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Promoting **Digital Data Literacy** in **Primary Education**: First Lessons from the DIRECTORS Project

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Introduction | Digital Data Literacy

Data literacy:
the ability to understand, find, collect, interpret, visualize, and support arguments using quantitative and qualitative data

- in today's digital landscape, developing digital and data skills is essential
- still underrepresented in early education
- a need to investigate and develop effective teaching models for data literacy that are appropriate for the age and cognitive development of young learners

Erasmus+ project DIRECTORS
(Digital data-Riven EduCaTion for kidS)

- promoting data literacy in primary education (pupils aged 8–10) through new teaching methods and resources
- workshops conducted in Croatia and the Netherlands --〉 enabling cross-country comparison

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In this presentation…

--〉 workshop design, implementation, evaluation results, and lessons learned

Methodology, Design, and Implementation

Three-Level Data Literacy Workshops in Croatia & the Netherlands

General Structure > Three workshops:

Basic data skills

Data in Our Hands (and Mobile Devices)

Moderate data skills

Geospatial Data (and Maps) in Our Hands

Advanced data skills

Data sources

Each workshop:

- 2 sessions (2 x 45–60 min)
- offline (manual) + online (digital) learning
- interactive, hands-on, age-appropriate methods
- full data cycle: collection → processing → analysis → visualization → critical thinking

Methodology, Design, and Implementation

Three-Level Data Literacy Workshops in Croatia & the Netherlands

General Structure > Three workshops:

Basic data skills
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Moderate data skills
Geospatial Data (and Maps) in Our Hands

Advanced data skills
Data sources

Full data cycle:

young children
ISCED level 1

DATA COLLECTION
by children from the real-world environment

DATA PROCESSING
"children-readable form", checked for possible errors, and cleaned if necessary

DATA ANALYSIS
ask questions, extract insights from data

CRITICAL THINKING
draw CONCLUSIONS from the data and about the data

DATA VISUALISATION
depict data in a clear manner, encourage spatial thinking

Methodology, Design, and Implementation

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Data sources

Implementation Contexts:

- Croatia:
  53 pupils (ages 8–10; grades 2–4)
- Netherlands:
  44 pupils (Group 7; age 10)

+

- Croatia:
  61 pupils (ages 8–10; grades 2–4)
- Netherlands:
  90 pupils (Group 7; age 10)

Methodology, Design, and Implementation

Three-Level Data Literacy Workshops in Croatia & the Netherlands

Workshop 1: Basic data skills

Data in Our Hands (and Mobile Devices)

Session 1: Mobile device usage data

- pupils estimate daily app usage
- classify & compare data using data cards
- word cloud: raw vs. cleaned data (spelling/formatting)

Session 2: Collecting and analysing mobile device usage data

- pupils collect actual usage data
- enter into spreadsheet; compare estimates vs. reality
- discussions on data quality, privacy, and anonymization

Methodology, Design, and Implementation

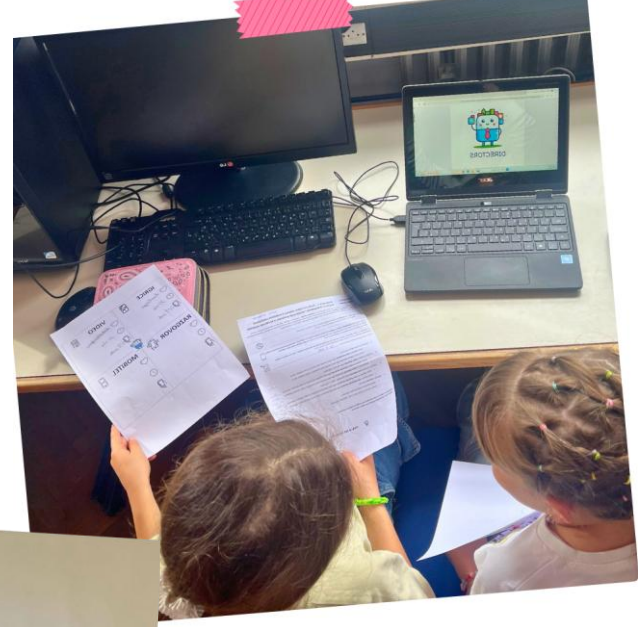
Three-Level Data Literacy Workshops in Croatia & the Netherlands

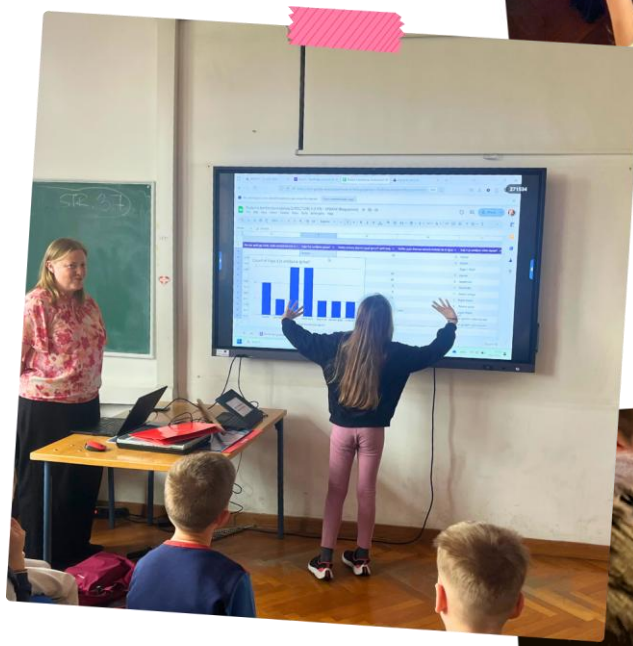
Workshop 1: Basic data skills

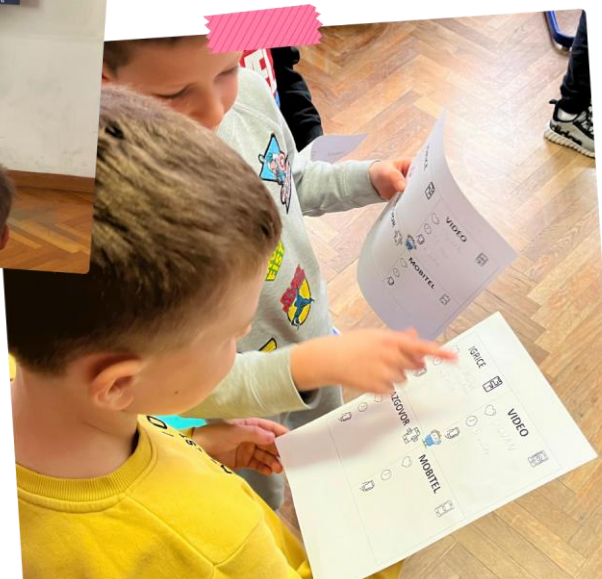
Data in Our Hands (and Mobile Devices)

Methods:

- real-life, tangible data = high engagement
- visualization: tables, charts, word clouds
- combination of individual and group work







Methodology, Design, and Implementation

Three-Level Data Literacy Workshops in Croatia & the Netherlands

Workshop 2: Moderate data skills

Geospatial Data (and Maps) in Our Hands

Session 1: Smart Maps in action: trace, overlay and discover!

- pupils create map layers using transparent sheets
- learn GIS and cartographic principles: georeferencing, vectorization, map symbology

Session 2: Escape (Class)Room – The Mystery of the Missing Teacher

- digital GIS activity: Escape Room – The Missing Principal
- use digital maps & spatial analysis to solve mystery

Methodology, Design, and Implementation

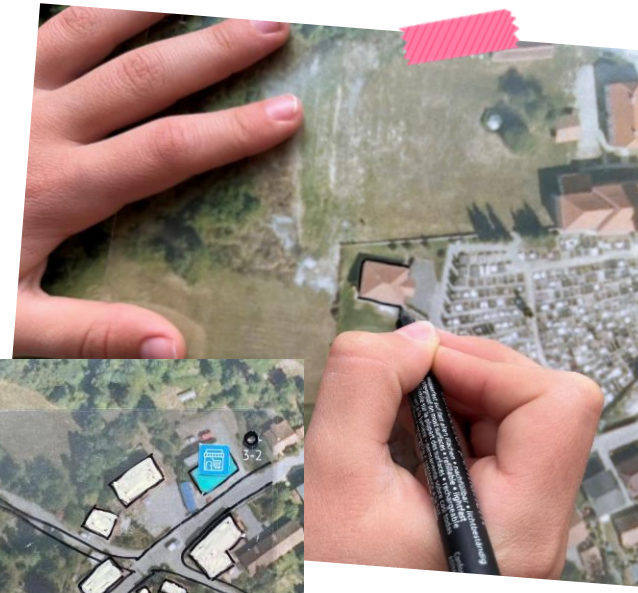
Three-Level Data Literacy Workshops in Croatia & the Netherlands

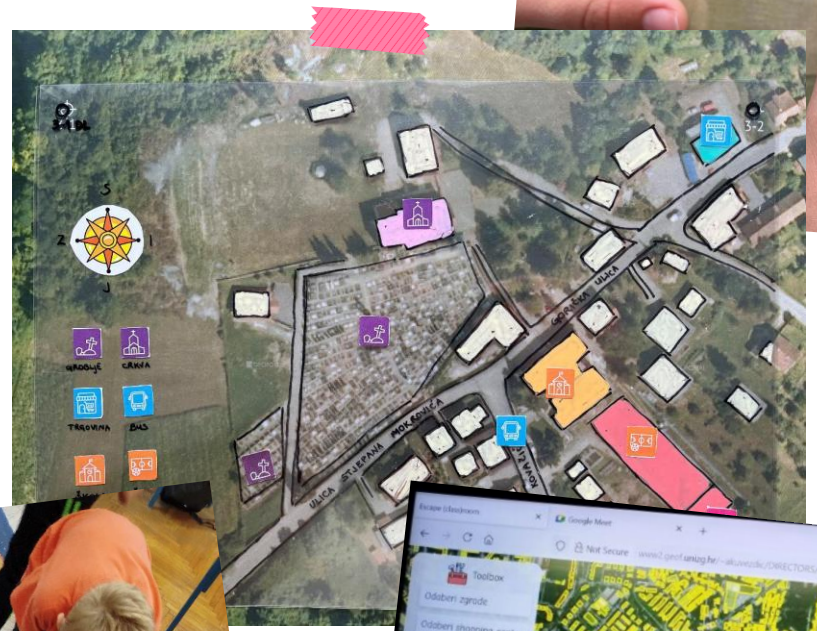
Workshop 2: Moderate data skills

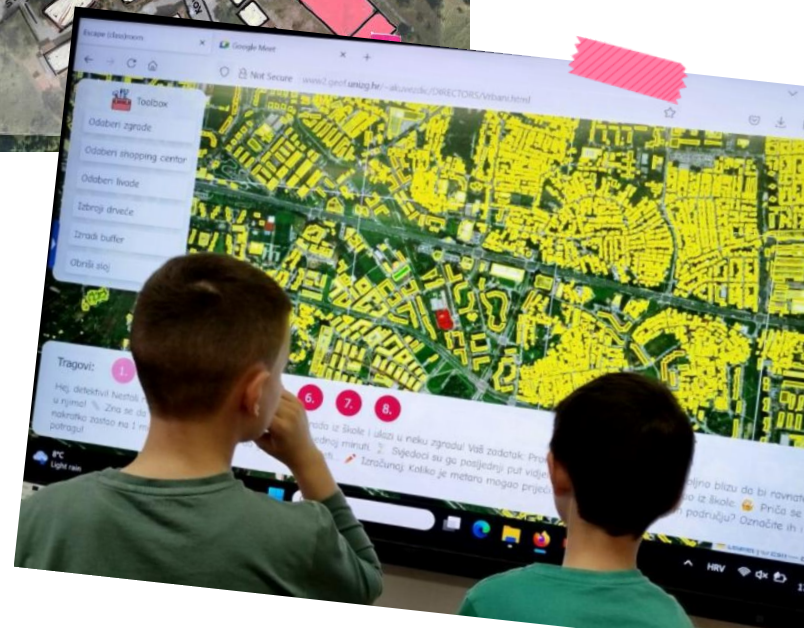
Geospatial Data (and Maps) in Our Hands

Methods:

- team-based problem solving
- from analogue to digital maps
- strong real-world relevance (school environment)







Methodology, Design, and Implementation

Three-Level Data Literacy Workshops in Croatia & the Netherlands

Workshop 3: Advanced data skills

Data sources

Session 1: From our bodies to sensor technologies

- measure distance with body (steps) vs. technology (apps, wearables)
- discuss sensor accuracy, method comparison

Session 2: Technology to the rescue! Or not?

- GPS/GPX tracking using phones and watches
- visualise tracks in Google Maps
- evaluate impact of device placement on results

Methodology, Design, and Implementation

Three-Level Data Literacy Workshops in Croatia & the Netherlands

Workshop 3: Advanced data skills

Data sources

Methods:

- mixed methods: analog vs. digital
- critical thinking on data accuracy & limitations of tech

Results | General findings

- overall, workshop outcomes were positive
- pupils enjoyed active learning, discovering new things, and open discussions
- minor differences noted between Croatian and Dutch implementations

Results | General findings

Pupil and teacher evaluation

- surveys conducted after each session using smiley-based scale (1–5)
- pupils reported high engagement and satisfaction
- Croatian pupils gave slightly higher average ratings than Dutch pupils
- quantitative data gives only a preliminary view
- oral, in-class feedback might offer richer insights in the future

Analysis and Recomendations | Lessons Learned | General Insights

- connect abstract concepts to concrete, real-world contexts
- start with analogue activities before introducing digital tools
- provide clear and consistent instructions and well-prepared materials
- active teacher involvement is essential for long-term knowledge integration
- ensure technological readiness: working devices and stable internet
- adapt activities to accommodate varying levels of knowledge and interests
  --〉promotes inclusiveness and meaningful engagement for all pupils

Analysis and Recomendations | Lessons Learned | Practical Adjustments

- redesign second session to avoid the need for mobile phones
  - not all pupils have phones → feelings of exclusion
  - some pupils distracted by their phones
- review pupil evaluation strategy: extreme scores reduce usefulness of averages
  - in-class oral evaluation could yield more qualitative feedback
  - introduce a neutral classroom observer for more objective assessment

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Conclusion

- DIRECTORS project explored hands-on workshops promoting data literacy
- workshops covered full data cycle: collection, processing, analysis, visualization
- interactive, hands-on approach boosted engagement and foundational skills
- differences between Croatia and the Netherlands offer insights for refinement
- success factors: concrete contexts, clear plenary instruction, teacher involvement
- one additional cycle planned to refine methods based on lessons learned
- early results are promising – continued iteration needed for lasting impact

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