

REPORT OF THE WORKSHOP ON 'EVIDENCE-BASED EDUCATION', Educational day, 3 November 2015

Frank and Hans van den Berg

We had eight participants, plus Ineke Wagenaar as our host, who also participated. Participants included Wietske Bijker, Yorick Birkhölzer (student), Pieter Tjerk de Boer, Henk van den Hengel, Herman Oosterwijk, Maaïke Rump (student) and Judith Timmer.

We had 5 posters in the room, including one on effect sizes, and a 6th that was unveiled at the end.

We did three workshop elements:

- Participants individually ranking 18 interventions from Hattie and others (see next slides)
- Participants working in two four-person groups on confronting *what you do as researcher* with *what you do as teacher*. And subsequently finding inspiration from research to teaching and vice versa
- Briefly discussing the Effect Sizes of the 18 interventions, plus Erik Mazur as an extra. Due to time constraints (steps 1 and 2 took way more time than expected), we could only show the actual list of interventions and elaborate a little on 2 or 3 of these.

Furthermore, we had to downsize one subject of the meeting (from barriers to options, lateral thinking), again due to time constraints.

The second element yielded a number of outcomes (more on the flipovers with post-its):

- Publishing in research → having students write papers in education
- Studying literature in research → studying literature in education (but: where and how?)
- Do new things in research → doing new things in teaching? (There are barriers) Doing known, established things in teaching
- Critically examining methodology ↔ no critical examining of educational methods

During the third element we discussed e.g. the usefulness of seeing educational interventions, like Problem-Based Learning on a spectrum instead of as a binary: teachers can vary the degree of 'unleashing' and steering.

In the final part we discussed things like Carol Dweck's mindsets, in connection with Hattie's top-of-the-list intervention (*students' own estimate of own performance*, ES = 1.44). Also, we discussed the balance between 'unleashing' and 'steering', and developing teacher's situationality. Furthermore, we spoke of individual teacher's freedom to experiment in the classroom.

Evaluation was positive: three participants scored a 4, two a 4.5, on a 5-points scale.

Motivating Students
Principle: Students' motivation generates, directs, and sustains what they do to learn.

Fixed and Growth Mindsets
Fixed Mind-set: Carol Dweck (Stanford), Peter Dinkels and others. Growth Mind-set: Carol Dweck (Stanford), Peter Dinkels and others.

Adolescence and learning
Most of our students are in the adolescence stage. In this stage a significant transformation of the brain takes place. The Pre-Frontal Cortex is the last to mature and to undergo transformation.

Zone of Proximal Development
ZPD, Lev Vygotsky. Zone of Proximal Development (ZPD).

Effect Size (ES), aka Cohen's d
ES is a measure for the difference between two normal distributions. The larger ES, the bigger the difference.

INTERACTIVE LEARNING – ERIC MAZUR
Average College and University Results. Active engagement vs. traditional instruction for approximating students' conceptual understanding of basic physics concepts (taken from Laws et al., 1996).

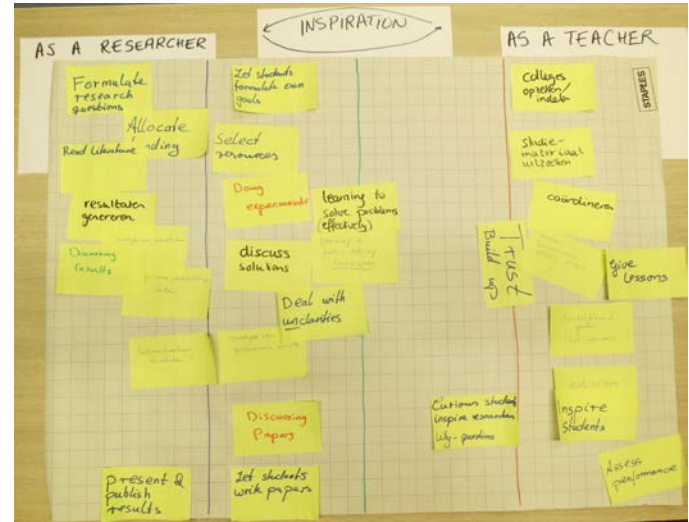
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As a first step, eight participants individually ranked 18 educational interventions

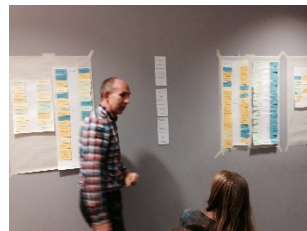


In a second step, participants worked in two sub-groups to compare research with teaching and to finding inspiration both ways



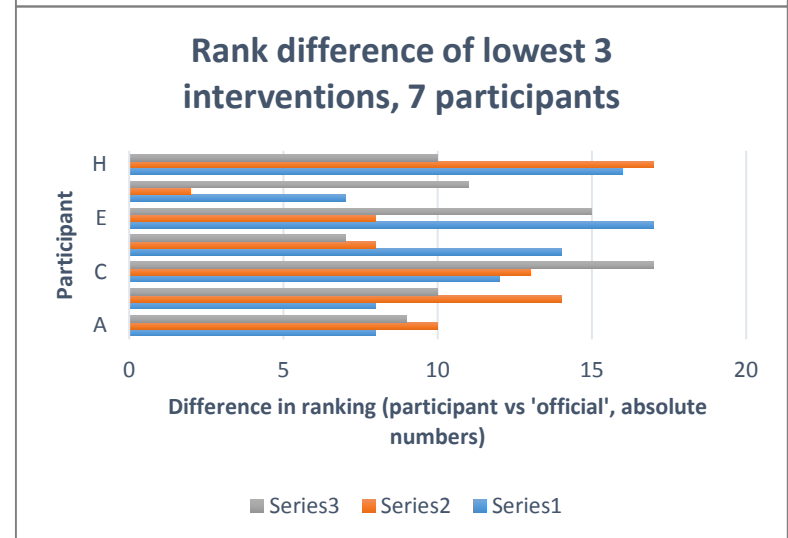
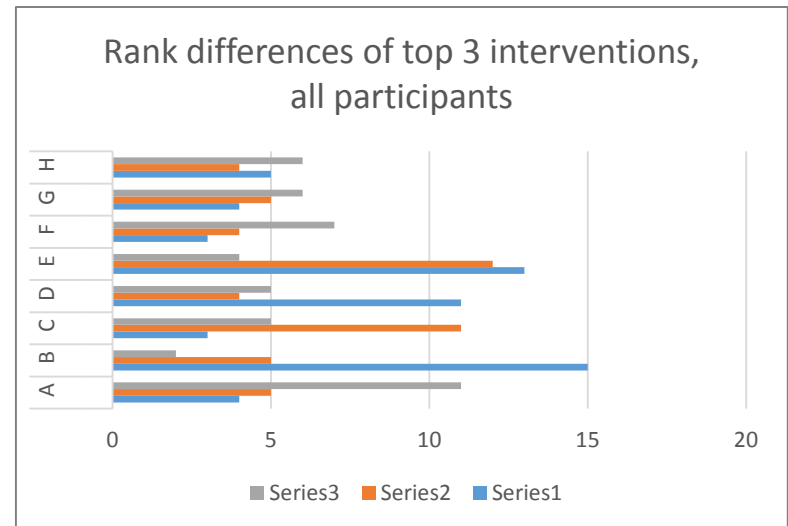
- 1 Student's estimate of own performance 1.44
- 2 Project Based Learning 0.2 - 1.39
- 3 Teacher Credibility 0.90
- 4 Student peer-teaching 0.88
- 5 Small Group Learning 0.47 - 0.87
- 6 Teacher Clarity 0.75
- 7 Feedback from Students to Teacher 0.73
- 8 Prior Achievement of students 0.65
- 9 Study Strategies 0.63
- 10 Direct Instruction 0.59
- 11 Problem Based Learning -0.73 - +0.54
- 12 Peer influences 0.53
- 13 Quality of Teaching 0.44
- 14 Time on Task 0.38
- 15 Attitude towards math/science 0.36
- 16 Home work 0.29
- 17 Class size 0.21
- 18 Teacher subject matter knowledge 0.09

Finally, we compared the outcomes of the ranking with the evidence base



After the workshop, we did a bit of analysis on step one of the workshop's outcomes

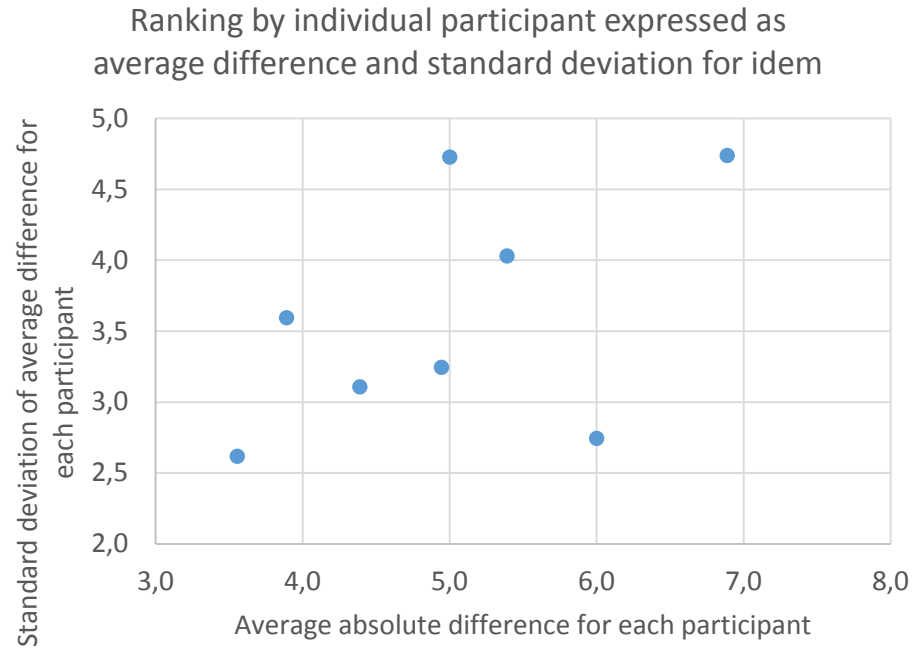
- As the graphs to the right show, there was a large spread in participants' rankings
- Three top 3 interventions were ranked correctly
- Twenty-one top 3 interventions were not ranked correctly
- Three bottom 3 interventions were ranked correctly
- Nineteen bottom 3 interventions were not ranked correctly
- One top 3 intervention was ranked in the bottom 3
- Zero bottom 3 interventions were ranked in the top 3



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Clearly, the differences between individually ranked interventions and ranks from evidence are very large.

This graph shows that some participants had a closer match than others.



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Facilitators conclude that this format and content can work and that these have much potential as a regular workshop for experienced teachers, e.g. in addition to the UTQ (BKO) workshops. We do need more time (like 3 instead of 1 hour) to properly cover the content during the workshop.

We will therefore propose to include this workshop Evidence-Based Education in the regular offer of CELT for teachers.