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Issues of Environmental Risk Management in the Greek Schools^(*)

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Leonardo da Vinci

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Environmental education the Greek schools

Priority issue since the early '80s - takes 3 distinct forms:

- **Formal environmental education** within the official school curricula.
 - ✓ Distinct chapters or themes within the syllabus of all subjects
 - ✓ Specific course 'Study of the Environment' for grades 1 to 4
 - ✓ Environmental viewpoint discussion of the course context

Especially intense in Science subjects,
Environmental aspects more profound than in other countries.

- **Optional environmental activities** through environmental education groups
 - ✓ On a voluntary basis beyond the formal school hours,
 - ✓ All teacher specialties may be involved –Science teachers lead
 - ✓ Study of a specific environmental issue,
Usually from the school (natural or social) environment.

- **Informal environmental actions** reflecting the local culture:
 - ✓ Of the specific school,
 - ✓ Of the school (social) environment.

Through the everyday school operation.



Environmental Risk and Risk Management

An ever-increasing concern of technology dependant societies:

➤ **Environmental hazards.**

- ✓ An ever-increasing concern of technology dependant societies
- ✓ Of natural causes (earthquakes, flood ...), or
- ✓ Due to human activity (pollution, chemical leaks, accidents, ...)

Environmental aspects more profound than in other countries

➤ **A real concern in our times due to:**

- ✓ Higher population concentrations,
- ✓ More intense environmental exploitation,
- ✓ More powerful technology,
- ✓ New products – materials with **properties mostly unknown to the public**

An otherwise environmental disaster may lead to catastrophic effects

→ Need for environmental risk management (~2Mi INTERNET hits)



Relation to the Environmental Education

Effective Environmental Risk → active public participation:

- To appreciate potential hazards- dangers (risk appreciation).
 - ✓ Consuming society → society in increased danger (risk society).
 - ✓ New materials with unknown proprieties → specific handling.
Opportunity for exaggerated(?) security airport measures
- To understand measures (Risk Management) of:
 - ✓ prevention, ✓ anticipation ✓ deterrence ✓ combat ✓ etc.



Environmental Risk and Risk Management Literacy

- Through education through the compulsory education especially.

Wider recent knowledge & new materials and processes → society influence inadequate



Purpose. How

- **Environmental risk,**
- **Environmental risk management, and**
- **Related issues,**

e.g. assessment, anticipation – avoidance, confrontation reduction, acceptance - retention.

are considered within the formal environmental education in Greek schools

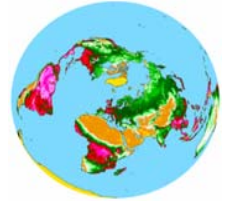
Methodology.

- **We examined the official school curricula and textbooks**
focus on the Environmental and Science subjects,
- **We searched the literature on optional Environmental activities**
limited (scarcity of works), mostly our own works + guidelines and circulars,
- **We used our experience with school education activities and culture**
to cover informal environmental actions (only available resource)



Notes.

- **We used the (rather naïve) approach of textbook pages** to indicate the extent environmental risk management issues are covered.
- **Objectives of environmental education and textbooks in discord** interdisciplinary approach only in the 'Study of Environment may be traced.
- In **Humanities** the focus is towards the appreciation of **local culture**.
- In **Science** subjects there is a more systematic approach towards **knowledge** of the natural environment
- For the formal environmental education we **focused** on the subjects:
Study of the Environment, Chemistry Physics
- **Geography (natural and human)**
surprisingly, no topics related to environmental risk and risk management in syllabus
- **Biology** an incidental mentioning to genetic engineering is mentioned.
- **Other courses** only incidental references



Primary School grades 1-6 Ages 6-12.

➤ **Courses examined:**

Study of the Environment (grades 1-4),

Science – a combined course of Physics, Chemistry, Biology ... (grades 5-6) .

➤ **Ages: 6-10 years (grades 1-4).**

➤ **Objectives:**

appreciation of the natural and the human environment

understanding the interrelations between environmental constituents

➤ **No specific provision** for environmental risk and risk management topics

with the exception of earthquakes (see later) occur only incidentally.

➤ **Suggested teaching approaches** provide the opportunity

to discuss aspects of environmental risk and of risk management.



Primary School grades 1-6 Ages 6-12.

- **Relevant issues cover about 15% of the textbook**
starting from almost 10% for the 1st grade (age 6) and increasing to about 20% in the 4th grade.
Situation similar with the course 'Science' for the 5th and 6th grade.
- **Water, Water management and related risks (pollution, flooding, ...)** mostly
80% in the 1st grade to 50% in the last
- **Other topics** include (2 different instances each topic):
 - ✓ **Fires, Energy,**
 - ✓ **Thunder Storms,**
 - ✓ **Food chain**
Food webs (or networks) ignored
→ misconceptions, e.g.
Elimination of one prey
→ elimination of all its predators
 - ✓ **Landscape forming,**
 - ✓ **Wind Storms,**
 - ✓ **Ecosystems, (7 different instances)**
- **Risk assessment** is the specific risk aspect **favoured** with instances on:
- **Reduction** (treatment of household wastes, alternate energy sources), and
- **Anticipation** (e.g. river bed or coast line shaping to anticipate flooding).



Gymnasium grades 7-9 Ages 12-15.

- **Courses examined: Chemistry, Physics (2nd and 3rd year grades 8-9).**
- **Suggested teaching approaches and incidental provisions in 27 instances.**
- **Relevant issues cover only 3% of the textbooks**
 - Chemistry 9% and 5% of the textbook for the 2nd and 3rd year respectively,
 - Physics 1% and 1% of the textbook for the 2nd and 3rd year respectively.
- **Risk aspect mainly on Risk perception**
 - Focus on knowledge → presentation (only) of the different risk parameters
no estimations or relative importance of the different risk factors involved.



Gymnasium grades 7-9 Ages 12-15.

- **Most of the topics are related to Water 70% (19 instances). Adopted viewpoint extending into:**
 - ✓ **Pollution** (including detergents, fertilizers, quality of drinkable water, eutrophication),
 - ✓ **Management,** ✓ **Dams,** ✓ **Hydro electrics,**
 - ✓ **Waste water,** ✓ **Drought,** ✓ **Etc.** ✓ **Acid rain,**
- **Other Topics** include (each with one 'en passant' instance):
 - ✓ **Volcanoes,** ✓ **European and Greek legislation,** ✓ **Sustainable development,**
 - ✓ **Rio and Kyoto conventions** ✓ **Greenhouse effect**

<http://www.biodiv.org/default.shtml>
<http://www.unece.org/trade/kyoto/ky-01-e0.htm>,



Lyceum grades 10-12 Ages 15-18 (influenced by the Tertiary education entrance examinations).

- **Courses examined: Chemistry, Physics**
general –common courses taught in all 3 years, and
'specialty' courses in 2nd and 3rd years ('Mathematics and Science' and 'Technology paths')
address somewhat more than the 2/3 of the Lyceum students (<~1/3 in Humanities path)
- **Suggested teaching approaches and incidental provisions in 26 instances.**
- **Relevant issues cover only 2% of the textbooks** mostly in general courses.
1st year: Chemistry 8%, Physics 5%, Total 1st year 4%.
- **Risk aspects as in Primary school and in Gymnasium**
With a wider variety of topics
- **Topics** include (each with one or two instances):
 - ✓Volcanoes, ✓Nuclear wastes, ✓Green house effect, ✓Industrial wastes,
 - ✓Acid rain, ✓Radioactivity, ✓Nuclear explosions, ✓Sea waves and tsunami,
 - ✓Emission of chlorofluoro compounds and ozone hole,
 - ✓Earth waves and anti- seismic measures,



Technical Vocational Education (after compulsory education - Gymnasium)

- Only **3 instances** were found covering about **7% of the textbooks**.
rather expected due to the technical vocational orientation of the schools.

- **Topics Covered:**

- Earth waves and anti-seismic measures,**

- with a rather extensive (8 pages) presentation on seismic waves and protective measures,

- Acid rain,**

- Air pollution.**

- **However**, depending on the specialty study path followed, specific courses on job environment and safety exist.
- These were **not analyzed** as they were considered **specialist's education**.



Optional activities (in general education schools)

➤ No definite syllabus

Activity planned by the 'environmental group'
students and teacher (s) decide on the topic to study,
Topics mostly from the immediate vicinity of the school,
Quite a few are of a more general nature,
No significant variations between short and long term activities

➤ Literature limited → our own work

Based on the project titles from the reports submitted (mostly financial accounts).

➤ 193 projects analyzed between short and long term activities

89 (46%) on the natural environment,
91 (47%) on the human environment,
13 (7%) of a combined character.

➤ The majority of the projects undertaken:

Provide opportunities to study environmental risk and risk management,
Especially for the projects related to the natural environment (almost all),

However focus on environmental education

→ environmental risk and management aspects only incidentally



Informal activities (in all schools)

- **No records**
- **From ongoing studies: activities not systematic but numerous**
- **Subjects: Pollution, Waste treatment and landfills, road traffic safety**
- **Aim is a clean and safe school environment**
- **Environmental risk and management aspects discussed incidentally**

Theodore Antoniou, 'Environmental Issues on the Newspapers of HERAKLION – CRETE',
2nd International Conference on Hands on Science Hsci2005 – Science in a Changing
Education, July 13-16, 2005 – Greece, The University of Crete campus at Rethimno
(<http://www.clab.edc.uoc.gr/2nd/>).



Earthquakes (in all schools)

➤ High seismic activity in Greece

4R ~1 per week, half of all seismic activity in Europe within Greece



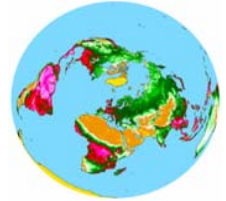
➤ Special measures in all school levels, including:

➤ Anticipation measures:

- ✓ guidelines on what to have ready before an earthquake,
- ✓ how to behave during an earthquake,
- ✓ what to do afterwards,
- ✓ Etc.

➤ Drills (at least once per year) to apply the guidelines,

➤ Specific courses on the anti-seismic measures – regulations.



Comments

Environmental risk and risk management only **incidentally** discussed

within the broader context of environmental education

despite their significance

a situation common to other European countries.

→ people mostly unready to extreme situations and hazards

Their importance is not being appreciated

An inertia result, perhaps, from the past where environmental intervention was rather limited and required a long time to be noticeable. Not any more (advanced and more powerful technology).

Similar attitudes - a couple of decades ago - on environmental education. Now

United Nations through the

UNESCO and the ISDR (International Strategy for the Minimization of Destructions)

organize specific actions on the subject.



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Comments

Environmental education should be enhanced to include in a systematic way issues of environmental risk **and of environmental risk management.**

Need for appropriate (education) material and means.



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On environmental Risk and Risk management



SGE – Safety Goes Europe On safety issues (from materials, processes, ...).

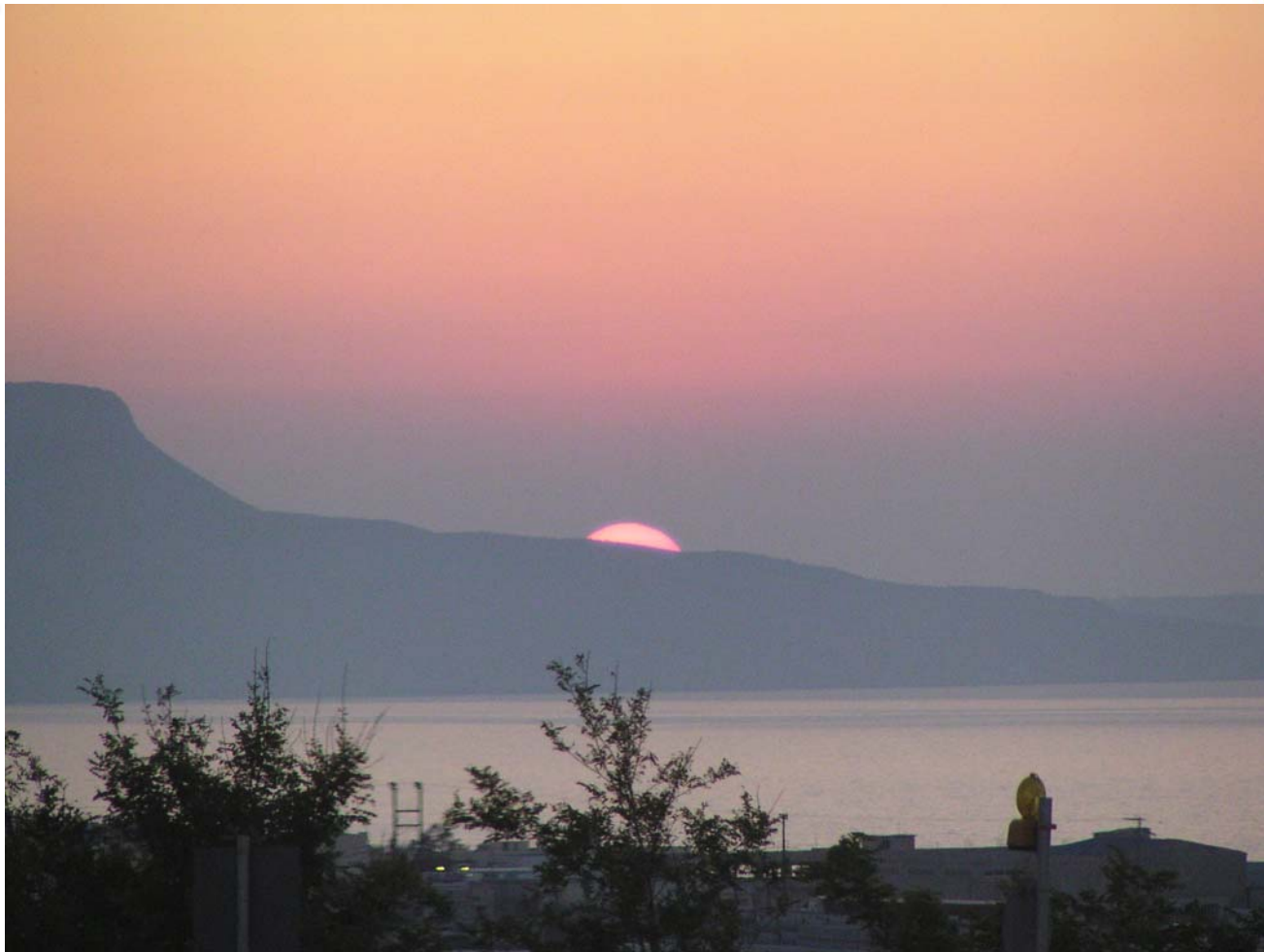
<http://www.clab.edc.uoc.gr/sge/>



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A view from The University of Crete campus at Rethimno

Thank you