FEDERAL UNIVERSITY OF ABC
Postgraduate Course in Environmental Science and Technology

ENVIRONMENTAL SCIENCE AND TECHNOLOGY

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2025

Content

- Conceptions of the environment
- Ethics and environment
- Environmental science and interdisciplinarity

Environmental conception and ethical models

- Environment is external to humans
  - Focus on Western culture
  - Ethics of care
  - Gardener metaphor

- Human being with part of the environment
  - Focus on oriental culture
  - System harmony

Pelizzoli, M.L., 2003. Currents in environmental ethics. Voices.

Conceptions of environment and relationships between human beings

Environment	Relationship
Nature	Preservation and appreciation
Resource	Management
Problem	Mediation and resolution
Place to live	Take care of the place
Biosphere	Planet to be co-inhabited
Collective project	Engagement

Sauvé, L., 1997. Environmental education and sustainable development: a complex analysis. Journal of Public Education, 6(10), pp.72-102.

Matrices of environmental ethics

Conservationist	Pragmatics	Critical
Human-environment dichotomy	Anthropocentrism	Systemic complexity
Human being as destroyer	Human being capable of using without destroying	Human beings live in a web of social, natural and cultural relationships
Return to primitive nature	Fatalistic perspective (protect the environment to survive)	Historically determined relationship
Human being reduced to its biological dimension	Law of action and reaction (vengeful nature)	Human being as bio-psychic-social, endowed with emotions
	Human being as biological and social	

Krasilchik Krasilchik, M. and Silva Ferreira, R., 2009. Concepções de educação ambiental na televisão educativa do Brasil. *Enseñanza de las ciencias*, (VIII Congreso Internacional sobre Investigación en la Didáctica de las Ciencias), pp.1172-1176.

Matrices of environmental ethics

Conservationist	Pragmatics	Critical
Issues involving social conflict are not addressed	Conflict presented as "false consensus"	Controversial issues presented from the perspective of various social subjects
Manichaean behavior patterns (good vs evil)	Solution depends on what you want to do	Discussion of inequality in access to natural resources and distribution of risks
Everyone is equally responsible for problems and environmental quality	Emphasis on individual behaviors	Formation of values and attitudes for environmental ethics and environmental justice
	Direct relationship between information and behavior change	

Krasilchik Krasilchik, M. and Silva Ferreira, R., 2009. Concepções de educação ambiental na televisão educativa do Brasil. *Enseñanza de las ciencias*, (VIII Congreso Internacional sobre Investigación en la Didáctica de las Ciencias), pp.1172-1176.

Resource Conservation Ethics

- Social responsibility in consumption and production
  - From the 3 to 6 R's:
    - Rethink: values related to consumption and production
    - Refuse: do not choose anti-ecological products
    - Reduce: consumption and pollution
    - Reuse
    - Recycle
    - Recover: mitigate the impacts of consumption
- Criticism:
  - See nature as a resource (instrumental value) and not as an intrinsic value (living being's right to exist)
  - Values of controlling nature, not belonging

Sauvé, L. (2005). Currents in Environmental Education: Mapping a Complex and Evolving Pedagogical Field. Canadian Journal of Environmental Education, 10(1), 11-37.
Sachs, W. (2000). Development: An ideology in ruins. In W. Sachs & G. Esteva (Eds.), On the ruins of development (pp. 13-81). Montreal: Ecosociety.

Deep Ecology

- Ecocentrist ethics instead of anthropocentrism
- All living beings (including human beings) have the same importance
- Deepen the person's ethical and emotional connection with other living beings
  - Leads to changes in attitude
  - Participation in environmental movements
  - Reduction in birth rate
  - Simple lifestyle

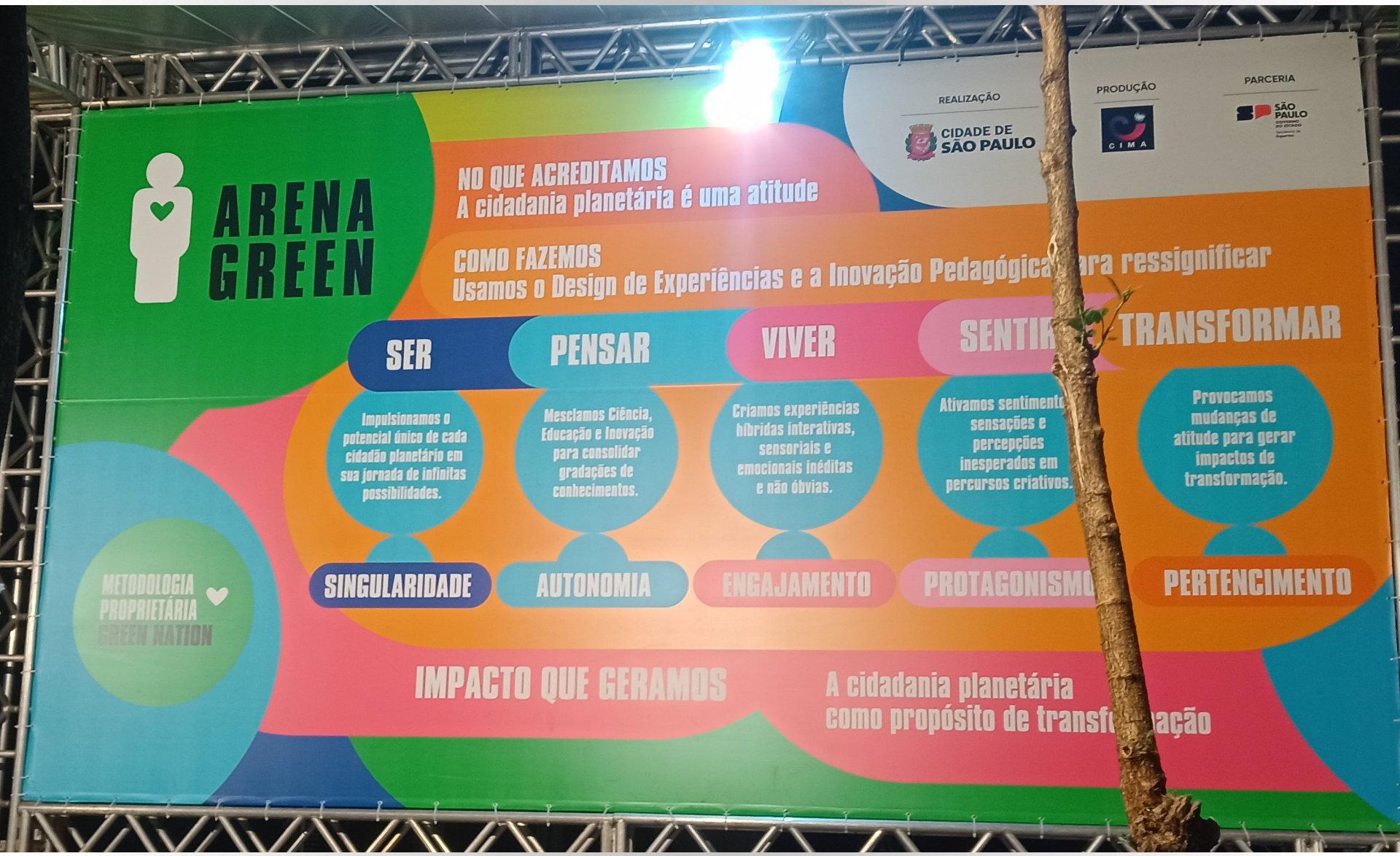
Source of personal satisfaction, not obligation

Næss, Arne (1973). "The shallow and the deep, long-range ecology movement. A summary". Inquiry. 16 (1–4): 95–100

Planetary Citizenship

- Promotion of life to develop the meaning of existence
  - The Earth as a single living organism
  - “Cultivation” rather than “conquest” of the Earth
- Dynamic balance to develop social sensitivity
  - Economic balance must preserve social and ecological balance
- Harmonic congruence that develops tenderness and wonder
  - Feel like a living being alongside others on the planet
  - Emotional connection with nature
- Integral ethics (values of ecological awareness) that develops the capacity for self-realization
- Intuitive rationality that develops the ability to act as a whole human being
  - Recognizes the limits of logic and does not ignore affectivity
  - Ability to transform order and disorder in the world
- Planetary consciousness that develops planetary solidarity
  - Participation in the becoming of the world through planetary citizenship

Gutiérrez, Francisco 1994 Pedagogia para el Desarrollo Sostenible. Heredia, Costa Rica: Editorialpec.
Gadotti, Moacir. *Pedagogia da terra: Ecopedagogia e educação sustentável*. CLACSO, 2000.

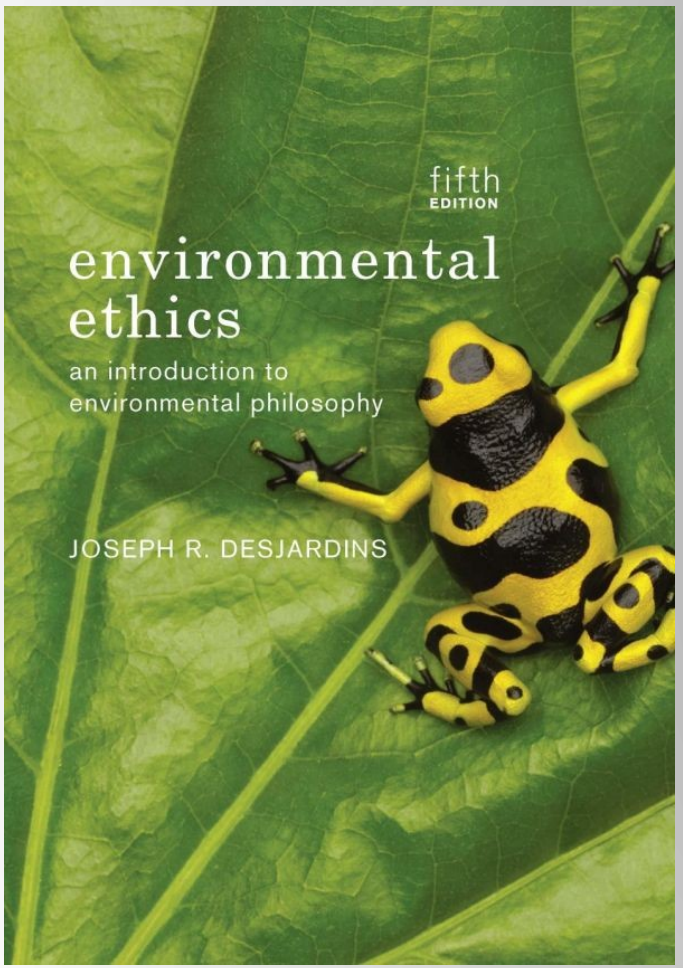

ARENA GREEN
REALIZAÇÃO
CIDADE DE SÃO PAULO
PRODUÇÃO
CIMA
PARCERIA
SÃO PAULO
NO QUE ACREDITAMOS
A cidadania planetária é uma atitude
COMO FAZEMOS
Usamos o Design de Experiências e a Inovação Pedagógica para ressignificar
SER
PENSAR
VIVER
SENTIR
TRANSFORMAR
Impulsionamos o potencial único de cada cidadão planetário em sua jornada de infinitas possibilidades.
Mesclamos Ciência, Educação e Inovação para consolidar gradações de conhecimentos.
Criamos experiências híbridas interativas, sensoriais e emocionais inéditas e não óbvias.
Ativamos sentimento sensações e percepções inesperados em percursos criativos.
Provocamos mudanças de atitude para gerar impactos de transformação.
METODOLOGIA PROPRIETÁRIA GREEN NATION
SINGULARIDADE
AUTONOMIA
ENGAJAMENTO
PROTAGONISMO
PERTENCIMENTO
IMPACTO QUE GERAMOS
A cidadania planetária como propósito de transf ação

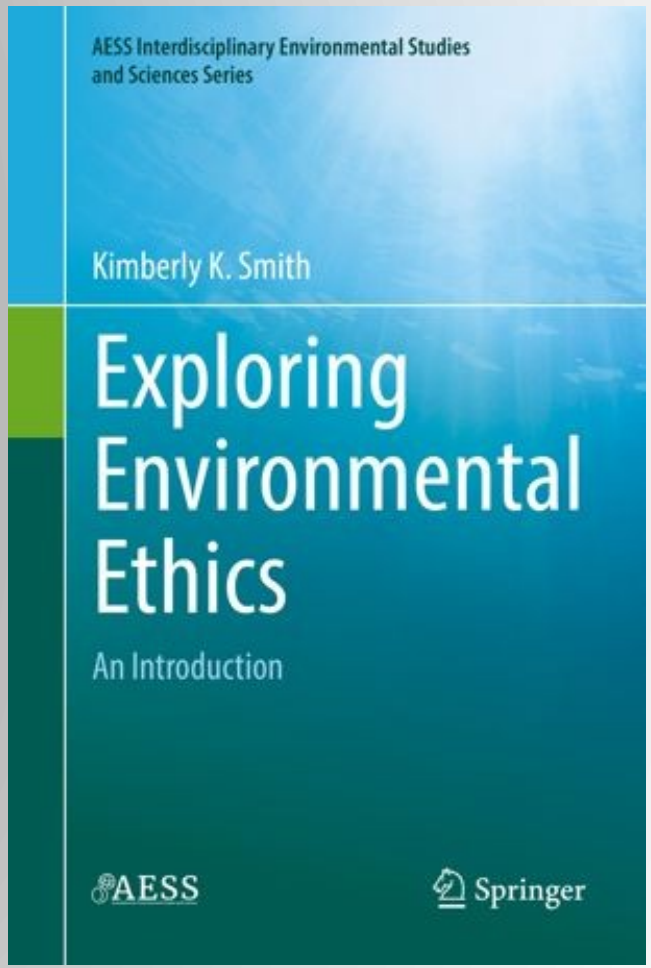

CIDADANIA PLANETÁRIA
TRANSFORMAR
pertencimento
5PS
PESSOAS, PLANETA, PARCERIA, PROSPERIDADE e PAZ
singularidade
SER
INSPIRAÇÃO CURIOSIDADE ANCESTRALIDADE
DIVERSIDADE UNICIDADE MULTIPLICIDADE
DIREITOS VALORES PROPÓSITOS
REFLEXÃO CONSCIÊNCIA SIGNIFICADO
IMAGINAÇÃO PENSAMENTO CRÍTICO RESILIÊNCIA
EDUCAÇÃO CIÊNCIA INOVAÇÃO
INEDITISMO NÃO ÓBVIO AUTENTICIDADE
INTERATIVIDADE SENSORIALIDADE EMOCIONALIDADE
CRIATIVIDADE ARTE CULTURA
autonomia
PENSAR
ODS
engajamento
VIVER
AGENDA 2030
SENTIR
protagonismo
CONVERGÊNCIA SERENDIPIDADE EVOLUÇÃO
SENTIMENTOS SENSAÇÕES PERCEPÇÕES
IDENTIDADE ORIGINALIDADE MUTAÇÕES
LEGADO EXPONENCIALIDADE DISRUPÇÃO
ALTERNÂNCIA CORAGEM REVOLUÇÃO
COCRIAÇÃO COLABORAÇÃO COMPARTILHAMENTO

Reflection

- What is the conception of environment in your research project?
- How can the objectives of your research project be justified in relation to human values in relation to the environment?

To delve deeper





Environmental science and technology

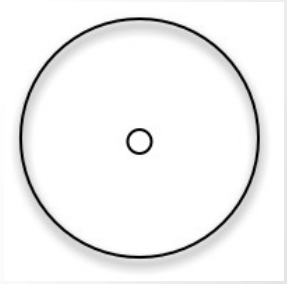
Environmental Science has to address two issues:

- Complex systems, making theoretical and methodological integration difficult, and
- The difficulty researchers have in stepping away from their specialties and seeking new perspectives.

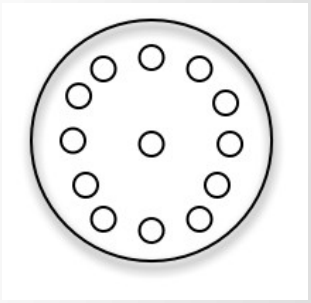
ABRAMOVAY, Ricardo. **Construindo a ciência ambiental**. Annablume, 2002.

Environmental science and technology

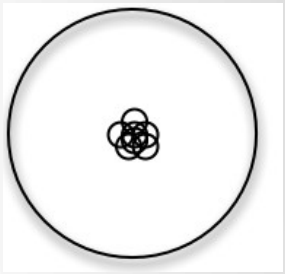
- Separation
  - Study of the whole through the parts (Cartesian): specialization
- Hyper-specialization:
  - 7 fields of knowledge in 1300, 54 in 1950, and 8530 in 1987
- Separation of the objects of analysis from the environment and, consequently, between the knowing subject and the object of knowledge



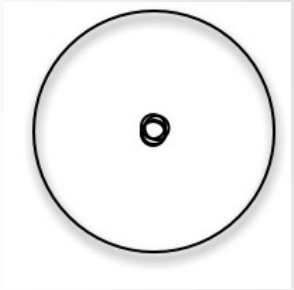
- **Disciplinary:** scientific and specialized exploration of a field of study



- **Multidisciplinary:** an object of study is investigated by various disciplines, but they do not communicate with each other



- **Interdisciplinary:** dialogue between disciplines, but each maintains its boundary of study



- **Transdisciplinary:** total integration, with the elimination of stable boundaries between disciplines. Knowledge is constructed jointly

PIAGET, Jean; DUCKWORTH, Eleanor. Genetic epistemology. American Behavioral Scientist, v. 13, n. 3, p. 459-480, 1970.

How could a methodology be for studying the Central Park of Santo André using each approach:

- Disciplinary
- Multidisciplinary
- Interdisciplinary
- Transdisciplinary

https://br.pinterest.com/pin/451768024920668832/

RESOLUTION CONAMA No. 001, of January 23, 1986

- Article 7 - The environmental impact study will be carried out by a qualified multidisciplinary team (...)

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The construction of theories in Environmental Science

- Limits to interdisciplinarity
  - The educational history of the individual researcher
  - Undergraduate students and the disciplinary perspective
  - Introduction to Environmental Science

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The construction of theories in Environmental Science

- The participation of professors in the construction of Environmental Science
- Sciences with equal value
- Weakening of the scientist's individualism
- Collective production

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The construction of theories in Environmental Science

- Work on knowledge boundaries
- Case studies → patterns
- The combined view of the disciplines:
  - Common study sites
  - Interdisciplinary themes
  - Theoretical discussion

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The construction of new areas of research

- Biophysics
- Environmental engineering
- Conservation and restoration
- Human ecology
- Complex systems

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The method in Interdisciplinarity

- The description phase (Narrative or Natural History)

- Appropriation of methods from other areas: new methods?

- Experimental design: control and replications?

- Fulfillment of hypotheses and objectives: ability to extrapolate data.

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Analysis in Interdisciplinarity

- Databases: case studies and syntheses
- The use of mathematical language
- Multivariate analyses
- Inexact science

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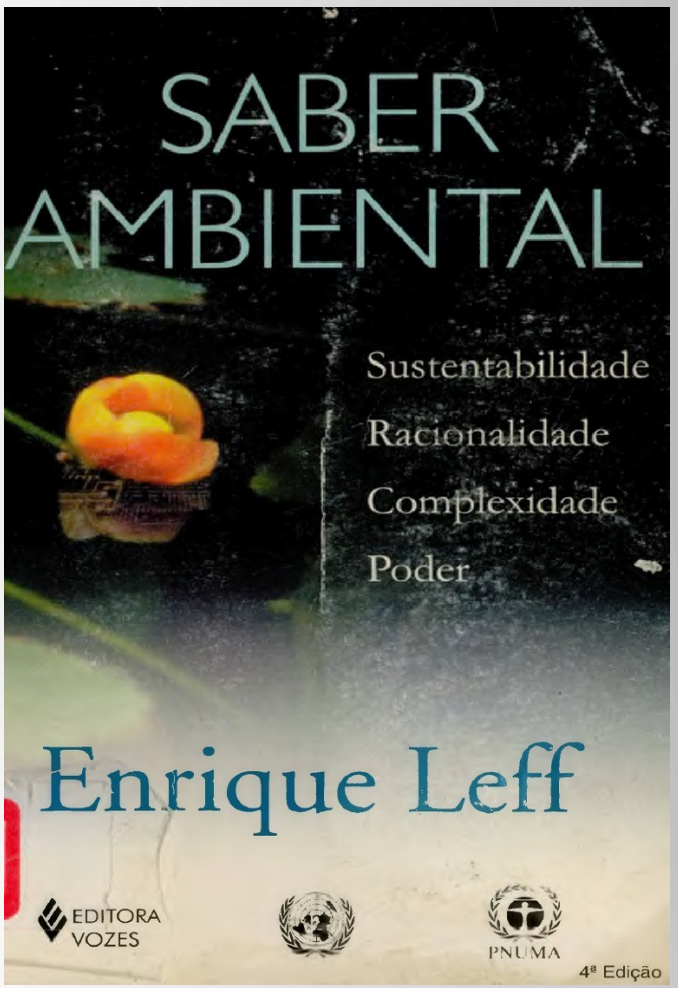
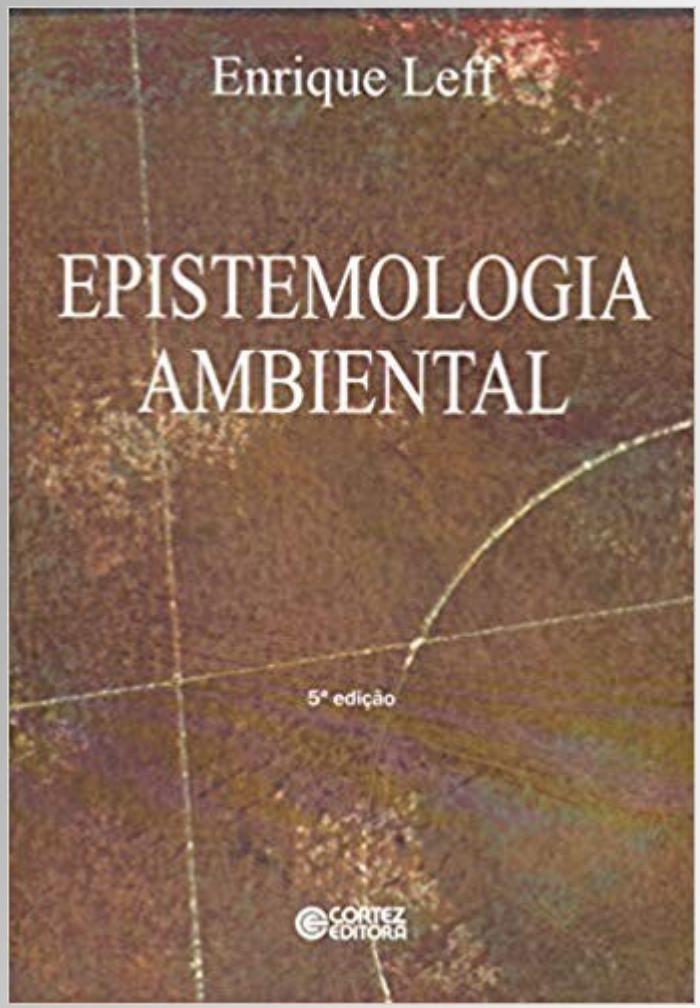
Reflection

- How do multidisciplinary, interdisciplinary and transdisciplinary relationships occur in your research themes?

- What are the challenges and potential of these relationships between different areas of knowledge in your research?

To delve deeper





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Final considerations

- Environmental Science as an integrating axis of a new model of Citizenship

- The appropriation of nature's resources for the benefit of a few

- Society's new stance towards the environment: common values and a new (?) ethics

- Environmentalism and Environmental Science, the role of the Academy

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Final considerations

The university, if it really wants to 'sponsor' interdisciplinarity, needs to:

a) relativize departmentalization

b) reduce bureaucracy in the processes involving projects which integrate research and extension

c) give priority to potential interdisciplinary projects

JANTSCH, A. P. & BIANCHETTI, L. Interdisciplinaridade - Para além da filosofia do sujeito. In: JANTSCH, A. P.; BIANCHETTI, L. (Orgs.) Interdisciplinaridade. Para além da filosofia do sujeito. Petrópolis: Vozes. 2000

Thank you!

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Credits to Waldir Mantovani for contributing to previous versions of this class