

## Mini-Project – Agent Behavioral Constructs

### Background:

In March 2010, at the Bi-Annual European Discrete Event Simulation (DES) Conference (SW10), there was a stream of papers and a couple of plenary sessions on Agent Based Modeling and Simulation (ABMS). During one of these a prominent UK academic said “Why does someone not do for ABMS what SIMUL8 did for DES 10 years ago”. Well we took that as a challenge – maybe we can do the same again.

The challenge was to make building and using AB models very quick and easy for the people who need the answers from them (rather than for the people who understand ABMS) – while accepting (as we did with DES) that you can’t simplify everything and any tool must remain “open” so that the modeler who needs to add their own refinements can do so when they need to. The general approach we took with DES was to allow the flow of work to be drawn as a flow chart on screen and to assume default values for every parameter so users can get started quickly. Statistics are collected automatically on everything the problem owner is likely to be interested in. Then we allow the flow chart to be opened up and parameter to be changed and options selected. Finally we allow a scripting language (that we designed to look and read very simply) to be used to add rules and behavior that we have not pre-programmed behind check boxes – so ultimately it has the power to avoid limiting any user, while being very easy to do some reasonably high proportion of DES projects without having the do anything complex.

### Where we are now and what is the problem:

By January 2011 we had SIMUL8 ABMS working; it is now out with 3 customers who are trying it out on real world problems. The product will be generally available as 1.0 to paying customers from April 2011.

What we want to know: There is a fairly well established literature on ABMS and typical applications. But these are applications where there is the involvement of people who have great skill and background in ABMS – they are not necessarily the same as the applications that “end users” of the need to ABMS would choose to use it on if it was easy to just “get on and do AMBS” on any problem that comes along. We are expecting, for example, many “marketing” people will want to model the way “Social Networks” cause their marketing campaigns to succeed or fail. We are already seeing “Social Networks” as a key focus for one of our current “test” users (a big government department).

We see modeling Social Networks as a really key application of “widespread” use of ABMS.

As more and more people start to try to create AB models we are going to see significant numbers of people say “I can’t do X without writing some of my own scripts and that is tough for me”. X is typically a behavioral rule that we have not thought anyone (or many people) would need to use. If every X is different this would not be interesting. But our experience from DES 10 years ago was that many of the Xs were similar. We need to develop and understand a way to classify these so that we can work out a way to generalize

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what people need to do, so that we can remove the need for significant numbers of the people to “script” their special behavioral rule by us creating “check boxes” that do it for them.

### **Mini-Project:**

Therefore the mini-project is to use a combination of the feedback we are getting from users (especially those using it to model “Social Networks”) and also the existing literature on ABMS to identify classifications that usefully show us the most effective behavioral constructs to code up ourselves and make available as check boxes to users.

We would expect the selected PhD candidate to be able to meet many of the customers using the tool to gain direct feedback and experience of collecting data from real users who are keen to use ABMS and have problems to solve that may be interesting in themselves for the candidates own later research. We would also expect this to develop contacts for the candidate (both in the UK and internationally).

We will make available resources to implement ideas for trialing constructs with users and also senior people who understand PhD research to fit this practical field work into the context of PhD research.

SIMUL8 Corporation is a company of mostly young and dynamic people keen to work on interesting new topics and ABMS is one of those. We are based in a converted church only a few paces from Glasgow’s magnificent and vibrant George Square.

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