The Challenges of Trans-disciplinary Research at ASU

Paper presented at Sichuan University
March 13, 2009

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TDR often starts with the wrong expectations

- Trans–disciplinary research implies severing the link between data and meaning built up in each discipline;
- It implies taking data and/or theories out of their original contexts;
- Integration is therefore almost always at the level of the lowest common denominator, leading to reductionism.

Let’s look at the reasons for this in some detail.
How do Disciplines Originate?

◊ How does understanding emerge?
  • Searching for regularities (defining problems)
  • Finding the pattern (the solution)

◊ Convergence of elements of understanding
  • Unifying perspectives on them
  • Constructing meta-language that links them
  • Discarding apparent noise
Disciplines are a Question of ... Discipline

◊ Discipline
  - is at the root of the strengths of the disciplines …
  - limits research to questions within the range accepted by the scholars involved

◊ Disciplines have developed different perspectives (on space, time and other things)

Ø We get a bee’s eye view in which the brain makes the final link (jump) between the different images.

Ø What can one do to make the various images as compatible, and yet as complementary as possible?
Disciplinary Competition and Conflict

- Cultural differences (e.g., the respective roles of theory and observation)
- Different levels of generality (theoretical, practical and applied research, engineering)
- Different methodologies (role of induction, deduction, models)
- Different degrees of precision (conceptual fuzziness)
- Different degrees of investment (many researchers on small topics, few researchers on huge ones)
- Differences in data
MACH vs BOHR

◊ **Ernst Mach**: Theories in physics are generalised prescriptions, deriving value from traditional practices.

◊ **Niels Bohr**: Physicists need to believe in an objective world - depriving them of it is the end of physics’ power.

◊ **Extreme positivism** (Ranke: ‘Die Interpretation schwankt, die Tatsachen bleiben’) hampers trans-disciplinary work

◊ **There is no objectivity – there is no single truth**

◊ **There are only epistemological relationships between observations and ideas**
What Determines Our Ideas?

◊ Perception mediates between us and our environment
  • One cannot objectify it, or separate data from meaning. All information is contextual.
  • We have to assume:
    ➢ the relative under-determination of our theories by our observations
    ➢ their relative over-determination by socio-culturally negotiated perspectives that cannot be challenged

◊ Data are poly-interpretable
◊ Data are transformed into information by relating them to existing meanings (concepts, questions and values)
The Epistemological Process

◊ Relates data to existing culture (in the widest sense)
◊ Is thus individual, disciplinary, cultural etc.
◊ People partake in it as passive, active and reflexive individuals
  • they look at, they interpret and they observe their own perceptions and actions
◊ Different disciplines and communities negotiate different “environments” or “ecologies”
◊ It is the purpose of our work, and of this discussion, to bring them closer together
Creation of Domains of Knowledge

REALM OF CONCEPTS

Cultural sphere: people's perceptions, norms and ideas

Natural sphere: Potential resources

ontological connection

epistemological connection

Socio-natural dynamics and their results (e.g. landscape)

REALM OF PHENOMENA

Cultural sphere: people's perceptions, norms and ideas

Natural sphere: Potential resources
Transformation into Disciplines

REALM OF CONCEPTS

Cultural disciplines, social sciences and humanities

Natural and life sciences

ontological connection

epistemological connection

REALM OF PHENOMENA

Cultural and social phenomena

Natural phenomena
Introduction of a Model

REALM OF CONCEPTS

People Perceptions

Nature Materials

Dynamics of cognition of, and action upon the environment

REALM OF PHENOMENA

Results of socio-natural dynamics
- landscape and land cover
- production
- consumption
- artefacts
- disposal

ontological connection
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epistemological connection
Negotiation Between Disciplines

◊ There is negotiation around a set of non-negotiable observations.
◊ Those observations were made in response to negotiated questions.
◊ Scientific trans-disciplinarity is inter-subjectively assessing the objective results of research aimed at solving subjective questions.
The Aim of Trans-disciplinary Projects

◊ The principal aim of any trans-disciplinary project is:
  • to negotiate the essential questions to be asked
  • to negotiate how they can be answered from many different cultural and disciplinary backgrounds.

◊ It is NOT to negotiate the concepts to be used in answering those questions
  • that leads to disciplinary battles and suppresses the fuzziness of concepts that is essential for creativity
The Requirements of a Trans-Disciplinary Project

◊ All disciplines must acknowledge:
  • entities exist in many different, but equivalent, ways
  • these are linked to certain practices, and requirements
  • differences between perspectives or negotiated practices (understanding), rather than kinds of phenomena (knowledge).

Ø Concepts and questions need to be defined together
Ø Socio-natural research is neither social science nor natural science, but delivers constructs all its own.

◊ Comparative judgments should be like “this kind of understanding is (not) applicable to this range of perspectives”
Example: The Socio-Natural Approach

◊ There is no natural system, there is no social system, there are only socio-natural interactions
  • Environmental issues are socio-natural issues
  • Perception and technique interface between people and environments
  • Crises are temporary incapacities of the people to process enough information to deal with complex dynamics
  • Patterns are due to interactions of entities at lower levels
  • Spatio-temporal correlations rather than causalities
What is the Nature of Socio-Natural Interactions?

- We hardly know, because we have generally focussed on either social or natural dynamics.
- How should we imagine them?
- Perception and technique are the two crucial areas
  - Environmental communication is about the environment, not with it.
  - Environmental problems do exist by virtue of the fact that they have been defined in and by a society: they are culture-bound
Practice

◊ Open up the “kitchen” of the individual disciplines (and practitioners) to outside looks
◊ Change attitude to one that is interested in how others think, rather than promulgating one’s own (discipline’s) ideas as “truth” or belittling others’ ideas
◊ Find a fulcrum between a post–modern and a socio–biological perspective
◊ Take an anthropological perspective
  - The difficulty is in not going for the simple solution
What Can One Do?

◊ Personality must transcend learning
◊ Create a basis of trust
◊ Create a neutral context
◊ Create long-term, personal interaction in the team
  • Eat, drink and be merry together ....
  • Organise self-structuring meetings
  • Focus on small groups (Rule of six information sources)
  • Team up people of different disciplines for longer periods
  • Definitions discussions are a stage on to play power games on
  • Data are ways to put people from other disciplines down
  • Discuss themes across topics & fields
Local and Formal Knowledge

◊ These two kinds of knowledge find their source and their legitimation in different areas

◊ **Experience vs. Education**
  - ‘I am legitimate because I live here’ vs. ‘I am legitimate because I have studied’.
  - Bottom-up vs. top-down knowledge.
  - Detailed circumstantial knowledge vs. generalised abstract knowledge.
  - Importance of ‘bottom up’ component in project and system design
Transdisciplinarity between Research and Policy

◊ Research is question-driven, open-ended but policy is solution-driven, closed.

◊ Interaction between research and policy should take place at all the levels concerned,
  • It should include both knowledge formulation and -use, and policy formulation and -implementation,
  • It should identify the different agendas involved,
  • It should formulate the relevant questions, research aims, policies and policy implementation measures at each level.
The Role of Modelling

◊ Modelling is a tool to force conscious integration of ideas from different disciplines
◊ Making models of reality or testing theories against data?
◊ Mediation by specialists in inter-disciplinarity
◊ The difficulty of assuming responsibility: modellers and sociologists/agronomers
From ‘Anthropology’ to ‘Human Evolution and Social Change’ at ASU

◊ The Anthropology Department has morphed into the School of Human Evolution and Social Change
  - Part of the horizontally networked university
  - A focus on issues of the XXIst century
  - A trans-disciplinary approach and organization
  - A changing approach to teaching
  - A new role for anthropology at the core of a range of disciplines

◊ http://shesc.esu.edu
Reasons for this transformation

◊ Anthropology has not kept pace with developments in the post-colonial period
  • It was torn apart between the developed and the (fragmenting) developing world
    ◊ It has lost its focus on mediating between cultures
  • It went through a crisis of conscience
    ◊ It has lost its impact on academic and political events
  • It needs to refocus on our own multi-cultural societies

◊ To regain momentum it must re-energize and refocus the discipline on today’s issues:
  • Sustainability, equity, development, etc.
Some recent changes

- Faculty growth from 35 to 55 + 3 Research Faculty, 4 Emeriti, lots of affiliates etc.
  - 4 mathematicians, 3 sociologists, 2 economists, 2 political scientists, 1 geographer, 1 geneticist, 2 STS, 5 anthropologists, 2 medical anthropologists

- New collaborative degrees:
  - Revamped BA in Anthropology (in progress) BA in Global Health, BS in Applied Mathematics for the Life and Social sciences, BS in anthropology (in progress)
  - MA in Global Health, Museum Studies
  - PhD’s in Environmental Social Science, Social Sciences of Health, Human and Social Dimensions of Science and Technology, Applied Mathematics for the Life and Social Sciences

- Other developments in the planning stage
Focus on the challenges of the 21st century

◊ Research and training themes
  • Human Origins, Evolution and Diversity
  • Societies and their Environments
  • Urban Societies
  • Biological, social and cultural dimensions of human health
  • Identity and Culture
  • Globalization and regional interaction
  • Technology and society

◊ In each case, we take the very long perspective
Reasons for very long-term research

◊ The world is dependent on scenario’s to plan a very complex future
  - These are based on the last 50-200 years
  - That is a very high risk strategy

◊ If you don’t take the longer term into account:
  - you miss the long time-scales (millennia)
  - you overlook many instances of the dynamic
  - your sample is biased towards the present
  - you overlook the change of change (e.g. change in time horizon)
  - you overlook the role of legacies

◊ Studying multi-scalar spatio-temporal phenomena involves the disciplines most appropriate for each
Some examples

◊ SHESC has large portfolio of projects and ideas
◊ Due to new direction not always suitable for ‘classic’ channels (federal funding)
  • Some too ‘applied’
  • Some too risky or too early
◊ Presenting a handful as examples
  • Give a flavor of the kinds of things we are doing
  • Not only in your collective foci, because I’d also like advice as to where else to go
◊ My first foray into ‘foundation-land’
  • Please give me any comment you may have
Cooperation, Culture and the Spread of Modern Homo Sapiens

- Is human uniqueness a product of ‘eusocial’ cooperation and transmission of cultural conventions promoting “other-regarding behaviors” between non-kin?
- Does its emergence coincide with the origins of morality and ethnicity, and their unique emotional underpinnings?
- This implies natural selection of genes and cultural patterns from the individual to large cooperative-breeding extended-kin-units, and to higher level coalitions.
- Together, this would have given an important advantage to humans over other species (e.g. chimpanzees) in life expectancy.

Project combines experimental economics, game theory, common pool resource theory etc. with anthropology and archaeology.
Hadar (Afar, Ethiopia)

- Long term research on human origins by our paleo-anthropologists
- Lucy, but many other finds as well.
- Fundamental area for understanding of human origins
- World Heritage site
- With Ethiopian government (ARCCH) and NGS, we are now trying to protect the area
- To do so, we must communicate its importance to the local population
- We are therefore building a (small) museum
Long Term Vulnerability and Resilience in the US Southwest

- Detailed social-environmental data (AD 400 to 1600):
- Diverse trajectories of in similar arid environment
  - Hohokam: huge scale irrigation
  - Mesa Verde: rainfall agriculture
  - In both large institutions rise and fall dramatically
  - Zuni and Salinas: long stable sequences, less investment
  - La Quemada: urbanization

- ‘Classic’ study of long term resilience
- Major modeling input, now put on the web (IHOPE)
Societies and their Environments

◊ Long-term evolution of Mediterranean landscapes
  • Combine archaeological and written data with modern scientific insights to model multi-temporal dynamics of land use
  • Use this to make more informed decisions today.
  • Three areas: SE Spain, Rhone Valley, W. Jordan

◊ Three foci:
  • the effects of growth in agro-pastoral systems on biodiversity;
  • the impacts of land use intensification on landscape resilience and vulnerability to degradation;
  • the long-term sustainability of human maintained socio-ecosystems in varying environmental and social contexts.

◊ What is different or similar between these regions?
  • Are differences the result of natural or cultural factors?
  • How do we identify long-term sustainable uses of the land?
  • How to put these in place?
Societies and their Environments

◊ **Societies in transition in the Philippines**
  - Migration and Household Economic Diversification in the Palawan Fishing Economy
    ◊ Migration and changes in the exploitation of coastal zone resources are transforming household economic strategies
    ◊ How do these affect natural resource management?
  - Re-envisioning the Upland Philippines
    ◊ New patterns of upland land use, geographic mobility, new axes of social differentiation and cultural allegiance today bind uplands to lowlands
    ◊ How best to characterize these transformations?
    ◊ Which new conflicts emerge?
    ◊ How will these changes affect the future?
Social-cultural dimensions of Health

◊ South Phoenix project
  • Use social science to help agencies further social change
    ◊ history (how did health inequities focus geographically),
    ◊ cultural processes (how do people relate to each other),
    ◊ cultural knowledge (what local knowledge works well)
  • What is new?
    ◊ Study cultural variation at root of health and environment issues
    ◊ Use case study to intersect methods at multiple scales
    ◊ Analysis of space, modeling, scenario creation
    ◊ Stakeholder involvement
  • Example:
    ◊ Study health issues (obesity, family planning, STD) by linking
      individual knowledge to social networks and geography
    ◊ ‘What if?’ scenarios (e.g. hardening of attitude to Latino’s
  • Focus: general methodology to identify role of information, which can be exported elsewhere
Social-cultural dimensions of Health

◊ Indigenous Health Sciences and Human Rights Group
  • Indigenous minorities’ health suffers excessively as there is no healthcare/protection
  • Aims to generate strategic solutions to protect complex socio-cultural and environmental systems upon which populations, and the surrounding biodiversity depends
  ◊ International clearinghouse of date and publications
  ◊ Disease surveillance system
  ◊ Use of models to predict resurgence
  ◊ Design, implementation and evaluation of community-based programs linking indigenous communities to the initiatives
  ◊ Study of the implications of these scientific activities for understanding the origins of human resilience through hyper-cooperation
Phoenix Innovation Study: improving the resilience of a city

• **Aim:**
  - To compare Phoenix with other metropolitan areas
  - To understand the factors limiting invention and innovation
  - To remove obstacles and make the climate more conducive

• **New:**
  - A generative approach to studying innovation
  - Combining economics with social science techniques (ethnographic observation, in-depth interviews, spatial econometrics)
  - 3 levels:
    - Micro-businesses
    - SME’s
    - Large companies
  - Emphasis on role of ethnic minorities
Late Lessons from Early History

Linking the whole past to the future and fostering intellectual fusion in the School

- Paleo–anthropology and Paleo–genetics of Fynbos, Marine Ecosystems and Human Origins
- Change is hard: the challenges of path-dependence
- Urban Organization Through The Ages: Neighborhoods, Open Spaces, and Urban Life
- Cooperation, social networks, and global health
Conclusion

◊ What do we have?
  - An interested and interesting scientific community that intends to make a difference
  - A supportive administration that wants to foster this approach throughout the university

◊ What am I looking for?
  - A dialogue on challenges, ideas, advice, implementation, support