AHRB/EPSRC Designing for the 21st Century Research Cluster: Embracing Complexity in Design (ECiD)

Complex is Beautiful Tutorial
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The tutorial on Complex is Beautiful delivered by George Rzevski was motivated by the idea that designing adaptive artefacts is important as the environment within which they are developed and used becomes more complex and unpredictable. The tutorial was focussed on the analysis of a two-fold research hypothesis: first, that complexity is a prerequisite for adaptation, and second, that it is necessary to build complexity into artefacts in order to make them adaptive. George demonstrated some examples of complex artefacts and offered a tentative definition of complex systems. He further elaborated his view on the mechanisms of adaptation in complex systems and the performance affecting features of complexity. Finally he suggested some crucial parameters or methodological decisions for designing complexity into artefacts. (For more details see the Complex is Beautiful PowerPoint presentation).

One of the main issues discussed at different points during the tutorial was whether increasing complexity is a panacea for designing artefacts. For example, multi-level systems were mentioned as a way to decrease complexity by having less 'objects' at a higher level. George clarified the position that increasing complexity is necessary in systems that fall directly into his definition of complex systems and have some distinguishing features, such as: network configuration, no central control system, distributed decision making, rich information processing ability (knowledge) and emergent behaviour. It was soon understood and agreed that the proposed approach was focussed not on designing (complex) artefacts but on designing complexity per se.

Related to this, the question was posed of how one determines the requisite/optimum/maximum or appropriate complexity for particular artefacts in specific situations. George suggested that there are certain types of decisions to be made (how many agents are needed, their connectivity etc) and the exact answers to these are identified through both experimentation (trial-and-error) and knowledge transfer from other scientific domains. The idea was also put forward that measurements of complexity could complement this research effort.

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