Informatics
can start early. And rightly so.

Let us make the best of it!
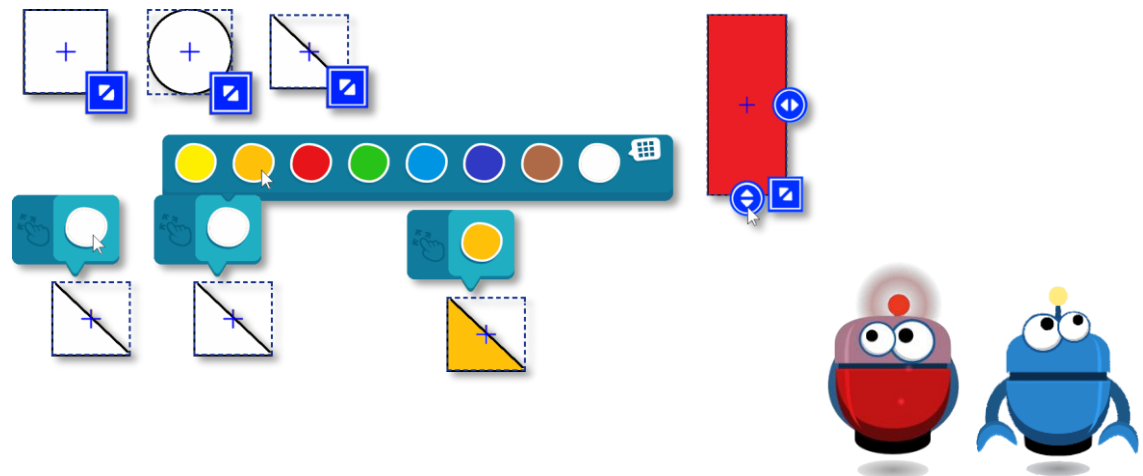
Ivan Kalas

Comenius University, Bratislava

**I want to share our experience with designing
the content, pedagogy and strategy
for new primary informatics in Slovakia and Czech Rep**

content

- some facts about informatics in Slovakia and Czech Republic
- background, vision and goals for Informatics with Emil
- strategy, approach, design and pedagogy principles – in primary
- demonstration of Informatics with Emil
- informatics content as an instrument for research

some facts about informatics in Slovakia and Czech Republic

- **we believe in *'informatics in education for every learner'***

  if properly implemented and integrated
  sensitively and with respect
  with realistic expectations
  with modern pedagogy

- **it starts in primary education**   what I refer to as primary
  why primary is so important for us

  (pre-school and primary) teachers know that learning needs storytelling
  UNESCO: primary is the most important period of school
  amazing learning atmosphere
  naturally supports the principle of *learning together (L. Vygotsky)*

- **compulsory (Years 3 + 4)**   1 lesson per week (= 2 x 33 lessons)
  then also Years 5, 6, 7, 8, 10, 11, 12

- **both Czech Republic and Slovakia – new or revised curricula**
- **who are the teachers of informatics at primary**

background, vision and goals

support
computational curiosity

● **what we are trying to achieve**

contribute to building school informatics that is

stable, systematic, modern and useful

for every girl and every boy in the class

respects developmental appropriateness

exciting, creative, but also challenging

for pupils and for primary teachers

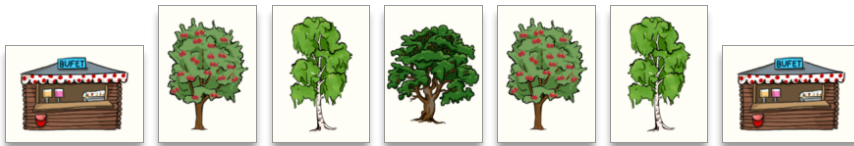also: respects individual differences between pupils

allows each pupil to take their own step

has its own 'cognitive arc' – progressing from week to week, from Year to Year…

clearly formulated learning objectives

what is programming in primary informatics, what role it plays

● **this requires systematic and complex teacher support and edu research**

strategy and approach: design and pedagogy principles

- **new informatics must**
  - **exploit the enormous potential of primary education**
  - **deliver relevant, attractive and useful content**

- **in our design we are guided by the principles**
  - **the teacher does not 'lecture' or 'explain', the key is pupils' discovery**
  - **pupils do not work alone --- we learn together, I teach you, you teach me…**
    - **working in pairs + whole group discussions**
    - **inseparable set-up: pupil, pupil, computer and two workbooks**
  - **different representations of the problem, different forms of work**
    - **working on tablets, in workbooks or either way**

- **our software environments do not give feedback**
  - **it's the pupils who are learning**
    - **to think, to solve problems, to collaborate, communicate, integrate, create**
    - **to develop computational thinking and digital competences**
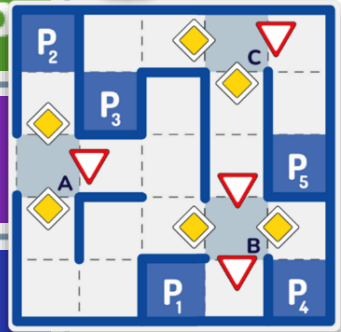   - **of pupils AND teachers**

map of Informatics with Emil

	pre school	Y1	Y2	Y3	Y4	Y5
Emil in pre-school	■ ■	■				
Emil part 1				▩	▩	
Emil part 2					▧	▧
Robotics with Ema		▨	▨	▨	▨	▨
Living Workbook				▦	▦	
Scratch with Emil's pedag.						▩ ▨
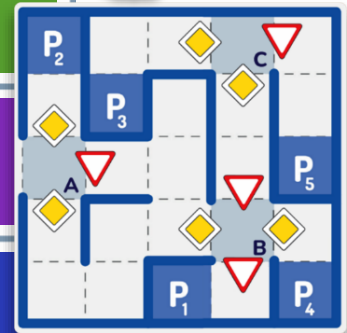
map of Informatics with Emil

	pre school	Y1	Y2	Y3	Y4	Y5
Emil in pre-school	5 5	8				
Emil part 1					16	
Emil part 2					16	
Robotics with Ema		5	5	5	5	
Living Workbook				8	8	
Scratch with Emil's pedag.						

demonstration

demonstration

demonstration

J1 The **P1** command stamps a circle of a random colour. Use **P1** to program **P2** as follows. First it sets size 5 and runs **P1**, then size 3 and runs **P1** again. And finally size 2 and again **P1**.

1. Using **P2** and other basic commands let Emil draw a chain of random colours:

2. Leave **P2** as it is. Modify **P1** so that using **P2** and other commands, Emil draws:

Did you succeed?

A

yes   no

B

yes   no

C

yes   no

*3. Leave **P2** as it is. Modify **P1** so that using **P2** alone, Emil draws these:

Did you succeed?

A

yes   no

B

yes   no

C

yes   no

D

yes   no

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instrument for research

- **programming in lower primary years: design principles and powerful ideas**
- **exploring control in early computing education**
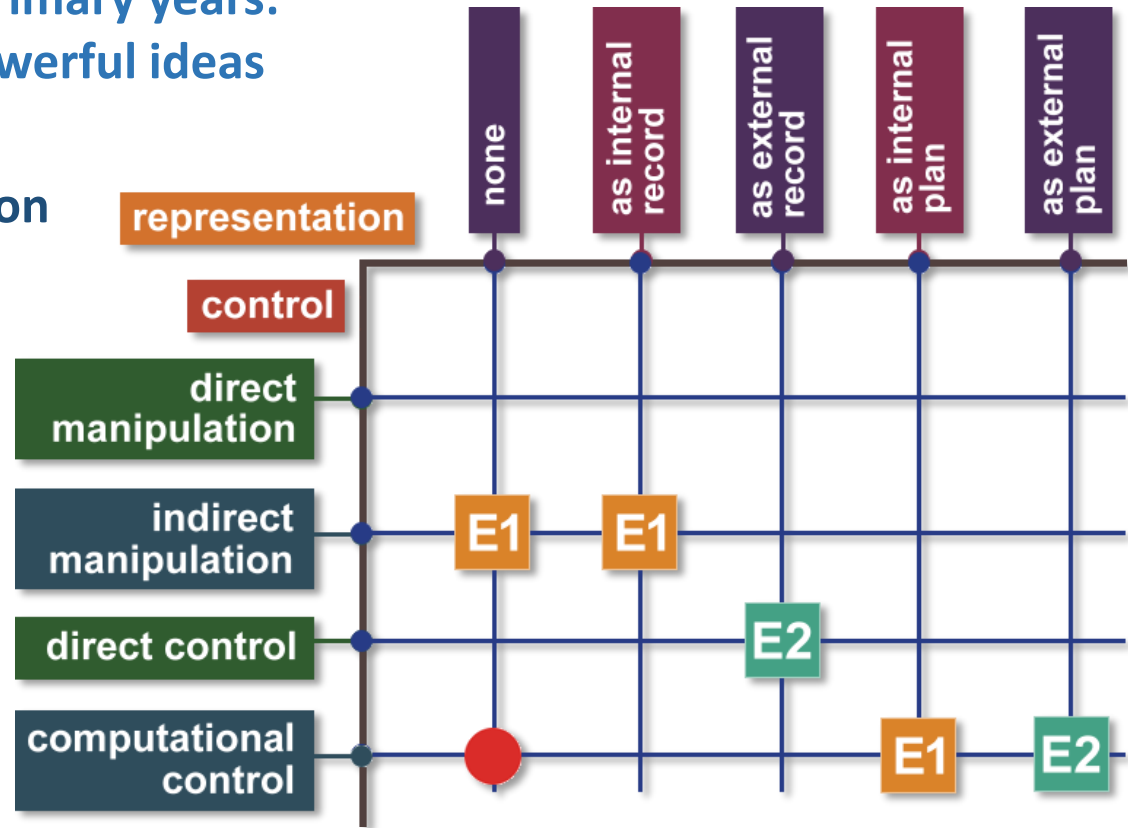

- **levels of control in primary robotics**

instrument for research

programming in lower primary years:
design principles and powerful ideas

exploring control in
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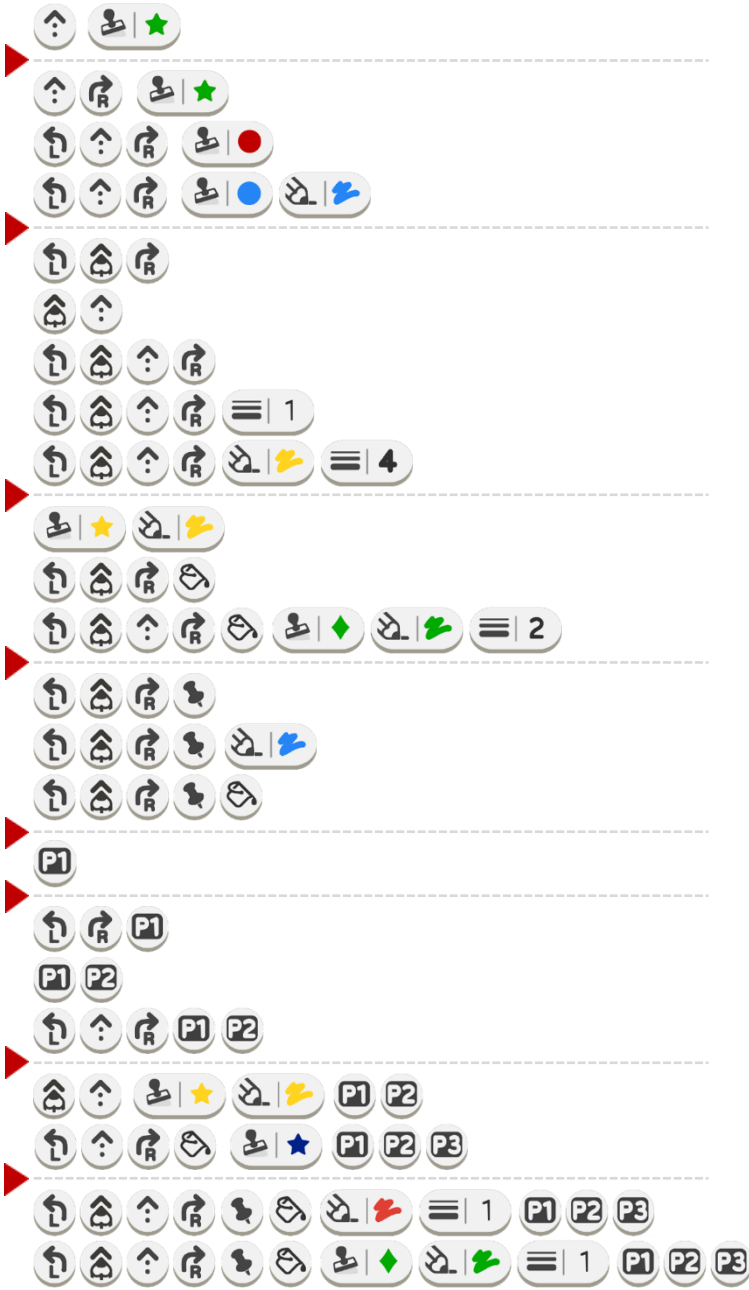
levels of control in primary robotics

● programming in Year 4: **analysis of the design research process**

● programming concepts and their cognitive demand

● tables and the development of CT in primary

structural thinking in CT and MT
multiple representations in the development of CT
powerful ideas in informatics
informatics basis of digital competencies

6 P1

7
L R P1
P1 P2
L ↑ R P1 P2

8
↑ ↑ | ★ | ✦ P1 P2
L ↑ R ○ | ★ P1 P2 P3

9
L ↑ ↑ R ● ○ | ✦ ≡ | 1 P1 P2 P3
L ↑ ↑ R ● ○ | ◆ | ✦ ≡ | 1 P1 P2 P3

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● **who are the teachers of informatics at primary**

> primary teachers teach different subjects – **big advantage**
> including MATHEMATICS
> so they can be **building bridges** and **using bridges** between subjects and learning areas
> they can naturally integrate, support collaboration and holistic development
> they are experienced and we already have them

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Thank you for your attention

contact

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