Understanding, prediction, control and design

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What is gained by quantifying complex social science research?

- Better
  - understanding,
  - prediction,
  - control and
  - design

Better understanding

- Could we realise the visions of Tolstoy, Asimov, Turchin to understand the forces of history quantitatively?
- Urban data analysis gives the prospect of understanding better how cities work (CUSP, WISC, PUMA)
- Quantitative experiments and analysis allow to construct better models of human behaviour (DR@W, NIBS)
- FuturICT: "The ultimate goal of the FuturICT project is to understand and manage complex, global, socially interactive systems, with a focus on sustainability and resilience. Revealing the hidden laws and processes underlying societies probably constitutes the most pressing scientific grand challenge of our century"

Better prediction

- Of social movements, e.g. Arab Spring, Ukraine
- Of required social provision, e.g. pensions, health service, schools

Better control/management

- Policy decisions, e.g. Willetts: "At present we have a serious shortage of social science graduates with the right quantitative skills to evaluate evidence and analyse data … in demand from business, civil service and charities"
- Nudges, e.g. Behavioural Insights Team

Better design

- Needs experiments and good analysis of the outcomes.
- The sort of thing the government in Singapore is doing.

What sort of quantitative methods?

- e.g. Dirk Helbing books "Quantitative sociodynamics" and "Social self-organisation" (ed), and the popular book by Philip Ball "Why society is a complex matter"

- I particularly push description and analysis by probability distributions for state of each agent as functions of time. This is unwieldy but my hope is that some general results will come out, e.g. generic tipping points, principles for nudging, and then the appropriate things to measure will become clear

continued

- Hierarchical aggregation methods
- Spreading in time-dependent networks
- How to model trust, confidence, asabiya
- Calibration of assessors

$$s_{ao} = v_o + b_a + \sigma_{ao} \eta_{ao}$$

Graph Showing Students Averages and their True Values
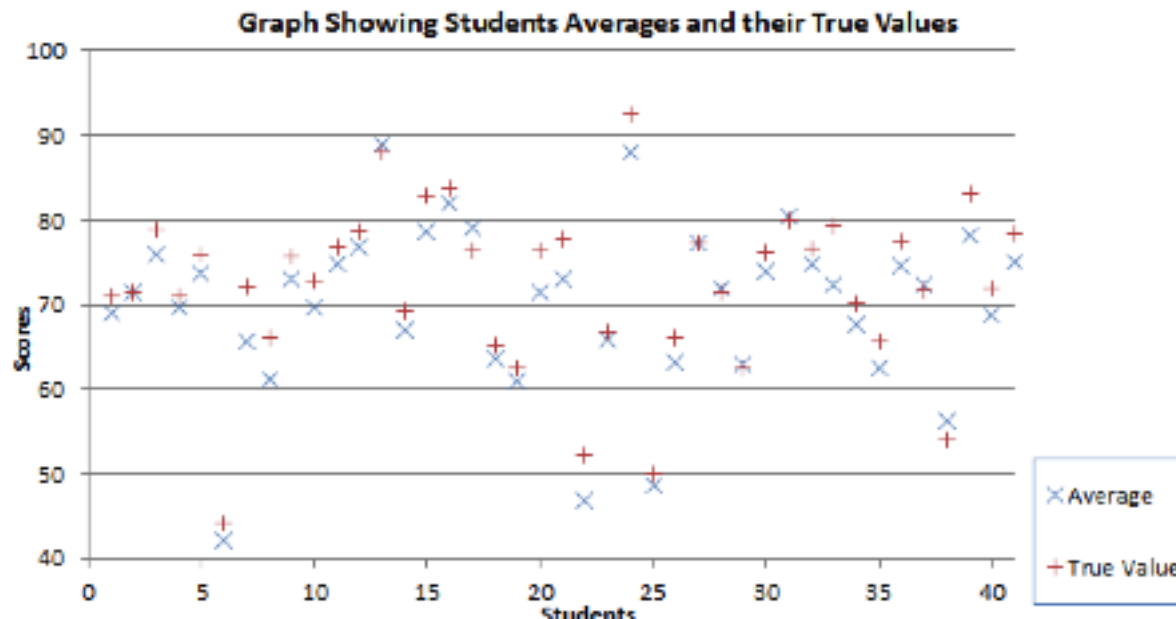
Conclusion

- I strongly support the development of more quantitative approaches in social science, e.g. the Q-step programme, the Complexity & Method seminar series, Leverhulme CDT bids.
- I would like to renew my proposal for a research programme at Warwick on Mathematics in the Social Sciences (MiSS Warwick).