

Abstract

“Our planet is in dire need of **ethical behaviour** by all its citizens. However, recent research has highlighted the increasingly dangerous **impact of human activity on life systems of the planet**. CO₂ emissions continue to rise (400+ppm, end 2016), methane emissions are accelerating. The Arctic is about 28°C above the normal average. Average global temperature is reaching 1° above normal. Air, water and ground pollution levels are reaching devastating levels. Resource depletion is accelerating. Yet most governments still beat the drums of **growth**, while hypocritically humming the tune of **sustainability**. Humans are **overshooting the carrying capacity of the planet**; as attested by top scientists and organizations. Earth overshoot day in 2016 was 8 August; we need 5 ½ earths to live like Australians.

Of course, **efforts** are being made globally and locally to combat impending disaster and to encourage more **respectful behaviour** towards the planet and its life. **Individuals** include scientists, writers, film makers, journalists. World-wide **organizations** include Climate Literacy and Energy Awareness Network (CLEAN), the Climate Change Education Partnership Alliance, the International Geoscience Education Organisation (IGEO), and the United Nations Environment Programme (UNEP). A key organization is the International Association for Promoting Geoethics (**IAPG**) because it focuses firmly and explicitly on the key issue of ethics, which few others appear to do. One might argue that the general **lack of major progress in environmental care** is rooted to a large degree in the **world-wide lack of strong adherence to geoethical principles**.

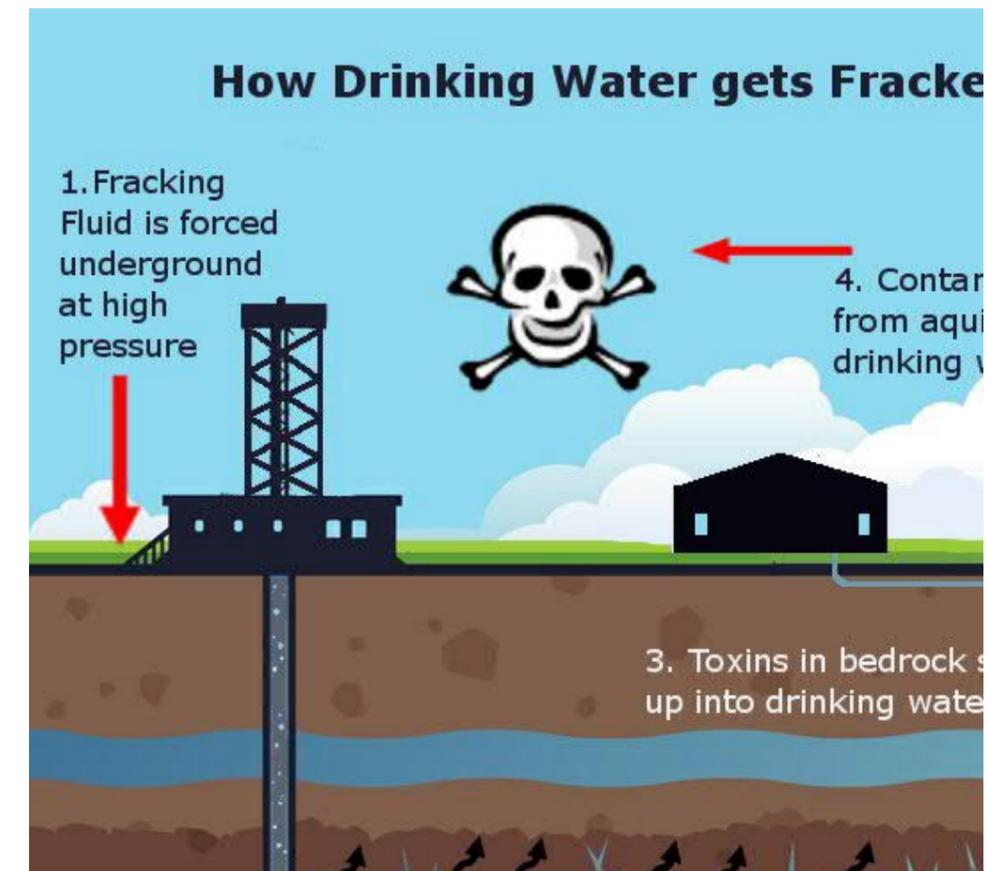
Learning to behave ethically needs far more than knowledge about energy imbalance, pollution, acidity, ice melt, etc. It needs people to learn, and grow up learning, about what is **right and wrong** in regard to each aspect of our personal earth citizen lives. That needs nothing short of a **revolution in educational practice** for all schools across the globe – a tall order, and an intergenerational process.

Our worry is: Can ‘we’ educate sufficient numbers of (younger) voyagers on our spaceship **Earth** in time – in order for a fully **informed humanity** to guide it towards **becoming a healthy environment**, fit for the wellbeing of humans, animals and plants. It seems to us that the **IAPG** is in a unique position to encourage this. The most powerful way to mitigate climate change, pollution, etc is to make **geoethics the core of education** across the globe. In our presentation, we will emphasize the need to boost strong **eduethics**, so that the positive effects are passed on **from generation to generation**.

The ~~presentation~~ [poster] will outline this rationale and then suggest ways in which we might wish to make **eduethics the companion of geoethics**, to encourage them to advance hand in hand. We hope to start a process of reflecting on how the IAPG, its members, educational communities and society can together move towards **education programmes** that encourage **ethically sound behaviour individually and collectively**. The aim would be for informed and ethical citizens to **vote** for governments that put the planet and its citizens at the centre of their preoccupations.”

Unethical human activity on geo-systems

- Deforestation
- Plastic waste
- Fracking
- Failing to be geoethical
- Emitting (too much) GHG
- Plundering Earth resources
- Pollution (by cars, planes, extraction, etc)
- Leaving lights & taps on
- Pollution (of earth, air, sea)
- Overfishing
- Illegal logging
- Wasting energy
- Waste
- Use of fossil fuels (oil, coal, shale, etc)



Offering solution(s) for Edu-Geo-Ethics & SDGs and behaving ethically for a healthy Earth

- Eat organic
- Drive slowly
- Use less water
- Donate or share
- Use no palm oil
- Be anti-antibiotics
- Do not waste food
- Eat less or no meat
- Take care of the soil
- Create a compost pile
- Reduce, Reuse, Recycle
- Buy locally produced foods
- Use less water plastic bottle
- Buy less and only what we need
- Plant trees, fruits and vegetables
- Use public transportation, bike or walk
- Avoid packaged foods, goods & products
- Switch off fans and lights when ever possible
- Use less chemical cleaners; Clean with vinegar



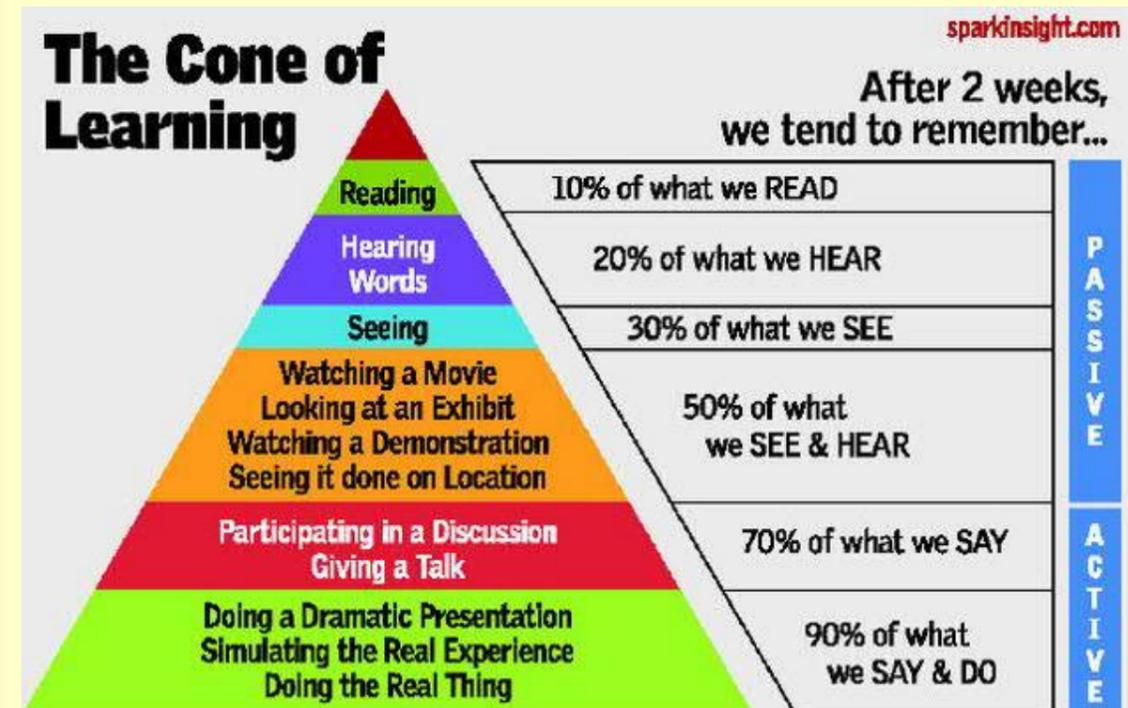
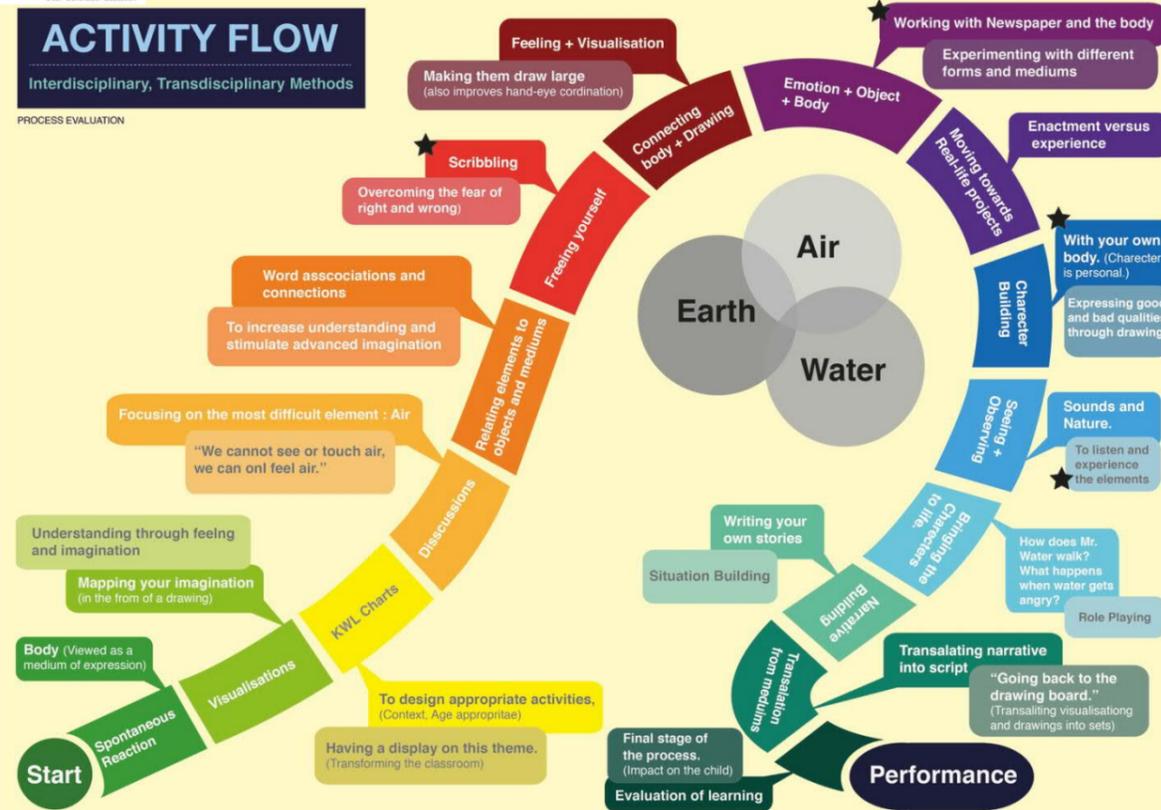
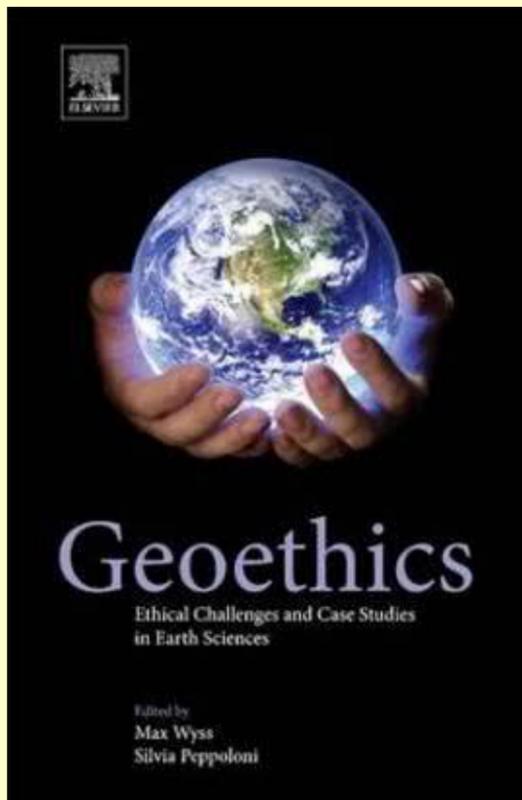
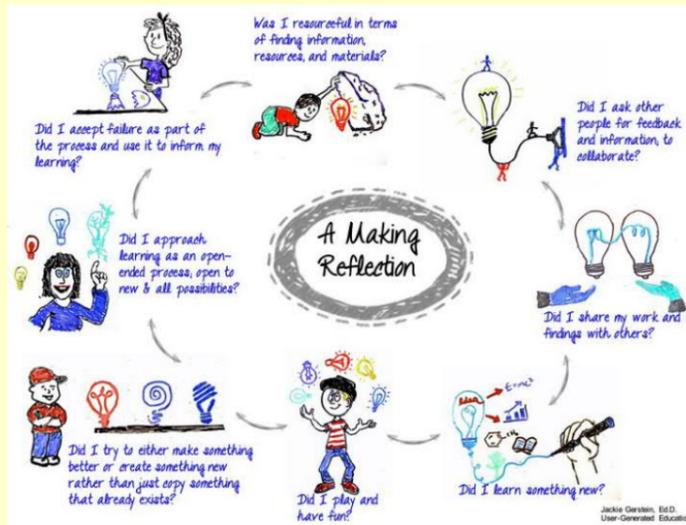
- Earth Day
- Stop junk mail
- Use a dry toilet
- Have fewer kids
- Fly less or not fly
- Install solar panels
- Use cloth shopping bags
- World Environment Day
- Buy second-hand clothes
- Vote for a green politician
- Volunteer for the environment
- Unplug devices when not in use
- People's Climate March (29 Apr, 2017)
- Support a charity (eg, Oxfam, Greenpeace)
- Realize that Earth is the only home we have
- Join an environmental organization (eg, IAPG)
- "Be the change you wish to see in the world" Ghandi
- "Happiness is not something ready made. It comes from your own actions" Dalai Lama



On the necessity of making geoethics a central concern in eduethics world-wide

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Organizations concerned with Earth edu or promoting edu geoethics

- **Climate Interactive:** helps people to work on solutions for climate change.
- **Camel Climate Change:** creates media resources for educators.
- **UNESCO:** UN Educational, Scientific & Cultural Org: educates people for a healthy environment.
- **Climate-KIC:** educates students for climate change and the environment.
- **Eco Action Games:** educates students to understand about the environment with games.
- **Carbon Detectives Europe:** supports the environment and helps students to learn.
- **Education and Outreach:** helps people to understand science for a sustainable future.
- **UN CC:Learn:** One UN Climate Change Learning Partnership: educates people about the environment and climate change.
- **FAO – Food and Agriculture Org of UN:** educates people for a healthy agriculture.
- **CAT – Centre for Alternative Technology:** educates people for green living and the environment.
- **EGU – European Geosciences Union:** international meeting and environmental activities.
- **NAAEE – North American Association for Environmental Education:** promotes excellence in environmental edu.



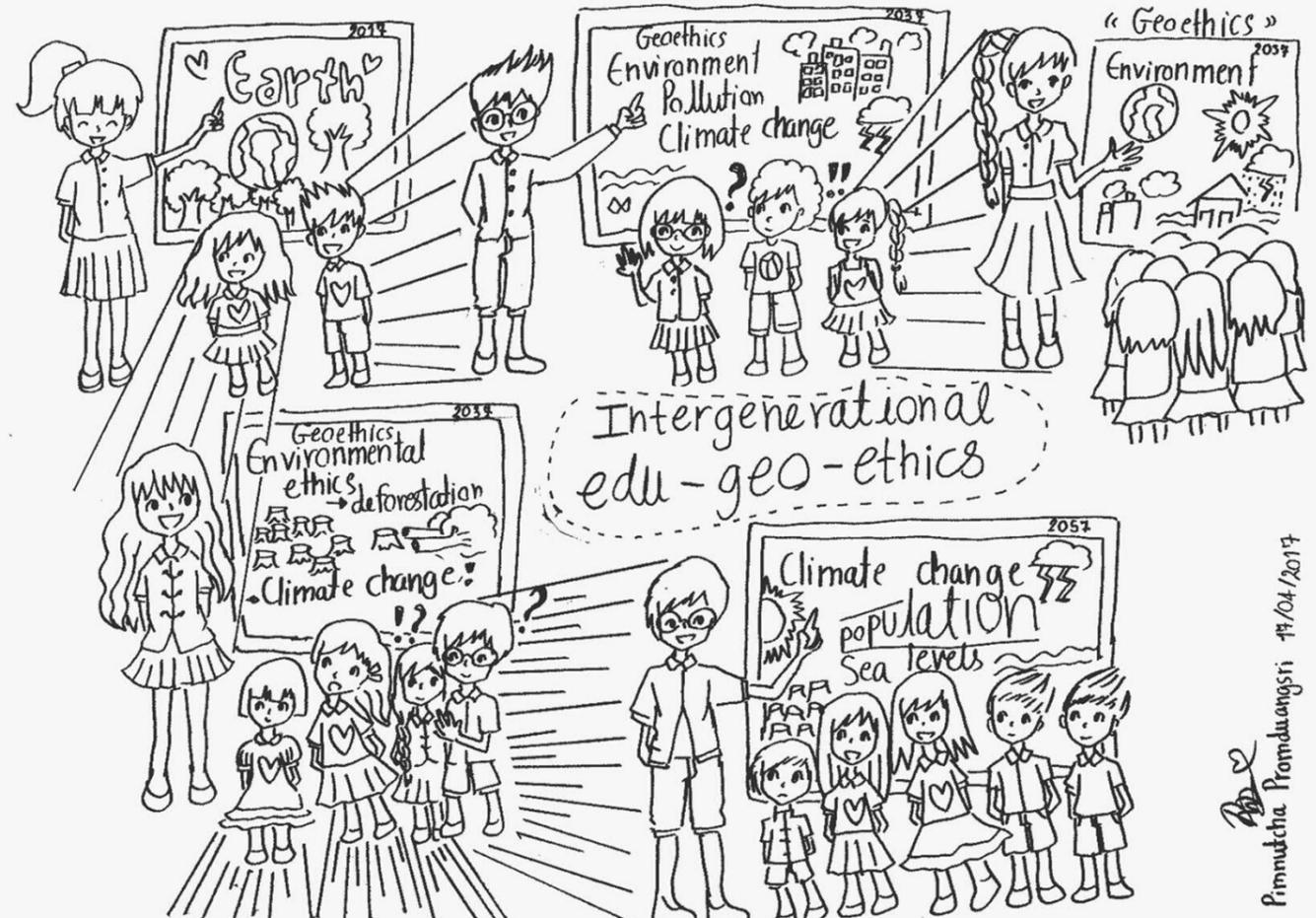
- **CLEAN - Climate Literacy & Awareness Network:** supports communities to improve climate and helps educators understand the big ideas in climate.
- **IGEO - The International Geoscience Education Organisation:** works for geoscience to educate internationally at all levels.
- **UNEP - The UN Environment Program:** educates and helps people to develop the environment.
- **IAPG - International Association for Promoting Geoethics:** promotes Geoethics values through international cooperation & education.
- **CREA - Le Centre de Recherches sur les Écosystèmes d'Altitude:** organizes missions for volunteers to participate on research and participatory science.
- **Earth Day:** educates and activates the environmental movement worldwide; projects for schools around the world.
- **Eco-Schools:** empowers students to make sustainable world by engaging in fun and socially responsible learning.
- **Green Cross International:** educates people and conducts national environmental projects.
- **Alliance for Climate Education:** educates young people and helps them take actions for climate change.
- Et al

Geoethics: In all classes, all the family; intergenerational:

= Possible way through to reducing the impact of humans on the Earth

- All classes (not just geo classes)
- All of society
- All citizens

Pls see panel 11

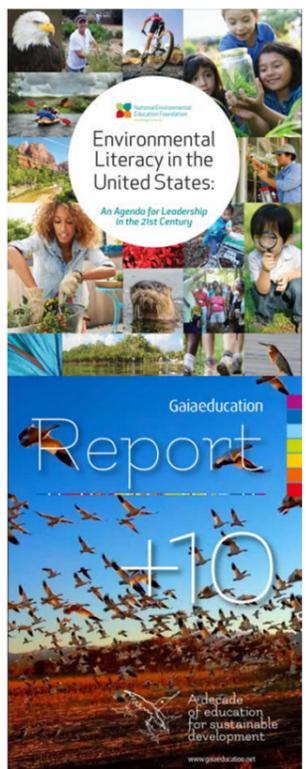


Making geoethics the core of all education

Making ethics the core of all geo-education

- “We are committed to greening every school in America within a generation”. 2017, Earth Day Network.
- Sustainability, climate change, and resilience must be included in one way or another in **every single** course, at **all levels**, primary to university, **across the world**. Crookall, 2013 (written 2009), Climate Change and Simulation/Gaming: Learning for Survival. *Simulation & Gaming*. 44(2-3) 195 –228.
- **Goal = Geoethics** to be in **all** courses, at all levels and in all subjects **worldwide** (intergenerational project).
 - ~ 90% the world’s pop & orgs to be **aware** of geo problems (bigger in the long term) & their cause(s)
 - ~ 60% of the world’s pop & orgs to act **ethically** / **responsibly** in regard to those problems
- Devise & use **ethical methods**, strategies & programmes to reach the goals. 
- If we advocate geoethics in education, then we need **edu-ethics** to teach.

- “Simulations of geoethical problems often generate strong emotions, just like their real-world counterparts.



- However, asking young people to participate in an emotion-generating event requires it to be done according to **ethical principles**. In many cases, many such simulations do **more harm than good** simply because they are **not conducted properly**.
- The simple fact of inviting people to participate in an emotionally challenging situation itself raises ethical issues, and this in turn has **ethical implications** for the **way in which we conduct** these kinds of **geoethical simulations**”. (2017, Abstract of oral presentation, IAPG session, EGU)
- Using simulation without débriefing is **unethical**.
- Doing experiential learning without debriefing is **unethical**.

Organizations fighting for the Earth, for geoethics

All organizations fighting for the Earth are in effect supporting geoethical principles, or should be.

- **Greenpeace:** supports volunteers to fight for the Earth, the environment and the animals.
- **World Wildlife Fund (WWF):** supports and helps volunteers for environmental projects.
- **Treehugger:** develops and helps the world.
- **Earthwatch Institute:** research in biodiversity.
- **Environmental Protection Agency (EPA):** protects the environment; internship for students.
- **European Environment Agency (EEA):** helps people to improve the environment and supports the environment.
- **Intergovernmental Panel on Climate Change (IPCC):** supports environmental projects and protects the environment.
- **Friends of the Earth:** campaigns for helping the Earth and carries out educational and research activities.
- **Rainforest Alliance:** works for conserving biodiversity and ensuring sustainable livelihoods.
- **Rainforest Action Network:** campaigns for the forests and the natural systems; project to protect the climate.
- **Climate Reality Project:** supports volunteers to fight for the Earth
- **Forest Stewardship:** voluntary programs for helping the forests and the environment.
- **Nature Conservancy:** protects the environment and supports volunteers around for helping the Earth.
- **World Resources Institute:** protects the environment and human well-being, and improves people's lives.
- **ClientEarth:** protects the environment through advocacy, litigation and science.
- **Sierra Club:** environmental organization “with more than two million members and supporters” for protecting the environment.



- **National Trust:** works for the nature and wildlife, and protects the environment.
- **Scottish Wildlife Trust:** protects the environment and wildlife and organizes volunteer group to conserve wild places.
- **Woodland Trust:** protects the forests for people and wildlife.
- **Sea Shepherd conservation Society:** fights for marine animals and the environment.
- **International Union for Conservation of Nature (IUCN):** protects the Earth and helps people to understand the values of nature.
- **Union of Concerned Scientists (UCS):** works for protecting the environment and the climate.
- **Earth Charter:** supports people for environmental activities.
- **Earth First:** protects the Earth and campaigns for educating people to attract attention to environmental concerns.
- **Campaign to protect Rural England:** protects, promotes and enhances towns and countryside.
- **350 organization:** works on protecting the climate and a better future for the Earth, and supports volunteers for environmental activities.
- **Worldwatch Institute:** protects the Earth for a healthy environment and develops a sustainable world that meets human needs.
- **Bioversity international:** works on climate change and helps people to improve nutrition.
- **Citizens Climate Lobby (CCL):** supports volunteers and influence climate policy.
- **Climate Action Network (CAN):** helps the Earth for a healthy environment and a better climate.

All organizations fighting for the Earth are in effect supporting geoethical principles, or should be.

Learning geo-edu-ethics

For people to learn responsible geoethical behaviour:

- Achievable only with **edu**; intergenerational
- **Geo-edu**: needs ethical **practice**; **doing** (not saying)

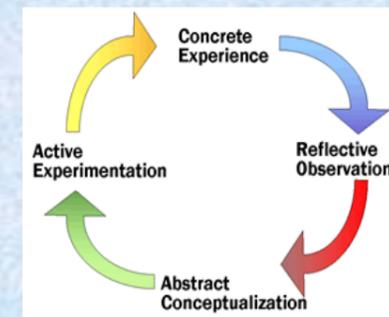
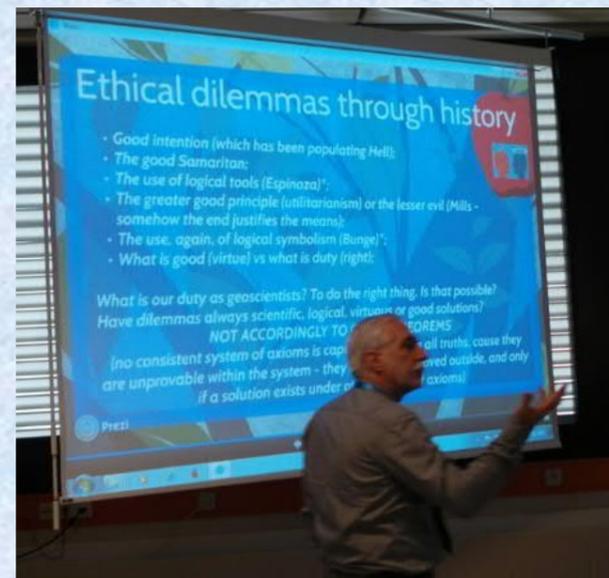
Many classic ways of teaching, e.g.:

- Chalk & talk, Demonstration; Tutorial; Seminar; Discussion
- Programmed instruction
- Reading
- Etc



Learning from experience (growing, but still rare)

- **Simulation/gaming, role-play**
- Field trips
- Internships
- Travel
- Conferences
- Research
- Disasters
- Film (documentaires)
- Everyday life & experience



Simulation/gaming, role-play and other structured **experiences**

Rely on providing or creating a (meaningful & memorable) situation or event that the learner **experiences** first hand (very different from a lecture). Called “geoethical simulations” because their content focuses on some ethical dilemma related to the earth, eg:

- A conflict among stakeholders over management of water along a river
- Competition among fishers for limited fish stocks (tragedy of the commons)

EduEthics for GeoEthics, EGU, Vienna
© 2017, Penelope Promoungert, David Craskal

Young citizen scientist, Chamonix

“Un seul mot d'ordre : la science participative. Vous collecterez des observations de terrain selon les protocoles établis par nos scientifiques pour compléter les données à disposition de la recherche. Vous serez également associés au traitement et à l'analyse de ces données pour découvrir ou approfondir la démarche scientifique.”
<http://blog.dreamontalanc.org/intentions-de-volontariat-a-chamonix-2017/>

Suivi de l'unité à Loriaz - juillet 2016 © 2016



Engaging learners, a few tips ...

People are **curious**. They need to learn about the Earth and the environment. Learning methods & activities that **engage** tend to be successful (for both motivation and for content).



1. **Curiosity** is especially important because it is a start of learning.
2. Show people the (positive and negative) **impacts** of their geoethical **actions** on the Earth, and thus on their families and their children.
3. Engage people in their learning and their learning process. People learn and understand better when they make **meaningful connections** between the Earth and their own lives.
4. Learning by **processing expérience** (compared, eg, with doing exercises in a book) is the most valuable, and long lasting for most people. Experience and its processing should include cognitive, skill and affective dimensions.
5. Know that people are different, with different learning **styles** and **preferences**. Some people learn better by drawing, by looking at pictures, by writing, by speaking, by working groups, by walking. It is thus important to include a variety of activities and materials.
6. Above all, people must process their experience to learn. This is done largely through various forms of formal and informal **debriefing**.

Project IDEALS - overview

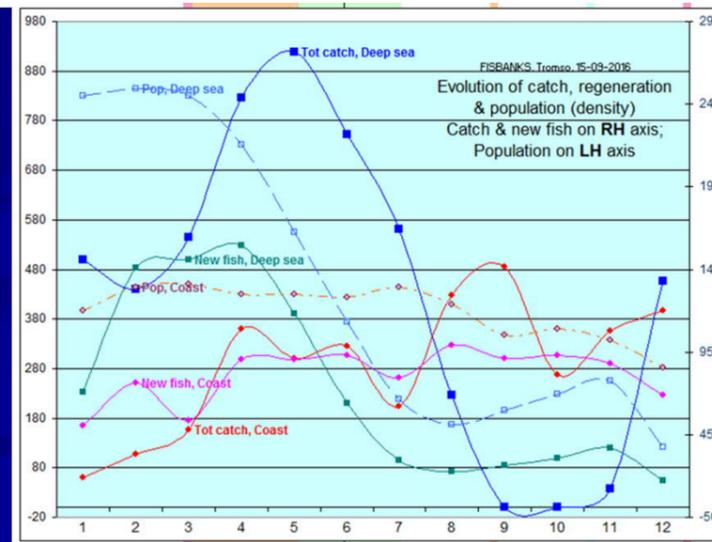
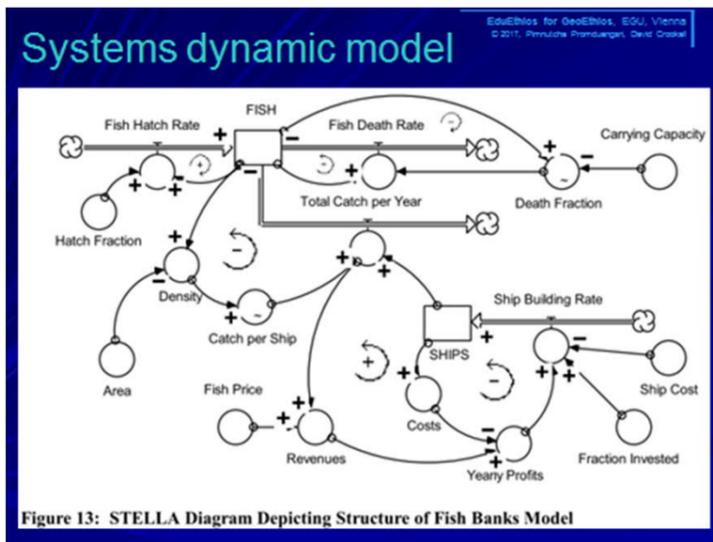
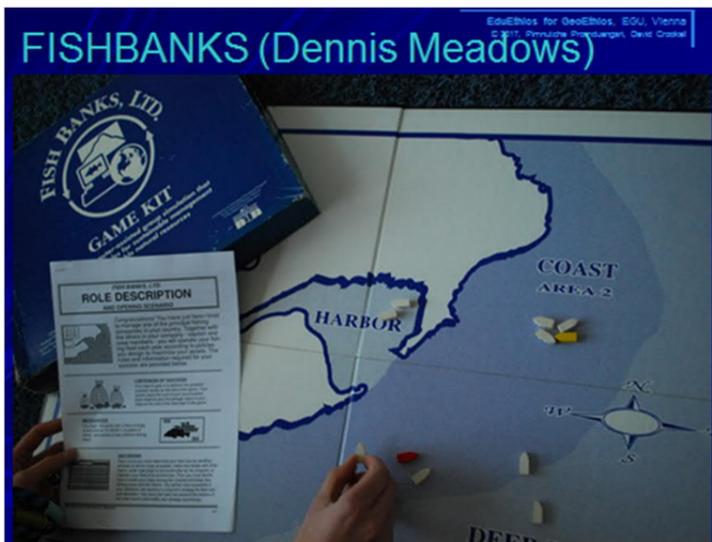
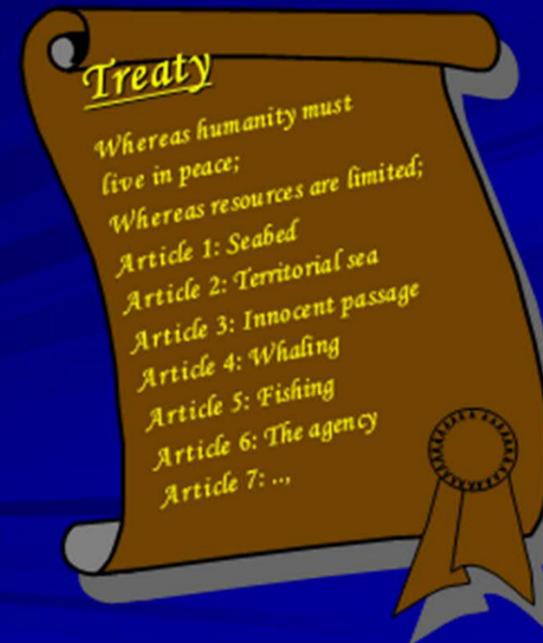
- o Teams = Synthetic countries, based on real; + Newspapers, Consultants, Pressure groups
- o Last run = with 27 participating teams:
 - o In 12 countries US, DE, HK, AU, CA, RU, JP, ...
 - o 800 participants; 40 facilitators
- o Learning objectives: Learn about the oceans, their resources, the politics, etc.
- o Sim goal: Write treaty ~ UNCLOS
 - o 3 weeks + 7 weeks + 4 weeks
 - o Internet: Before web (telnet); text + teleconfs
 - o First time Internet used in France for edu
 - o First time interactive Internet connection between USSR and USA

2b: Simulation/game: Objective

Negotiate the terms of a treaty governing the use and management of the oceans' resources

Compose the detailed text of that treaty

Uncanny resemblance with the real UNCLOS treaty



Debrief

Individual debriefing form (c) 2013 by David Crookall, for FISH BANKS, by Dennis Meadows

Name: _____ Fishing company: _____ Role: _____ Date: _____

Travaillez seul(e) et en silence. **Rappel: You are no longer in the simulation. Think back to your time in the simulation.** Inscrivez vos mots & phrases clefs (pas de longues phrases).

1. Quels étaient / sont vos différents **sentiments / émotions**?
 - a. pendant l'activité (excité, frustré, content, énervé, d'accomplissement, d'appartenance)?
 - b. maintenant?
2. **Qual?** Here just describe, do **not** explain or interpret. Qu'est ce qui s'est passé pendant l'activité? Do **not** try to explain or interpret here; be descriptive. Consider: Faits, événements, interactions. Decision processes. Teamwork in your company (clarity of objectives, role clarity, balance, responsibility, listening, etc). Ship allocation strategies used. Your company's achievements. Evolution of the fish stocks. Ship acquisition (purchase, trade, auction). Account keeping. Negotiation with other companies. Trust levels.
3. How well do you feel your company succeeded in the negotiations? How well do you feel the other companies succeeded?
4. A votre avis, **pourquoi?** Raisons & explications des événements en N°2 et succès ou échec en N°3. What **factors** encouraged success? What factors made things difficult? For example: How did **emotions** influence events? Did **communication** problems influence events? How did **negotiations** influence outcomes? What was the role of **greed** (the desire to become rich, the desire to become richer than others - to 'win' at all costs), and non-concern for next generations.

Individual form: (start)

Encourage all citizens to learn (together) → Civic edu-geo-ethics



It is relatively easy to think of and implement a wide range of civic edu-geo-ethical activities, some based round the local town hall.

- Weekly continuous ed **classes** about the environment, for parents / families.
- Outings or **visits** to local geoethically interesting places. For people, schools, parents, children.
- Schools, universities, associations participate , organize and/or subsidize edu-geo-ethical **activities**. Eg, Earthday, Climate March, Green trade fair, Green building demonstration.
- **Cinemas** (incl local libraries) organize environmental documentaries.
- Local **newspapers** and media given pride of place in all of above.
- International **exchange** programmes (twinning) based on geoethical principles are subsidized to allow more interaction.

All of the above **subsidized** by generous grants from businesses and central and local government.

Earth heroes game Apologies to people we omitted



a	Bill McKibben	Environmentalist & activist for climate change. First book was about global warming, called <i>The End of Nature</i> .
b	Charles D Keeling	Scientist interested in geochemistry of carbon and oxygen and other aspects of atmospheric.
c	Dana Nuccitelli	Environmental scientist and risk assessor has written for SkepticalScience.com and his recent book is called <i>Climatology versus Pseudoscience</i> .
d	David A Kolb	Educational theorist. The founder of Experience Based Learning System.
e	David Attenborough	Veteran broadcaster. <i>The nine Life series</i> .
f	Dennis Meadows	Scientist. Well known as the co-author of <i>The Limits to Growth</i> , and of FISHBANKS game.
g	Gavin Schmidt	Climatologist and Director of the NASA Goddard Institute for Space Studies (GISS) in New York.
h	George Monbiot	Writer. Known for his environmental and political activism and <i>The Land is Ours</i> .
i	Giuseppe Di Capua	Geologist at Istituto Nazionale di Geofisica e Vulcanologia (INGV) and Leader of the European Project ENVRI.
j	Iain Stewart	Geologist. Best known as the presenter of science programmes for the BBC.
k	James Hansen	Adjunct professor in the Department of Earth and Environmental Sciences at Columbia University. Well known for his research in climatology.
l	James P Sterba	Professor of Philosophy of University of Notre Dame. Well-known book called <i>Earth Ethics</i> .
m	Jane Goodall	Primatologist, ethnologist, anthropologist. Her 55-year study of social and family interactions of wild chimpanzees is best known.
n	Jason Box	Professor in glaciology at the Geological Survey of Denmark and Greenland.
o	John Abraham	Engineering professor, known for interest in climate science. Also known for global warming debate.
p	John Muir	Naturalist, author, environmental, philosopher. Also known as "John of the Mountains".
q	John Tyndall	Physicist showed that molecules of water vapour, carbon dioxide, and ozone are the best absorbers of heat radiation.
r	Jonathan Bamber	Professor in physical geography graduated from Bristol University. Was elected as the EGU President/Vice-President for the term 2016-2020.
s	Jørgen Randers	Professor of climate strategy at the BI Norwegian Business School.
t	Kattharin Hayhoe	Atmospheric scientist and associate professor of political science at Texas Tech University. In 2014, was awarded for her work on climate communications.
u	Ken Caldeira	Atmospheric scientist researches ocean acidification, climate effects of trees, intentional climate modification, and interactions in the global carbon cycle/climate system.
v	Kenneth E Boulding	Economist, educator and peace activist. The founder of numerous on-going intellectual projects in economics and social science.
w	Kevin Anderson	Deputy Director of the Tyndall Centre for Climate Change Research. An adviser to the British Government (as of 2009) on climate change.
x	Lester R Brown	Environmental analyst and founder of the Worldwatch Institute. Recent book is <i>The Great Transition: Shifting from Fossil Fuels to Solar and Wind Energy</i> .
y	Micheal E Mann	Climatologist and geophysicist. Known for Temperature record of the past 1000 years.
z	Nic Bilham	Director of Policy & Communications at the Geological Society of London and IAPG Corresponding Citizen Scientist.
aa	Paul Gilding	Environmentalist and author of <i>The Great Disruption: Why the Climate Crisis Will Bring On the End of Shopping and the Birth of a New World</i> (2011). Also a speaker of TED conference.
bb	Peter Wadhams	Professor of Ocean Physics, and Head of the Polar Ocean Physics Group.
cc	Rachel Carson	Marine biologist, author, and conservationist. Famous book is called <i>Silent Spring</i> .
dd	Richard Alley	Geologist and Evan Pugh Professor of Geosciences chaired the National Research Council on Abrupt Climate Change.
ee	Richard Heinberg	Journalist & educator who has written extensively on energy, economic, and ecological issues. Wrote a book called <i>The End of Growth</i> .
ff	Severn Suzuki	Environmental activist, speaker, television host and author. Known as "The Girl Who Silenced the World for 5 Minutes" because of her speech in Rio de Janeiro.
gg	Silvia Peppoloni	Researcher at the Italian Institute of Geophysics and Volcanology. Also IAPG Secretary General.
hh	Stephen Schneider	Professor of Environmental Biology and Global Change. Founder & editor of the journal <i>Climatic Change</i> .
ii	Vandana Shiva	Scholar, environmental activist, anti-globalization author and one of the leaders and board members of the International Forum on Globalization.