

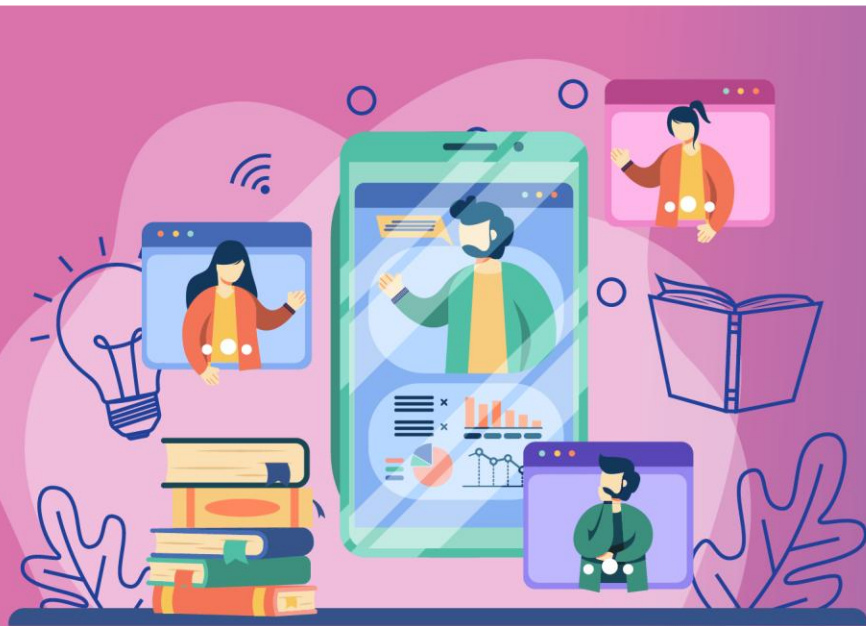


DIGITAL FIRST



# Digital First

Digital Tech As The First Language: Informatics  
For Digital Natives

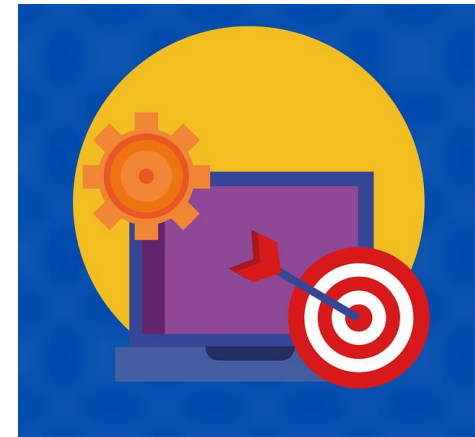


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# Project Digital First Digital Tech As The First Language: Informatics For Digital Natives

- Erasmus+ project
- Duration: December 1<sup>st</sup> 2023 – November 30<sup>th</sup> 2026
  
- Aim to make digital tech the first language for digital natives.
- Targets primary and secondary schools across Europe.
- Adapts education to the needs of children born in the digital age.
- Recognizes that children already possess some digital skills upon entering school.





# 11 countries – 15 partners

## CROATIA

Algebra University  
Partners in Learning

## SPAIN

University of A Coruña

## LITHUANIA

Vilnius University

## FINLAND

Turku University

## SLOVENIA

Faculty of Education, University of Ljubljana  
Ministry of Education Slovenia  
Primary school brothers Polančič Maribor  
Primary school of Tone Čufar Maribor



## PORTUGAL

Escola Secundária de Rocha Peixoto

## GREECE

Project LightHouse

## CYPRUS

T-HAP

## ITALY

Istituto Tecnico Industriale "Ferraris Pancaldo"

## BULGARIA

Secondary school "St. St. Cyril and Methodius"

## BELGIUM

All Digital



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# Project Digital First

- Moves away from traditional informatics education focused on programming and technical knowledge.
- Emphasizes computational thinking.
- Prepares students to address real-life challenges.
- Encourages students to be active creators in the digital world, not just passive consumers.



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# Project Digital First - Objectives



- Understanding the **theory and practice of teaching informatics** in primary and secondary schools across Europe through research and data collection
- Developing and testing **innovative pedagogical approaches to teaching informatics** with piloting in Bulgaria, Croatia, Cyprus, Finland, Greece, Italy, Lithuania, Portugal, Slovenia, and Spain.
- Defining a **competences catalogue** for informatics teachers
- Building an **informatics teachers support network**
- Involving all stakeholders in shaping the future of informatics education through the project's **dialogue clubs** to be organized in each project country.

# Project Digital First - Activities



1. Research and analysis of the current situation
2. Development of innovative teaching methods
3. Dialogue Clubs
4. Defining competencies for computer science teachers
5. Pilot Programs in Selected Schools
6. Use of learning data



# Why is computer science important?

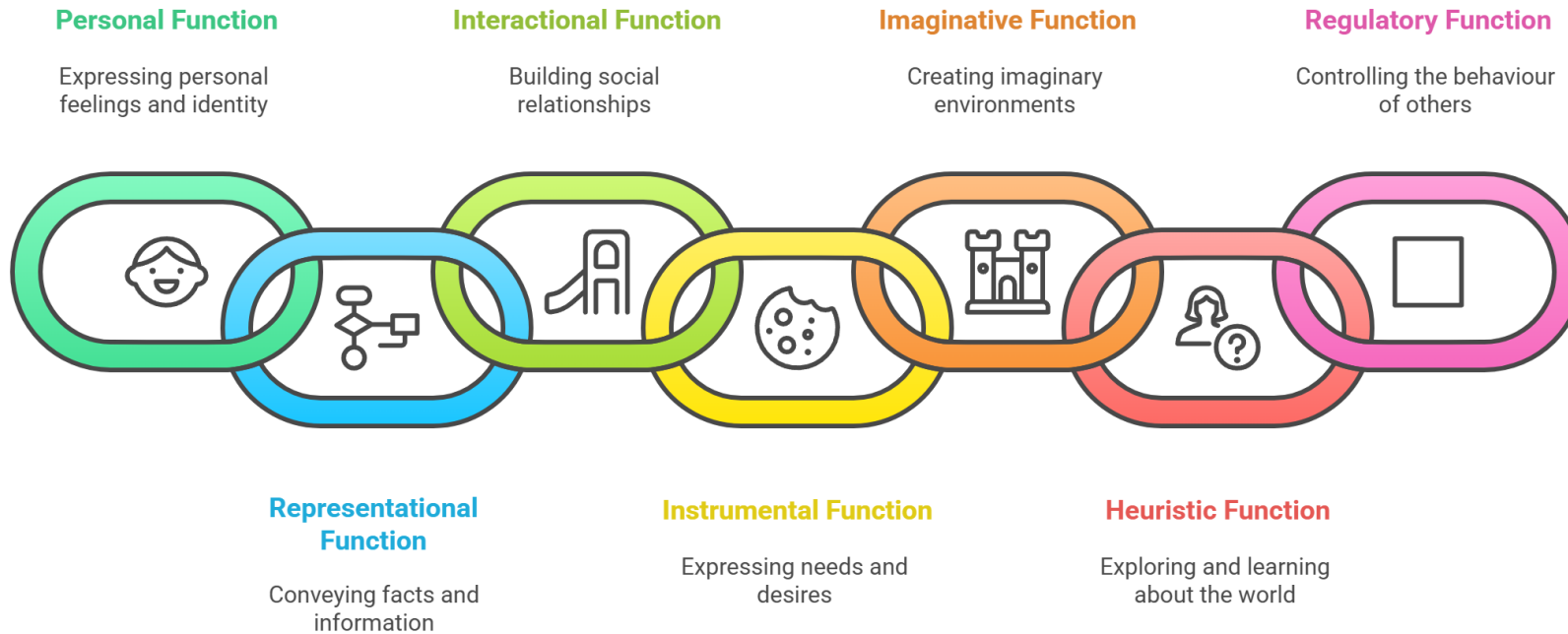
- Informatics in schools is key to equipping every citizen with the necessary knowledge to participate in the digital world.
- By learning computer science, students become able to use the Internet safely and critically.
- Computer science teaches how to recognize bias in algorithms and how to critically evaluate information on the Internet.
- Computer science education encourages students to be active creators of digital content, not just passive users.



# From a structural to a functional approach

Instead of emphasizing the structural approach, programming languages, and technical aspects, this approach focuses on the functionality of computer science and its application in various real-world contexts.

## Digital First: Functionalistic Approach





# Different Teaching Methods in Computer Science Teaching and Critical Thinking

- Workshops, demonstrations, puzzle method, etc.
- Methods that enable the organization of classes in such a way that each student is involved, that the student's attention is retained, that motivation is increased and critical thinking is developed.
- The methods further encourage creativity, problem-solving, innovation, entrepreneurship, communicativeness, adaptability, and teamwork and create a pleasant educational atmosphere that is an incentive for learning and class discipline.



*“Digital natives: they are not adopters of digital tech, they were born into the digital world. This means that we cannot approach them in the same way, as we did students who were digital migrants.”*

- Marc Prensky





# Project Digital First

 Website: <https://digitalfirstnetwork.eu/>

 Facebook: <https://www.facebook.com/digitalfirstnetwork>

 LinkedIn: <https://www.linkedin.com/company/digital-first-network/posts/?feedView=all>

 Instagram: <https://www.instagram.com/digitalfirstnetwork/>

Subscribe to our newsletter at our project website!

## Our Newsletter

Are you interested in hearing about our project news and results on informatics education in primary and secondary schools across Europe? Please fill in your details to receive the DIGITAL FIRST newsletter in your inbox!

Email\*

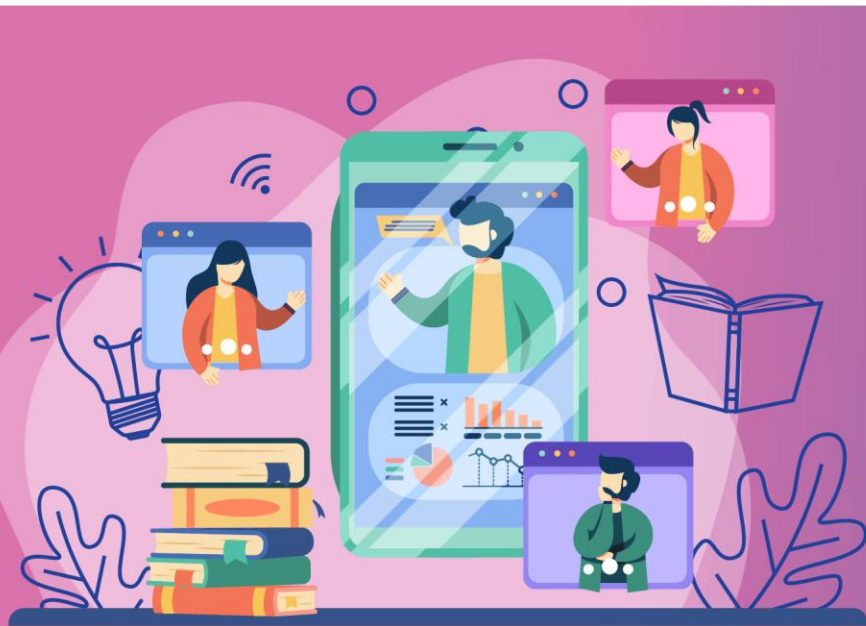
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Thank you! 😊



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# DigitalFirst Erasmus+ Project

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From **Structural** to **Functional**

**From Theory to Practice**



# The Pedagogic Role of Teachers in the Digital First Era

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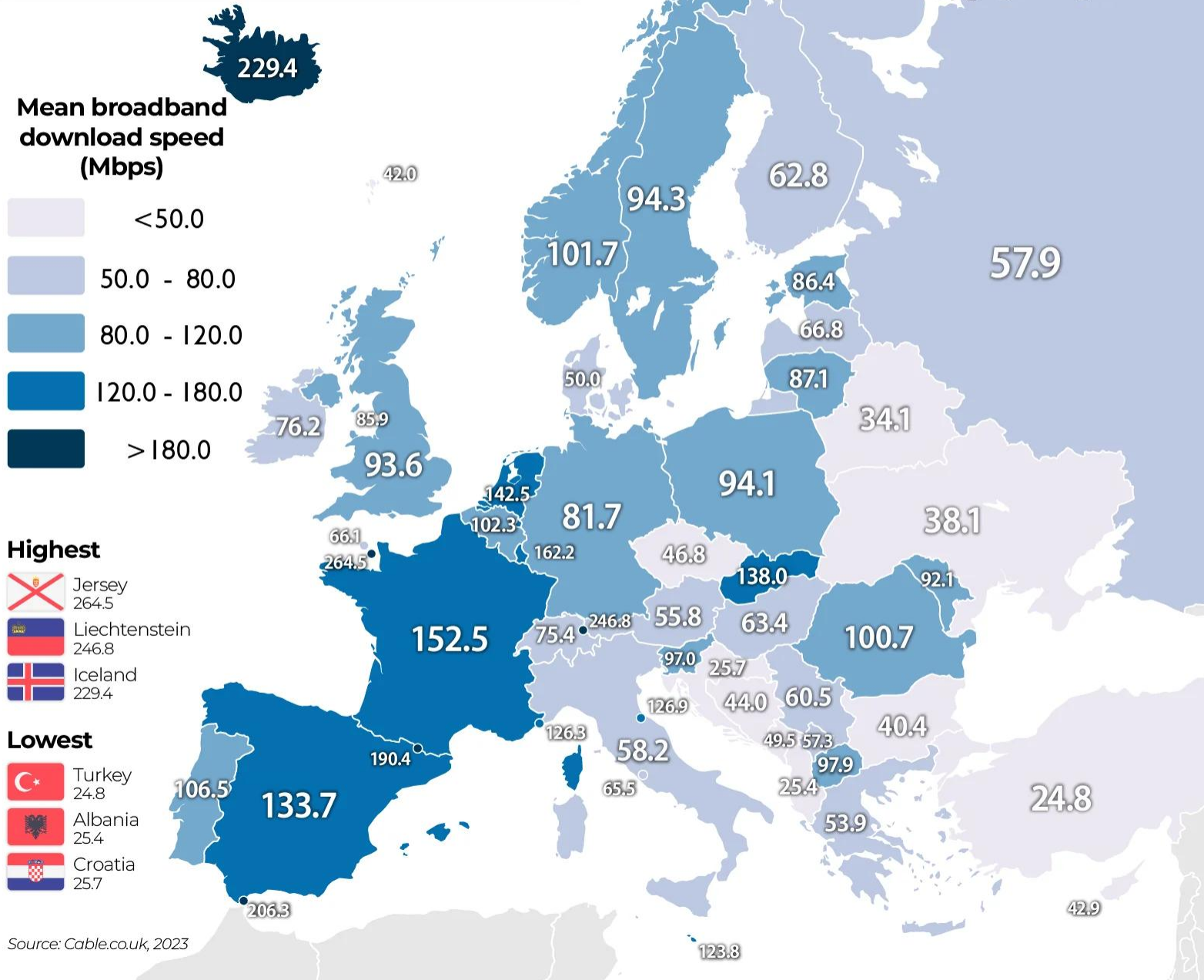
- Empowering educators to integrate digital competences across disciplines-**Dual focus**
- Digital First | Erasmus+ Project

# The Context: A Digital **Challenge** for Teachers

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- Preparing students for a fast and constantly changing digital future
- **Students « already there»**- teachers: where?
- Balancing ICT skills with pedagogy-can we?
- Adapting to diverse contexts and access levels-how?
- Uneven resources
- The role of the teacher- albeit pivotal on a psychological/psychoanalytic view- is highly devalued/ “unknown”

# Internet speed



Source: Cable.co.uk, 2023

# The Core Message

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- “Teachers are not merely conveyors of knowledge but the **pivotal enablers** who can **transform** digital competence into genuine digital **empowerment.**”
- — Digital First Article (2025)

# The Framework: DigCompEdu

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- 6 Areas of digital competence
- Focus: linking pedagogy + technology
- Foundation of the *Digital First* project
  
- \*\*How we define and build teacher competences and pedagogic growth

## What is the main pedagogic/professional task/competence/ quality of a teacher?

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- To have –and keep!-the Desire to Learn
- To transmit this desire to his/her students
- To accept his/her limits
- To keep on Learning!
- To keep his/her “hierarchical status”

# Area 1: Professional Engagement

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- Enhance Digital communication & collaboration (Padlet, interactive quizzes, Kahoot, online groups)
- Combine research, media and self-reflection
- Self-reflective practice
- *i.e. One new digital approach per term*

## Area 2: Digital Resources

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- Selecting and curating digital materials
- Creating and adapting content
- Managing and sharing resources responsibly

# Area 3: Teaching and Learning

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- Integrating digital tools to enhance pedagogy
- Guiding **collaborative** and **self-regulated** learning
- Encouraging creativity and engagement
- We **first see whom** we teach and then start teaching
- Baseline- what are the competences students already have?

## Area 4: Assessment

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- Using digital tools for formative feedback
- Collecting and analysing evidence of learning
- Supporting reflective planning
  
- *i.e. Begin with easy tools(short quizzes or recorded feedback)*

# Areas 5 & 6: Empowering Learners + Facilitating Digital Competence

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- Ensuring accessibility and inclusion
- Fostering digital citizenship and ethics
- Promoting creativity, problem-solving, and responsible use
- Focus on student experience and the teacher's role as a facilitator of digital citizenship/co-learning
- ***Responsible, ethical, critical use of Technology(EU's Digital Education Action plan,2021-2027)***

- 
- **Digital competence as a Journey, not a checklist**

# Conclusion: Re-Centering the Teacher

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- Teachers are **architects** of digital learning environments
- Pedagogic vision revisited
- Empowerment through **mentorship, trust, inclusion,** and **reflection**
- Digital competence → Digital empowerment

# Changes in:

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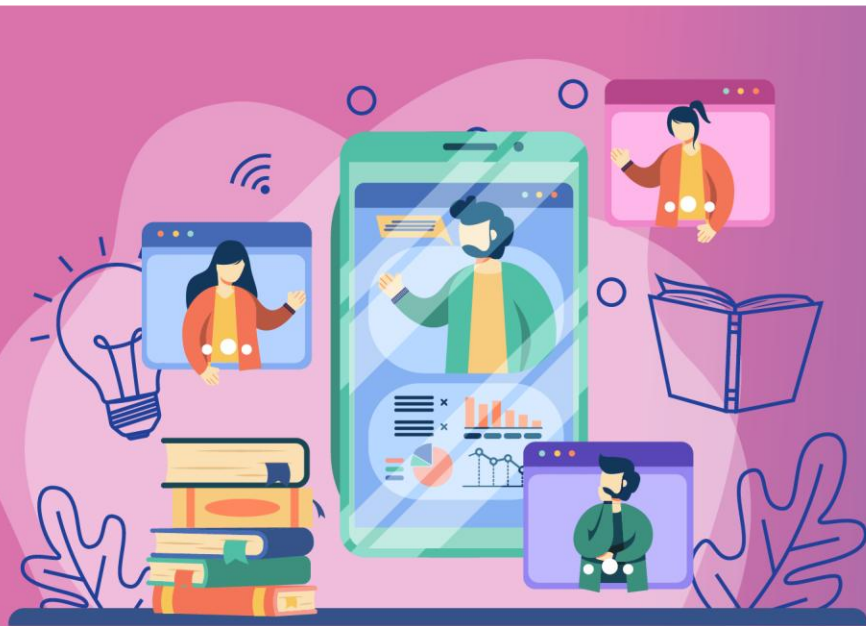
- Policy making
- Teacher empowerment and Spark of Desire
- Teacher know-how transversally
- On listening to the students
- Change of mindset: Not only ICT, not only pedagogy, but **merging beautifully both** –to meet successfully our zeitgeist/spirit and reality of the time
- Most importantly: **to “ win “ emotionally our students, so as to succeed in teaching them!**

- 
- Thank you!
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# Digital First

Functional approach in teaching  
Informatics for ISCED 1



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# Informatics in ISCED 1

Topics covered in primary school:

1. Data and Information
2. Algorithms
3. Programming
4. Computing Systems
5. Digital Creativity and Design
6. Modelling and Simulation
7. Privacy, Safety and Security
8. Artificial Intelligence
9. Computational Thinking



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# Data and Information

## Example 1: Favourite After-school activities

Students log how many minutes they spend on different after-school activities (e.g., playing outside, homework, screen time, helping at home) for three days. In class, they group the activities into categories, calculate total time spent per category, and create bar charts on paper or using a simple digital tool. Together, they interpret the results by asking: “Which activity takes the most time?”, “Are our afternoons balanced?”, “Would we like to change anything?”

- **Heuristic function:** students explore and interpret patterns in their daily routines.
- **Instrumental function:** they record time and create bar charts using simple tool.
- **Representational function:** students present collected data with charts.





# Algorithms

## Example 2: Robot on the Map

Students draw a simple map where a “robot” must follow a set of steps to reach a goal (e.g., deliver a package). They create the path and write clear, step-by-step instructions using arrows or action cards (e.g., “move forward”, “turn right”). In pairs, they follow each other’s instructions to test the algorithm and revise it if needed.

- **Imaginative function:** students design a playful robot scenario with a goal and a visual path.
- **Instrumental function:** they build and test step-by-step instructions using cards (unplugged) or block-based programming tools.





# Algorithms

## Example 3: Treasure Hunt with Conditions

The teacher sets up a classroom “treasure hunt” with a set of conditional instructions (e.g., “If you see a red card, turn left; if you see a blue card, pick it up and move forward two steps”). Students follow the instructions to reach the “treasure” (a small prize or fun message). Afterwards, they discuss how conditions change the flow of an algorithm and how similar logic is used in digital games.

- **Heuristic function:** students test and refine their understanding of conditional logic.
- **Instrumental function:** they apply simple “if... then” structures to solve a problem.
- **Imaginative function:** they experience algorithms as an interactive, game-like adventure.





# Programming

## Example 4: Unplugged Robot Commands

In pairs, one student is the “robot”, and the other is the “programmer.” The programmer gives step-by-step instructions (e.g., “Move forward 3 steps,” “Turn left,” “Pick up the ball”). The teacher introduces loops for repeated actions and conditionals (“If you see a red card, turn right”). Students then swap roles and test different “programs.”

- **Heuristic function:** students test, observe, and debug their instructions.
- **Instrumental function:** they use algorithms to control actions in a physical space.
- **Regulatory function:** they follow and adapt rules to ensure the “robot” completes the task.
- **Representational function:** the verbal or written instructions represent program code.





# Programming

## Example 5: Animate a Story

Students use ScratchJr or Scratch to create a short animation of a simple story, such as “A cat goes to the park.” They program the characters to move, speak, and react using sequences, loops (e.g., repeated walking), and conditionals (e.g., “If it’s raining, open an umbrella”). After programming, they present their animations to the class and explain which programming blocks they used.

- **Heuristic function:** students explore how combining blocks changes the program’s outcome.
- **Instrumental function:** they apply programming constructs to achieve a creative goal.
- **Representational function:** animations visually represent the sequence and logic.
- **Imaginative function:** students bring original story ideas to life through code.





# Computing Systems

## Example 6: Everyday Use of Computer

Students present examples of tasks for which they use computers and present which input and output devices they need for each task.

- **Representational function:** students connect names of devices with their use.





# Digital Creativity and Design

## Example 7: Creating Digital Artefacts

In pairs, students design a digital poster or short animation introducing an imaginary animal (e.g., "a rainbow-striped flying rabbit"). They describe its special features, habitat, and favourite food using images, text, and sounds.

- **Imaginative function:** they invent and express creative ideas through their animal.
- **Interactional function:** they collaborate, discuss, and co-create in pairs.





# Digital Creativity and Design

## Example 8: Design Thinking with Digital Prototypes

Students identify a classroom problem (e.g., lost items, noisy transitions) and use design thinking steps: empathize, define, ideate, prototype, test. They create digital mock-ups (apps, posters, or interactive boards) to propose solutions.

- **Heuristic function:** students explore problem-solving through cycles of testing and improvement, learning by designing solutions iteratively.





# Modelling and Simulation

## Example 9: Automatic Plant Watering Model

Students create a simple simulation of an automatic plant watering system. They attach a moisture sensor to the micro:bit (or simulate moisture levels using button inputs). The micro:bit displays a water droplet icon when the “soil” is dry and a happy plant icon when it’s moist. They can add a buzzer to signal when watering is needed. Students discuss how similar systems work in agriculture.

- **Regulatory function:** the micro:bit controls a simulated response based on input data.
- **Instrumental function:** students use micro:bit hardware to model an automated process.
- **Imaginative function:** they design and personalise the plant watering alert system.





# Privacy, Safety and Security

## Example 10: Private vs. Public

Students play a sorting game where they receive cards showing different types of information (e.g., photo of a pet, home address, favourite food). They decide whether each item is safe to share online or not and place the cards into "Safe to share" and "Keep private" boxes.

- **Regulatory function:** they practice making decisions about what information is safe.
- **Instrumental function:** they physically sort and classify information.
- **Personal function:** understanding of privacy.





# Privacy, Safety and Security

## Example 11: Respectful Chat Simulation

In small groups, students role-play an online group chat scenario with prepared “message cards.” Some messages show positive, respectful behaviour, while others show inappropriate or unsafe communication. Students sort the messages into “Respectful” and “Needs improvement” categories, then rewrite the unsafe messages to make them appropriate.

**Regulatory function:** students apply rules for safe and respectful online communication.

**Instrumental function:** they sort and rephrase messages.

**Personal function:** they reflect on how online tone and language affect others.

**Imaginative function:** they creatively reword inappropriate messages into positive ones.





# Privacy, Safety and Security

## Example 12: Escape the Hacker

The classroom is set up as a “digital escape room” where students must solve a series of password-related challenges to “lock out” a fictional hacker. Each challenge teaches an aspect of password safety: decoding a weak password to see why it’s unsafe; rearranging mixed-up characters to form a strong password; identifying phishing messages that try to steal passwords. Teams must complete all tasks to escape, with the final step being the creation of a class “Strong Password Rulebook.”

**Heuristic function:** students discover password safety principles through problem-solving.

**Instrumental function:** they apply these principles to create strong passwords.

**Interactional function:** they collaborate in teams to complete challenges.

**Regulatory function:** they establish and agree on safe password rules.

**Imaginative function:** they work within a game storyline to engage with the topic creatively.





# Artificial Intelligence

## Example 13: Teach the Robot

Students show different pictures (e.g., cats and dogs) to a "robot teacher" (themselves or a classmate) and help it learn to tell them apart by giving "yes/no" feedback.

**Heuristic function:** they explore and correct the robot's guesses.

**Instrumental function:** they use examples to improve the robot's sorting.





# Computational Thinking

## Example 14: Mystery pattern detectives

The teacher gives students a series of “mystery cards” with shapes, numbers, or symbols that follow hidden patterns. Working in small groups, students must identify the pattern, predict the next item, and explain their reasoning. They then create their own pattern sequences for another group to solve.

- **Heuristic function:** students discover and explain underlying rules in patterns.
- **Interactional function:** they collaborate and challenge each other’s thinking.
- **Instrumental function:** they design and test their own pattern puzzles.
- **Representational function:** they present their findings and solutions clearly to others.



# Functions covered in practical examples

Function	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14
Personal										X	X			
Representational	X			X	X	X								X
Interactional							X					X		X
Instrumental	X	X	X	X	X				X	X	X	X	X	X
Imaginative		X	X		X		X		X		X	X		
Heuristic	X		X	X	X			X				X	X	X
Regulatory				X					X	X	X	X		



# Time for your thoughts

- Do you have any interesting examples of activities that you do with your students?
- Can you detect any of the functions in it?
- Do you find functional approach useful for your teaching?

