Week 4 Reflection

* **What have I learnt this week?**

After carefully reflecting this week’s workshop, three new lenses to model the world were introduced; system dynamic models, network models and agent based models. The basics of each type of model and their differing uses was explored, whereby the methods of their implementation was clearly conveyed.

The network models were one I was personally familiar with during high school mathematics, as its mathematical uses and applications were taught. With this knowledge I was able to reflect on the significance that these models have in the real world, where they may be used for mapping careers, linking people via social media and much more. While the network models unique characteristics such as the degrees, nodes and weighted edges were discussed, the idea of forming weak and strong ties was taught.

System Dynamic Models provided an alternate insight into modelling where it focused on the abstract elements of models and ignored any finer details such as individual properties of people, or events. When learning about this system, I was able to understand how these systems are used to encourage and predict the dynamic behaviour of complex systems in order to create effective policy actions. Agent Based Modelling was introduced finally and taught me the idea that the universe can be modelled using agents, the environment and much more.

* **What do I 'now know' that I did not before?**

Although my knowledge on modelling was not extensive, this week’s workshop exposed me to a whole other dimension of modelling. By introducing three significant types of models and their uses, I was able to reflect on how these models work and how we use them in the real world. The agent based modelling was very new to me, where I learned of how it can enable us to better understand human behaviour in our society.

* **What insights have I gained?**

After reflecting upon the workshop, the section which focused on agent based modelling proved to be very insightful. It was interesting to understand how this form of modelling utilised various types of agents, from animals to cities, to nations and the environment itself. After attending this workshop, I researched more about this type of modelling to gain a clearer perspective on what agent based modelling really consist of. The video demonstrated a simple example of several fish swimming. These fish followed three simple rules; swim in one straight line, gradually change their direction and finally each fish moves the same direction the average others do. This was insightful as it mimics real life situations, such as following others instincts and ways of life. This example of agent based modelling presented an alternate way of understanding how phenomena and patterns can arise from very simple behaviour which is the hallmark of complex systems. These systems taught me that agent based models can be very informative and can convey to us the various combinations of behavioural agents and environmental conditions that yield interesting behaviours such as schooling of fish.

* **What are (my/the) perceived strengths and weaknesses that I have observed?**

After learning about agent based modelling, I realised my strength in intertwining social issues around the world to better understand this type of model. Through the current epidemic occurring around us, I was successfully able to understand how we can input certain factors such as age, population size or likelihood of gaining the disease into an agent based model, to mathematically create a range of results. Without any previous exposure to this type of modelling, I was able to grasp the content of the lecture and understand the great qualities this model provides.

**What theory proved to be useful and why? What have I learnt from this?**

As I was previously familiar with the concept of networks, it prompted me to research more about it by watching the videos recommended during the workshop. After viewing several videos on the ‘theory of networks’ it became apparent that these models are vital to the real world, as they can help prevent real life problems such as business failures or bankruptcy. These also represent the social side of things, where the term ‘homophily’ was introduced. Through networks we can represent social examples in which interactions between components with similar attributes require less resources. Furthermore, the idea of ‘clustering’ is also vital knowledge as to how within our local communities there are clusters of individuals which each pose unique properties, characteristics and ideologies. This is prominent throughout our everyday lives where we have religious groups, sporting groups and much more. By understanding networks and their features such as clustering, we are able to integrate them in useful models that will prove to be beneficial in analysing human interactions and behaviours.