A Declaration of Social Simulator Rights

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Abstract. Whilst social simulators are often very aware of their responsibilities (good documentation, verification, validation, etc.), they are perhaps less vocal in proclaiming the rights that go with these responsibilities. These rights flow from the conditions needed to do their job well, in particular to do it: honestly, transparently and reliably. Simulation modellers are often the ultimate guardians of model quality and therefore should not feel they have to accept conditions or framings that are unethical or that would result in detrimental modelling, but feel empowered to reject these. To this end I suggest six rights: *feasibility, adequate communication, criterion clarity, assessment transparency, responsibility sharing*, and *accurate attribution*. I call upon modellers to assert these rights and support their colleagues in doing so and upon those that use or collaborate with modellers to respect and uphold these rights, sharing the modelling responsibilities.

Keywords: rights, responsibilities, policy, honesty, transparency, reliability.

1   Motivation

In 2012, due to an embarrassing modelling debacle, the UK government commissioned a review of all model-based decision making used by the civil service. The resulting report [4] made a set of recommendations in order to avoid such situations in the future. Some of these recommendations were about how to do and check the modelling and others were aimed at those for whom the modelling was for – the 'clients' (usually higher grade civil servants and ministers). As a result, official guidance as to the practice of modelling within government was produced – the "Aqua Book" [5]. This sets out a lot of sensible advice as to how to do modelling – the responsibilities – but it left out all that the previous report said about the responsibilities of the clients in terms of support, feasibility of modelling tasks, transparency etc. This imbalance is unsurprising, the UK government is hierarchically structured so that those further down are supposed to simply enact whatever those higher up request, and to do so without questioning. In other words, the responsibilities of the modellers are now clear, but not their rights. If some modelling goes wrong (e.g. suggesting the wrong decision), the blame will fall solely on the modellers and not, for example, on their resourcing or due to being given impossible project objectives.

This situation contrasts markedly with that of the UK military. That is also hierarchically structured, but there is far more feedback up the chain. Ministers are made aware of the considered feasibility and costs of any military venture – that is, there is

an active dialogue in the commissioning process. Ministers will take the blame if the military is not adequately resourced to do what is asked of it, or if they asked to do the impossible. There is considerable expertise in terms of which military 'tools' (units, equipment etc.) can achieve what kinds of objective – no one asks an amphibious unit to keep off enemy aircraft. In other words, although the military have dreadful responsibilities, they are also perceived as having corresponding rights. Some of these rights are written down, as in the Geneva Convention having some legal force.

I have personally heard from modellers who told me that they were asked to:

- ensure that all the different models of something give the same answers, even though each of the different models used different mechanisms and assumptions;
- to claim that some modelling will be able to predict the outcome of different policies (so better policies can be chosen) in a grant application, even when this is infeasible;
- to integrate different strands of results and evidence towards the end of a late-running project, when there is nowhere near enough time to do so;
- to suppress negative results from modelling, so that an impression of success can be broadcast, or so that the biases of decision-makers might not be contradicted;
- to have their conclusions simplified beyond recognition, so that all the caveats and complexities are eliminated in order to make things simple for a decision-maker.

These sorts of things often happen to modellers – not so much modellers doing academic research, who can often choose their own goals, methods and conditions, but more those employed in government, consultancies or those participating in large projects with real-world objectives. Big projects, particularly those with substantial participatory aspects can be subject to more pressure of a political nature [6].

Others, worried about the misuse of modelling in the COVID era, have concentrated on the obligations of modellers – basically that they should do their job properly (e.g. [8]) – but obligations and rights go hand in hand, so here I focus on what else is needed, the rights. A declaration of standard social simulator rights might empower modellers to refuse such inappropriate requests, or even facilitate having them written into grant proposals or contracts. This paper aims to start the ball rolling by suggesting the first draft of such a standard.

2 Why Particularly in Social Simulation?

Clearly, the kinds of problem identified above, and hence the corresponding rights, are not restricted to social simulations but are almost certainly common to many kinds of analyst. So why focus on social simulation here? *Firstly*, I am not an expert in other kinds of analysis, so although I would have thought very similar arguments might hold elsewhere, this is not for me to say. *Secondly*, social simulation deals with a kind of phenomena which has many aspects that are radically uncertain – in particular, individual and social human behaviour. Other kinds of simulation may be representing, simulating or analysing entities which are much better understood. Those outside the field often underestimate the uncertainties involved and thus ask for and expect higher levels of certainty from social simulations than is feasible. This disparity creates tensions.

Thirdly, agent-based social simulations often play an integrating role within larger projects or contexts. That is, an agent-based social simulation is built to be consistent with different kinds of evidence, e.g. when qualitative accounts are used to inform the models of individual behaviour in an ABM which is then run to produce numbers that can be compared to those of available time-series [7]. The different streams of evidence are often associated with different assumptions, but also with people from different fields who might have very different views and methods to those of the other fields involved. For example, whilst subjective participatory input might have informed some elements of the design of ABMs others involved might want to use the ABM as if it were objectively representative of the social system (e.g. when relying on it to predict the effects of different policy choices). Attempting to incorporate such disparities into a model can result in an unmanageable beast (what has been called a "Chimaera model" [1]).

3   The Right of *Feasibility*

The first right is that of *feasibility* – that modellers should not be asked to attempt the impossible. For example, I remember a funding call that asked for "fundamental advances in complexity science" as well as "policy implications" within a 3-year project. It takes time for modelling advances to be checked and validated using real-world data, and the more fundamental the advances, the longer this would take. It would be highly irresponsible to base any policy implications on unvalidated advances. The result of such impossibilist demands is not accelerated progress, but rather increased dishonesty since researchers understandably seek to promise what is asked for, even when they suspect that they will not be able to deliver on it. Thus, asserting this right would improve transparency, since it will reduce the motivation for dishonesty.

A subtle version of such demands is that for a "best guess" given some unrealistic time frame. The idea seems to be that modelling is a gradual process of adding detail and getting more accurate, however in my experience there is a minimum threshold of detail needed before the results are any better than the obvious null models ("same as last time", random walk etc.). Asking for the "best guess" before this threshold is reached risks giving essentially arbitrary results the clothing of apparently scientific modelling and hence that they might be relied on inappropriately. Such requests are often to predict the outcome of policy options. Providing inadequate modelling in these circumstances can be worse than doing nothing, since it might reduce reliance on other sources for the decision-making.

Of course, there are modelling projects where one cannot judge their feasibility before embarking on them, somewhat justifying speculation as to what might be achieved by the modellers. This is OK as long as the modellers are allowed to be honest once its infeasibility has been revealed so that they can come back to those that commission the project to re-negotiate the goals, timeframe etc. to something that is feasible or drop the project at an early stage.

4   The Right of *Adequate Communication*

The second right needs a bit of explanation. Sometimes social simulation is seen as another kind of off-line analysis – the analysts understand the task, take the data, go away and come back with the analysis – essentially a one-shot process. However, due to the increased uncertainties and choices involved in social simulation this is almost never a good way to proceed. Rather, to achieve good modelling, the process takes quite a lot of interaction between modellers and stakeholders, asking ancillary questions that will only arise once well into the development.

    This is the motivation behind the right of adequate communication – that is, the stakeholders needs to invest enough time for this communication to take place during model development. This means that the stakeholders will be sufficiently engaged to make a good modelling outcome possible. Not doing this will likely result in modelling that misses key inputs, assumptions and data and very likely deviates from what the stakeholders want. In such a case it is often the modellers that are blamed but in the case where stakeholders have been unable or unwilling to provide the necessary input they should share the blame for a project's lack of success.

5   The Right of *Criterion Clarity*

Unlike some other kinds of analysis, simulation modelling can have many different goals [3]. People commissioning simulation modelling might not have a clear goal, for example they might have assumed that the model will be a good enough 'picture' of the target system that it can be used for any purpose or simply have not clarified their thinking enough. However the necessary modelling activities, even the style of the model, is deeply impacted by the modelling goal [2], so if there is uncertainty about the modelling goal, it is unlikely that the modelling project will be successful. This can be a particularly contentious issue due to the tension between what people imagine might be possible and what is actually feasible – so this can motivate the fudging of goals to bridge between the two. Determining the goal of a modelling project is a collective responsibility, so leaving this up to the modellers alone is an abdication of this [1]. In the opposite direction, a set of clear goals for the modelling can ensure that effort is directed in the right direction and disappointment in the outcomes prevented.

6   The Right of *Assessment Transparency*

Once the modelling is over and the outcomes known, there is a tendency to exaggerate their importance by spinning them or by interpreting the results overly strongly. This can be for different reasons: modellers themselves can be enamoured by their own models (seeing the world through the lens of their models), the whole project might want all aspects to be seen as a success because it will reflect upon their reputation (which might be important to get a future grant), or stakeholders might want the modelling to

support their prior views on an issue. However, such misrepresentation can have a damaging impact upon future modelling projects, when they are built upon that reported modelling. A lack of honesty in modelling impedes feedback to modellers and makes reliable modelling more difficult in the longer-term. Furthermore, much modelling is done using public money (directly or indirectly), so the public have a right to know the reality of what models do and do not say – especially if they impact on policy decisions. If the right to transparently report the success of modelling is asserted from the beginning of a project with the reasons why it is important to be transparent, others in the project are more likely to accept this.

7   The Right of *Responsibility Sharing*

Due to the sheer number of choices involved in any social simulation project, it is intimately connected with the context it is developed within. That is, the decisions, collaboration, feedback and interpretation of modelling is not limited to the technical modelling team but rather comes from a much wider set of people. If these people do not take their responsibilities seriously in this regard, but rather assume it is the modelling team that is solely responsible for achieving successful outcomes, then this increases the probability of failure. A whole variety of kinds of decision affect a modelling project and hence its outcomes. Sometimes these are explicit, such as when described in grant proposals, but sometimes these are implicit, such as suggestions that come from expert or participatory input. All those that participate in the decisions that affect the modelling (its framing, scope, goals, etc.) should share the responsibility for the outcomes.

8   The Right of *Accurate Attribution*

In the opposite direction, although there are many technical, procedural and methodologically prescribed aspects, modelling is a creative process. It is not merely enacting the wishes of those that commission the modelling. Thus this creative input should be explicitly acknowledged – modellers are not a kind of mechanical sub-contractor implementing the wishes of those that commission the modelling. Of course, attribution and responsibility go hand in hand, all those who play a part in moulding, supporting, assessing and interpreting should be given credit – each according to the role they played. This is not only important for the self-esteem and careers of modellers, but it is also important when people are pulling together teams for future projects that include modelling. Knowing exactly who contributed what in the past, can inform who might be asked or commissioned for each role in the next project. This holds for roles other than the technical modelling ones, for example those that commission a model – seeing a gap where modelling would indeed by useful, or those that independently assess a model are also important to identify and credit.

9   Implementation of the Rights

Ultimately asserting these rights will lead to better, more transparent and more reliable simulation modelling as well as helping avoid situations where modellers are put in invidious positions. So, in parallel with asserting these rights, there needs to be education as why these are desirable – desirable for those that model, desirable for those that use modellers and, most importantly, desirable for the public that might be affected by decisions informed by modelling. Thus these rights can be equally seen as a set of criteria that the public could reasonably expect to hold so that they are not subjected to decisions apparently supported by modelling (but which later turns out to be inadequate to the task attributed to it).

However, asserting these rights will not be in the interest of all. Those who want to over-promise in grant applications, those who want simulation models to falsely give their opinions pseudo-scientific backing, those who are too impatient to wait for adequate modelling to be done, those who want difficult decisions to be made for them, those who simply want to deflect blame, those only going through the motions of modelling – to tick a box, those who do not want to sufficiently engage with the modelling process etc. might see these rights as an obstacle. Thus, to a significant extent, this will have to be a *unilateral* assertion of rights, made by modellers despite the outside pressures. We will need to insist that these rights are built into (or at least are consistent with) the grant applications/agreements, contracts, project descriptions/understandings etc. that we are part of, but we will also have to support fellow modellers in doing so and not under-cut them. This will be made easier if we are able to mobilise some public/wider support, as people realise that (increasingly) many of the decisions that affect them might be influenced by modelling results. Just as human rights help ensure good governance [9], simulator rights help ensure good policy modelling.

10   Concluding Plea

Modellers of the world unite! It is we who are so often the guardians of *model integrity* – that the model and its results do actually achieve what is claimed for it, that its inference is sound, and that it is grounded in suitable assumptions and adequate evidence to reliably achieve its declared goals.

We are too often at the crux of evidence integration which has been left towards the end of a project. We are too often used as if we were a mere technical worker or tool, rather than an active collaborator in the ultimate results. For too much of the time we have to put up with fudged criteria and over-promising. We are often blamed when the modelling does not achieve all its aims, despite the failure being, at least partially, the fault of decisions made by others.

These tendencies do not serve the public well. It is time to push back.

Acknowledgements

References

1. Edmonds, B., Jan Hofstede, G., Koch, J., le Page, C., Lim, T., Lippe, M., Nöldeke, B. and van Delden, H. (in review) Chimaera Modelling – when the modellers have to reconcile inconsistent elements.
2. Edmonds, B., le Page, C., Bithell, M., Chattoe-Brown, E., Grimm, V., Meyer, R., … & Squazzoni. F. (2019) Different Modelling Purposes. *Journal of Artificial Societies and Social Simulation*, 22(3), 6. http://jasss.soc.surrey.ac.uk/22/3/6.html
3. Epstein, Joshua M. (2008). Why Model?. *Journal of Artificial Societies and Social Simulation*, 11(4), 12. https://www.jasss.org/11/4/12.html
4. HM TREASURY (2013). Review of quality assurance of government models. http://www.gov.uk/government/publications/review-of-quality-assurance-of-government-models
5. HM TREASURY (2015). The Aqua Book: guidance on producing quality analysis for government. http://gov.uk/government/publications/the-aqua-book-guidance-on-producing-quality-analysis-for-government
6. Lim, T. et al. (in press) Recognizing political influences in participatory social-ecological systems modelling, *Socio-Environmental Systems Modelling*.
7. Moss, S. and Edmonds, B. (2005) Sociology and Simulation: - Statistical and Qualitative Cross-Validation, *American Journal of Sociology*, 110(4), 1095-1131.
8. Saltelli, A., Bammer, G., Bruno, I., Charters, E., Di Fiore, M., Didier, E., ... & Vineis, P. (2020). Five ways to ensure that models serve society: a manifesto. Nature, 582, 482-484.
9. United Nations Human Rights Office of the High Commissioner. Good Governance and Human Rights. https://www.ohchr.org/en/good-governance/about-good-governance