GEO-ACADEMY
GEO-Hub for teachers in Europe

GEO-Academy: Innovative digital GEO-Tools for enhancing teachers' digital, green and spatial skills towards and effective STEAM Education for Sustainability Development

ΠΑΙΔΑΓΩΓΙΚΟ ΙΝΣΤΙΤΟΥΤΟ ΚΥΠΡΟΥ

Αξιοποίηση γεωτεχνολογιών για την ενίσχυση χωρικών, ψηφιακών και πράσινων δεξιοτήτων στο πλαίσιο της Εκπαίδευσης STEM+ και της Εκπαίδευση για τη Βιώσιμη Ανάπτυξη

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Beginning in June 2023, GEO-Academy will establish over 36 months a network of teachers and teacher trainers and develop training resources as well as an international Community advocating to enhance STEM+ Education (science, technology, engineering…..), **through the inclusion of Geographic Information Systems (GIS), Global Positioning Systems (GPS), Remote Sensing (RS) and Earth Observation (EO) in Education for sustainable development (ESD).**

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By targeting both *pre- and in-service teachers*, GEO-Academy aims to *enhance educators' digital competencies, green skills, and spatial skills*, enabling them to **incorporate inspiring examples of environmental and climate phenomena using real world data through digital storytelling across a range of subject domains.**

Εκπαίδευση STEM+

Η ενίσχυση χωρικών, ψηφιακών και πράσινων δεξιοτήτων για την Εκπαίδευση για τη Βιώσιμη Ανάπτυξη

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- Το Ενοποιημένο Πλαίσιο Δεξιοτήτων του Έργου «GEO-Academy»
- Δείκτες Επιτυχίας και Επάρκειας Αναλυτικού Προγράμματος και Ενοποιημένο Πλαίσιο Δεξιοτήτων του Έργου «GEO-Academy»
- Σκιαγράφηση STEM+ διδακτικών δράσεων/δραστηριοτήτων - Αξιοποίηση ιδεών και γεωτεχνολογιών του Έργου «GEO-Academy»

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E-Learning modules for Geo-Academy

- Cartography, map literacy and development of spatial skills
- Geographical Information Systems (GIS), tools and techniques
- Remote Sensing (RS) and Earth Observation (EO)
- Synthesis of information through map storytelling
- STEM Education, robotics and coding
- The Geo-Academy Unified Competence Framework
- The Geo-Academy Evaluation and Assessment model

Ενοποιημένο Πλαίσιο Δεξιοτήτων του Έργου «GEO-Academy»

1. Systems Thinking under the lens of Spatial Complexity and the leveraging of Digital Tools and Information Systems	1.1. Applying System Thinking for Sustainability Challenges using Geospatial Thinking and Digital Technologies 1.2. Framing Sustainability in its Spatial Complexity with the Aid of Digital Technologies
2. Critical Thinking and Problem-Solving for Sustainability Challenges	2.1. Develop and Implement Spatial Problem-Solving Strategies that value Sustainability 2.2. Creatively Use Digital Technologies, Information Systems, and Spatial Data to tackle Sustainability Issues
3. Spatial Information Management and Digital Literacy to reach Sustainability Goals	3.1. Critical Consumption and Interpretation of Spatial and Digital Information 3.2. Collect, Analyze, and Visualize Geospatial Data for Informed Decision-Making
4. Collaborative Use of Digital and Geospatial Tools for ESD Community Projects	4.1. Collaborative Use of Digital and Geospatial Tools for Community Projects 4.2. Communicating Sustainability Concepts Effectively

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1. Systems Thinking under the lens of Spatial Complexity and the leveraging of Digital Tools and Information Systems

1.1. Applying System Thinking for Sustainability Challenges using Geospatial Thinking and Digital Technologies

Knowledge:

- Understanding of environmental systems and how human activities influence ecological and spatial dynamics.
- Understands that human activities, ecosystems, and sustainability issues are interconnected and span across time, space, and scales.
- Understand and model the interconnectedness of the different natural and anthropogenic systems.
- Recognize how various elements interact across ecosystems in space and time.

Skills:

- Use digital technologies and information systems to manage and analyze natural and anthropogenic systems in space and time.
- Analyze and map system interrelationships in different environmental projects, using digital infrastructures and spatial thinking to predict outcomes and impacts effectively.

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1. Systems Thinking under the lens of Spatial Complexity and the leveraging of Digital Tools and Information Systems

1.2. Framing Sustainability in its Spatial Complexity with the Aid of Digital Technologies

Knowledge:

- Know that systems are governed by spatial complexity and that they need digital technologies and information systems when tackled with

Skills:

- Able to assess the spatial complexity governing natural and anthropogenic systems.
- Use digital technologies to manage and deal with systems' spatial complexity.
- Observe sustainability problems in local area through open data.

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2. Critical Thinking and Problem-Solving for Sustainability Challenges

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2.1. Develop and Implement Spatial Problem-Solving Strategies that value Sustainability

Knowledge:

- Knows about different geospatial technologies (e.g., GIS, remote sensing) and digital tools (e.g., AI, big data) used for sustainability problem-solving.
- Understanding of spatial models and digital algorithms for evaluating environmental issues like resource management and pollution control.
- Awareness of multi-disciplinary approaches for solving complex sustainability problems that involve spatial concepts and thinking as well as deploy digital technologies.

Skills:

- The ability to critically evaluate the quality, accuracy, scale and appropriateness of spatial data.
- Ability to apply simple digital and spatial tools to develop solutions for different sustainability challenges (e.g., climate change mitigation, biodiversity loss, urban planning).
- Identifying spatial problems, formulating relevant questions, analysing spatial data, evaluating alternative solutions and implementing effective solutions.
- Employ structured problem-solving strategies using geospatial tools and data analytics to address challenges such as resource allocation, pollution, and climate impact (i.e. Multi-Criteria Analysis and Decision-Making).
- Perform informed decision-making and the effective resolution of complex sustainability-related problems.
- Proficiency in using digital simulations or geospatial models to predict and solve sustainability problems.

2. Critical Thinking and Problem-Solving for Sustainability Challenges

2.2. Creatively Use Digital Technologies, Information Systems, and Spatial Data to tackle Sustainability Issues

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Knowledge:

- Know that digital technologies knowledge and spatial data can be used as tools for innovation that provide new sustainability solutions of social, cultural and or economic added value.
- Knowledge: Understands basic geospatial tools (e.g., GIS, EO and VR for visualization) and their role in solving environmental challenges.
- Understanding of digital literacy skills, including how to access, interpret, and use digital tools for sustainability decision-making.
- Knowledge of geospatial data literacy, including how to interpret spatial data and integrate it into environmental decision-making.

Skills:

- Engage in resolving sustainability issues through digital and geospatially driven solutions for the problem.
- Ability to utilize geospatial tools for collecting and analyzing data to support sustainable decision-making.
- Uses GIS and EO tools for geospatial analysis (calculating areas, distances, implementing spatial interpolation and sampling techniques)
- Proficiency in using geospatial technologies to make informed decisions on environmental management and sustainability practices.
- Combines multiple data layers and performs complex overlays to analyze environmental, social, and economic factors in a sustainability context.
- Uses network data and pathfinding algorithms to plan sustainable routes for transportation, utilities, or conservation efforts.

3. Spatial Information Management and Digital Literacy to reach Sustainability Goals

3.1. Critical Consumption and Interpretation of Spatial and Digital Information

Knowledge:

- Knows how to read maps related to hazard vulnerability and impact from natural disasters.
- Understanding the principles of critical media literacy and the role of geospatial data in shaping public perception.
- Knows that various data and information biases can influence the discourse on sustainability.

Skills:

- Evaluate the reliability of digital and spatial data sources, identify potential biases or misinformation, and use reflective practices to avoid the spread of inaccurate information.
- Can look at various sources of spatial and digital information and assess their reliability to form unbiased views about sustainability and to provide feasible solutions to sustainability issues.

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3. Spatial Information Management and Digital Literacy to reach Sustainability Goals

3.2 Collect, Analyze, and Visualize Geospatial Data for Informed Decision-Making

Knowledge:

- Knowledge: Understands how to access, evaluate, and verify the credibility of online data, including geospatial and sustainability-related information.
- Knowledge: Aware of the role open data plays in addressing sustainability challenges.
- Knowledge of various data collection methods (e.g., sensor networks, satellite imagery, surveys) for environmental and spatial data.
- Understanding of data processing techniques to transform raw environmental and spatial data into meaningful insights.

Skills:

- Extract and interpret data from various geospatial sources, transform datasets for analysis, and adequately and properly visualize findings to inform policy or strategic planning.
- Ability to collect and analyze environmental data using digital tools and geospatial technologies like GIS (desktop or web-based).
- Skill in transforming data into visual formats (e.g., charts, maps) that aid in decision-making for sustainability initiatives.

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4. Collaborative Use of Digital and Geospatial Tools for ESD Community Projects

4.1. Collaborative Use of Digital and Geospatial Tools for Community Projects

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Knowledge:

- Familiarity with digital platforms and geospatial technologies that facilitate community engagement and participation in sustainable initiatives (e.g., online petition platforms, mapping tools, citizen science projects, Volunteering GIS).
- Understanding of spatial justice and how digital technologies can support equitable decision-making in urban and rural planning.
- Understanding the role of spatial data in fostering responsible citizenship and sustainability education.
- Aware of local and regional geospatial stakeholders who can influence environmental and sustainability decisions.

Skills:

- Ability to use digital and spatial technologies to co-design and engage with communities and stakeholders in sustainability efforts.
- Engages in collaborative efforts for sustainability through digital platforms and geospatial data-sharing, fostering collective action for local and global change.
- Skill in leveraging digital platforms to mobilize and organize civic action on environmental and sustainability issues.
- Identifies actions and initiatives that lead toward preferred sustainable futures using digital tools for scenario development.
- Lead and contribute to group projects involving the use of mapping tools and collaborative digital spaces to create shared solutions and public awareness campaigns.

4. Collaborative Use of Digital and Geospatial Tools for ESD Community Projects

4.2. Communicating Sustainability Concepts Effectively

Knowledge:

- Knowledge: Understands various types of digital content (e.g., audio, image, video, maps) and their formats, recognizing the importance of open-source platforms for knowledge dissemination.
- Knowledge of communication strategies and channels for presenting sustainability data and information to diverse audiences.
- Understanding of best practices for creating maps, graphs, and visual figures to effectively communicate complex sustainability data.

Skills:

- Use storytelling techniques, thematic visual representations, and persuasive communication to explain findings and promote sustainability values, fostering greater understanding and action.
- Ability to create and design maps, graphs, and interactive visualizations and infographics that clearly present data in a visually appealing and informative way, tailored to different audience needs.

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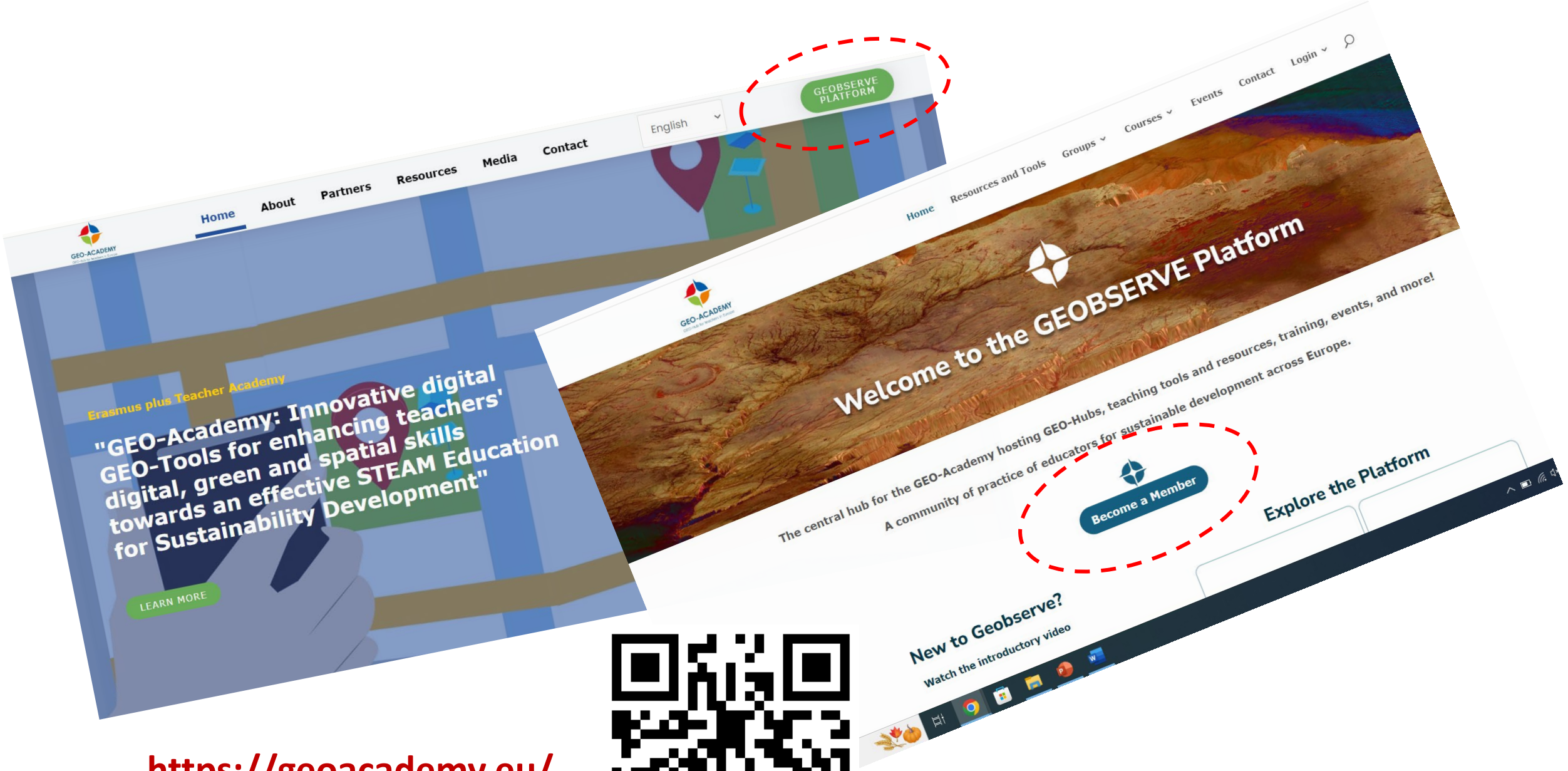

https://geoacademy.eu/

The GEOBSERVE platform