UNIVERSITY OF OSTRAVA
FACULTY OF EDUCATION

Utilization of Approaches of Hejny's Method in Education

Department of Mathematics with Didactics

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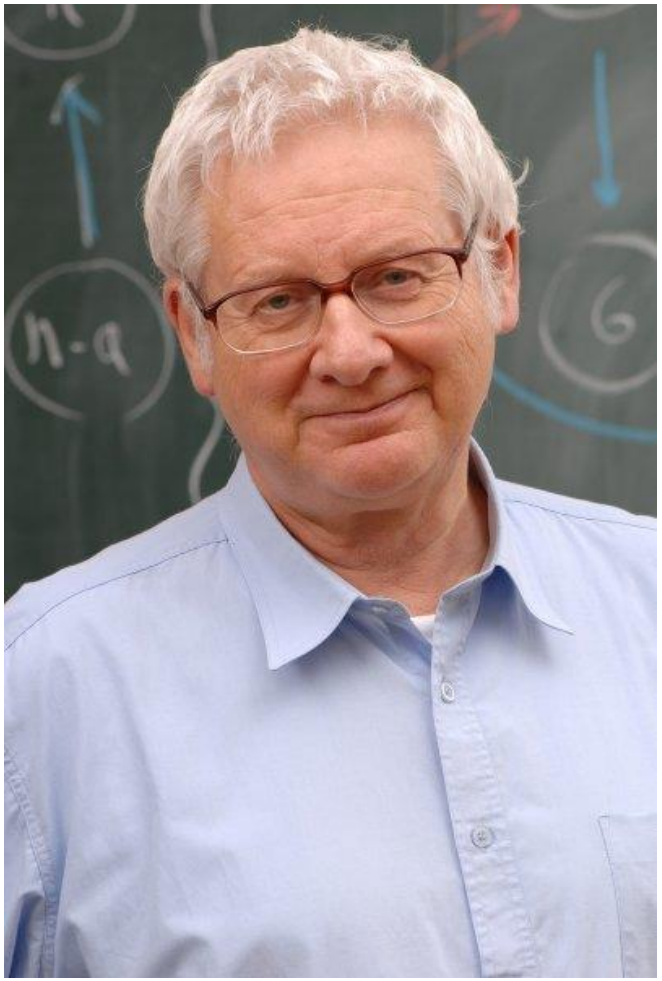
Inroduction: Mr. Milan Hejny

- Czech and Slovak mathematician,
- an expert in didactics of mathematics,
- a professor at the Pedagogical Faculty of Charles University in Prague,
- author or co-author of 16 mathematical publications and more than 270 publications on mathematics didactics, including 13 frequently cited books.
- He has lectured at 13 foreign universities and at more than 30 international conferences, has been or is a co-investigator or co-investigator of 7 domestic and 4 international grant projects.



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Hejny's method in education

- Non-traditional way of teaching mathematics
- Method adopted by more than 750 of the 4100 Czech schools on the primary and lower-secondary level
- Method implemented in a range of alternative schools and in home-schools
- Applied frequently in Czech Republic, Italy, Finland, Sweden, Greece, Poland, Canada
- Textbooks for primary schools approved by Czech Ministry of Education in Czech Republic

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Method's key principles

1. Building Schemata
2. Working in Environments
3. Interlinking Topics
4. Character Development
5. True Motivation
6. Real-Life Experience
7. Enjoying Mathematics
8. Personal Knowledge
9. Teacher's Role
10. Working with Error
11. Appropriate Challenge
12. Supporting Cooperation

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Working in environments: learning through repeated visits

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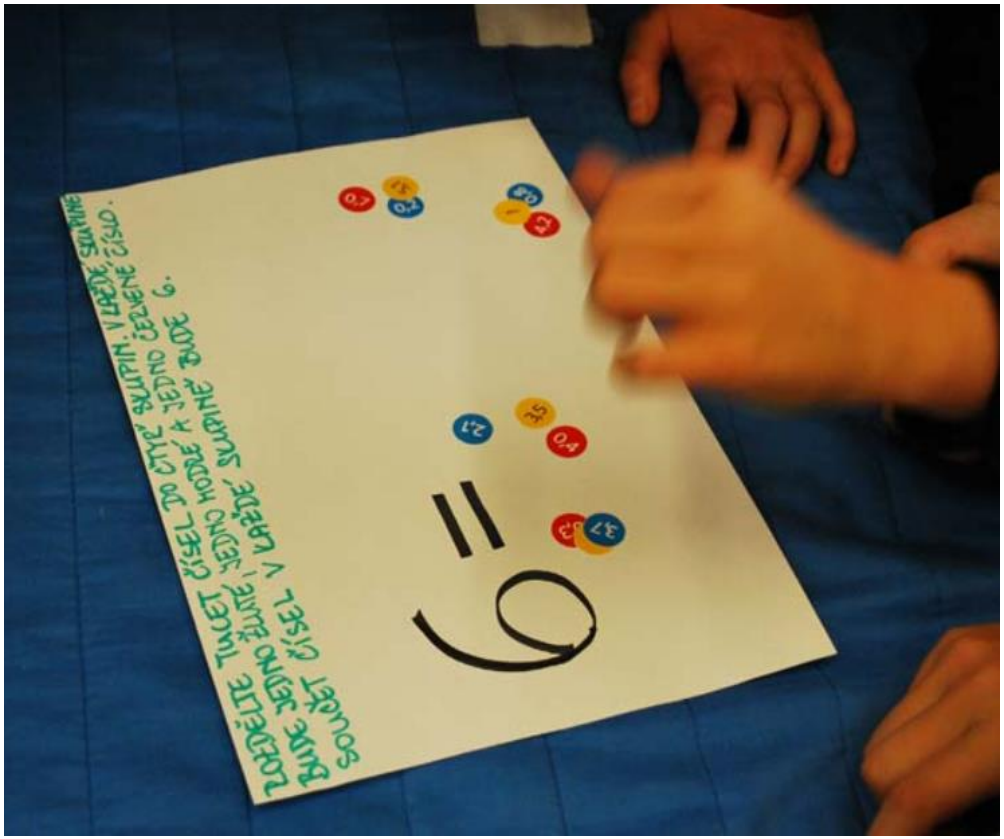
Interlinking topics: not isolating mathematical patterns



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Character development: supporting the child's independent thinking

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True motivation: when “I don’t know” and “I want to know”

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Real-life experience: we draw on the child's personal experience

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Enjoying mathematics: enjoyment significantly contributes to further learning

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Personal knowledge: it outweighs received knowledge

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The teacher’s role: guiding and mediating discussion

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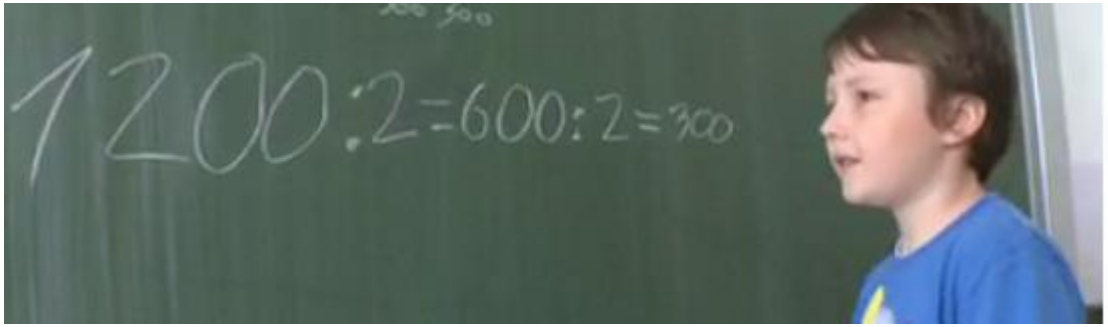
Working with error: avoiding unnecessary anxiety



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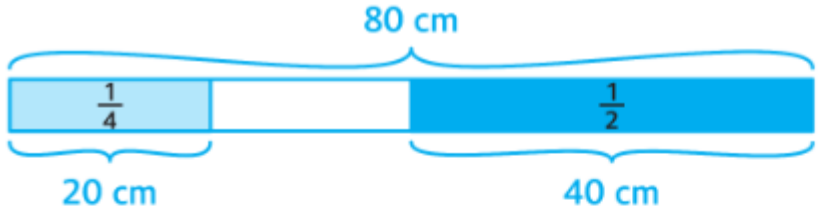
Appropriate challenge: tasks for each child at their level



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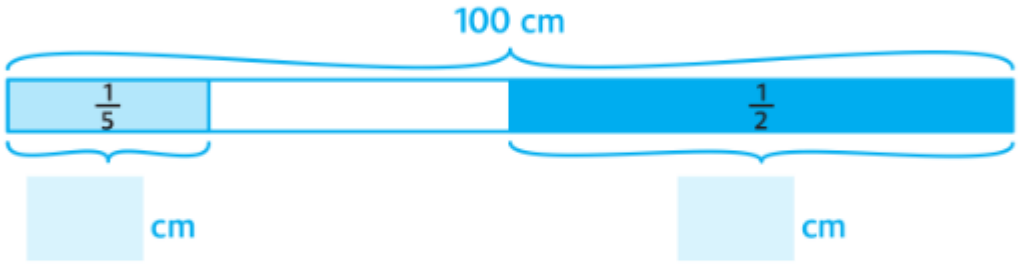

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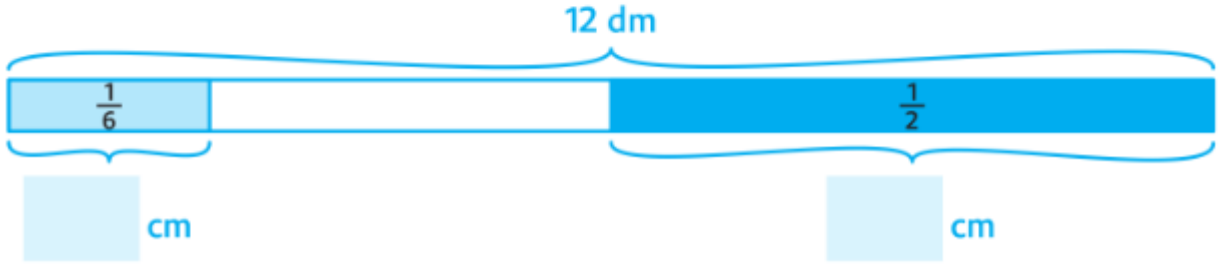

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Supporting collaboration: acquiring knowledge through discussion

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Method's key principles

https://www.h-mat.cz/en

https://youtu.be/JY39-OtkUGQ

Video including subtitles

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Enviroment of Hejny method

1. Numeric
    1. SEMANTIC - based on the pupil's extracurricular practice
    2. STRUCTURAL - not based on pupil's extracurricular practice

2. GEOMETRIC
    1. 2D plane
    2. 3D - space

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Enviroment Examples

Environment Bus

Now we will work as in real class, I am teacher and you are students ☺
Did you every travel by bus?
Let's built bus station, arrange travelers and let's go!

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Enviroment Examples

Environment Bus

On which stop get IN the most of passengers?
On which stop get OFF the most of passengers?
How many passengers are between RED and BLUE station?
How many passengers were in bus during whole ride?
How many passengers get IN/OFF on Blue station?
Etc.

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Enviroment Examples

Environment Bus

Sooner or later students realize, that evidence and notes are very welcome.

Please try it. We will repeat whole ride.

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Environment Bus – evidence of process

Did you know, that childs are working with evidence of process in kindergarten?

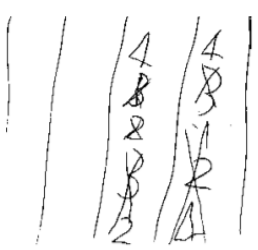
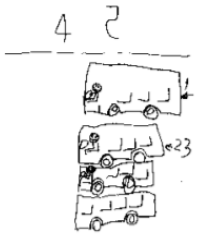


FOTO.7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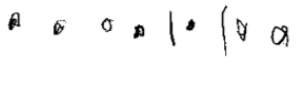
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FOTO.10

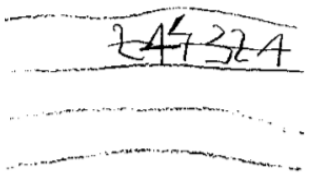
FOTO.11


FOTO.12

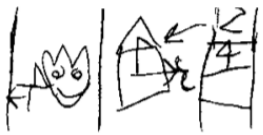
FOTO.13


FOTO.14


FOTO.15

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Environment Bus –

Student‘s list of notes:

					
Vystoupili		2	1	4	
Nastoupili	3	3	4	1	
Jeli					

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Enviroment Examples

Environment Bus

https://www.youtube.com/watch?v=pJ-E4dnKu2w&list=PLbb8j-uXWuKo57pMFDdKdT8VRJsFcVJ0S&index=7&t=0s

Video 5.00 – 8.15

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Environment Bus – task

Task (2. grade Primary School): Complete chart:

	A	B	C	D	E
V			4		18
N		7		9	0
J	8	12	14		

On bus stations A, B, C gets in bus …. people.

On bus station C gets in/out….people.

On station…. gets in 4 people.

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Environment Bus – math content

Which mathematical topics and themes did you recognize in this task?

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Environment Bus – math content

- Various math topics and themes
- Arithmetic Operations (Addition, Subtraction)
- Different semantic meanings of the number (number, operator)
- (we know 3 figures, we count 4), eg the situation at the stop C (12 people arrive at the stop C, 4 get off. How many people came in when 14 still went?)…

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Environment

There are nearly 30 similar environments in Hejny‘s method.
You can check them out in books or on next slides.

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Environment Making Steps

https://www.youtube.com/watch?v=S6IqoZotCH0&list=PLbb8j-uXWuKo57pMFDdKdT8VRJsFcVJ0S&index=10

video 9.45 – 12.20

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Environment krychlové stavby

https://www.youtube.com/watch?v=S2O4VbGBdkY&list=PLbb8j-uXWuKo57pMFDdKdT8VRJsFcVJ0S&index=8&t=0s

video 0.00 – 3.40

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Zdroje

- Hejný, M. a kol.: Matematika pro 1. – 5. ročník ZŠ, učebnice, pracovní sešity, příručky učitele, gradované karty, Plzeň, FRAUS 2007 – 2011
- Hejný, M. a kol.: Matematika pro 1. - 3. ročník ZŠ, učebnice, pracovní sešity, příručky učitele, gradované karty, Praha, H-mat 2018 – 2019
- Hejný, M: Exploring the Cognitive Dimension of Teaching Mathematics through Scheme-oriented Approach to Education, Orbis Scholae 2012/2, dostupné online https://www.cupress.cuni.cz/ink2_stat/dload.jsp?prezMat=104065
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Thank your for your attention

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