Transdisciplinary competences for SES research and action

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New problems demand new solutions

- Increasingly complex problem solving demands “whole system” approaches. The practical world grows increasingly impatient with the academic. But integrating research is often vital - WE CAN’T AFFORD TO BE SIDELINED.

- To innovate at the system level, change agents must be system entrepreneurs with the social and knowledge management skills and competences to work across disciplines, organizational and social cultures, boundaries and scales.
A example..
The Ugandan Mountain Gorilla

PHVA

- Habitat and species under threat
- Two populations
  - Bwindi (Uganda)-300 surviving
  - Virunga National Park (Rwanda/DRC)-310
Held in Kampala, 1998 for 3 days
Attended by 80 participants (foreign and local scientists, managers, NGOs, government, ecotourism)
Understanding the challenge of complex problems

The Certainty/Agreement Matrix

![Graph showing the Certainty/Agreement Matrix. The x-axis represents Certainty with 'Close to' and 'Far from' labels, and the y-axis represents Agreement with 'Close to' and 'Far from' labels. The graph is marked with a cross to indicate a point of uncertainty.](image)
Simple Agreement

Close to

Far from

Simple
Plan, control

Certainty

Far from

Close to
Technically Complicated

![Graph showing the relationship between Agreement and Certainty. The graph is divided into two quadrants: Close to Agreement, Close to Certainty and Far from Agreement, Far from Certainty. The top right quadrant is labeled Technically Complicated (Experiment, coordinate expertise). The bottom left quadrant is labeled Simple (Plan, control).]
Socially Complicated

Agreement

Close to

Far from

Socially Complicated

Build relationships, create common ground

Simple
Plan, control

Technically Complicated
Experiment, coordinate expertise

Close to

Certainty

Far from

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Know When Your Challenges Are In the Zone of Complexity

- Close to Agreement
- Far from Agreement
- Close to Certainty
- Far from Certainty

- Simple
  - Plan, control

- Socially Complicated
  - Build relationships, create common ground

- Technically Complicated
  - Experiment, coordinate expertise

- Systems Thinking
- Relationship Building
- Collaboration
- Good Enough Vision
- Minimum Specifications
- Multiple Actions
Integrating Knowledge: Translational competencies

Integrating people: transactional competencies

Knowledge

People

WHO/Planning

Getting the right disciplines/data

Getting the right collaborators

HOW/Process

Building new knowledge

Building new relationships

Interdisciplinary Research and Action
Dynamics of Group Decision-Making
Dynamics of Group Decision-Making

New Topic

Divergent Thinking

Decision Point
Dynamics of Group Decision-Making

- New Topic
- Familiar Opinions
- Decision Point
- Divergent Thinking
Dynamics of Group Decision-Making

The Groan Zone

Divergent Thinking
- Hope
- Anticipation
- Curiosity
- Thoughtfulness
- Relief

Convergent Thinking
- Focus
- Confidence
- Imagination
- Eagerness
- Clarity

Shared Framework of Understanding
- Synthesis
- Refinement

New Topic
- Familiar Opinions
- Diverse Perspectives
- Competing Frames of Reference

Decision Point
- Exasperation
- Relief
- Thoughtfulness
- Anticipation
- Curiosity
- Hope
Integration Challenges

• Working across disciplines: e.g. Integrating human and animal disease data

• Working across scales: e.g. Integrating human demographic data into risk assessments of the species

• Working across logics (1)-qualitative vs. quantitative: e.g. Integrating war scenarios into risk assessments; incorporating indigenous knowledge.

• Working across logics (2) – action vs. rationality: e.g. managing people in parks.

We see these challenges in multiple fields - global health, sustainability, economic development etc.
Translational competencies

Knowledge management and integration for complex problem solving
The Horns of a Dilemma

“Pure” research/disciplinary orthodoxy/scientific knowledge

Application/interdisciplinary/clinical/action research/practice

The intersection: where value is added
It isn't easy: we are trained to think in disciplinary terms

- Old form - “mode 1”
  - University based
  - Explanation driven: application of the scientific method to increase understanding, insight and explanatory power
  - Structured by disciplinary based research protocols and methodologies
  - Disciplinary competencies critical
  - Formulation as separate from implementation, in part to protect “purity” and objectivity of scientific research.
  - Findings disseminated through research publications and (sometimes) in graduate training.

- New form - “mode 2”
  - Research labs, think tanks etc. often outside universities
  - Problem driven- application of multiple perspectives to solve problems
  - Structured by collaborative process
  - Disciplinary and transdisciplinary competencies critical
  - Formulation and implementation merged in single knowledge production process.
Another example: Florida panthers (*Felis concolor coryi*)
Alternative (competing) perspectives

- Field vets
- Wildlife researchers
- Professional game hunters
- Wildlife managers
- Lab geneticists
- Population modelers
- Land owners
- [native tribes]
Sources of conflict over the “truth”

- Different datasets
- Different valuations placed on data
- Different scales
- Different goals for the use of the data
- Status in different professional communities
- Data and knowledge ownership issues
- Control and power
- Opaqueness of analyses
- Mistrust of motives
What is a Florida panther?

- Traditional (morphological) taxonomists: a distinctive SE, swamp-adapted puma
- Molecular geneticists: an inbred N American puma
- Wildlife biologists: a career maker or breaker
- Native (in both senses) peoples: a big cat living in Florida
How many are there?

- Professional hunter: those he sees
- Population modeler: a number extrapolated from capture records
- Wildlife agency: a number that is unknowable and maybe we don’t want to know
- Land owners: a number that you won’t know
Potential for misunderstanding to become moral judgment:

- “but I use data, and you make things up”
- “where are your panthers?”
- “have you looked for them?”
- “do you know how much habitat is needed by each cat?”
- “you aren’t going to let this crazy information get out of this room, are you?”
- “then I don’t want my name associated with the proceedings”
"You are completely free to carry out whatever research you want, so long as you come to these conclusions."
Barriers

- Knowledge integration:
  - The scientific knowledge needed to understand most complex problems are “embedded” in multiple disciplines.
  - The dynamics which drive most complex problems are operating at vastly different scales.
  - The logics of action and those of analysis are fundamentally different.
  - Local knowledge and expert knowledge are increasingly hard to integrate.
  - There can be deep distrust about motivations behind knowledge mobilization.
Transactional competencies

Collaborative and interpersonal skills
Conflict Management - a key skill
The Great Bear Rain Forest - the success of active listening
Facing the Shadow

- **Forest workers:** “capuccino-sucking urban enviros”
- **First Nations:** “eco-colonialists”
- **Forest Companies:** “they are trying to destroy us and the province we care about”
- **Government:** “irresponsible” and “enemies of BC”
- **Other environmentalists:** “corporate sell-outs”
- **Scientists:** “irresponsible” - prepared to take action without certainty. (Dueling scientists)

Grains of truth= “breathe”
Barriers:

- Power dynamics, turf wars, ancient and currant conflicts, mistrust, lack of respect
  - Specialists are unaware of blind spots: will attempt to exert dominance in the name of “truth”
  - Knowledge hierarchy favors quantitative and deductive disciplines over qualitative and inductive disciplines
  - In conservation, theory trumps practice; in business/government, practice trumps theory.
  - Everybody trumps “journalists”
  - Sustained conflict is difficult to sustain
Each specialist works separately on his or her project – coordination through supervision or design.
Interdisciplinary:

Knowledge shared between disciplines; new knowledge created “in the between” of established disciplines
Transdisciplinary Knowledge

Knowledge Integration frameworks, processes, techniques

The knowledge which facilitates new knowledge building, breakthrough discoveries, collaborative action – “thinking about thinking; thinking about practice”-
Bridging tools

Conflict management

Negotiation

Stakeholder management

Team building

Facilitation

Active Listening

cross cultural management

Coalition building
Bridges

• Frameworks for understanding “generic” knowledge structures and how knowledge is embedded = epistemological agility

• Protocols for translating, integrating and/or bridging knowledge embedded in “foreign” disciplines/thought worlds in order to solve complex problems most effectively.

• Methodologies for “cracking codes” of other “cultures” (including disciplines, scales, thought worlds)
A Dilemma

You are riding in a car driven by a close friend. He hits a pedestrian. You know he was going at least 35 miles per hour in an area of the city where the maximum allowed speed is 20 miles per hour. There are no witnesses. His lawyer says that if you testify under oath that he was only driving 20 miles per hour it may save him from serious consequences.
How would you testify?

1. What do you think you would do in view of the obligations of a sworn witness and the obligation to your friend?
   
a. I would testify that he was going 20 miles an hour.

b. I would not testify that he was going 20 miles an hour.
Doing Business Across Cultures:
Recognizing the Differences

Universalist Culture
2. Focus more on rules than on relationships.
3. Draw up legal contracts readily.
4. View as trustworthy those who honor their word or contract.
5. Recognize as valid only one truth or reality, the one that has been agreed to.
6. Believe that “a deal is a deal.”

Particularist Culture
2. Focus more on relationship than on rules.
3. Modify legal contracts readily.
4. View as trustworthy those who honor changing mutualities.
5. Recognize several perspectives on reality as valid, relative to each participant.
6. Expect that “relationships evolve.”
Universalist Testimony: Responses by Nationality

Percentage of respondents opting for a universalist system rather than a particular social group.
Doing Business Across Cultures: Practical Tips

For Universalists (working with Particularists)

3. Be prepared for personal, “meandering,” or “irrelevant” interactions that do not seem to be going anywhere.

4. Do not take personal, “get to know you” attitudes as unimportant small talk.

5. Carefully consider the personal implications of your legal “safeguards.”

For Particularists (working with Universalists)

3. Be prepared for “rational” and “professional” arguments that push for your acquiescence.

4. Do not take impersonal, “get-down-to-business” attitudes as rude.

5. If in doubt, carefully prepare the legal ground with a lawyer.
Difficulty in working across thought worlds- reconciling reflection and action

- **Academic Scientist**
  - Truth is a dominant goal
  - Careful analysis is required to arrive at truth
  - “Not good enough “- more data and analysis required.
  - Disciplined specialization is key

- **Social Entrepeneur**
  - Productivity is a dominant goal
  - Action is required to arrive at productivity
  - “Good enough -push on”
  - Collaborative integration is key
Compared to cultures, disciplines and thought worlds should be easy to “crack”

- If we can “map” culture, we can map basic drivers of different research paradigms.
- If we can understand how knowledge is structured, we can understand how to connect it to solve system problems.
- If we understand the role of both reflection and action we can learn to work as teams.
- We can learn to “think about thinking”
Summary

- New demands for complex problem solving in turn demands new modes of knowledge production.
- Solving complex problems demands interdisciplinary knowledge production and transdisciplinary skills.
- Social innovation/social action that is informed by research will be most likely to succeed.
- However, this requires new knowledge generation and transmission skills on the part of the researcher interested in social change or the innovator/social entrepreneur.
- Development of tools and protocols for this new knowledge production currently underway, but have yet to be pulled into a pedagogy or coherent methodology. *Push for it!!*
When we try to pick up anything by itself, we find it hitched to everything else in the universe.

*John Muir*