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Language, Nursing, Chaos, and Learner Autonomy Literacy

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What is Chaos?

- A theory, also known as complex systems theory, that attempts to explain the difficulty of predicting events in the long term due to the seemingly unlimited number of factors that influence each other.
- (adapted from various definitions)

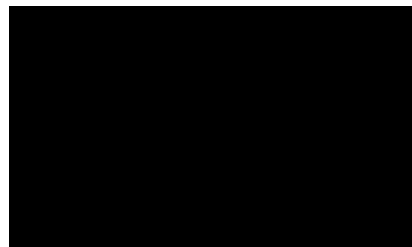
Chaos Theory Dynamics

- Sensitivity to initial conditions
 - Importance of minor factors in overall outcome
- Attractor states and Recursiveness
 - Major factors that influence a system
 - Temporary repetition of patterns (near mirror images)
- Non-linearity
 - Not cause-and-effect, sequential, and deterministic
 - BUT
 - Dynamic, complex, and uncontrollable/unfathomable

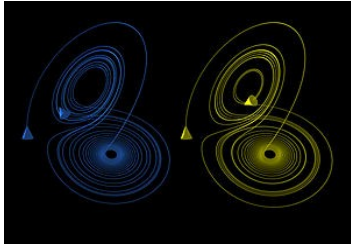
Chaos Who's Who

- Edward Lorenz – Weather prediction models
- Robert May – Population growth
- Helge von Koch – Koch curve

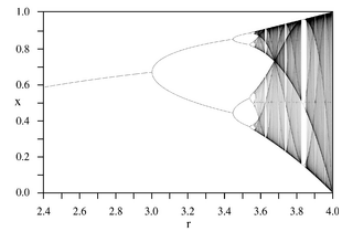
Lorenz's Meteorological Equation



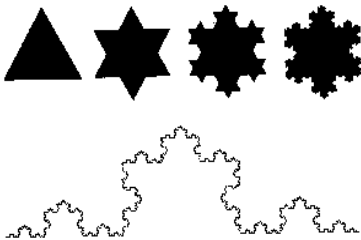
Lorenz Attractors



May's population equation bifurcation diagram



Koch curve



Classic Example of sensitivity to initial conditions

- “Butterfly Effect”
 - The flapping of a butterfly’s wings in Brazil can cause a hurricane in Florida
 - In order to be able to predict the weather perfectly (with a confidence of 100%) it would be necessary not only to know basic information such as atmospheric pressure, temperature, and wind direction, but also all the movements of all the birds, insects, icebergs, solar flares, etc.

Chaos and Nursing (1)

- Linear aspects within the medical field
 - Cellular processes
 - Molecular reactions to medication
 - BUT
- “Why would a health care intervention for two essentially equivalent patients result in such different outcomes?”
 - Need to understand and explain phenomena which seem to evolve very differently in apparently similar systems

Chaos and Nursing (2)

- Non-linear aspects of nursing
 - Patients’ responses to:
 - Injection of medication
 - Nurses’ attitudes when explaining patients’ conditions
 - Nurses’ confidence when administering medication
 - Patients’ need for control
 - Attitudes of family members
 - Environment of hospital
 - Etc.

Uncertainty in Illness Theory (Merle Mishel, 1998)

- Formulated to describe patients' thought processes and mindsets throughout their health care experience
- The theory asserts that patients are unable to determine the meaning of illness-related events, assign definite values to objects and events, and/or accurately predict outcomes

Constructs of theory

- Stimuli frame
 - System pattern
 - Event familiarity
 - Event congruence
- Cognitive capacity
 - Ability of patient to understand what is happening
- Structure providers
 - Education level
 - Social support
 - Credible authority

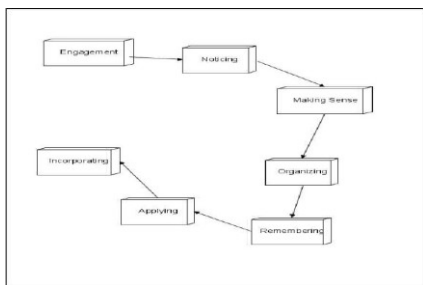
Effects of Uncertainty in Illness

- High uncertainty in illness can lead to anxiety and confusion (and possible worsening of illness)
 - BUT
- It can also lead to opportunities for good outcomes
 - strengthening of faith and confidence
 - Correction of misguided preconceived ideas about illness

Chaos and Language Learning

- Main elements in language learning
 - Engagement
 - Noticing
 - Making sense
 - Organizing
 - Remembering
 - Applying
 - Incorporating

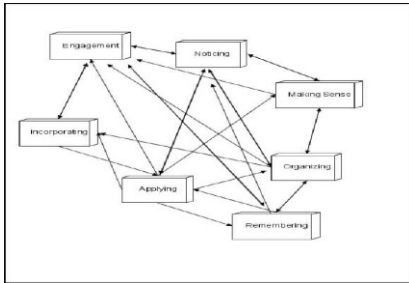
A linear model of language learning (Harshbarger, 2007)



Main attributes of a dynamic model of language learning

- Non-linear – each element influences and is influenced by a number of other elements
- Limited predictability – Although there is a general direction to the learning process, specific learning achievements can only be determined partially and temporarily
- Subject to many variables with complex interactions
- Difficult to control – no fixed results
- Susceptible to influences and contextual conditions
- Generally unfathomable – insights are indirect, partial, and temporary

A dynamic model of language learning (Harshbarger, 2007)



Chaos and Learner Autonomy Literacy

- Implications of Chaos Model for Students
 - Emphasis on individual learning processes
 - Student-centered education
 - Multiple intelligences & learning styles
 - Teachers as resources and models
 - Models rather than transmitters of information
 - Holistic engagement levels and proficiency change over time as the basis for program, teacher, and student assessment

Conclusion (Message for Students)

- Although complex systems such as nursing and language learning are chaotic and unpredictable, they are subject to influences that can act as guides toward a general, albeit non-linear, progression
- “Be flexible and try to adapt!”
 - In nursing you need to understand the changing thought processes of patients in order to try to predict patients’ reactions and outcomes
 - In language learning you need to understand your own changing thought processes and try to adapt your learning methods so that they meet your needs at a particular time and place

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