



époque

Environmental Portfolio
for Quality in University Education

Erasmus+ 2014-2016 2014-1-EL01-KA200-001373
EPOQUE University of Ioannina



DURATION 24 months

PARTNERS University of Ioannina (coordinator) | University of Helsinki (FI)
Hellenic Open University (EL) | University of Naples (IT)
BEST Institut für berufsbezogene Weiterbildung und Personaltraining GmbH (AT)
Projects In Motion limited (MT)

Objectives

- Higher Education priorities
- The project **ÉPOQUE** promotes a smart specialization of prospective teachers, scientists and engineers through an environmental portfolio ready to be integrated into the university syllabuses. It creates a new generation of green teachers, green scientists, green engineers in the context of higher education modernization agenda connected to SMEs and organizations (including schools).

Target groups

University students | University teachers
Adult learners | Adult education teachers / trainers
Pre-primary, primary and secondary schools | SMEs



Contact details

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Activities

1

Development of an Environmental Portfolio for all participating institutions, focusing on an interdisciplinary and international approach. (Leader: **UOH** - Participants: **All**)

Development of tools and didactic manual to accompany the courses; (Leader: **UNINA** - Participants: **All**)

Development of guidelines for the establishment of an Energy Management System in selected schools and SMEs; (Leader: **PiM** - Participants: **All**)

2

Validation period of the courses developed, reinforced with the organisation of an ISP and blended mobility, during which the students will attend the common course, carry out an internship and develop an EnMS for the selected schools and SMEs; (Leader: **UOH** - Participants: **All**)

Collection of feedback from the validation period and the ISP, with the aim of tailoring the project intellectual outputs and ensuring they address the needs identified;

3

A series of dissemination activities (workshops and a final conference, distribution of four newsletters related to important project milestones, a project flier and logo) (Leader: **Uoi** - Participants: **All**)

5 transnational meetings for the management and the implementation of the project (Leader: **All** - Participants: **All**)

Preparing the conditions for integration of the course into the departments' curricula/syllabus, joint degrees or certifications (Participants: **All**)

6 regional/national training workshops with adult learners/stakeholders (Participants: **All**)



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Energy Management Systems (EnMS)

Projects in Motion, PiM Malta



Introduction

In view of the world's growing dependence on energy availability, the need for energy management is now felt more than ever. It is essential to save on energy use in order to :

- reduce the damage that we're doing to our planet
- reduce our dependency on fossil fuels which are limited in supply

Energy management is the process of monitoring, controlling, and conserving energy in a building or organization; and key to reducing greenhouse gas emissions. Energy management systems (EnMS) are key to controlling energy consumption and to reach energy efficiency targets.

By the end of Course IV of the EPOQUE portfolio of courses, the learner will be able to promote and implement EnMS systems within any organisational setup. Considering the shift towards more energy efficient modes of operation within industry, public buildings, offices, etc., this course aims to enable the learner to enter the workforce with the required skills for EnMS management.

Methods



An EnMS is an ongoing process of identifying, planning and implementing improvements in the way an organisation uses energy. A holistic EnMS builds business value by acknowledging the importance of energy conservation as an essential business principle, and by establishing lasting processes to monitor and achieve best practices in the use of energy resources.

The implementation of an effective EnMS will provide the framework to deliver on an organisation's energy objectives. EnMSs are ongoing processes and need to be treated as such. Consequently, continual monitoring and updating of the implemented measures is a must.

Course Content

This course is based on the ISO 50001:2011 framework and aims to empower the learner with the necessary skills to be able to argue in favour of energy conservation through energy management, to assess the performance characteristics of a building/organisation, and to develop policies and structures. These are necessary steps for an effective EnMS.

The course is divided into 4 modules:

• **Module 1: ENERGY**

This module is an introduction to the various sources of energy available together with their effects in a global scenario. The state of energy consumption trends in Europe will be discussed and analysed in the light of the EU's energy priorities and targets.

• **Module 2: ENERGY POLICIES & STANDARDS**

The various major energy regulating/guideline documents will be covered in this module together with a highlight on the major benefits obtained by an organisation when investing in itself by controlling, reducing and monitoring its energy consumption. Amongst others, the standards covered are:

- ISO14001:2001 - Environmental Management Systems
- ISO 9001:2008 - Quality Management Systems
- EMAS - Eco-Management and Audit Scheme
- ISO 50001:2011 - Energy Management Systems

• **Module 3: ENERGY MANAGEMENT SYSTEMS**

Based on the framework provided by the ISO 50001 standard, this module will prepare the learner to design and implement an EnMS for an organisation/building. Students will be provided with the necessary skills required to collect and interpret data of energy consumption, identify and quantify opportunities to save energy, target those opportunities and track any energy savings.

• **Module 4: FIELD WORK**

Putting in practice all the topics covered in Modules 1,2 and 3 through the development of an EnMS within a school environment.

Bibliography

- ISO 50001: 2011 Energy management systems - Requirements with guidance for use 2011 - International Organization for Standardization http://www.iso.org/iso/catalogue_detail?csnumber=51297
This voluntary standard provides guidance and requirements for EnMS. It is intended to establish a framework valid across all sectors of the economy, and will assist facilities to create transparency and promote best practice in energy management systems. This standard is useful for personnel responsible for designing and implementing an EnMS and in any organisation type and size.
- Handbook: Step by step guidance for the implementation of energy management 2007 - Intelligent Energy - Europe (IEE) <http://www.ee-ip.org/theme/post/energy-management/iee-library-bess-handbook-step-step-guidance-implementation-energy>
The handbook provides a framework for implementation of an EnMS, including both organisational and technical aspects. This resource is aimed at SMEs and is relevant across multiple sectors.
- Making the Business Case for a Carbon Reduction Project 2009 - UK Carbon Trust <http://www.carbontrust.com/resources/guides/carbon-footprinting-and-reporting/making-the-business-case-for-a-carbon-reduction-project>
Proposers of carbon reduction projects often encounter inherent issues when attempting to have energy and carbon projects approved for implementation. This document asks questions that help the reader determine who makes the decisions in the organisation and how to engage with these stakeholders. It discusses how to build a business case, including: considering finance and risk, competing for funds, and drafting / presenting business proposals.
- From Shop Floor to Top Floor: Best Business Practices in Energy Efficiency - PEW Center on Global Climate Change http://www.c2es.org/docUploads/PEW_EnergyEfficiency_FullReport.pdf
This report documents the efficiency strategies of many companies, distilling best practices and providing guidance plus resources for other businesses.

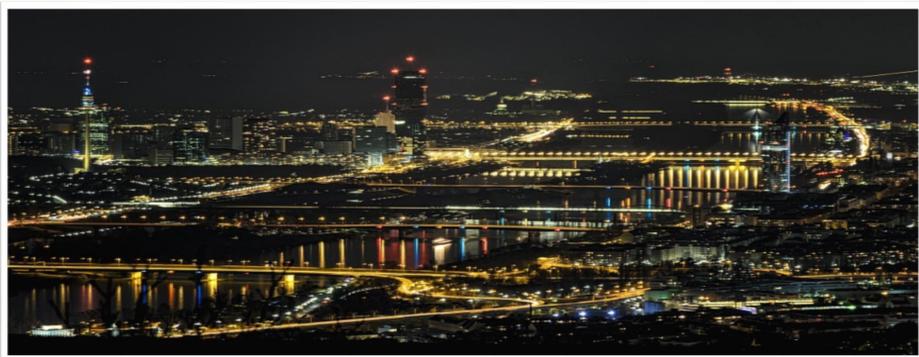
GREEN ENTREPRENEURSHIP

“Blue Minds” Company, Factory and Greentech Incubator

A Best Practice example for the promotion of Green Entrepreneurship in Austria

The Company

The Blue Minds company was founded in 2014 and is based in Vienna. It has a network with South-East-Europe, Turkey and Middle East and North Africa, including a subsidiary in Tel Aviv, which develops software for digital energy services.



It works on business models for energy transition and collaborated with other companies in the areas of research, consulting and communication. As start-up incubator, Blue Minds provides mentoring and support for new businesses with creative ideas in their area of energy transition.

Blue Minds Factory

The “Blue Minds Factory” is an incubator of the Blue Minds company, which addresses new businesses in the field of energy transformation. The term of energy transformation comprises in particular energy efficiency, smart energy technologies and infrastructure, as well as sustainable mobility. On a larger scale, it is related to city life, modern ways of water use and agriculture. The fields are combined with the opportunities of digital trends. Blue Minds supports business founders as a sparring partner and mentor with comprehensive services on the topics of



management know-how, sales & markets, financing & development, infrastructure, and scientific, public and private-sector network.

Greentech Incubator

“Innovation in the district” is an incubation programme for sustainability in Vienna. The aim is to promote projects on climate and raise public awareness for the importance of green technology.

An additional objective is to promote the city of Vienna as an attractive destination for business start-ups, with a special focus on of the importance the Viennese districts. The programme is supported by the Municipal Department 20 – Energy Planning.

In frame of the project, the Blue Minds company accompanied eight start-up businesses with their start and development phase and mentoring, taking into consideration the individual business needs by providing tailored solutions. In detail, the focus lies on community building and networking, marketing and public relations, various workshops, sales support, advice on energy efficiency law and exploring of financing options.



In February 2016, the “graduation” was celebrated in a “summit event”. The company announced that the programme will probably continue this year.

Useful links

Green potential in Vienna
thegreencity.com/tag/vienna

Sustainable entrepreneurship award
www.se-award.org

European project on Green Entrepreneurship:
ec.europa.eu/epale/en/content/henge-invites-adults-learn-green-entrepreneurship

Bibliography

1. <http://www.blueminds-company.com/en/about/>
2. <http://www.blueminds-company.com/en/greentechinkubator/>
3. <http://blueminds-factory.com/about/?lang=en>

An insight into the qualitative features of the Finnish education system.

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Introduction

Finland is continually ranked as the best or amongst the best-performing countries in the world in regard to the high quality of educational opportunities provided. Such an achievement reasonably brings up the question of which are the particular characteristics of the very system that make it so high-performer. The answer lies in a concise account of the basic guidelines for the arrangement of all the schoolwork- and the daily school routine based both on the NCC and the consideration of the special circumstances and needs of the local children and their families.



Conclusion

The key characteristics of the Finnish education system:

- emphasis on the active role of the pupil
- focus on learning rather than testing
- creation of a collaborative playing and learning environment through inspiring activities
- promotion of students' autonomy and holistic development.

Method

The researchers conducted a short-term observation of the main qualitative features of the Finnish basic education. The data gathered during the teaching assistant's role comprise **recordings, pictures, videos, interviews and notes** and shed light upon the different aspects of the implemented curriculum.

Results

- Finnish curriculum is designed with a great focus on intertwining students' school reality and their everyday life. Apart from the main subjects –such as mathematics and grammar- every child attends knitting, sewing, wood crafting and cooking classes.
- Instruction is inclusive and participatory while at the same time adapted and oriented to meet every child's individual needs. There is at least one helper inside every classroom.
- School life sees to provide a basic daily meal, dental & health care and counseling for all.
- Positive disposition both from students and teachers towards the school life as reflected from the interviews they gave us.

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Environmental awareness – just a first step forward!

Comparative study between Greek and Finish middle school students' pro-environmental attitudes and behaviors.

Lina Vraka in collaboration with Efthalia Arvaniti

Recent decade has marked persistent and urgent calls of EU policy makers to raise its citizen's environmental awareness. It is hoped that increased awareness will eventually lead to individual and collective pro-environmental choices and behavior. Therefore widespread citizen education campaigns on sustainability were launched. Environmental awareness became part of curriculum in EU schools in hopes that informed students will make sustainable choices and adopt appropriate behavior.

This study focuses on whether environmental awareness alone is enough to influence adolescent students' behavior

During the formative adolescence years it is most likely that individuals will adopt sustainable behavior patterns, which will stem from environmental awareness combined with maturation of cognitive abilities, and maintain them though adulthood. (Yurgelun–Todd, 2007). This is due to the fact that 15 year old individuals develop (Deborah & Russell, 2005):

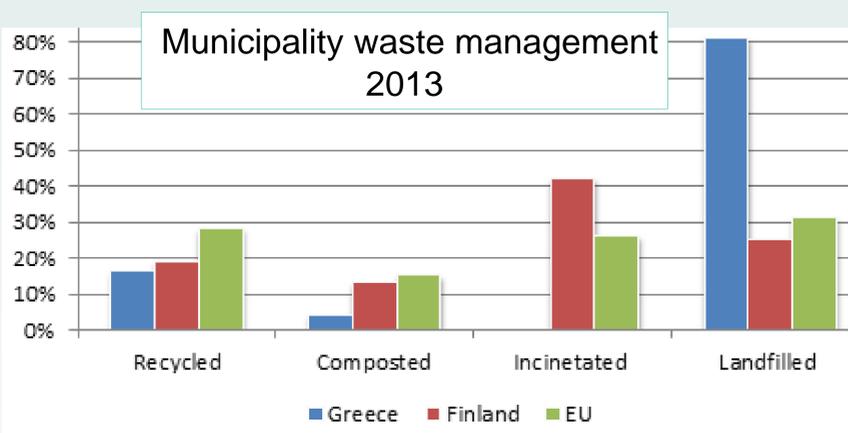
- Abstract thinking and ability to reason,
- Increased ability to read social cues,
- Personal identity,
- Personal choices for ideology,
- Sense of responsibility for self and others,
- Personal behaviors.



Research, indicates that mere raising of environmental awareness is not sufficient. It is proposed that in order to influence behavior additional factors such as

- contextual support,
- social norms,
- and ease of actions

need to be addressed along with attitudes (McKenzie-Mohr, 2000).



Due to EU policies environmental awareness is promoted through school curriculum's in both countries. However, statistical data shows that Finnish culture supports sustainable behavior much more than Greek.. We suggest therefore that Finnish students have the advantage of additional factors empowering their sustainable behavior.

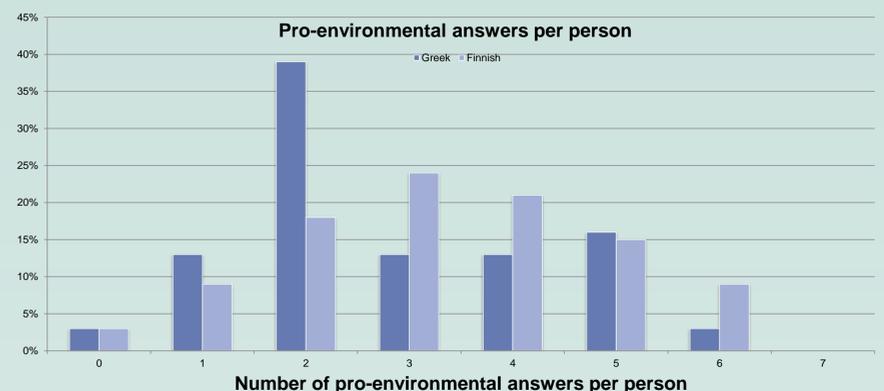
Data sample (Finland n=33, Greece n=31):

- 15 years old, 10 years of formal education
- Non-science classroom setting in order to have more genuine answers that revealed:
 - Understanding of sustainability issues at large,
 - Possible adopting of sustainable behavior.

Research limitations:

- Small sample and limited range of gathered data
- Insufficient knowledge of allocated and interrelated hours for environmental education during compulsory education in either country.

Findings



Finnish students steadily outperformed Greek students in choosing pro-environmental answers.



They also seemed to have a better understanding of how awareness leads to changes in behavior (questions 5,6,7).

Conclusion

Students in both countries have a good grasp of environmental issues. However, Finnish students consistently outperformed Greek students and showed a much greater inclination to adopt sustainable behavior. These findings reiterate Arbuthnott (2009) in that if environmental awareness is to translate into altered behavior, education must assist people to act in ways consistent with their values.

References

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Industrial Sustainability

Good Practices

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George Efthimiou, Mathematician



Sustainable industries is a term first mentioned in 1990 in a story about a Japanese company that wanted to reforest a tropical forest with a view to create a sustainable industry for the local community. (Dietrich, 1990)



Figure 1. Pääjät - Hämeen Tekstiilihuolto Lahti, Finland



Figure 2. Heat Recovery Systems

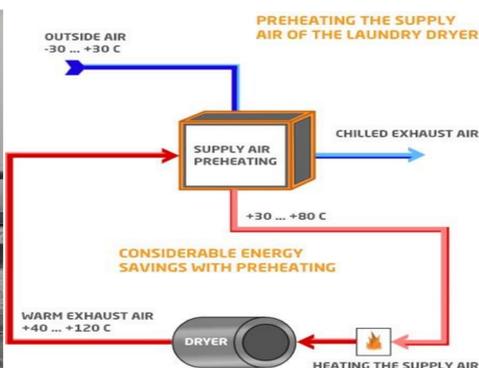


Figure 3. How the heat recovery system works

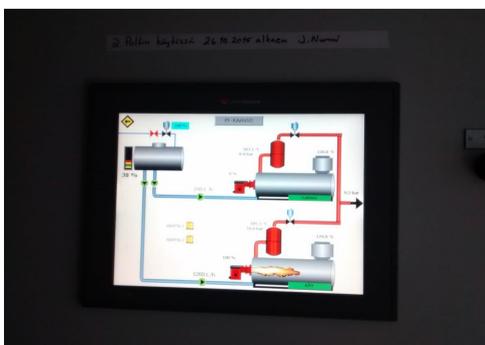


Figure 4. Steam Generator Control Panel



Figure 5. Steam Generator



Figure 6. Wastewater Treatment



Figure 7. Heat Conveyor

Pääjät - Hämeen Tekstiilihuolto (Figure 1) is a regional textile maintenance company in Lahti, Finland that handles laundry from hospitals, refugee centers, veteran and retirement homes. It was granted an enterprise-wide ISO 14001 certification in 2015. Being part of the laundry industry, a significant amount of energy is consumed both for washing and drying. In three years time it has managed to reduce energy consumption by 43% (about 400MW per month in 2012 to about 250 MW in 2015) (Figure 8).

Reducing energy consumption, therefore energy costs and resources has been greatly achieved with the help of modern technology.

- Replacing lighting with LED bulbs, led to a whopping 80% savings in energy costs and a 3-year payback time.
- Steam is essential for the operation of the plant. A steam generator has been installed that consumes 110MW per month and is closely monitored to avoid energy overuse. It is the plant's primary goal to become steam free but currently achieving this, meets many challenges (Figure 4 & 5).
- A significant amount of energy is consumed in the laundry industry for drying the laundry. Replacing the conventional exhaust pipes with heat recovery systems (Figure 2), typically, all the heat energy the dryer produces is blown away into air and the supply air is taken straight from the outside air. With this upgrade, the CO2 emissions were reduced as much as 50% (Figure 3 & 7). Furthermore the drying period shortened by 25%, enhancing production capacity of the laundry.
- A significant amount of water is also used. Wastewater treatment greatly decreases water consumption by disinfecting wastewater from the washing machines suitable for reuse (Figure 6).

The plant is currently planning to install solar panels. Solar panels would produce 43 MW per year which is about 10% of the plant's electricity. The only setback is payback time which is almost 30 years.

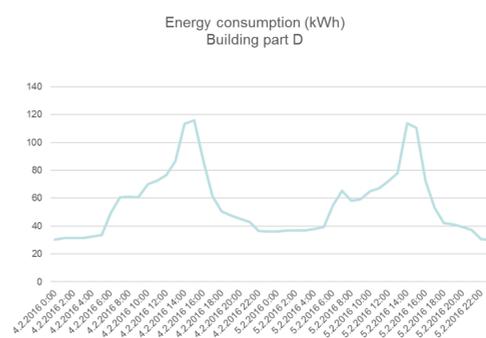


Figure 8. Daily energy and water usage logs are kept

Unmistakably, achieving sustainability within in the industrial sector is no easy task. [...]there are a number of barriers to the implementation of industrial sustainability ideas. For a start, it is unclear what industrial sustainability means in practical terms. (Subashini, Farrukh, Phaal and Probert, 2004)

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Environmental Issues in University Curricula

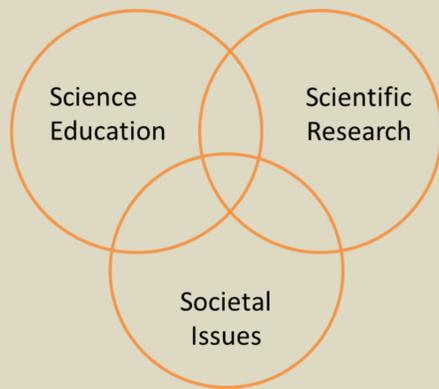
Lessons learnt in the framework of the ÉPOQUE project

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Based on our experience as science education researchers, we entered this project with the belief that the need for modernised environmental curricula in Universities should be based on a change in the epistemological perspective about what science and science education are meant for. This change of perspective should go in the direction of merging the issues of scientific thought with educational, cultural and societal issues in order to construct a brand new and holistic approach to environment and sustainability. In this perspective environmental issues are brought into a wide scenario that involves social, economic and cultural issues and are linked to a general idea of social equity.

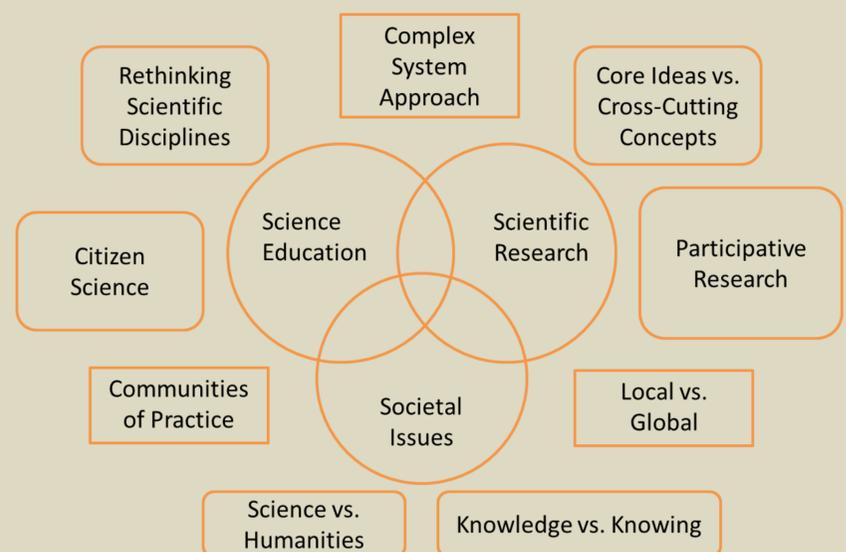


Building upon these premises we moved along the project schedule trying on one side to collect evidence about the need for change we identified and on the other to contribute to the work of the ÉPOQUE Consortium in building resources that are aimed at supporting this need for change.

The investigations carried out within ÉPOQUE Output 1 confirmed that environmental curricula in Italian Universities are based on a culture of environmental issues that fails to embody their huge complexity and more in particular fails to connect the strictly scientific and technological aspects of these issues with their broader cultural, social, economic, political implications. While University curricula pretend to be based on a multidisciplinary approach, they actually fail in developing environmental science as an independent discipline and they construct competencies that are the result of a sum rather than an integration of disciplinary contents.

The development of the **Environmental Portfolio**, which is the main intellectual output (O2, which is to be considered together with the associated O3-Didactic Manual) of the ÉPOQUE project, was deeply influenced by the results of O1 and allowed us (and the Consortium as a whole) to deepen our views about new directions to be undertaken in the development of University curricula on environment and sustainability.

The validation of O2 and O3, which was mainly carried out during the Intensive Study Programme (held at the University of Ioannina in November 2015) helped us in declining the concepts, methods and perspectives that are suitable to develop the holistic point view about science which was the starting point of our reflections within this project. The map on the right gives an overview of the factors we have taken into account in designing the final version of the Portfolio, which will be delivered in the form of an online course aimed at university students (O5).



The students' internship (which we hosted during February 2016) was a further opportunity to put to the test the holistic approach to environment we outlined during the whole project.



Visit to a regional waste collection and recycling plant



Visit to a university lab working on photosynthesis in extra-terrestrial environments



Visit to a NGO and participation in their educational activities with children



Visit to the archaeological site of Pompeii

The weekly programme of activities we offered to the visiting Finnish students was meant to give them a chance to get in touch with a number of different actors (university researchers, administrators and policy makers, representative of citizens' committees, members of NGO's, entrepreneurs involved in the waste management cycle) which are committed with different environment-related activities.



EPOQUE

Science and Sustainability Festival





ΗΜΕΡΙΔΑ ΠΕΡΙΒΑΛΛΟΝΤΙΚΟΙ ΠΕΙΡΑΜΑΤΙΣΜΟΙ



Το Πανεπιστήμιο Ιωαννίνων,
η Ερευνητική Ομάδα για τις
Κοινωνικοπολιτισμικές Προσεγγίσεις
στη Διδακτική των Φυσικών Επιστημών
@fise group και η
Αν. Καθ. του Π.Τ.Ν. Σχολής Επιστ. Αγωγής,
Κατερίνα Πλακίτση

ΠΡΟΣΚΑΛΟΥΝ

τους εκπροσώπους των
Περιβαλλοντικών και Παιδαγωγικών
Οργανισμών, τους Ερευνητές και
Πανεπιστημιακούς, τα σχολικά
δίκτυα και όλους τους
ενδιαφερόμενους για την Εθνική
Περιβαλλοντική Πολιτική στην
Ημερίδα με θέμα

ΠΕΡΙΒΑΛΛΟΝΤΙΚΟΙ ΠΕΙΡΑΜΑΤΙΣΜΟΙ

Πέμπτη 14 Απριλίου 12:00 – 18:00

Παιδαγωγικό Τμήμα Νηπιαγωγών

Αμφιθέατρο, Αιθ. 5 & 6 (1^{ος} όροφος)

Πανεπιστήμιο Ιωαννίνων

Είσοδος Ελεύθερη

ΣΥΝΕΔΡΙΟ Erasmus+

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