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Emergence in Socio-Technical Systems

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As the pervasiveness of technology increases across aspects of daily life, there is a corresponding need to understand the complex interaction of people and technology. This complex nature means that new properties may *emerge* from the interactions within such Socio-Technical Systems. These properties, be it behaviour or characteristics, may be at the individual level or collective properties of the system as a whole. For example in eLearning Communities, relevant emergence may include domain knowledge and eLiteracy in the individual learner or social capital and creativity of the collective community. The socio-technical nature means that many factors influence emergence: social interaction, culture, technology as well as individual skills, competencies, motivation and capabilities of learners. Understanding how such different factors interact or that a new phenomenon has emerged – e.g. how does an individual comprehend and capitalise on the social capital of a community – is proving difficult.

The concept of emergence itself is still poorly understood. There is much debate as to its existence, what constitutes emergence, how to represent it formally and what the full range of potential emergence in a given complex system is. Ambiguity surrounding emergence arises it is argued for two reasons: (i) varying vocabulary and perspectives across disciplines and (ii) diverse types of complex systems display different emergent phenomena.

If a 'meta' theory of emergence is to be developed then it should, under the right conditions, be able to explain and predict the full range of emergent phenomena – embracing such features as the evolution of life and development of society. To date no practical theory has been forthcoming.

Using examples from a variety of different disciplines, this presentation will discuss evidence for the claimed ambiguity, the possibility of a 'discipline neutral' definition of emergence and identify key 'discipline neutral' emergence which any 'meta' theory must embrace.