On the necessity of making geo-edu-ethics a central component throughout education
Proposed as an oral; retained as a poster

EGU General Assembly, 2019, *Geophysical Research Abstracts*: Vol. 21, EGU2019-2728
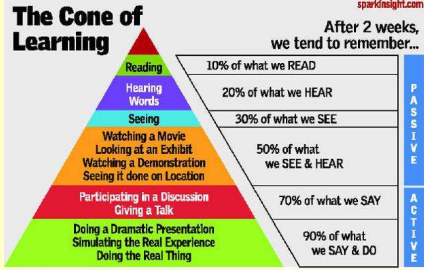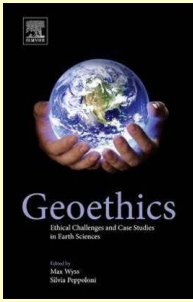
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On the necessity of making geo-edu-ethics a central component throughout education

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Abstract

In their convening abstract, Peppoloni et al remind us that "geoscientists are **aware** of their ethical responsibilities – towards themselves, colleagues, society and the environment"[a]. However, we must go well beyond awareness – we must go to **action**, specifically in **geo-edu-ethics**, a term coined to denote a nexus of Earth, education and ethics.

In this ~~paper~~ [poster], we will present two views of such action. Seen from a high level vantage point, we must reach the objective of ensuring that **geo-edu-ethics** becomes a **central component** of most courses in schools and universities **round the world**. From a grass roots viewpoint, we will provide an example of a small, easy-to-implement **pedagogical activity** of the sort that can quickly be adapted to a wide range of **subject areas** and **educational levels**.

> Geoscientists can promote a culture sensitive to the **environment** … . … **geo-resources** and geo-environment constitute a **common heritage**, to be considered as a cultural, **educational** and scientific value, as well as a **social capital**.

The above quote brings in the notion of **education**. It was taken from an NSF course titled "Teaching GeoEthics Across the GeoScience Curriculum"[b]. Our thesis here is that geoethics should play a central role across **all** curricular areas, not just in geoscience courses.

The IAPG Cape Town statement[c] stipulates that Fundamental Values of Geoethics include

> Promoting **geo-education** and **outreach for all**, to further sustainable economic development, geohazard prevention and mitigation, environmental protection, and increased societal resilience and well-being.

This suggests, but does not explicitly state, that **geo-edu-ethics** should be a **universal part of all education**, just as is maths and science today.

Coming down to **grassroots** level, we will show that it is perfectly possible to facilitate the learning of geo-edu-ethics in all disciplinary areas at **all levels** of education and training. A wide variety of interesting and pedagogically sound methods is available to enable facilitators of learning (aka teachers) to include aspects of geoethics in their training (courses).

We will outline a discussion **framegame**[d] that can be loaded with content adapted to course topic and level, for example, to university sociology or high school biology.

When teachers in most subject areas, at all levels, across the globe, begin to **educate** their pupils and students in the **geoethical aspects of life on Earth**, then humanity will have some hope of making it through the looming climate, environmental and societal crises.

This geo-edu-ethic objective needs to be taken to the **highest levels**, such as UNESCO, other UN agencies, universities, ministries of education, accompanied by pedagogical materials to enable geoethical learning across the curriculum. What better organization to initiate and enable it than the IAPG.

https://meetingorganizer.copernicus.org/EGU2019/session/32818. [Emphasis added.]
Peppoloni, S. (2014). *Foundations of Geoethics*. PPT Presentation. https://www.slideshare.net/sercuser/foundations-of-geoethics-36255381. [Emphasis added.]
http://www.geoethics.org/ctsg. [Emphasis added.]
A framegame is a game format or structure that came be 'loaded' with a variety of content. The one that we will present here was originally designed, tested and debriefed for a sustainable development workshop in Costa Rica.

Please also see our other poster about a charter for geo-edu-ethics

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Unethical human activity on geo-systems: Examples

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- 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)

How Drinking Water gets Fracked
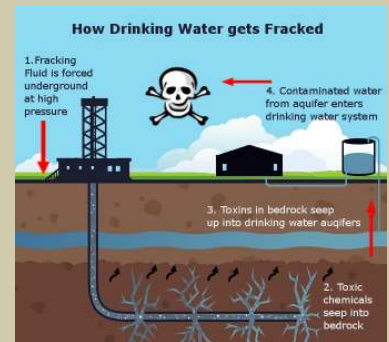
Offering solutions for Geo-Edu-Ethics & SDGs & behaving ethically for a healthy Earth

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- 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

7 CLEAN ENERGY
13 PROTECT THE PLANET
14 LIFE BELOW WATER
4 QUALITY EDUCATION
6 CLEAN WATER AND SANITATION
BBC BÂTIMENT BASSE CONSOMMATION

"We shall require a substantially new manner of thinking if mankind is to survive."

David Crookall
Pariphat Promduangsri
Pimnutcha Promduangsri

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Organizations concerned with Earth edu or promoting edu geoethics

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- **Climate Interactive**: helps people to work on solutions for climate change.
- **Camel Climate Change**: creates media ressources 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 unterstand 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

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Making **geoethics** the core of all **education** ➔ participatory experience
## Making **ethics** the core of all **geo-education** ➔ participatory experience

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- "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 **un**ethical.
- Doing experiential learning without debriefing is **un**ethical.

Organizations fighting for the Earth, for geoethics

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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 projets 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.
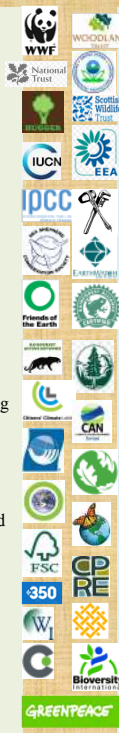
- **National Trust**: works for the nature and wildlife, and protects the environment.
- **Scottish Wildlife Trust:** protects the environment and wildlife and organizes volunteer group to conserve wild places.
- **Woodland Trust**: protects the forests for people and wildlife.
- **Sea Shepherd conservation 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.

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Geo-edu-ethics by **experiential learning**

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, Etc

Learning from experience

growing, the only way to 'deep learning'
• **Simulation/gaming, role-play**
• Field trips
• Internships
• Travel
• Conferences
• Research
• Disasters
• Film (documentaires)
• Everyday life & experience

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.chamonixland.org/initiations-de-volontariat-a-chamonix/2017

Concrete Experience → Reflective Observation → Abstract Conceptualization → Active Experimentation

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)

Engaging learners ethically & experientially, a few tips … [10]

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**.

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Plate tectonics: escape games and trip to the center of Earth

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In France, the program of the Earth Sciences for the 1st class (students of 16-17 years old) is driven by an historical approach. The official theme is called: "Plate tectonics, the story of a model". The teachers start with...

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

Project IDEALS - overview
○ Teams = Synthetic countries, based on real;
  + Newspapers, Consultants, Pressure groups
○ Last run = with 27 participating teams:
  ▪ In 12 countries US, DE, HK, AU, CA, RU, JP, …
  ▪ 800 participants; 40 facilitators
○ Learning objectives: Learn about the oceans, their resources, the politics, etc.
○ Sim goal: Write treaty ~ UNCLOS
  ▪ 3 weeks + 7 weeks + 4 weeks
  ▪ Internet: Before web (telnet); text + teleconfs

FISHBANKS (Dennis Meadows)

Debrief
Individual form:
(start)

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## Encourage all citizens to learn (together) ➔ Civic edu-geo-ethics [11]

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 contiuous 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.

Reading & Call for Papers SPRINGER NATURE [12]

Call for papers ➔
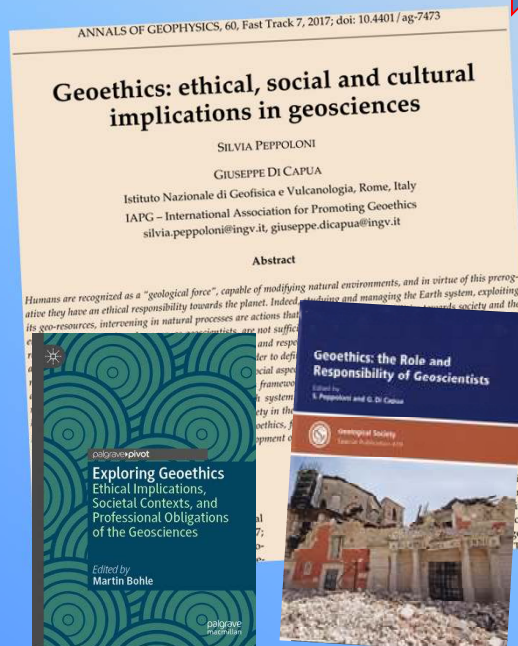
You are invited to submit an article to a special issue of a Springer Nature journal on the theme:

Learning Sustainability

https://e4l-jrnl.weebly.com/cfp-se-long.html

The issue brings together four main areas :
- **sustainability** of the Earth and humanity, including the **SDGs** & **climate change**,
- **experience** (of all kinds),
- **learning**, including experiential learning, and
- **ethics** of learning.

Articles need to be clear, but not necessarily high-brow academic. The journal aims to bridge lay community and science. See Section 2 on the CfP web page.

Please feel free to contact the lead guest ed here:
e4l.jrnl@gmail.com

We look forward to hearing from you.
Please forward this CfP to interested friends and colleagues.

ANNALS OF GEOPHYSICS, 60, Fast Track 7, 2017; doi: 10.4401 / ag-7473

Geoethics: ethical, social and cultural implications in geosciences

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Abstract

Humans are recognized as a "geological force", capable of modifying natural environments, and in virtue of this prerogative they have an ethical responsibility towards the planet.

Geoethics: the Role and Responsibility of Geoscientists
Edited by S. Peppoloni and G. Di Capua

palgrave pivot
Exploring Geoethics
Ethical Implications, Societal Contexts, and Professional Obligations of the Geosciences
Edited by Martin Bohle
palgrave macmillan

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