Complex Systems and ActEarly

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ActEarly

£6.6 million grant over 5 years to improve the life chances of children in deprived areas

- Study areas are Bradford and Tower Hamlets
- Three focus areas - Healthy Places, Healthy Learning, Healthy Livelihoods
- Leveraging the Born in Bradford data and similar data set being built in Tower Hamlets.
- Big Data and Modelling.
- And...

Interventions in Complex Systems

Clearly an ambitious project that hopes to make meaningful interventions in complex systems.

"Health is about **much more than avoiding disease and living long lives** – it's about feeling well in mind and body, feeling safe, being part of a community and having things to look forward to.

The **homes we live in, the design of our roads and high streets, the availability and quality of parks and green spaces and of recreational opportunities** – these all have a bearing on our health and wellbeing. As do the types of shops and businesses that we're exposed to, pollution levels and opportunities to mix with others.

For children living in deprived areas, a **whole raft of environmental, economic and social factors combine to stack the odds of a long, healthy life against them**. Sadly, prevention research has so far only helped to make the already healthy much healthier, while struggling to reach the less advantaged."

--Professor John Wright, BTHFT's Director of Research (PI)

Evaluation??

There is also an evaluation component.

- How do you evaluate an intervention in a complex system? (Causality?)
- Example - Living Wage:
  - There is a proposal to trial a living wage for 16-18(?) year olds - £50 a week I think.
  - What is your metrix?
  - When do you measure it?
  - What is the sample and how big is it?
  - What might the unintended consequences be?
  - ...

Complexity Theory

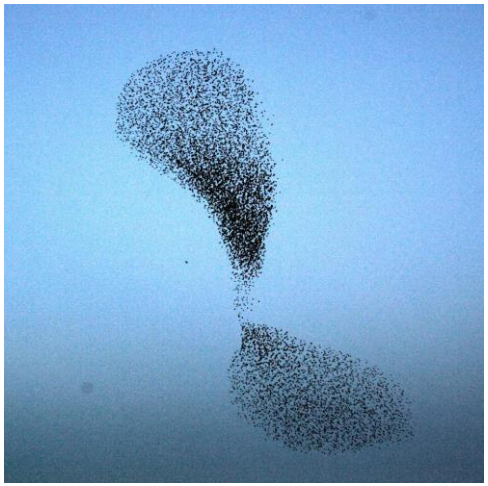
Complexity theory provides a useful theoretical lens which we can use to assist with aspects of the ActEarly project.

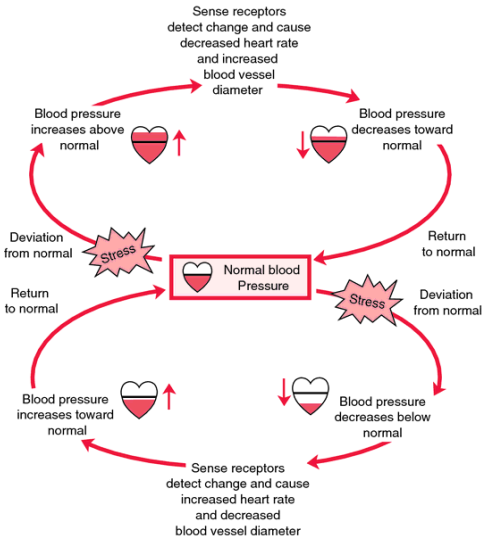
Complexity theory takes a relational view of the world where systems can be broken down into ‘parts’ and the relationships between those parts.

There are some key features of complex systems that we have to take into account.

Features of Complex Systems

Emergence - the whole is greater than the sum of its parts.
Homeostasis or Inertia - shock/change may produce little or no immediate response.
Adaption - the internal arrangement of the parts can change to maintain the system behaviour.
Feedback - internal parts regulate each other.
Memory - prior states influence the current and future state.
Non-linear - small perturbations may have a proportionate response, not response, or a disproportionate response.
Self-organising - the internal parts will arrange themselves to produce the emergent global, system behaviour. With no central organisation or control mechanism.





Why These Matter

Emergence - did it do that because we did something? Or?

Inertia - is something going to happen or not?

Homeostasis - now its in a new state getting it out again is going to be very hard (austerity).

Memory - the past and present state is going to have a significant impact on the future state.

Non-linear - how hard to we prod it? Oh it broke.

Self-organising - which bit do we prod?

When Complexity Gets Wicked

There is an aspect of the types of systems ActEarly is dealing with that is an additional complicating factor.

- They are systems of complex systems, e.g. people, organisations, etc.
- Activities such as the drawing of boundaries for systems are political acts and are also not precise.
- Might not have ‘solutions’.
- Long timescales.
- Cannot be separated from the context they are in.

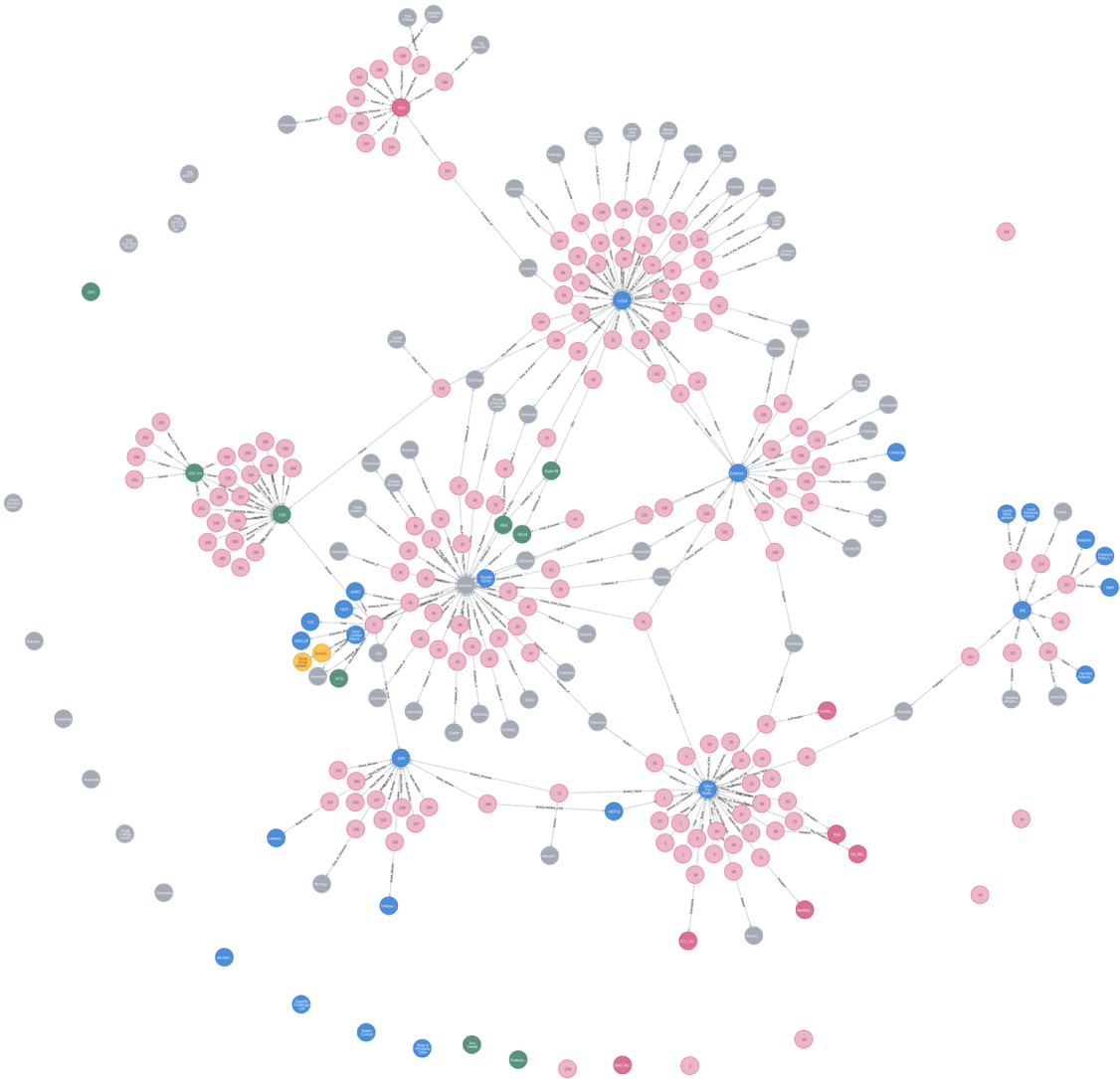
Complex Networks & System Mapping

Complex networks allow you to store and analysis systems as networks.

You can store information about in the system as the network.

Analyse the network for features/characteristics that might tell you something about how it is working.

Mapping to build a network is often a useful process in its own right.



Questions?