

CHAOS, COMPLEXITY, & COMPLEX ADAPTIVE SYSTEMS: GLOSSARY

Agent Something that takes part in an interaction & is subsequently changed; eg a person, a society, a plant, a student, the teacher

Attractor Where a system tends to end up over time, if you plot successive points on its trajectory, which is often cyclical; eg a valley into which rain water flows after following many paths on its way down, or a wash basin.

Boundaries A demarcation or barrier of sorts that allows exchange between a system and its environment. These are permeable to outside input; eg a cell membrane, cultural rules.

Chaos The apparent absence of order in a system which is actually deterministic with hidden order. eg weather systems are often chaotic yet contain predictability

Chaotics A blend of the theories and ideas about chaos and complexity.

Complex Adaptive System (CAS) A non linear system with the potential for self-organisation in a permeable environment which at times is far from equilibrium. Evolution is based on its history. eg the immune system, stock markets, the human nervous system

Deterministic systems A linear system in which later states are clearly determined by previous ones. In contrast to **stochastic systems** where future behaviour is independent of previous states.

Dynamic systems A complex interactive system evolving over time through multiple modes of behaviour & following certain rules; eg the cardio vascular system.

Emergence The arising of new unexpected structures, patterns or processes in a self organising CAS. eg a jazz group playing live, learning.

Equilibrium A system that tends to remain at status quo, unchanged. eg a traditional school?

Edge of chaos, far from equilibrium The conditions that lead to self-organising. eg a new set of institutional rules, cognition

Fractal This is a geometrical shape that is irregular all over yet is “**self-similar**” in that the shape looks the same from all distances, near or far. A portion is equivalent to the whole system. eg the British coastline, a cauliflower

Linear system A system in which the variables plot a straight line. Predictable changes occur and a small change has a small effect. eg thermostat

Non-linear system Variables are represented by curvilinear patterns, and feedback loops have unpredictable effects, yet can be replicable. eg Starling’s curve for the heart, weather systems, presidential elections