

Threshold Concepts in GEES: ideas from conference participants

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Science is difficult
 What is human geography?
 What is science?
 But I saw it on the TV – preconceptions
 Hermeneutics
 Ontology and epistemology
 Interdisciplinarity
 Relativism
 Paradigm shift
 Everything is connected to everything else (if only we knew how!)
 Different and inferior are not synonyms
 Representing data e.g. graphs of different types
 Concept of modelling reality; a model is not reality
 Map relief
 Educational development: social construction of knowledge
 A threshold skill: decision making
 Truth and objectivity: what is a fact?
 Environmental geography: world views as parallel and mutual critique
 Contested knowledge
 Actor network theory
 Using imagination to think beyond personal realities
 Marxist theory
 Nation states haven't always existed (time)
 Sustainable development
 What does evaluation mean?
 How to interpret a graph
 3D from 2D maps
 Sustainability
 Development

Limits between models of reality
 Geographical imagination
 Thinking in 3D
 2D representations of 3D (and reverse)
 Stereographic projection
 Stereonets
 Models
 Statistics are our friend!
 'Provisional' nature of scientific knowledge
 Environmental law! 'Hazards and risks depend on local politics'
 Education/lecturers: difference between teaching and learning
 Contested information
 Nature of evidence
 Prioritisation
 Interrelations
 Interdisciplinarity
 Combining interrelating concepts
 Relating discipline skills with generic skills, in relation to employability
 Working together
 For teachers: letting go of egocentric didactic practices and moving towards letting students 'go' and learn for themselves.
 Learning
 Students developing a true understanding of their learning styles, such that they can tactically adjust their approach to suit the learning situation.
 Cultural 'others' are not necessarily exotic or obscure or wrong
 Metacognitive self awareness
 Intergenerational ethics (personal responsibilities to the future)

Regionalism
 Globalisation
 Gaia: human impact on environment – determines human activity
 Greenhouse effect is human-induced
 Systems theory
 Chaos theory
 Complexity - contingency of environmental systems
 Interconnectedness of environmental systems
 Uncertainty of environmental systems
 Dynamics of environmental systems
 Dynamics of systems
 Place (not location)
 Identity, place, space: culture
 Correlation or coincidence?
 Concept of the globe
 Oil pollution – can't get away from Exxon Valdez
 Pollution limits (concentrations)
 Application of analytical instrumentation
 Energy movements in reactions

Correlation and causality
 Ecological self
 Global warming v ozone hole
 Nuclear energy v atomic bombs
 Landscape
 Cycles and systems (as opposed to isolated ideas)
 Multiple reasonable solutions to incomplete datasets
 Classification (lumper or splitter)
 Irreversibility and overshoot
 Systems
 Uncertainty?
 Probability and statistical significance
 Spatial relationships
 Holism
 Complexity
 Lifecycle: cradle to grave
 Ecological succession
 Niche theory
 Environmental impact assessment

Time - deep/geological time, absolute time
 Relative time: younging tables
 Space and place - point, line, area
 Mantle state: 'solid but convects'
 Scale e.g. time, distance, space
 Density
 Rates of activity
 (Glacier) flow
 (Pore water) pressure
 Metamorphic processes
 Crystallography
 Strength

'Etchplains' etc.
 Chemical reactions
 Bonding interactions of atoms
 Carbon cycle
 Causality
 Magnetism
 Gravity
 Stress
 Rock cycle
 Tectonic plate
 Causality
 Sampling distributions
 2D, 3D, 4D