

Comments on “A Dialogical Argument for the Usefulness of Logic in MAS”

Bruce Edmonds

Centre for Policy Modelling
Manchester Metropolitan University
<http://cfpm.org/~bruce>

Abstract. This is a commentary on Frank Dignum and Liz Sonenberg’s dialogical reply to my paper on “*How Formal Logic Can Fail to be Useful for Modelling or Designing MAS*”, which has all arisen out of a discussion that occurred at RASTA’02. Whereas I bewailed the existence of formalist papers without results or implementations, Dignum and Soneberg argue that sometimes such explorations are useful. Ironically Dignums papers show how logical formalisms can be used productively.

In many ways Frank Dignum is an ideal person to answer my criticism of empty formalist papers. He *does* use logic in much of his work, but he *applies* these ideas in real implementations which are attempting to solve real problems. In my view it is exactly this “rubbing together” of abstract ideas and real domains which gives interest and relevance. He has obviously been inspired and aided by his study of formal logics. In their reply to me Dignum and Soneberg give several examples of this sort of inspiration and conclude that developing logical systems has, at times, been helpful in the design of MAS.

I certainly agree that abstraction and formal models (including logic-based ones) *can* be very helpful in solving practical implementation and modelling problems in MAS. Indeed I would argue that abstraction and formalisation are often *essential* if substantial progress is to be made. Further, my reading of Dignum and Soneberg’s reply indicates that they also deplore the presentation of empty papers which do not present any results, or even implementations. So wherein lies the disagreement?

I think the difference lies in our views of the scientific process in which MAS is embedded. It appears that Dignum and Soneberg see empty formalist papers as an inevitable phenomenon – a sort of irritating, but ultimately irrelevant, “background noise”. I, on the other hand, see this as a more active, detrimental and preventable phenomenon, which is why I bother to argue against them. Now the progress of MAS and the influence of particular papers and approaches is a very complex and varied affair – one is never going to be able to *finally demonstrate* which view is correct. However, I do think that an examination of such processes can be helpful in that some guides for future action can be made.

Let us consider the case of BDI logics and their ilk and their influence on the MAS community. It is undoubtably the case that BDI logics have enjoyed a wave of popularity in recent years (fortunately now on the wane). It is also clear that their popularity during this time was not based upon any substantial evidence that their use provided any significant “leverage” for solving any real world problems. In particular

it was not the case that the properties of the BDI logics were shown to be pivotal to the advertised BDI languages (e.g. dMars) or applications. Rather their use seemed to be as a sort of loose analogy for guiding programming. Their popularity seemed to be more based upon the vision of agent-based software engineering that accompanied them¹. What resulted was that many papers were written to *look* like they were about or used BDI agents, when, in reality, they were not. Was this a case of simple and harmless “background noise” or did it, in fact, waste a lot of time of many researchers across the world? I leave the reader to decide.

In his examples Dignum points to a more productive way forward. Learn about and know a whole *range* of formal systems, so that when you are presented with a difficult problem you have a substantial palette of formal systems with which to solve it with. Providing this palette is, indeed useful – it is what pure mathematics does. However this does not excuse publically presented papers of meeting some hard criteria – it is just that different criteria apply. A pure formalist paper needs to demonstrate its generality, potential relevance and inferential power (Edmonds 2000a). If the empty formalist papers met these criteria I would not be complaining.

Dignum and Soneberg propose the slogan “No experimentation without explanation”, meaning “No published experimentation without explanation” - I agree with this. I also say “No published explanation without experimentation”. Together they form the criteria that you need *both* experimentation and explanation for something to be worthy of presentation in a public forum (what consenting researchers do behind closed doors is, of course, their own affair).

I will end by describing a happy outcome of this interchange, and thus attempt to assuage Dignum's fears: that researchers will pay a little more attention to the needs of their audience when presenting formal systems and that reviewers will not be scared by heavy formalisms and be a little more strict at rejecting papers that show neither results nor demonstrate their inferential power. I think the outcome of this would not be to split the field or to stop the interchange of ideas, but cause the formalist papers that are presented to have *more* impact and become *more* productive.

References

- Dignum, F and Soneberg, L. (2003). A Dialogical Argument for the Usefulness of Logic in MAS, this volume.
- Edmonds, B. (2000a) The Purpose and Place of Formal Systems in the Development of Science. CPM-report: 00-75, MMU, UK. Accessible at: <http://cfpm.org/cpmrep75.html>
- Edmonds, B. (2000b). A review of Reasoning about Rational Agents. *Journal of Artificial Societies and Social Simulation*, 5(1), <<http://jasss.soc.surrey.ac.uk/5/1/reviews/edmonds.html>>
- Edmonds, B. (2002). How Formal Logic Can Fail to be Useful for Modelling or Designing MAS, this volume.
- Wooldridge, M (2000). *Reasoning about Rational Agents*, Cambridge, MA: MIT Press.

¹ A readable and authoritative account of this vision can be found in (Wooldridge 2000) which I review in (Edmonds 2000b), discussing many of these issues.