



GEO-ACADEMY

GEO-Hub for teachers in Europe

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

Work Package 3

Development of educational model for teacher training

Nikolaus Albrecht
**University College of Teacher
Education Tyrol, Austria**



Objectives

Addressing teacher needs in Education for Sustainable Development.



Objectives

Establishing a common ground for teaching digital, green, and spatial competencies.



Objectives

Developing a prototype for in-service and pre-service teacher training.

Objectives

Implementing the necessary scaffolding for teacher training.



Objectives

Promoting cross-curricular teaching within training sessions.



Objectives

Assessing the effectiveness of the teacher education program.



Challenges for teachers

Limited time

Curricular constraints



Limited time

Teachers struggle to find time for additional training.



Other challenges

Managing the daily workload.

Other challenges

Gap between policy and school-level implementation.

Other challenges

Unequal access to training opportunities.

Why Continuing Education for Teachers?

Connection to educational quality and student outcomes.



Why Continuing Education for Teachers?

Need for lifelong learning and professional growth.



Why Continuing Education for Teachers?

TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners, page 3:



Why Continuing Education for Teachers?

“Students are unlikely to become lifelong learners if they don’t see their teachers as active lifelong learners.”



Approaches to CPD

Continuing Professional Development (CPD)



Approaches to CPD

MOOCs (Massive Open Online Courses)



Approaches to CPD

Erasmus+ Teacher Academies

Approaches to CPD



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GEO-Academy approach to CPD



Joyful wedding!

Content domain

Experts in the field of

Cartography

Geographic Information Systems

EO, RS & Sat Apps

Teaching domain

Experts in the field of

STEAM Education & Coding

Storytelling

Assessment



Joyful wedding!

Content domain



National Technical University of Athens



LUND
UNIVERSITY

• U



C •



eurisy

Teaching domain



Pädagogische Hochschule Tirol



European
University Cyprus



ELLINOGERMANIKI AGOGI

NUCLIO

spotin
SPOTLIGHT ON INNOVATION



ПРОФЕСИОНАЛЕН ФОРУМ ЗА ОБРАЗОВАНИЕТО



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Regional Training Centers



LUND



VATTENHALLEN
SCIENCE CENTER



Innovation in Science Teaching



Pädagogische Hochschule Tirol



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Research Tells Us ...

Impact of sustained, practice-oriented, and collaborative training.



Research Tells Us ...

Importance of linking theory to classroom practice.

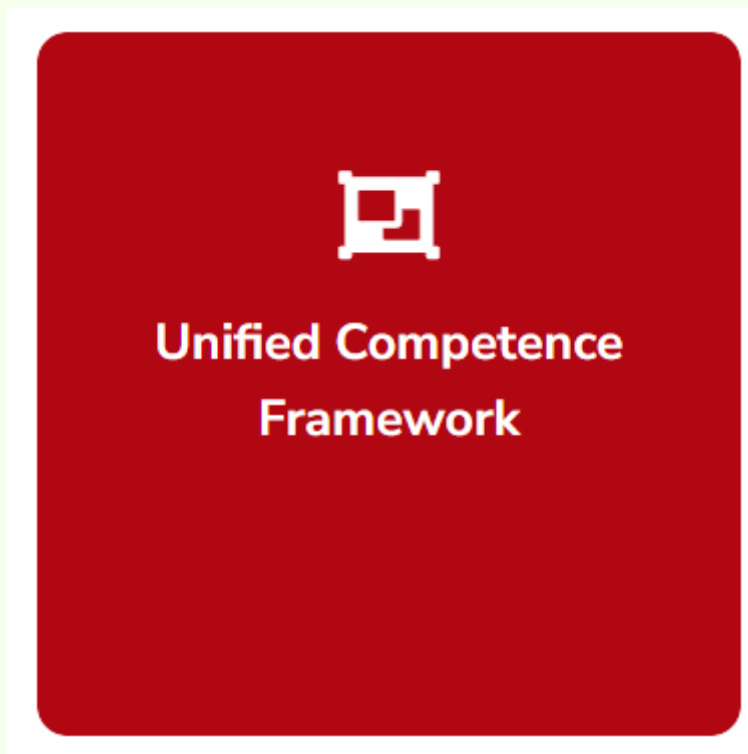


Emerging Priorities

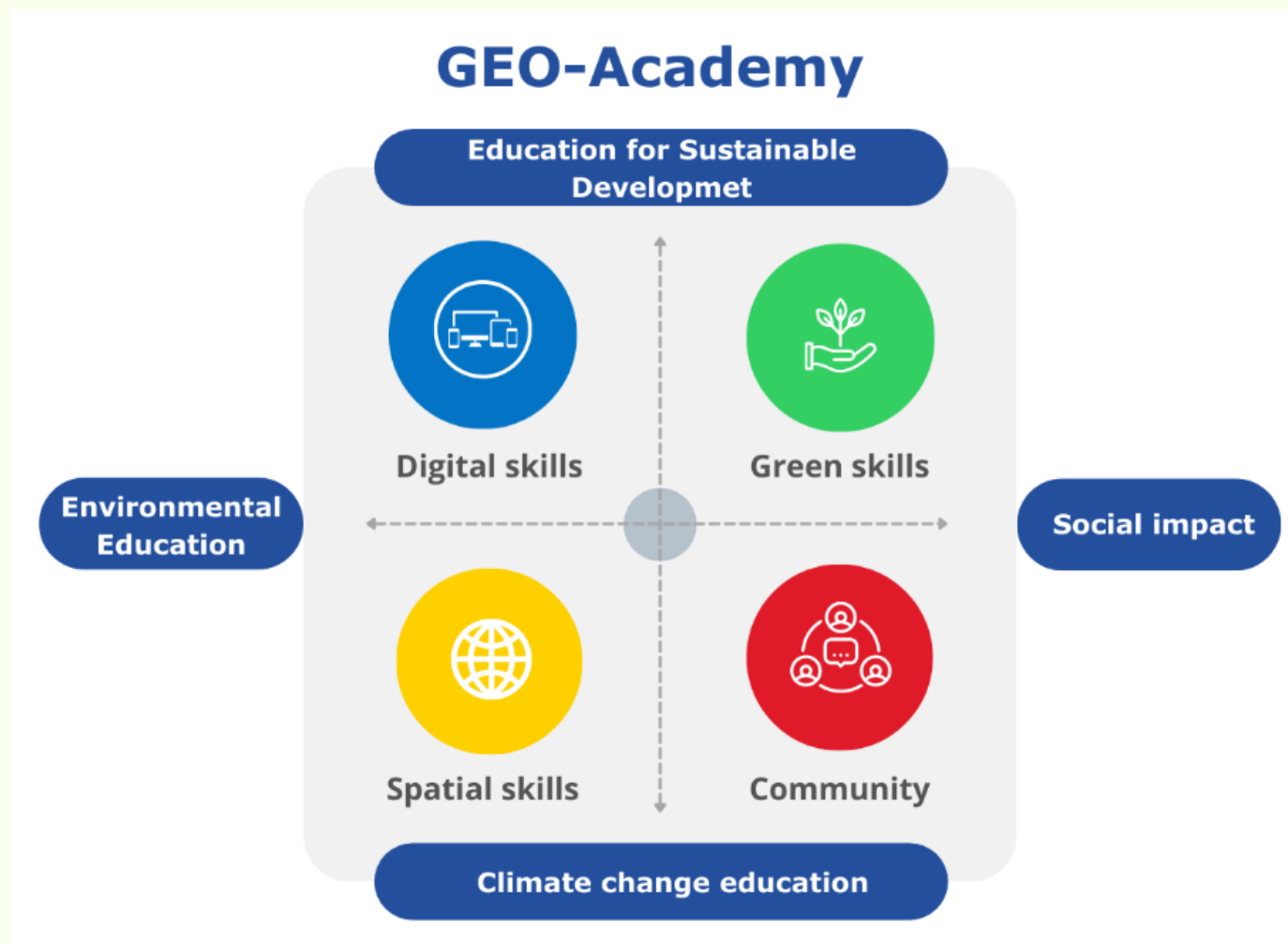
Integration of digital and environmental literacy into CPD.



Unified Competence Framework (UCF)



Unified Competence Framework (UCF)



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Emerging Priorities

Highly application-oriented and transdisciplinary approach.



Emerging Priorities

Combining scientific and practical knowledge.



Teacher perspective

Compatible with professional and personal commitments.



Teacher perspective

Teachers' intrinsic motivation depends on their autonomy.



Teacher perspective (background)

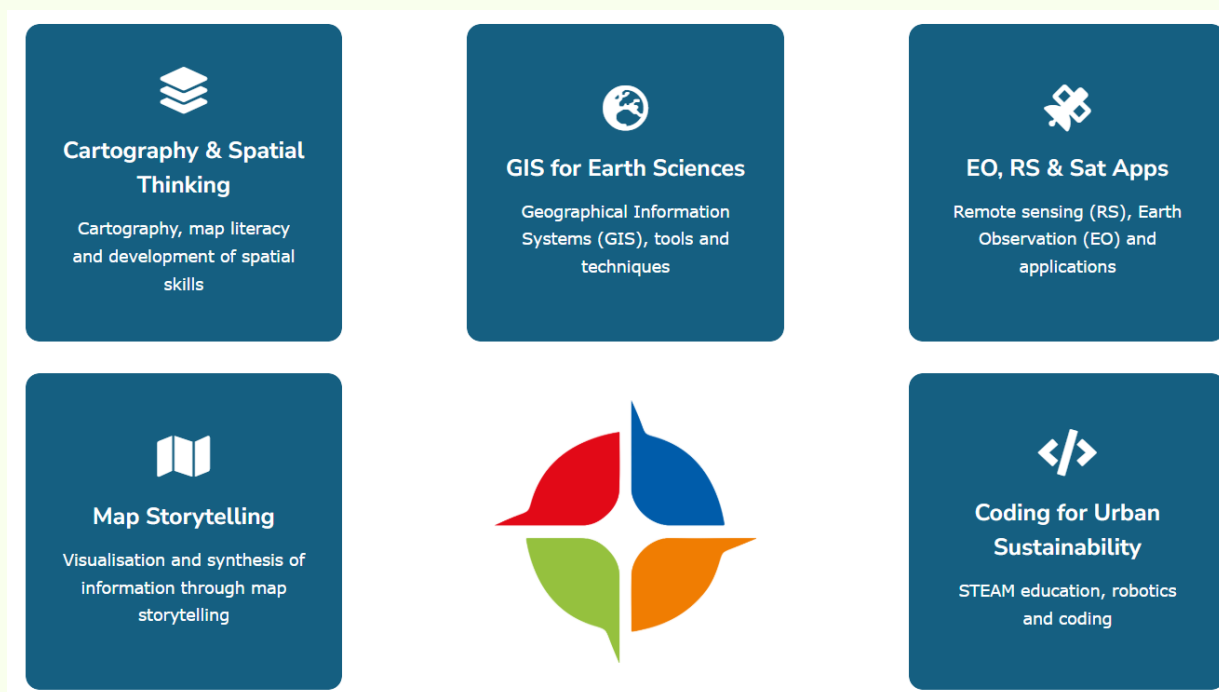
Self-Determination Theory (SDT)

Deci, E. L., & Ryan, R. M. (2000)



Implementation (Geo-Academy)

Self-paced e-learning modules



Student perspective

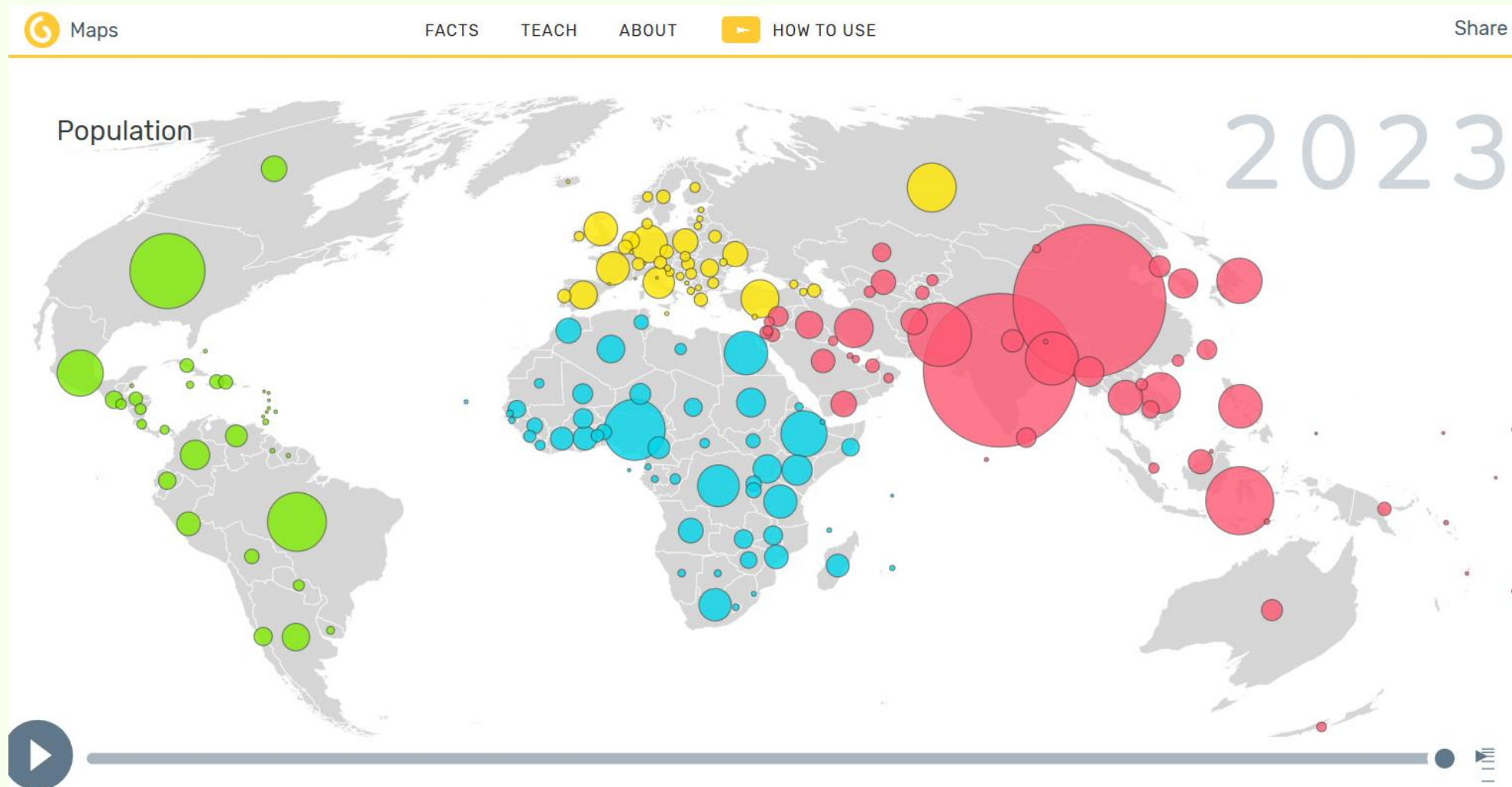
Opportunities in rapidly changing times by focusing on core competencies.



How does it look like?

Some examples ...

How does it look like?



How does it look like?

Resources and Tools

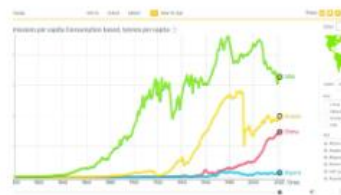
A selection of resources and tools curated by the GEO-Academy team.

Gapminder

[Clear selection](#)

Select boxes to filter content

- ☐ Age Group (1)
 - ☐ Lower Primary (5-9 years) (0)
 - ☐ Lower Secondary (12-15 years) (1)
 - ☐ Upper Primary (9-12 years) (0)
 - ☐ Upper Secondary (15-18 years) (1)



Gapminder

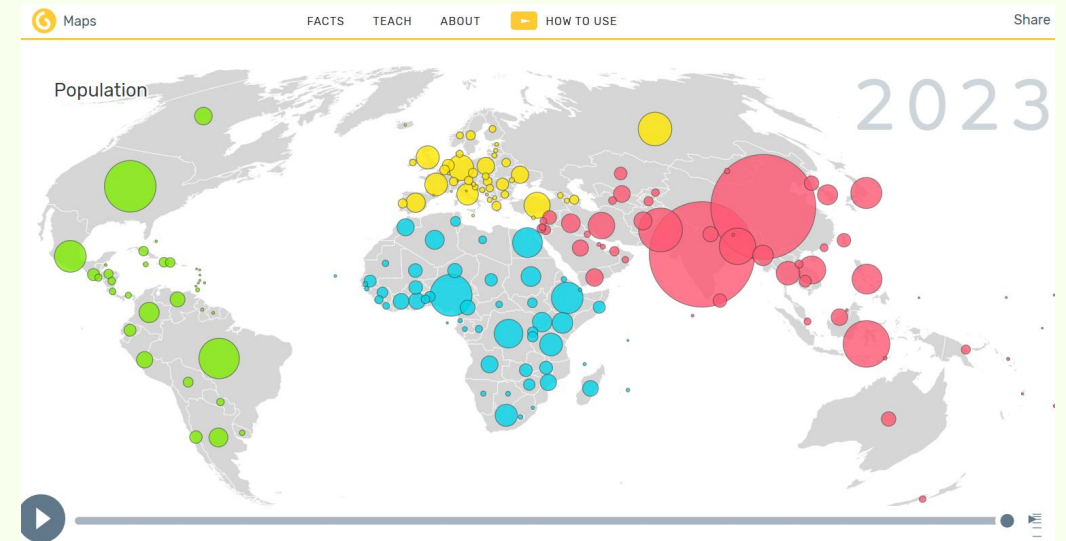
Gapminder is an invaluable tool for understanding our world, offering a variety of features that make complex global data accessible and engaging.

[read more](#)

How does it look like?

... focusing on core competencies

How to read a map's legend?



How does it look like?

Matching learning intentions with ...



How does it look like?

... what was actually learned.



How does it look like?

Curriculum

Formative Assessment



How does it look like?

Curriculum

Start-up Model for teacher training

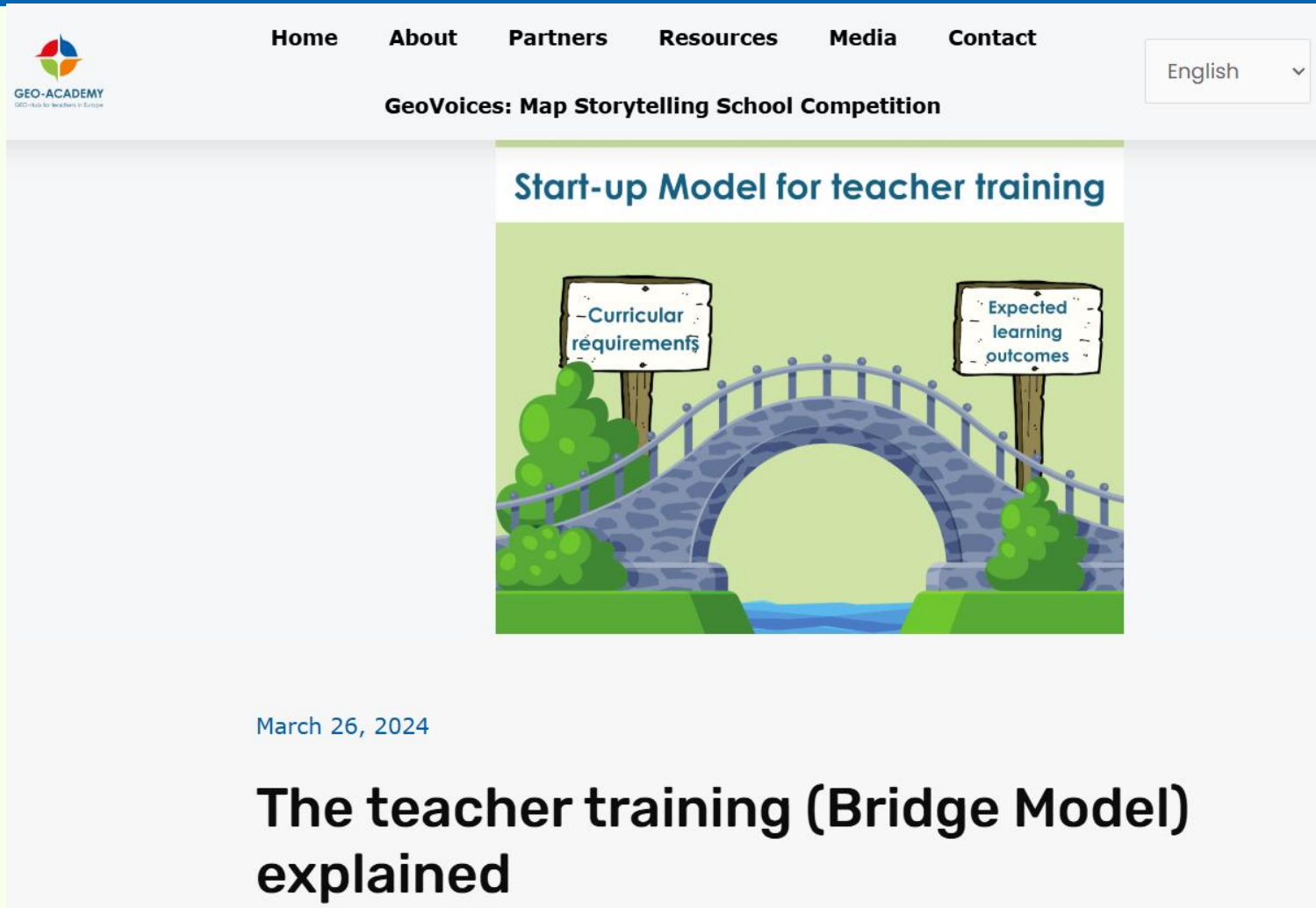
Formative Assessment



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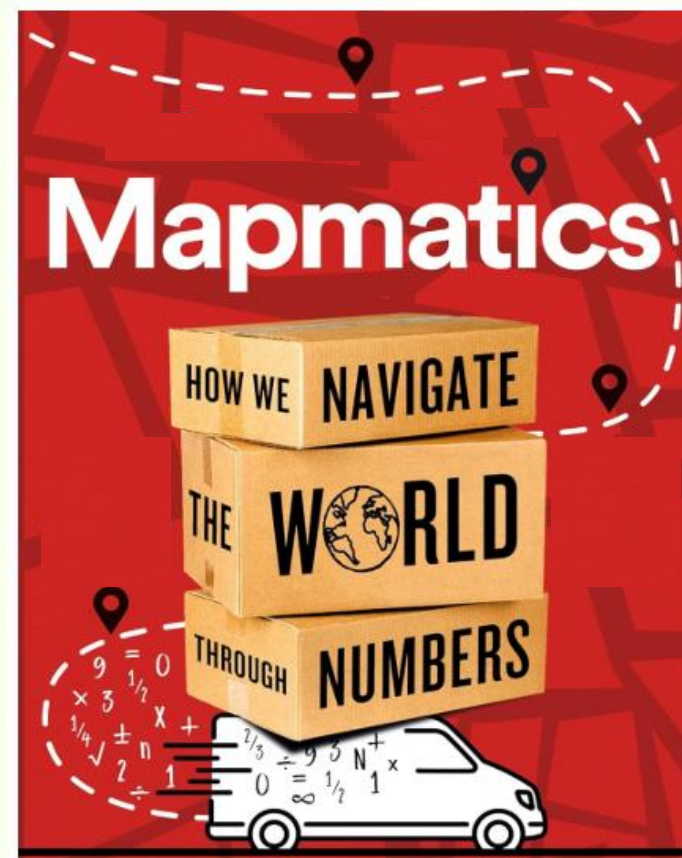


How does it look like?



How does it look like?

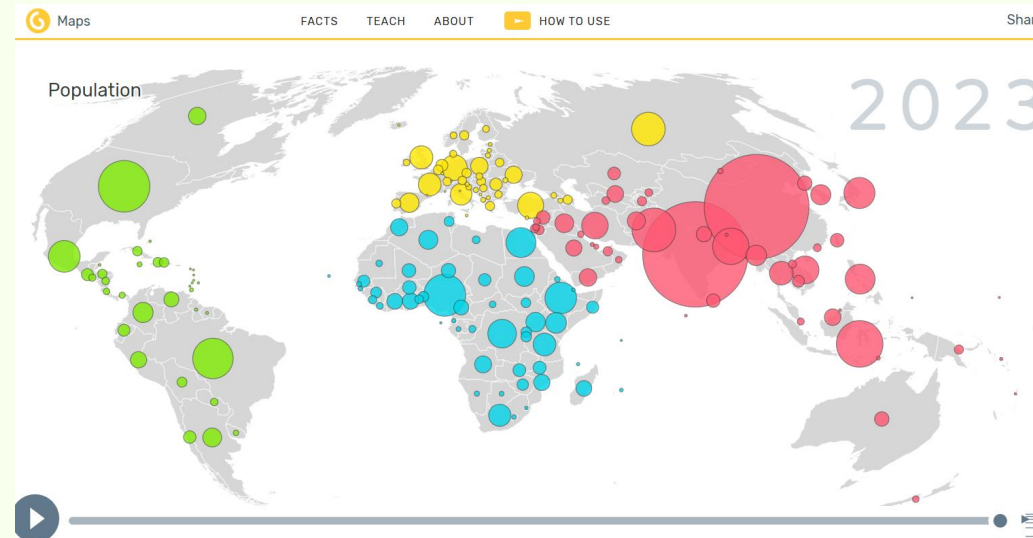
Curriculum, e.g., in Mathematics
Core competencies



How does it look like?

Curriculum, e.g., in Mathematics

Double the radius of a circle — what will happen to its area?

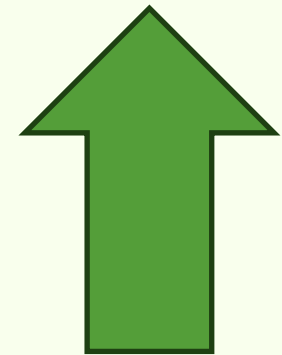


How does it look like?

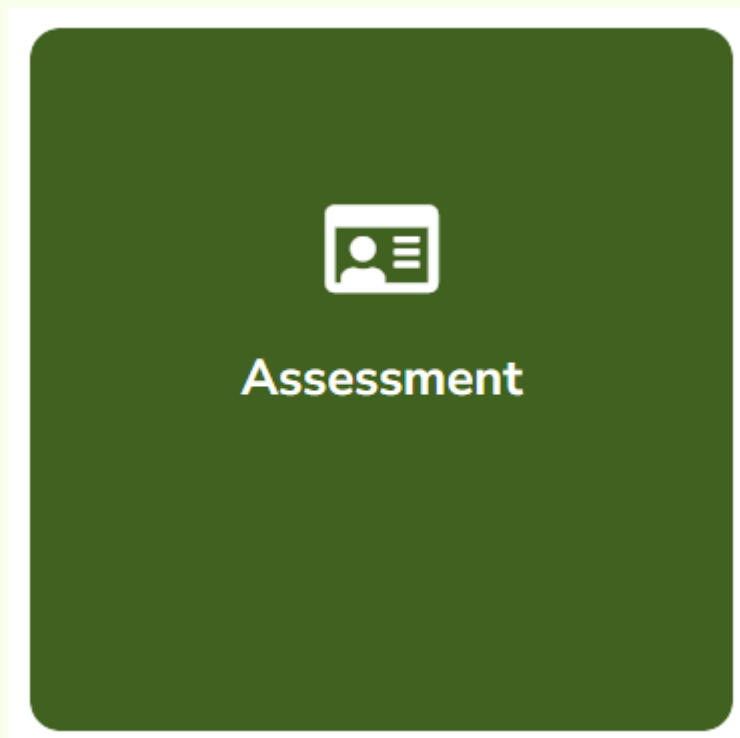
Curriculum



Formative **Assessment**



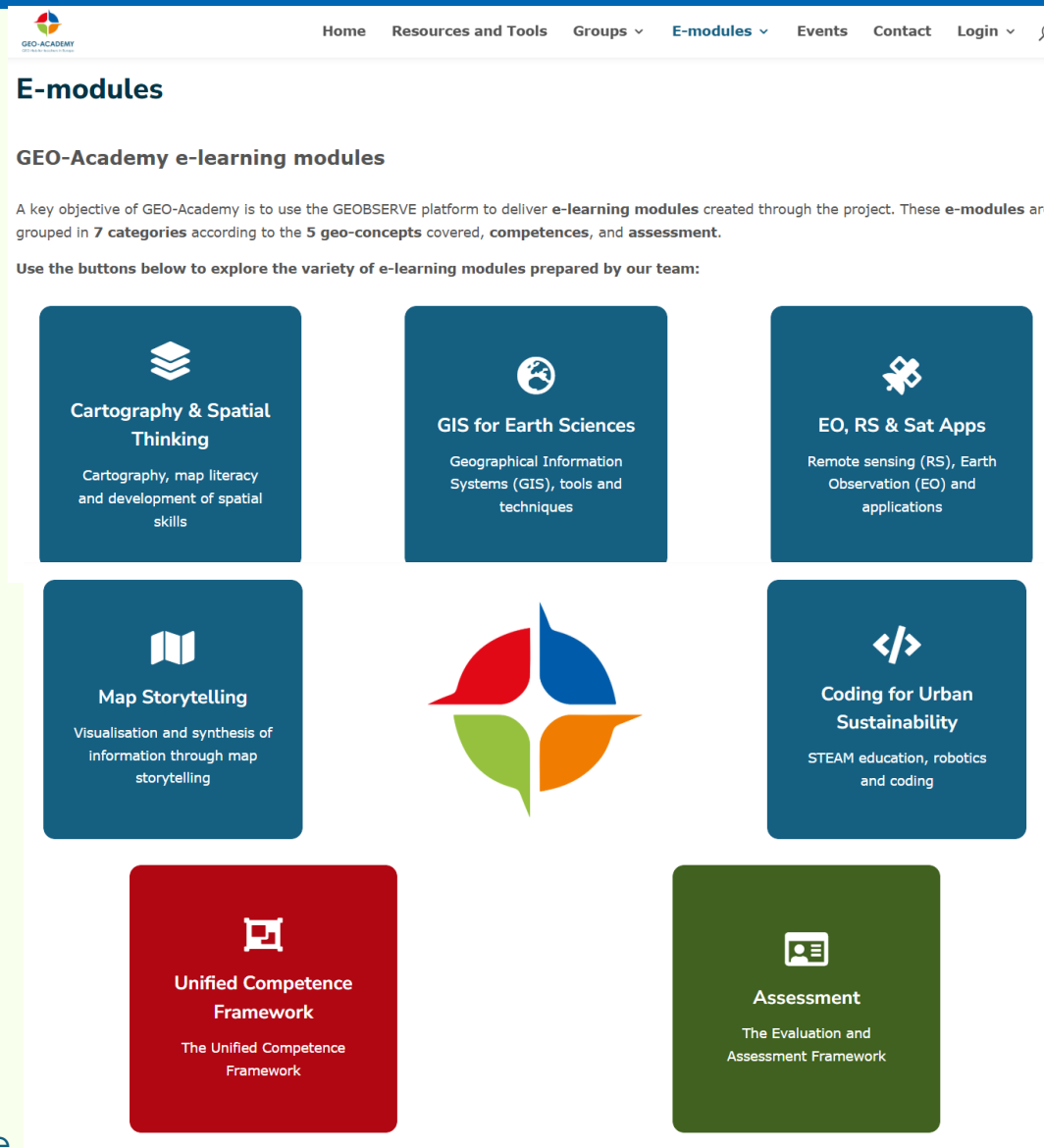
How does it look like?



Formative **Assessment**



How does it look like?



The screenshot shows the GEO-Academy website's 'E-modules' page. At the top is a navigation bar with links: Home, Resources and Tools, Groups, E-modules, Events, Contact, and Login. Below the navigation bar is the 'E-modules' section header. Underneath is the title 'GEO-Academy e-learning modules' followed by a paragraph explaining the project's objective and the categorization of modules. Below this is a prompt to use buttons to explore e-learning modules. The main content area features seven blue and red boxes, each representing a module or framework, arranged around a central GEO-Academy logo. The modules are: Cartography & Spatial Thinking, GIS for Earth Sciences, EO, RS & Sat Apps, Map Storytelling, Coding for Urban Sustainability, Unified Competence Framework, and Assessment.

E-modules

GEO-Academy e-learning modules

A key objective of GEO-Academy is to use the GEOBSERVE platform to deliver **e-learning modules** created through the project. These **e-modules** are grouped in **7 categories** according to the **5 geo-concepts** covered, **competences**, and **assessment**.

Use the buttons below to explore the variety of e-learning modules prepared by our team:

- Cartography & Spatial Thinking**
Cartography, map literacy and development of spatial skills
- GIS for Earth Sciences**
Geographical Information Systems (GIS), tools and techniques
- EO, RS & Sat Apps**
Remote sensing (RS), Earth Observation (EO) and applications
- Map Storytelling**
Visualisation and synthesis of information through map storytelling
- Coding for Urban Sustainability**
STEAM education, robotics and coding
- Unified Competence Framework**
The Unified Competence Framework
- Assessment**
The Evaluation and Assessment Framework



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How does it look like?

Connection between

„What should be learned“
and
„What was learned“

1

--	--	--

2

3

4



How does it look like?

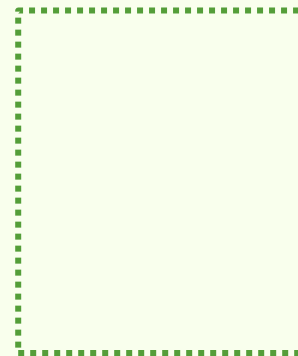


1

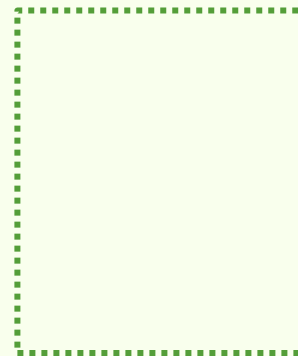
Connection to one's own

world of experience

2



3



4



How does it look like?



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HomeResources and ToolsGroups ▾E-modules ▾EventsContact

Logout ▾

Home > Courses > Skills: Spatial > The numbers beneath the map



Instructor
Remote Sensing And Earth Observation Team



Category
Skills: Digital | Skills: Green | Skills: Spatial

The numbers beneath the map

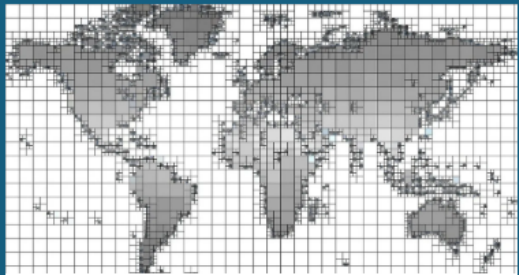
 10 Weeks

 All Levels

 7 Lessons

 3 Quizzes

 5 Students



Free

Start Now

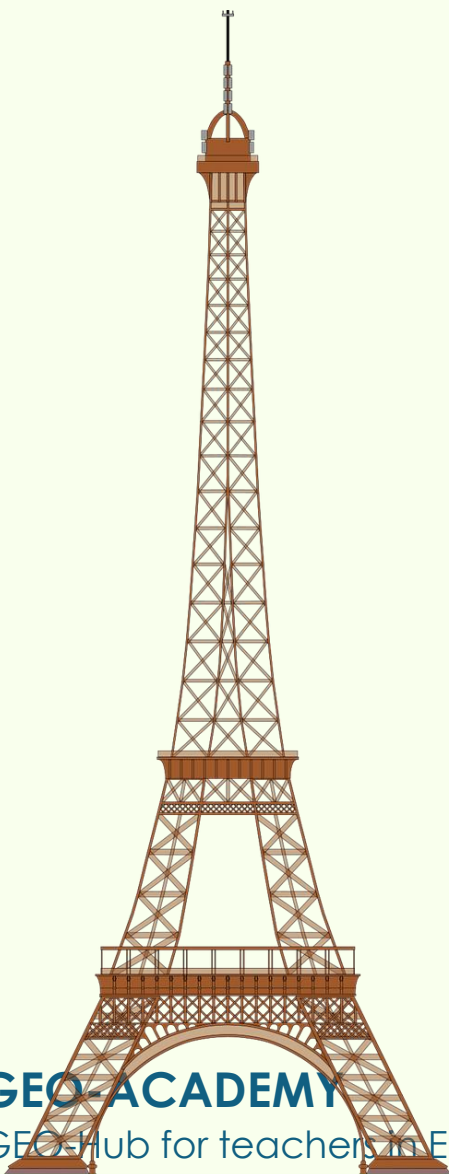
Overview

Course Curriculum

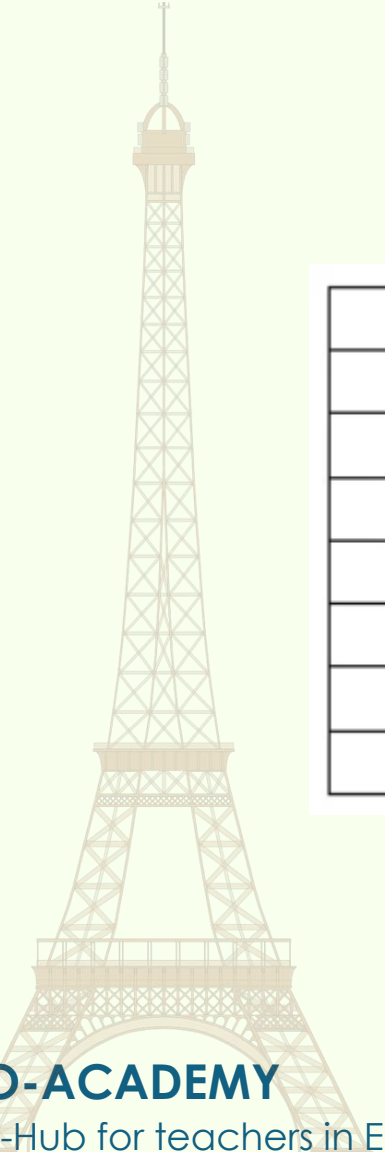
Instructor

Digitalised maps often conceal a swarm of numbers that want to tell us something. Efficient work with maps therefore requires us to be able to direct this swarm of data. The course provides an initial introduction to this.

How does it look like?



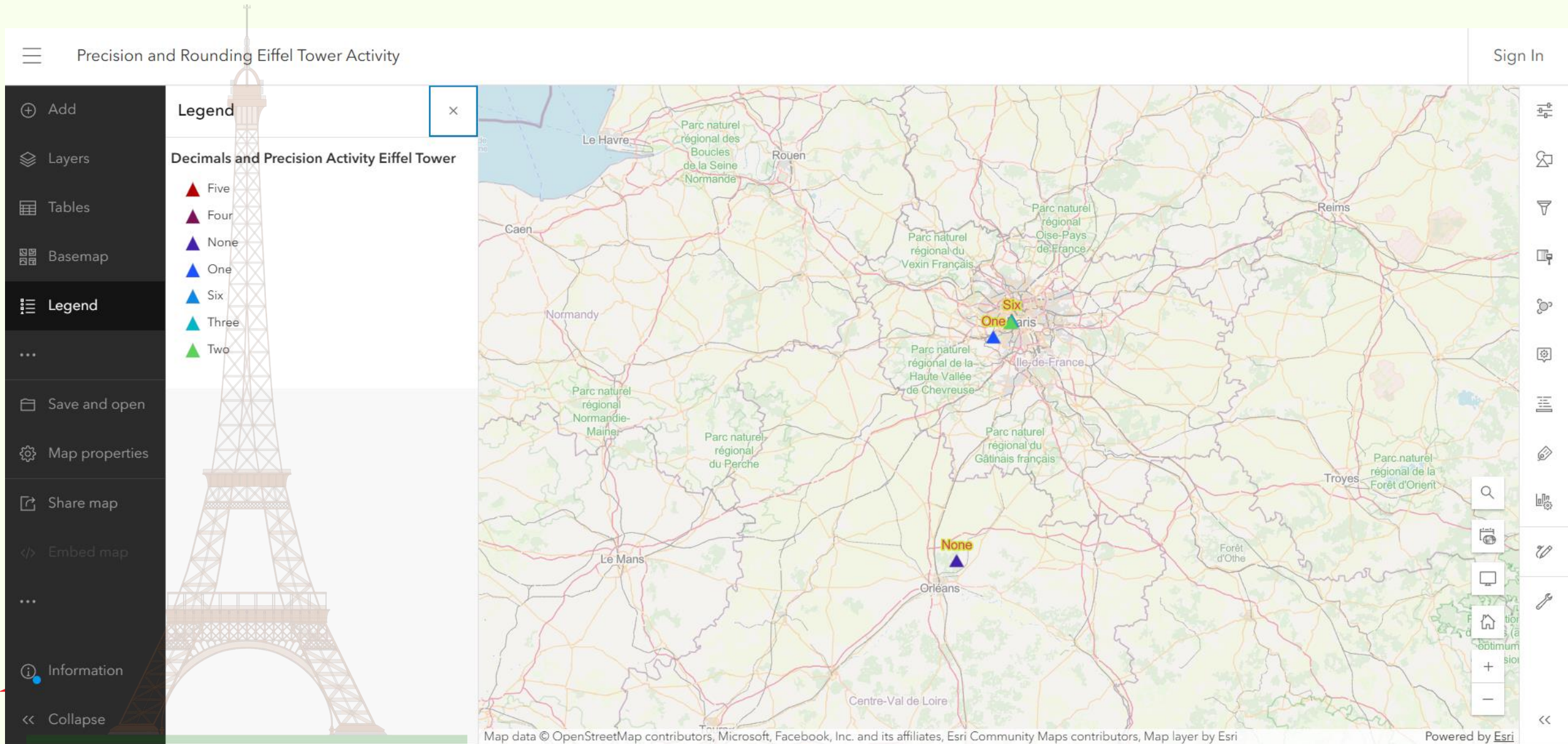
How does it look like?



Decimalplaces	Longitude	Latitude
6	2,294524	48,858260
5	2,29452	48,85826
4	2,2945	48,8582
3	2,294	48,858
2	2,29	48,85
1	2,2	48,8
0	2	48



How does it look like?



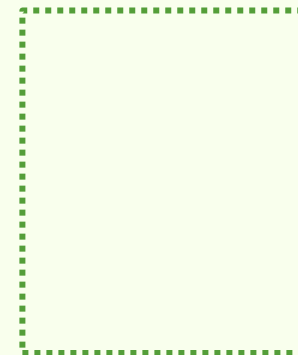
How does it look like?



1 2

Relevance of the topic
and
Actuality of the topic

3



4



How does it look like?

 **FloodMap**

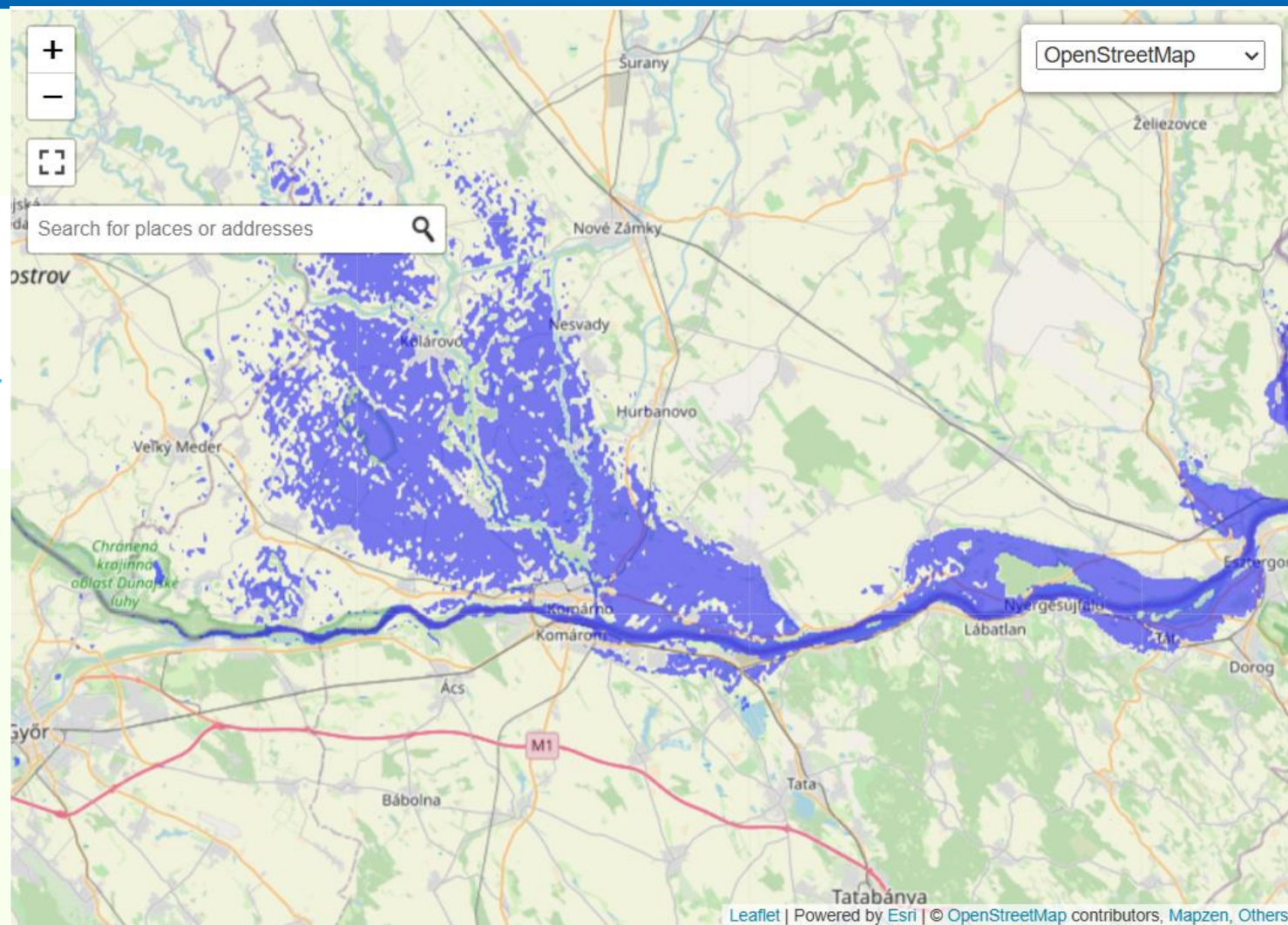
Elevation/Height/Water Level (-/+):

5

Set

5 meter.

Click on the Map to get/set the flood water level at the location.



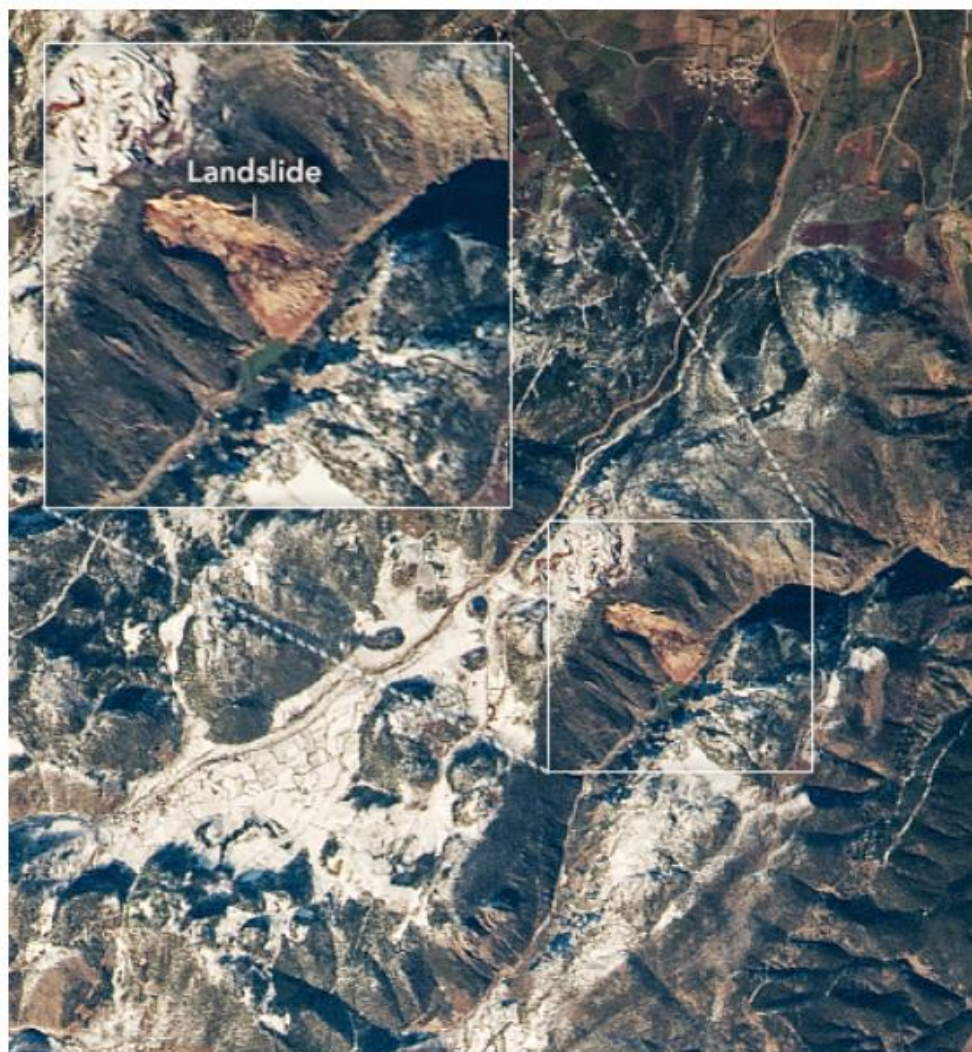
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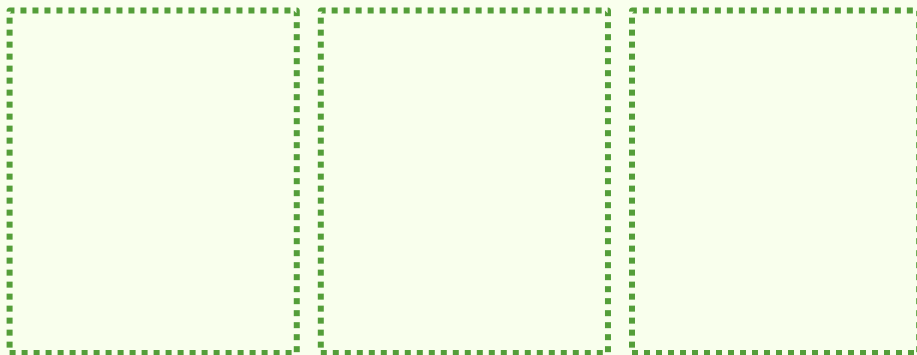
How does it look like?



How does it look like?



How does it look like?



1 2 3

Integration of findings from

**Cognitive Psychology /
Learning Theory**

4



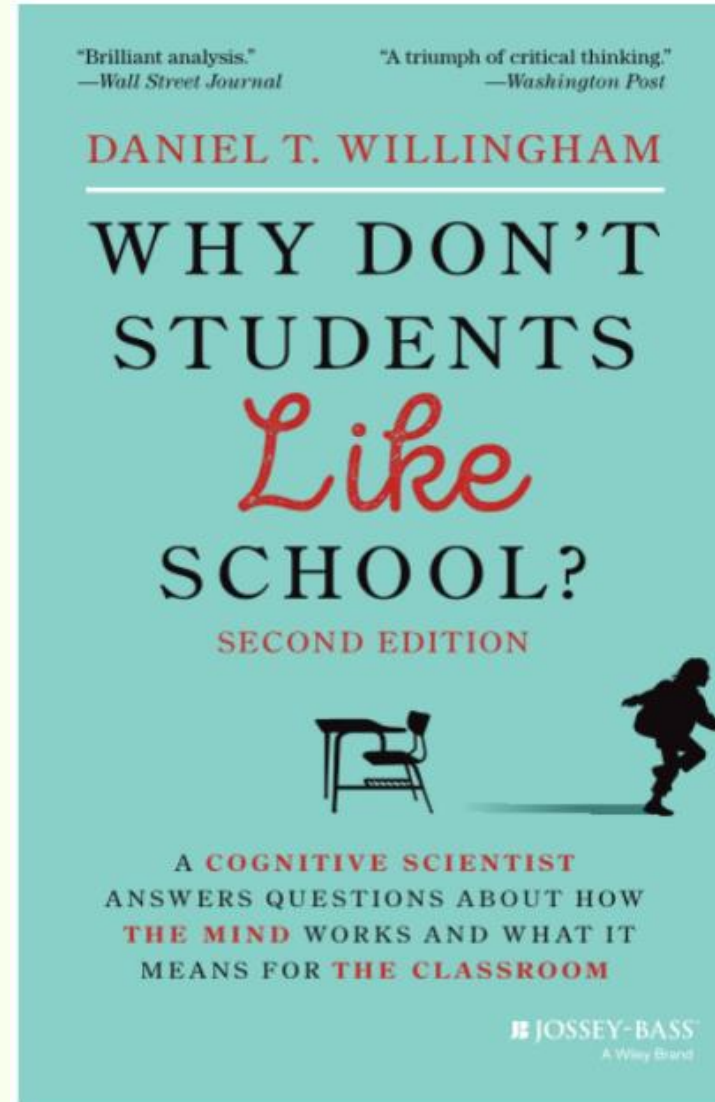
How does it look like?



How does it look like?

Daniel Willingham

The Power of Stories



How does it look like?

Why Storytelling Matters...



How does it look like?

Stories make abstract ideas relatable



How does it look like?

Stories activate emotions, strengthen memory and understanding



How does it look like?

Humans are “wired for stories” – we learn best through narrative



How does it look like?



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[Home](#) [Resources and Tools](#) [Groups](#) ▾

2.4 | Common Online Data Analysis Platform (CODAP)

Insight into a heap of data

-  **Data records made up out of (thin) air | RS-EO-SatApp-2.4.1**
30 minutes
-  **A story that needs telling | RS-EO-SatApp-2.4.2**
30 minutes
-  **CODAP gets the data talking | RS-EO-SatApp-2.4.3**
30 minutes
-  **Get to know your data | RS-EO-SatApp-2.4.4**
1 hour
-  **Juggling with data | RS-EO-SatApp-2.4.5**
2 hours
-  **Making sense of data | RS-EO-SatApp-2.4.6**
2 hours
-  **Deliberate Practice - Background | RS-EO-SatApp-2.4.7**
30 minutes



How does it look like?



Home Resources and Tools Groups ▾

2.4 | Common Online Data Analysis Platform (CODAP)

Insight into a heap of data

 **Data records made up out of (thin) air | RS-EO-SatApp-2.4.1**

30 minutes

 **A story that needs telling | RS-EO-SatApp-2.4.2**

30 minutes

 **CODAP gets the data talking | RS-EO-SatApp-2.4.3**

30 minutes

 **Get to know your data | RS-EO-SatApp-2.4.4**

1 hour

 **Juggling with data | RS-EO-SatApp-2.4.5**

2 hours

 **Making sense of data | RS-EO-SatApp-2.4.6**

2 hours

 **Deliberate Practice - Background | RS-EO-SatApp-2.4.7**

30 minutes



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How does it look like?

- Deliberate Practice
- Cognitive Load Theory
- Spaced Learning
- Retrieval Practice
- Interleaving



How does it look like?

 Co-funded by
the European Union



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**A Teacher's Guide
to the
Geo-Academy portal**



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Challenges

That's not to say everything went just great ...



Challenges

In some countries, we struggled **to connect** with the **teacher community**.



forward-looking

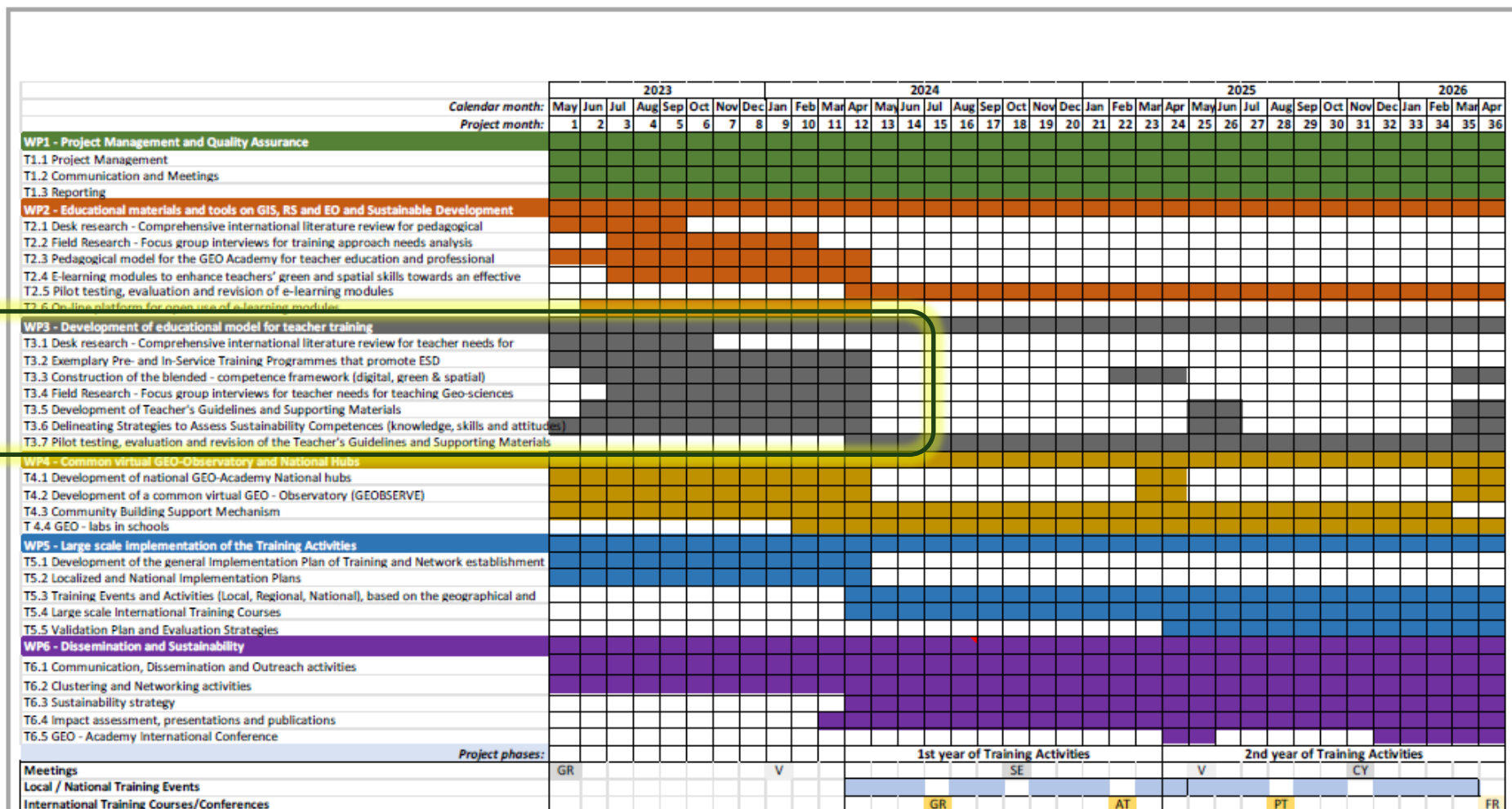


Figure 8: List of Tasks and overview of the training activities and consortium meetings of the GEO-Academy

1

Continuous monitoring of a **micro-credential** university course available to **all teachers in Austria**, launched this semester with an integrated **GEO-Academy module**.

2

Analysis of **further opportunities** to establish GEO-Academy in teacher training **on a long-term basis**.

3

Bringing together **conclusions from** implementation experiences in **partner schools** (“Geo-Labs”).

Implementation of Recommendations

Validating and Co-Creating Conclusions & Recommendations for the Erasmus Teacher Academies Initiative: Final Validation Workshop

Assessment of the Erasmus+ Teacher Academies Initiative

17 June 2025



Implementation of Recommendations

Key Findings:

Challenges: Difficulties include collecting robust impact data, administrative burdens, limited time and funding for mobility, school-level participation barriers, and **sustainability after project funding ends.**



Implementation of Recommendations

Validated Recommendations:

Align with national policies and formally recognize participation.

Improve **coordination among National Agencies.**



Coordination among National Agencies

The Geo-Academy's E-modules are incorporated into an **Austria-wide university course** in continuing education for teachers.



Coordination among National Agencies



HLG MINT

[Über HLG MINT](#)

[Module](#)

[Anmeldung und FAQ](#)

Partner

Diese neun Pädagogischen Hochschulen bieten gemeinsam den Hochschullehrgang MINT an:



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Coordination among National Agencies



HLG MINT

[Über HLG MINT](#)

[Module](#)

[Anmeldung und FAQ](#)

“These nine teacher training colleges jointly offer the MINT university course:”

Partner

Diese neun Pädagogischen Hochschulen bieten gemeinsam den Hochschullehrgang MINT an:



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GEO-Hub for teachers in Europe



Recognize Participation.

Validated Recommendations:

Align with national policies **and formally recognize participation.**

Improve coordination among National Agencies.



Recognize Participation.

Recognition is granted via **Microcredentials** and within the framework of **ECTS credits** in continuing education.



Recognize Participation.

Wahlbereich: Projektorientierung im MINT-Unterricht (je 3 SWS, 5 ECTS-AP)			
KI im Unterricht	PPH Augustinum	Link folgt	Wintersemester 2026/27
Die Erde im Blick – ohne Fächergrenzen	PH Tirol	Link folgt	Wintersemester 2026/27
Projekte im MINT-Unterricht	PH Steiermark	Link folgt	Wintersemester 2026/27
Innovatives Problemlösen	PH Oberösterreich	Link folgt	Wintersemester 2026/27

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Innovatives Problemlösen	PH Oberösterreich	Link folgt	Wintersemester 2026/27

Recognize Participation.

“Focus on the Earth – across all disciplines”

Wahlbereich: Projekt			
KI im Unterricht	PH Augustinum	Link folgt	Wintersemester 2026/27
Die Erde im Blick – ohne Fächergrenzen	PH Tirol	Link folgt	Wintersemester 2026/27
Projekte im MINT-Unterricht	PH Steiermark	Link folgt	Wintersemester 2026/27
Innovatives Problemlösen	PH Oberösterreich	Link folgt	Wintersemester 2026/27



Recognize Participation.

“Focus on the Earth – across all disciplines”

Wahlbereich: Proj

KI im Unterricht

Die Erde im Blick – ohne
Fächergrenzen

Projekte im MINT-Unterricht

Innovatives Problemlösen

PH

PH

PH


Cartography & Spatial
Thinking

Cartography, map literacy
and development of


GIS for Earth Sciences



Coding for Urban
Sustainability

STEAM education, robotics
and coding

**Unified Competence
Framework**

The Unified Competence
Framework



EO, RS & Sat Apps

Remote sensing (RS), Earth
Observation (EO) and
applications

Wintersemester 2026/27

Wintersemester 2026/27

Wintersemester 2026/27

Wintersemester 2026/27


Map Storytelling

Visualisation and synthesis of
information through map
storytelling



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Recognize Participation.

“Focus on the Earth – across all disciplines”

Wahlbereich: Pro...

KI im Unterricht

Die Erde im Blick – ohne
Fächergrenzen

Projekte im MINT-Unterricht

Innovatives Problemlösen

PH

PH

PH


**Cartography & Spatial
Thinking**

Cartography, map literacy
and development of


GIS for Earth Sciences



**Coding for Urban
Sustainability**

STEAM education, robotics
and coding

**Unified Competence
Framework**

The Unified Competence
Framework


Map Storytelling

Visualisation and synthesis of
information through map
storytelling



Assessment

The Evaluation and
Assessment Framework

Intersemester 2026/27

Intersemester 2026/27


EO, RS & Sat Apps
Remote sensing (RS), Earth
Observation (EO) and
applications



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Thank you



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