European Schoolnet
Transforming education in Europe

# Teaching Authentic and Gender-Inclusive Informatics in Schools across Europe

## A teachers' perspective

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6 November 2026

# **European Schoolnet** - what is it?



- European Schoolnet is a non-for-profit organisation funded in 1997 under the legal name EUN Partnership AISBL.
- It is a network of 30+ ministries of education with headquarters in Brussels.
- The organisation represents the voice and interests of its members – ministries of education from more than 30 European countries.
- It offers a space to debate, exchange best practices, learn from each other, and collaborate to find common solutions to key societal challenges impacting education.

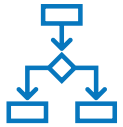
# **European Schoolnet** – Mission and Vision



- **Vision:** Transforming education in Europe.



- **Mission:** Support ministries of education, schools, teachers and relevant education stakeholders in Europe in the transformation of education processes for 21st century digitalized societies.



- **Areas of work:**
  - Providing concrete evidence and data in the area of innovation in education on which to base policy recommendations.
  - Supporting schools and teachers in their teaching practices.
  - Developing and sustaining a network of schools engaged in innovative teaching and learning approaches.

# **STEM education**
# at European Schoolnet

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**European Schoolnet's** programme to **improve** Science, Technology Engineering and Mathematics (**STEM**) **teaching and learning in formal education** follows the **priorities set by** our **Ministries of Education STEM representatives Working Group.**

24 Ministries of Education have appointed a STEM representative as of Sep 2025 including: Belgium (Flanders), Belgium (Wallonia), Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Greece, Hungary, Ireland, Israel, Italy, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Serbia, Slovakia, Spain, Switzerland, and Turkey

## 1. Improve STEM teaching

Emphasise contextualised learning and transversal themes, from early childhood to secondary education.

## 2. Connect STEM education with global challenges

Help educators nurture mindful citizens and modernise education to reflect 21st century values.

## 3. Expand access to STEM careers for all students

Raise awareness and foster inclusivity to encourage all students to pursue careers in STEM fields

## 4. Facilitate exchange and peer learning

Share, pilot and validate best practice and innovative technologies with teachers and other education stakeholders.

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# European Schoolnet's STEM projects cover:

## INTEGRATED STEM: connecting STEM subjects

The SEER – STE(A)M EDUCATION EUROPEAN ROADMAP

STEAM LEARNING ECOLOGIES

SCIENTIX COMMUNITY TOOL

OUTSTE(A)M

## CONTEXTUALISING STEM: Culture and Society

europeana education

SpicE – Special EduCation STEAM Academy

STEAMBRACE

## CONTEXTUALISING STEM: Environmental Sustainability

BUSTICEDU

NBS EduWORLD

GEN

NBS ACADEMY

COOL SCHOOLS

Carb0n:ACT

LOESS

BlueLightS

BRING THE OCEAN INTO YOUR SCHOOL

Life Terra

ProBleu

## EMERGING TECHNOLOGIES: EdTech and Innovation

EMPOWERED – EDTECH ECOSYSTEM FOR BETTER LEARNING

SMART CONNECTED CLASSROOMS

LEARN CODING WITH VINCIBOT!

## EXPLORATORY ACTIONS: Beyond STEM

crops – growing citizen science

TINKER

accelerating teaching

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# Our questions for today

**Teaching informatics in schools across Europe:**

- What is the current reality?
- How present is the gender bias, and how is it addressed?
- How authentic is informatics teaching, and how can it be made more authentic?



# Methodology: Qualitative Thematic Analysis

Educators' responses to some of the activities included in the MOOC *Teach informatics using authentic learning and gender inclusion* were analysed to identify key themes, recurring patterns and contrasting perspectives on informatics teaching and classroom practice.

Findings were interpreted and complemented considering EUN's experience working with STEM teachers across Europe.



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# Methodology: Qualitative Thematic Analysis

**Strengths:** Captures rich insights into educators' experiences and identifies common trends and diverse perspectives – it provides depth to our observation.

**Limitations:** Findings are interpretative and may be influenced by researcher bias; voluntary responses to the activities may not represent all educators, limiting generalisability. It does not provide width to our observation.



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# Data

Responses to **six Padlet activities** included in the ***MOOC Teach informatics using authentic learning and gender inclusion*** e.g.

What's your experience in teaching informatics at school?

- Overall, is it positive, negative or nor good or bad?
- What are the most common problems you encounter when designing and carrying out informatics educational activities at school?
- How do you try to overcome them?



# Data

**Participants**: 1,203

- **Profile** – (75%) female, 36 years of age or older, primary and secondary school teacher
- **Experience** – 25% had at least 20 years of experience
- **Topic** – the majority teaches STEM subjects
- **Countries most covered** – Türkiye, Spain, Romania, Italy, Greece, Croatia, Portugal, North Macedonia, Albania, Serbia



# Main axes of the analysis

## Teachers' experience

How are gender inclusion and authentic learning reflected in the classroom when teaching informatics?

- Teaching informatics
- Gender inclusion in informatics
- Authentic learning in informatics

## Teachers' self-reflection

What are teachers' dos and don'ts for gender-inclusive and authentic informatics teaching in schools?

- Self-evaluation of own practice
- Solutions to improve authenticity and inclusivity
- Possible hidden gender biases

# Key findings – teachers' experience

**One classroom ≠ one starting point.**

The biggest challenge is heterogeneity as often **students do not start from the same place** e.g. difference in knowledge, skills, confidence, learning pace, needs, etc.



**Flexibility is the dominant coping strategy**

Teachers respond to heterogeneity and uncertainty through **flexibility** e.g.

- Different levels → differentiated tasks
- Technical problems → alternative/offline activities
- Different confidence → peer support
- Limited time → shorter/simplified activities
- Limited resources → simple/free tools
- Attention problems → interactive/hands-on activities

# Key findings – teachers' experience

**Digital natives" do not necessarily have digital literacy**

Students may be very familiar with smartphones, social media and entertainment platforms, while **lacking basic skills for productive, educational or creative uses of technology**. Being familiar with technology does not mean knowing how to use it productively.

**Technology use ≠ informatics competence ≠ digital literacy**



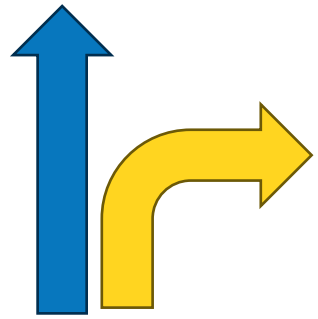
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# Key findings – teachers' experience

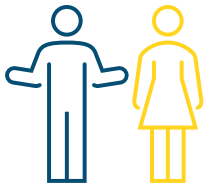
**Interest is relatively balanced early, but a gap emerges later**

Initial gender differences in interest are limited, but a gap can emerge during the educational journey, **particularly around adolescence**. The challenge is therefore to sustain girls' participation and confidence, not simply attract them initially.



**Confidence/self-efficacy is more important than actual ability**

Observed participation and confidence should not be treated as direct indicators of ability or intrinsic interest. Boys may be more visible and willing to take risks, while **girls may demonstrate comparable competence but participate more cautiously.**



**Female role models matter**

Role models **contribute to students' sense of belonging and help them imagine a future in informatics**, but their impact is most likely when combined with supportive teaching, meaningful experiences and encouragement.

# Key findings – teachers' self-reflection

**Collaboration does not automatically ensure inclusion**
Teachers recognise that working together does not necessarily mean that all students feel included or participate equally and that a **positive, inclusive classroom culture needs to exist first**.

**Stereotypes can be subtle and pervasive**
Teachers recognise **gender bias is not only in roles**, but also themes, examples, materials and representations.

**Student choice strengthens authenticity and inclusion**
Teachers identify **student choice as a key** element in making learning more authentic and inclusive.

**Authenticity and social purpose are particularly promising**
Meaningful, authentic and **socially relevant contexts** can broaden participation and make informatics more appealing to students who may not identify with a narrow technical conception of computing.



# Key findings – teachers' self-reflection

**Authenticity goes beyond real-world topics**
Teachers recognise the need to shift from focusing on real-world topics to addressing **real-world problems and users' needs**.

**Authentic learning might be present but be invisible**
Many educators are already connecting learning to real-life contexts **without necessarily identifying their practice** as authentic learning.

**Reflection itself emerges as a missing component**
A significant number of participants recognised that their learning activities often end with **a product, rather than asking learners to reflect on it.**



# Key recommendations - school level

## Start small but meaningfully

Start with a **meaningful problem**, then identify the informatics concepts students need to solve it. Treat **testing, mistakes, feedback and revision** as core parts of the learning process, not merely steps before the final product.



## Strengthen authenticity by small changes

Teachers' existing activities can often become more authentic through relatively small changes e.g. more **student choice, real feedback, external audiences, reflection and iteration**, etc.

## Include diverse representation

Actively include **diverse role models, perspectives and experiences** in learning activities and materials. Ensure that **different genders, backgrounds and abilities are visible and valued,** rather than assuming that a seemingly neutral activity is automatically inclusive.

# Key recommendations - policy level

**Invest in purpose and pedagogy, not just in sophisticated technology**

Both simple and advanced tools can support authentic learning when they are used to address a meaningful task. Thus, start by **investing in pedagogical design and teacher support**, rather than assuming that more advanced technology automatically produces more authentic learning.



**Scale up gender inclusion & authentic learning via systemic support**

Time, curriculum pressure, staffing, assessment and lack of practical guidance remain important barriers. **Allow teachers time to test, provide adaptable examples, professional development opportunities and adequate organisational conditions** to create and employ gender inclusive and authentic learning practices.



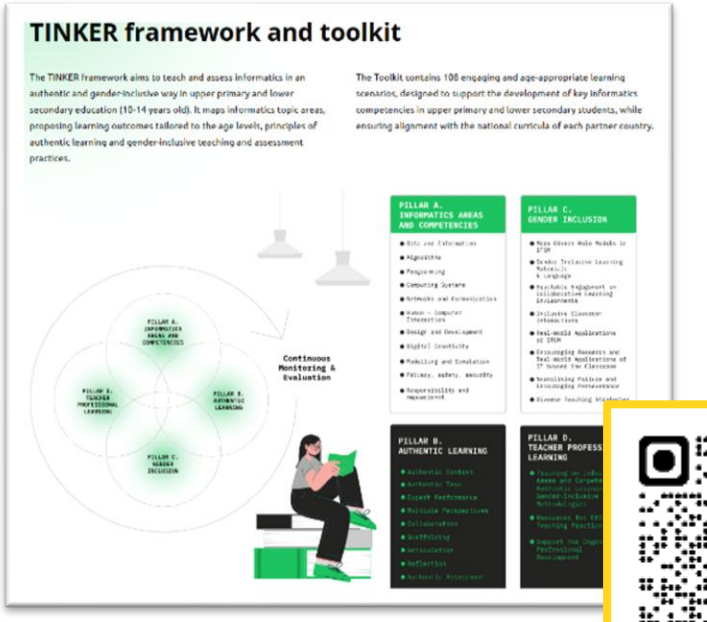
**Connect schools and their communities**

Often, educators are already connecting informatics with authentic problems. The opportunity is to deepen these activities by providing **curriculum flexibility, practical professional development and connections between schools and their communities**.

# Ready to use resources

https://tinker-project.eu/

https://www.scientix.eu/






# QUESTIONS?



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# Thank you!

www.eun.org