reference to convergence of nanotechnology, biotechnology, information technology and cognitive sciences (NBIC) that has led to ideas of improving human performance. In reality NBIC is not about nanotechnology, which is not a unified field, but about the convergence of many threads of science, technology and engineering, and society. Models and simulations have played such an extraordinary but largely unnoticed part in this convergence that they may be regarded as the convergence and that its progress depends upon them. Perhaps there are no better examples than the penetration of mathematics and computable models into biology and living systems. If human performance can be improved its genesis will lie there providing the real world allows convergence in desirable ways rather than expecting the natural world to become obedient to computable, partial models.

Keywords: Keywords: Models; simulation; convergence; human performance