A Matematika Tudáselméleti- és Pszichológiai Kutatócsoport Umeában

PME = Psychology of Mathematics Education

„Minden”, ami a matematikai gondolkodás témakörébe tartozik.

1. Mi az a „minden”?
2. Mi az, ami a „mindenen” kívül van?

PI

„Minden” rtozik.

1. Mi az a

2. Mi az, a

Egy nap a konferencián

- PL= Plenary Lecture
- RR = Research Reports
- OC = Oral Communications

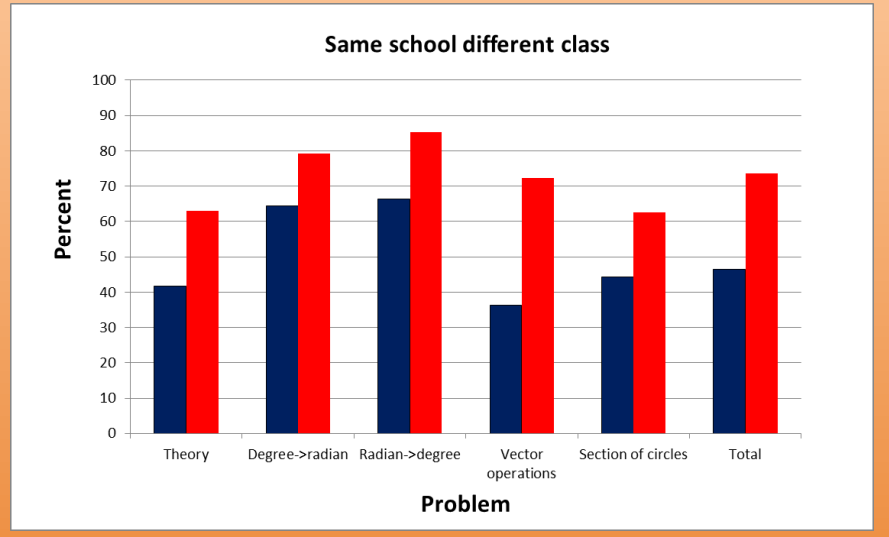
Egy nap a konferencián

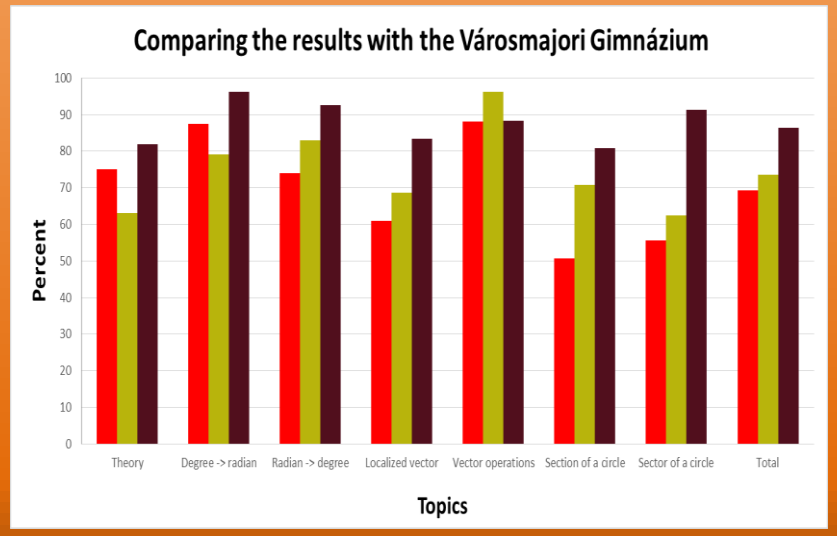
- CO = Colloquium
- WG= Working Group
- PP=Poster Presentation

Date: Wednesday, 04/Jul/2018

9:00am - 10:30am	Plenary Lecture 2: Nathalie Sinclair - "AN AESTHETIC TURN IN MATHEMATICS EDUCATION" Location: Aula Nordica							
11:00am - 11:40am	RR 1:01 Location: N410	RR 1:02 Location: N420	RR 1:03 Location: N430	RR 1:04 Location: N440	RR 1:05 Location: N450	RR 1:06 Location: N460	**RR 1:07** Location: N300 Cancelled!	RR 1:08 Location: N320
	RR 1:09 Location: N330	RR 1:10 Location: N360 New chair!	RR 1:11 Location: N370	RR 1:12 Location: N380	RR 1:13 Location: N210	RR 1:14 Location: N230	RR 1:15 Location: N260	RR 1:16 Location: N270
	RR 1:17 Location: MC313	RR 1:18 Location: MC333	RR 1:19 Location: MC343	RR 1:20 Location: MA346				
11:50am - 12:30pm	RR 2:01 Location: N410	RR 2:02 Location: N420	RR 2:03 Location: N430	RR 2:04 Location: N440	RR 2:05 Location: N450	RR 2:06 Location: N460	RR 2:07 Location: N300 New chair!	RR 2:08 Location: N320
	RR 2:09 Location: N330	RR 2:10 Location: N360	RR 2:11 Location: N370	RR 2:12 Location: N380	RR 2:13 Location: N210	RR 2:14 Location: N230	RR 2:15 Location: N260	RR 2:16 Location: N270
	RR 2:17 Location: MC313	RR 2:18 Location: MC333	RR 2:19 Location: MC343	RR 2:20 Location: MA346				
2:00pm - 3:00pm	OC 1:01 Location: N410 **Topic:** Mathematics difficulties	OC 1:02 Location: N420 **Topic:** ICT and learning, Grade 7-9	OC 1:03 Location: N430 **Topic:** Classroom assessment	OC 1:04 Location: N440 **Topic:** Geometry, space and shape	OC 1:05 Location: N450 **Topic:** Preservice teachers, Practice experience	OC 1:06 Location: N460 **Topic:** Tasks in algebra and functions One presentation was cancelled!	OC 1:07 Location: N300 **Topic:** Proof, argumentation and reasoning	OC 1:08 Location: N330 **Topic:** Representations and modeling
	OC 1:09 Location: N370 **Topic:** Professional development programs	OC 1:10 Location: N380 **Topic:** Probability and statistics	OC 1:11 Location: N210 **Topic:** Preservice teachers and teaching	OC 1:12 Location: N230 **Topic:** Arithmetic, numbers and operations	OC 1:13 Location: N260 **Topic:** ICT, GeoGebra in Higher education	OC 1:14 Location: N270 **Topic:** Proportions	OC 1:15 Location: MC333 **Topic:** Affect, emotions and attitudes	OC 1:16 Location: MC343 **Topic:** Affect, emotions and attitudes
	OC 1:17 Location: MA346 **Topic:** Problem solving, Grade 8							
3:10pm - 3:50pm	RR 3:01 Location: N410	RR 3:02 Location: N420	RR 3:03 Location: N430	RR 3:04 Location: N440	RR 3:05 Location: N450	RR 3:06 Location: N460	RR 3:07 Location: N300	RR 3:08 Location: N320
	RR 3:09 Location: N330	RR 3:10 Location: N360	RR 3:11 Location: N370	RR 3:12 Location: N380	RR 3:13 Location: N210	RR 3:14 Location: N230	RR 3:15 Location: N260	RR 3:16 Location: N270
	RR 3:17 Location: MC313	RR 3:18 Location: MC333	RR 3:19 Location: MC343	RR 3:20 Location: MA346				
4:30pm - 6:00pm	WG 01 part 1 Location: N410	WG 02 part 1 Location: N260	WG 03 part 1 Location: N270	WG 04 part 1 Location: MC313	WG 05 part 1 Location: N420	WG 06 part 1 Location: N430	WG 07 part 1 Location: MA346	WG 08 part 1 Location: N440
	WG 09 part 1	WG 10 part 1	WG 11 part 1	WG 12 part 1	WG 13 part 1	WG 14 part 1	WG 15 part 1	

Research Report





Poster Section

- 2 poszter:

1. Előhívási hatás
   – középiskolai kísérlet

2. Beöltöztetett feladatok

DRESSED UP PROBLEMS – THE DANGER OF PICKING THE INAPPROPRIATE DRESS

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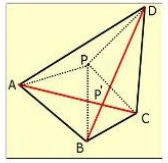
42nd Annual Meeting of the International Group for the Psychology of Mathematics Education

PROBLEM 1.: There are four oil wells, so-called rockers, on an oil field. The oil is conducted from the rockers to the oil storage facility by a transmission pipeline. Where should the storage facility be built in order to minimize the length of pipelines? (The rockers are located at the vertexes of a convex quadrilateral: ABCD.) /Matematika 9. OFI/

ANSWER ACCORDING TO THE TEACHERS' HANDBOOK: At the intersection of the diagonals. Sketch of the proof: let P be an internal point of the quadrangle, which is not located on the diagonals. According to the triangle inequality PA+PC>AC, PB+PD>BD, which means the total distance from the four vertexes of the ABCD convex square to the point is longer than the distance of the two diagonals.



The abovementioned problems all have the property that while reading them, we can already be sure that the books' sample solutions are wrong.

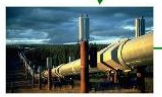
1995	1996	1997
204	288	339

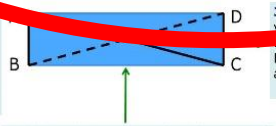
PROBLEM 2.: The table contains data from three different years on the number of deaths caused by drugs in Hungary. Give a prediction for the year 2010. /Matematika 11. Mozaik/

PROBLEM 3.: How many different passwords can be made if you are only allowed to use the letters of the English alphabet
a.) and a password is 6 characters long and all letters has to be distinct?
b.) and a password is 6 characters long and repetition of characters is permitted? /Matematika 11. OFI/

PROBLEM 3. question c.):
What can be question c.) if we know that the sample solutions of the book are wrong for a.) and b.)?

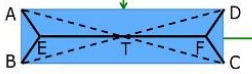
REMARKS: 1. Since **oil flows**, once the pipeline configuration is fixed, the storage facility can be located anywhere along the pipeline system. Hence, the answer cannot be correct.

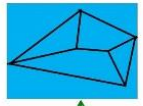




2. It is not even true that the sum of the diagonals minimizes the length of the system. In case of a rectangle if the diagonals have an angle less than 60 degrees, replacing one of the diagonals with two appropriate sides, a shorter path is obtained.

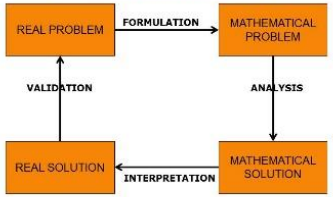
3. We can even get shorter path if the vertices of the ABCD rectangle are connected to the E and F points (the Fermat points of ABT and CDT triangles), as shown in the figure.





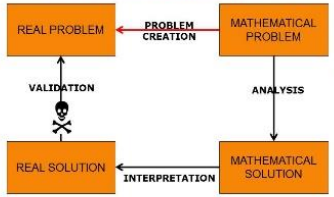
4. The solution of the problem in the generic situation is given by one of the Steiner trees of the points ABCD.

MODELLING CYCLE



In **modeling**, we solve a problem that is mostly outside mathematics by placing it in a mathematical context. (Greefrath, 2007)

THE PROCESS OF DRESSING UP



Dressing means, the designation of a task around a given mathematical content in a way that the task seems to have real content. The main purpose is to create an impression of modeling problem or a problem which is close to reality.

CURIOSITY:
One of the applications of Steiner trees is the highway construction. Nyíregyháza, Debrecen, Miskolc, Budapest, are Hungarian cities.

REMARKS:
In case of **problem 2.** it can be noticed easily that a correct prediction can not be given based on only three datas.

The question c.) of **problem 3.** is the following: How does the answer to question a.) and b.) changes, if you are allowed to use the lower case and capital letters, as well?
Answer: It does not change at all.

CURIOSITY:
According to the textbook's solution, 35980 or 9202 people „will" lose their lives in 2010 caused by drugs. In fact this number was 17 in 2010.

CONCLUSION:
These problems are all dressed up problems, where the mathematical idea was born sooner than the real problem. The problem creator is not necessarily able to validate, verify his/her own problem. A possible way to avoid these errors in validation is a more thorough, professional refereeing of the context problems.

The conference participation was subsidised by the Talented Student Program of Eötvös Loránd University, Budapest, the Természettudományos oktatásért Szabó Szeboics emlékére Alapítvány, the Új Nemzeti Kiválóság Program, and by the Pázmány-Eötvös Természettudományi Információs Alapítvány.

Efficiency of test-enhanced learning in teaching elementary geometry

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Csilla Gyöngyvér ZÁMBÓ, Anna MUZSNAY, Janka SZEIBERT, Csaba SZABÓ
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42nd Annual Meeting of the International Group for the Psychology of Mathematics Education

Motivation

In a recent review of studies on the intrinsic effect of testing, Roediger and Karpicke provided evidence that testing students on studied material results in improved retention of that material compared with spending an equivalent amount of time restudying the material. In their experiment, students studied prose passages and took three immediate free-recall tests, without feedback, or restudied the material the same number of times as the students who received tests. Students then took a final retention test 5 min, 2 days, or 1 week later.

	3x read	1x read , 2x tested
5 min later	80%	75%
2 days later	55%	70%
1 week later	40%	55%

Question: what is the effect of retrieval leraning in mathematics classes in highschool compared to
a) pupils with the same skills and
b) elite highschool students of high abilities.

Before:	Now:
• Laboratory	• Real life
• Psychology students	• Grade 9 pupils (highschool)
• Text/foreign words memorizing	• Mathematics lessons

Our hypotheses: retrieval effect already has its benefits at grade 9: students who study in a retrieval-enhanced way will perform better in comparison with previous results of themselves and other 9th graders of the same school and will perform similarly to students of an elite secondary school , who learn on the standard way.

Our Experiment is a real life experiment.

Topics - Elementary geometry:

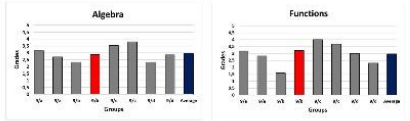
Arcs, sections of circles, arclength
Geometric transformations
Symmetric quadrangles
Regular polygons
Vectors

Test at the end of each lesson:

- From the material learnt the same day
- 2 questions: 1 theoretical, 1 practical
- Grading: 1 point each question
- The score counts in the final grade

In the original plan we wanted the pupils to submit the solution of a geometry problem to the teacher by email on the weekends, before Sunday evening. Most pupils did it on the first week. From the second week almost nobody did it. Several efforts of the teacher failed to have them to do the extra homework.

Control group form the same school



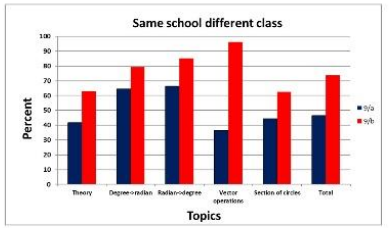
The two diagrams show the performance of the grade 9 study groups on two topics before the experiment. Our experimental group scored almost exactly as the average at the school and very similarly to the group 9/a.

Control group from an elite school

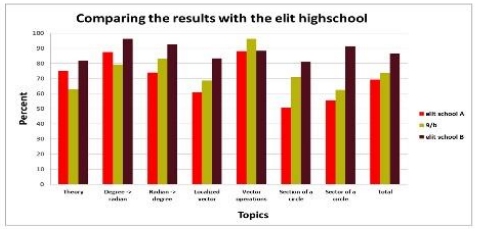
Experimental group	Control groups
• One group from 9 b.	• 9.c and 9.e classes (same teacher)
• 9 students	• 16, 18 students
• 3 lessons/week, 3-4 weeks	• 4 lessons/week, 4-5 weeks
• Total: 11 lessons	• Total: 19, 16 lessons
• Vocational school	• Grammar school
• Socially handicapped students (2016 National Survey of Competences)	• Elite school (Top 10 in national ranking in 2017)

Group 9/b and the elite school the same test of the level of the elite class.

Group 9/a wrote an easier test of their on level of the same topic.



The percentage of the score of study groups 9/a and the experimental study group 9/b. The red colomns denote the scores of the experimental group. Group 9/a had one less problem in the test. Their test was simpler, adjusted to the level of the vocational school.



The percentage of the score of study groups of the elite highschool and the experimental study group 9/b. The middle colomns denote the scores of the experimental group. The three groups wrote the same test of the level of the elite class. The pupils of the experimental group and of the elite highschool achieved the same result.

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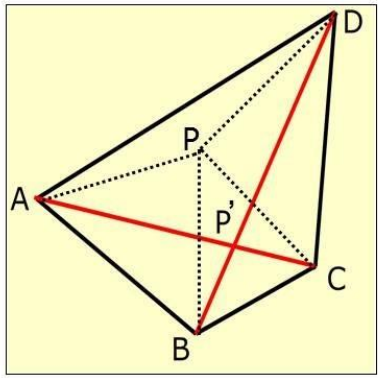

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Poster Section

Fogadás

Fogadás

Néhány darab a mozaikból - közelebbről

- Mogens Niss: The very multi-faceted nature of mathematics education research (PL)
  - Cikkírás fontossága
  - Kialakult stílus
- Markku Hanula: From anxiety to engagement
  - Egyik első kutató
  - Elmúlt években Mo-n is erősen kutatott téma
- Plenary Panel: …first – high performance or positive affective variables…

Néhány darab a mozaikból - közelebbről

- „Látókör-tágítás”
  - Esztétika a matematikában
  - Kreativitás (vs. Képzelőerő) mérhetősége
  - Tanulók kommunikációjának jellegzetességei csoportmunka során
  - Tanári hiedelemrendszerek szerepe

Néhány darab a mozaikból - közelebbről

- Modellezési feladatok
  - Előzetes tudás szerepe
- Tanár(szakos) és/vagy kutató
  - Strohmaier, Anselm R.: Mathematics in disguise: Effects of external context of mathematical word problems
  - Designing for guided reinvention of mathematical concepts

Research Reports No 6.

RR # Room	Author	Title
RR 6:01 N410	Mutara, Lydia; Makonye, Judah Paul	Students' pathways for solving probability problems
RR 6:02 N420	Sievert, Henning; Van Den Ham, Ann-Kathrin; Niedermeyer, Inga; Heinze, Aiso	Textbook effects on the development of adaptive expertise
RR 6:03 N430	Buforn, Ángela; Fernández, Ceneida; Llinares, Salvador	Decision-making in noticing students' proportional reasoning
RR 6:04 N440	Fritzlar, Torsten; Karpinski-Siebold, Nadja	Solving arithmetic-algebraic word problems by 10- to 12-year-old students
RR 6:05 N450	Lisarelli, Giulia	How dragging mediates discourse about functio
RR 6:06 N460	Di Martino, Pietro; Gregorio, Francesca	The first-time phenome non: Successful student mathematical crisis in secondary-tertiary transition
RR 6:07 N300	Dyrvold, Anneli	Conceptualising translations between representations


DROP IN


Te gusta
Siguiendo
Compartir
PME 42
29 de junio
Do you like to take a morning run? But you don't know where to run in Umeå? Don't worry! There will be guided running tours at different speed and different distances.
Time and place to meet will be announced at the PME42 Facebook page and on the announcement board at the conference venue.
You can also contact Frithjof at frithjof.theens@umu.se or
Frithjof Theens y 27 personas más
7 comentarios 2 veces compartido
Me gusta
Comentar
Compartir
Más antiguos
Anne-Sophie Supply Jo Van Hoof die loopschoenen gingen mee he?
Me gusta · Responder · Ver traducción · 18 s
3
12 respuestas
Frithjof Theens The first morning run will be on Wednesday, distance about 5 km, meeting at 7 AM.
Me gusta · Responder · 18 s
3