



Validation & Verification:
*Problems and Opportunities for Social
Simulation using e-Infrastructure*

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Definitions



(taken from the usage in computer science)

- **Verification**: Checking that the simulation corresponds to its specification/conception
 - More associated with design and testing phase
- **Validation**: Checking that the simulation corresponds to the target phenomena
 - More associated with judgement of model

Problems



- Social Simulations are complex (since social phenomena are complex), so...
 - The simulations themselves are difficult to understand
 - And thus impossible to formally verify 100%
 - It takes a lot of evidence to validate simulations
 - A mixture qualitative and quantitative evidence
 - Can involve masses of data
 - They have huge parameter spaces requiring massive computational power

Consequences for Verification



- Formal specification is difficult and partial
- Different levels/types of specification/description are needed
- The behaviour of a simulation needs to be extensively explored
- Simulations need to be replicated
- Thus results from accessible code need to be also accessible as a check

Consequences for Validation



- The data available in published papers is not enough for others to use in validation
- The kind of data one needs for validation is often not available:
 - Multiple information sources concerning the same phenomena
 - Anecdotal descriptions as well as “harder”, more formal data
- Validating the simulation at many levels (time, space, micro/macro, levels of abstraction)

Opportunities that might arise from e-Infrastructure



- The storage/provision of large amounts of data in a distributed manner
- The organisation/interrelation of code/data/description stored in a distributed (and modular?) manner
- The organisation/provision of distributed computational power
- The facilitation of active nodes on the internet (i.e. automation of interrelation)

Possibilities (a brainstorm) I



- The **establishment of standards** for the description (at different levels of formality/abstraction) of:
 - Data derived from observation
 - Results from simulations
 - The simulation code/implementations
- The **provision/organisation of storage** for
 - Simulation Code
 - Formal descriptions of code
 - Results from simulations

Possibilities (a brainstorm) II



- The **provision of an infrastructure** to allow access to:
 - Running simulations
 - Available distributed computational power
- The **organisation** of the various elements involved, i.e. facilitating the linking of:
 - Simulations to results
 - Data to simulations
 - Descriptions to code...

So...



- What *other* possibilities are there?
- Which do we *want*?
- Which do we want *next*?
- What do we need to *do next* to get what we want next?
- What *shall* we do next?
- What *shall we ask others* to do next?