## Kristina Edström

### Engineer & Educational developer

- M. Sc. in Engineering, Chalmers
- Associate Professor in *Engineering Education Development* at KTH Royal Institute of Technology, Stockholm, Sweden
- 700 participants in the 7.5 ECTS course *Teaching and Learning in Higher Education*, customized for KTH faculty, 2004-2012
- Director of Educational Development at Skolkovo Institute of Science and Technology, Moscow, 2012-2013

### Strategic educational development, national and international

- CDIO Initiative for reform of engineering education since 2001
- SEFI Administrative Council, 2010-2013

### Some publications

- Crawley, E.F., Hegarty, J., Edström, K., & Garcia Sanchez, C. (2020). *Universities as Engines of Economic Development: Making Knowledge Exchange Work.* Springer, Cham.
- Edström, K. (2020). The role of CDIO in engineering education research: Combining usefulness and scholarliness. *European Journal of Engineering Education, 45*(1), 113–127.
- Edström, K. (2018). Academic and professional values in engineering education: Engaging with the past to explore a persistent tension. *Engineering Studies, 10*(1), 38–65.
- Crawley, E.F., Malmqvist, J., Östlund, S., Brodeur, D.R., & Edström, K. (2014). *Rethinking Engineering Education: The CDIO Approach*, 2nd ed., Springer Verlag.
- Edström, K., & Kolmos, A. (2014). PBL and CDIO: complementary models for engineering education development. *European Journal of Engineering Education, 39*(5), 539–555.
- Edström, K. (2008). Doing course evaluation as if learning matters most, *Higher Education Research & Development, 27*(2), 95–106.
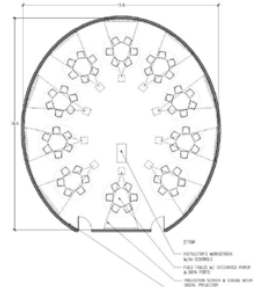
3

## Jakob Kuttenkeuler

- Professor in Naval architecture.
- PhD in Aerospace engineering.
- 10 years as director of two MSc programs and one PhD program.
- Research on design process of high speed craft optimization for sustainability, Routing etc.
- Teaches Hydrodynamics, Ship dynamics, Maneouvering, Propeller design, Sailing mechanics etc.
- Awarded the KTH prize for outstanding educational achievements.
- Engaged in CDIO since start.

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# The Teaching Trick
**How to improve student learning
without spending more time teaching**

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Jakob Kuttenkeuler
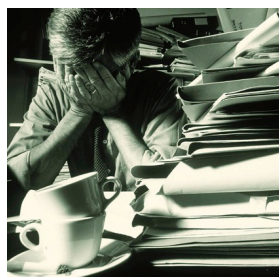jakob@kth.se

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# Cost-neutral interventions

**To persuade the grumpy
professor to listen**

**Because my best friends
found it useful**

**To support those dedicated
to teaching**

6

**Anyone can improve a course
(at least some little bit)
by working 100 hours more…**

Yeah. We don't have those hours.

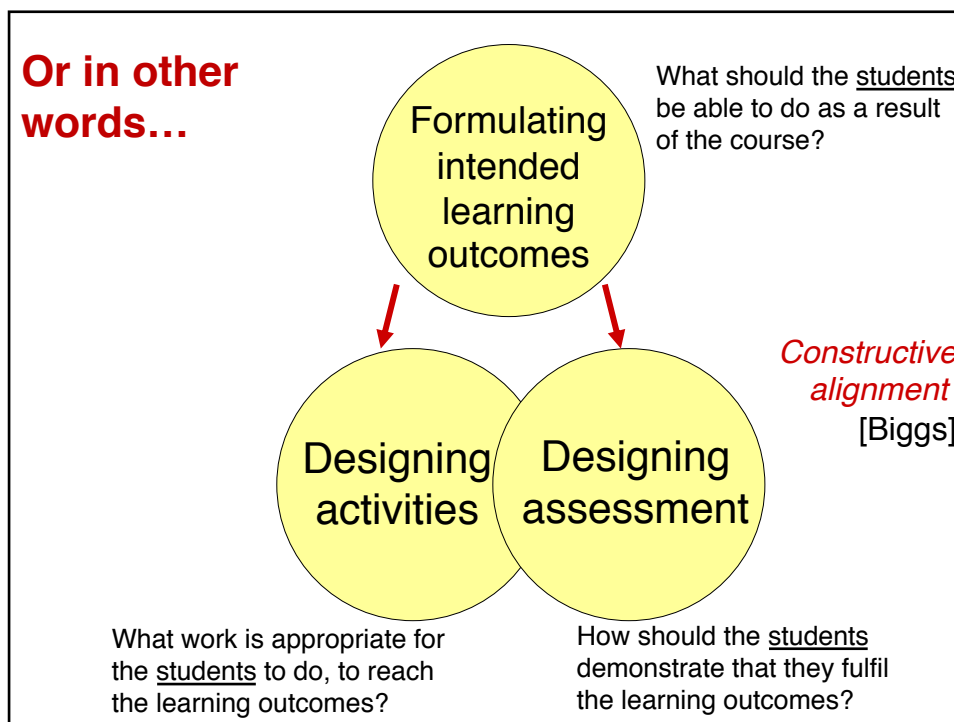**And often, "more of the same"
is not the best strategy…**

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# Pedagogical competence

1. **setting clear objectives**
   (intended learning outcomes)
   o relevant for the study programs
   o defining the threshold level of quality
   o deeper working understanding

2. **uphold the threshold level of quality**
   o only pass the students who reach the goals

3. **create a course which generates appropriate learning activity**
   o so students actually reach the goals
   o good throughput - with good quality

8

**Or in other words…**

Formulating intended learning outcomes

What should the <u>students</u> be able to do as a result of the course?

Designing activities

Designing assessment

*Constructive alignment*
[Biggs]

What work is appropriate for the <u>students</u> to do, to reach the learning outcomes?

How should the <u>students</u> demonstrate that they fulfil the learning outcomes?

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# Pedagogical competence

1. **setting clear objectives**
   (intended learning outcomes)
   - relevant for the study programs
   - defining the threshold level of quality
   - deeper working understanding

2. **uphold the threshold level of quality**
   - only pass the students who reach the goals

3. **create a course which generates appropriate learning activity**
   - so students actually reach the goals
   - good throughput - with good quality

4. **and doing this while using teacher time effectively**
   - generate appropriate study for the students
   - spend your time where it has effect on learning
   - create a sustainable workload for yourself
   - and sustainability for your institution and country

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**The acts of teachers
need to be judged
in the light of their impact
on student learning.**

Boud & Molloy, 2013

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# The teaching trick

**Do more of that which
contributes to learning**

*Pretty easy*

*But since we don't have 100 hours more:*

**Do less of that which
does not contribute**

*Pretty hard*

*Which one is easier and which one is harder?*

12

**Examples are illustrations of principles**

A specific
**example**

*will*
<u>*illustrate*</u>

**generic
principles**

*to*
<u>*inspire*</u>

**applications**
- of many
different kinds.

13

**3-2-1 Reflection**

**3 things I take with me**

- 
- 
- 

**2 questions, problems or issues I have going forward**

- 
- 

**1 thing I can use right away**

- 

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**Pick one!**

Family dinner · 
Seven minutes ·

Master test ·
/* No comments */ ·
Invest 0,20 € ·
Stroke of genius ·
Ultimate Frisbee ·
Fireworks ·

15

# /* No comments */

16

## The teaching trick:
Do less of that which does not contribute

**Spend less time on…
"finishing" student work!**

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## Professor S told us:

"I got **60 reports**. It is **boring** to give feedback and it takes **two weeks**.

I gave **individual comments** and asked those who had failed to re-submit.

*When the reports came back they were **still bad**. The students had **only corrected the things I commented on** specifically. They did not even read the rest!*

Next year I did not give individual feedback. Instead I made a **list with the most common errors**. Now the students had to **find their own** errors. When I got the reports back they were **generally very good**!"

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**Providing feedback on students' work is one of the most expensive components in their education**

Often an **ineffective** investment:
- when the feedback is **too slow**
- when students will **not use** the comments (or even read them)
  - typically in the end of the course
  - when students do not benefit from using it
  - when students focus on the grade rather than learning (e.g. just want to pass)

…this means that our assessment **normally does not support learning**

Gibbs, G. (1999) Using Assessment Strategically to Change the way Students Learn. In Brown, S., Glasner, A. (eds.) *Assessment Matters: Choosing and Using Diverse Approaches.* McGraw-Hill Education.
Boud, D., & Dochy, F. (2010). Assessment 2020. *Seven Propositions for Assessment Reform in Higher Education. status: published.*

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# Remember the purpose

- ### The purpose **is not**
  that *this particular* report should be good

- ### The purpose **is**
  that the **student should develop the skills** to write reports (so that he/she can write 1000 excellent reports later)

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**Every time you tie the shoes for your child, you hinder her own development.**

Maria Montessori

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For the same reason:

**Keep your hands on your back…**

**when you are assisting students in the computer lab – do not ever touch their keyboard!**

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## Tax payer's money down the drain!

Make the distinction between:
- feedback for learning
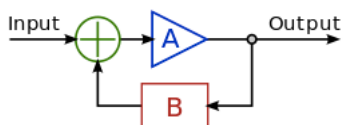- justifying grade (minimize cost)

Old exams archive

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## To really influence learning:
## feedback should be built into a learning activity

⏏

1. The students **do something** (report, presentation, etc)
2. Students **get feedback** (formative assessment)
3. The students **do it again**
4. Students get **grade** (summative assessment)
   - now without feedback

Input ⊕ → A → Output
B

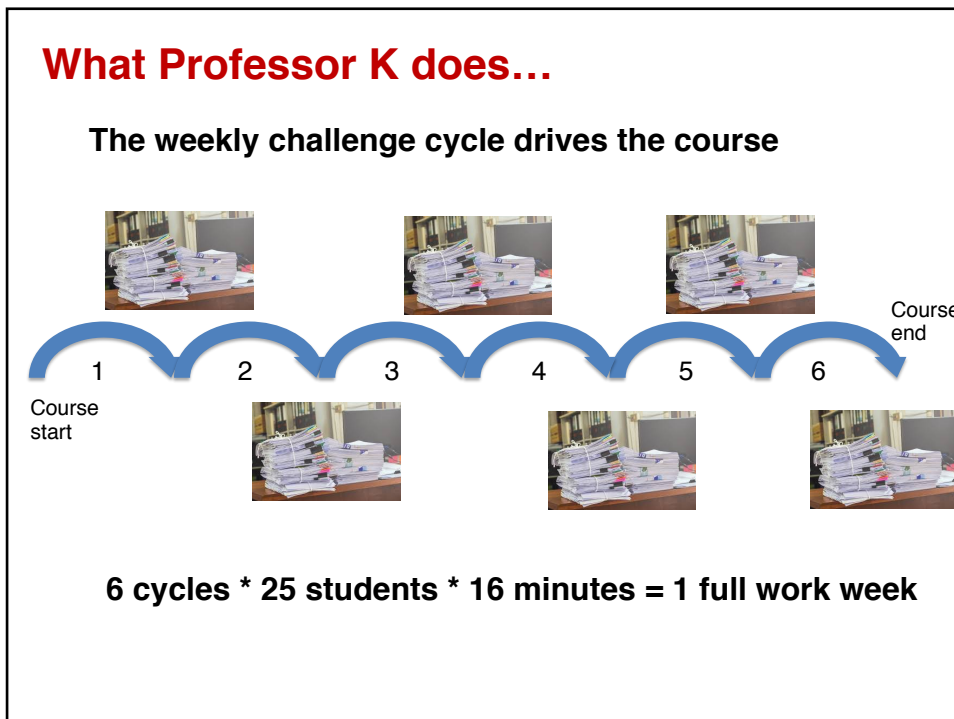**By definition: it is not feedback unless the loop is closed!**

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# Family dinner



25

## The teaching trick:
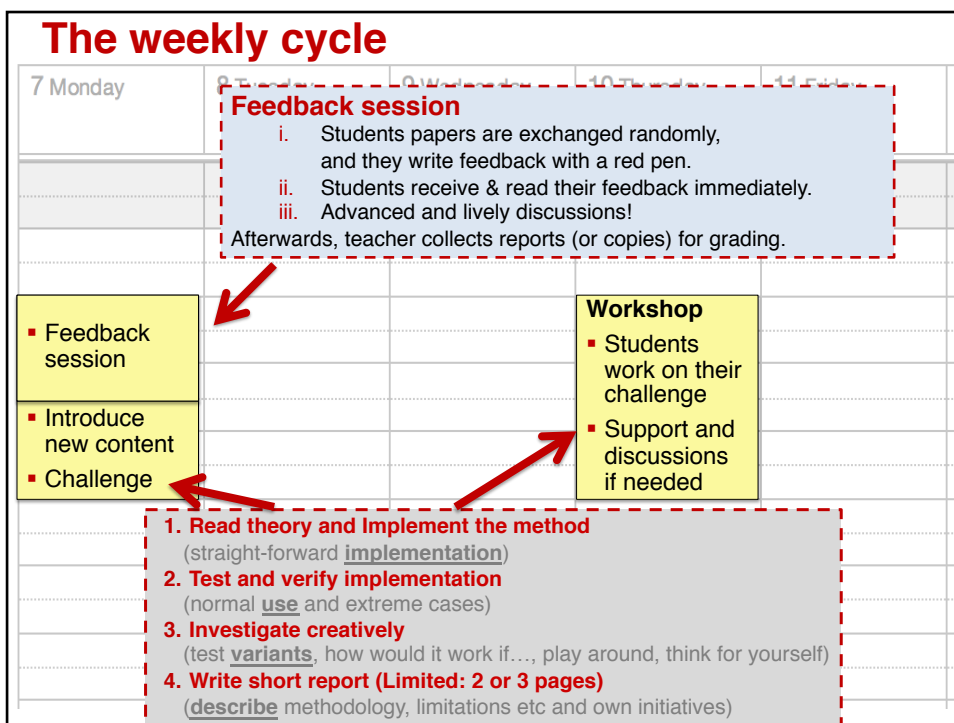
Do less of that which does not contribute

**Spend less time on…
marking coursework!**



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# What Professor K does…

**The weekly challenge cycle drives the course**



**6 cycles * 25 students * 16 minutes = 1 full work week**

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# The weekly cycle

| 7 Monday | 8 Tuesday | 9 Wednesday | 10 Thursday | 11 Friday |
|---|---|---|---|---|

**Feedback session**
i.   Students papers are exchanged randomly, and they write feedback with a red pen.
ii.  Students receive & read their feedback immediately.
iii. Advanced and lively discussions!
Afterwards, teacher collects reports (or copies) for grading.

- Feedback session
- Introduce new content
- Challenge

**Workshop**
- Students work on their challenge
- Support and discussions if needed

1. **Read theory and Implement the method**
   (straight-forward **implementation**)
2. **Test and verify implementation**
   (normal **use** and extreme cases)
3. **Investigate creatively**
   (test **variants**, how would it work if…, play around, think for yourself)
4. **Write short report (Limited: 2 or 3 pages)**
   (**describe** methodology, limitations etc and own initiatives)

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# Here comes the trick: Easy marking ☺

### Grading scale

| | | |
|---|---|---|
| • | Brilliant = 2p | (Requires substantial own initiatives) |
| • | Pass   = 1p | (Typical grade) |
| • | Fail    = 0p | (Seldom happens) |
| + | Writing feed-back =1p | (Needs to be of good quality) |

Easy to see the difference
between 0, 1 or 2 points,
in fact it only takes about
1-3 minutes per paper…



| Points | Grade |
|---|---|
| 25-28 | A |
| 21-24 | B |
| 17-20 | C |
| 14-16 | D |
| 11-13 | E |
| 0-10 | Fx |
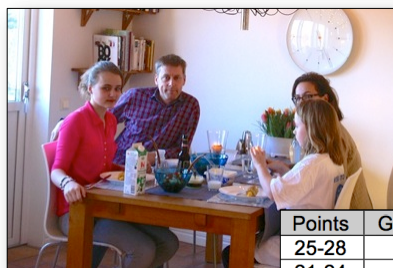
**At the end of the course, points are converted to final grade (no exam)**

+ In some courses there is also an oral exam, 0 p, 10 p, 20 p

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# What about larger classes?

- **Thursday workshops**
  - Might need some more assistants (PhD students).

- **Feedback sessions**
  - Peer feedback works just as well.
  - The group discussions risk to be a little less "personal".

- **Marking**
  - E.g. A few PhD students need to turn up in your office in time for marking.
  - Discuss the in-between cases.

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# The principle is to separate the processes

**– so that both can be made cost-effective**

## Formative assessment
**(=to support learning)**
- made into a group learning activity
- intense involvement
- learn to discuss the subject
- immediate feedback
- expose variation
- social motivation

## Summative assessment
**(=to grade learning)**
- by the teacher
- minimalistic
- sufficiently fair

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# Good for learning! ⏏

**Continuous studies**
- Distributes student effort during the course.

**The formative feedback session _as a whole_ (giving feedback, getting feedback and discussions) generates learning**:
- Repetition – Variation – Fast feedback.
- Deep & interesting discussions (instead of discussions on definitions).
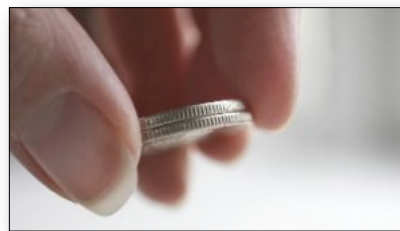- Social motivation – expose your understanding to others and see theirs.

**Satisfaction**:
- Students feel that the teacher really cares about their work.
- Clear, fair and transparent grading system.
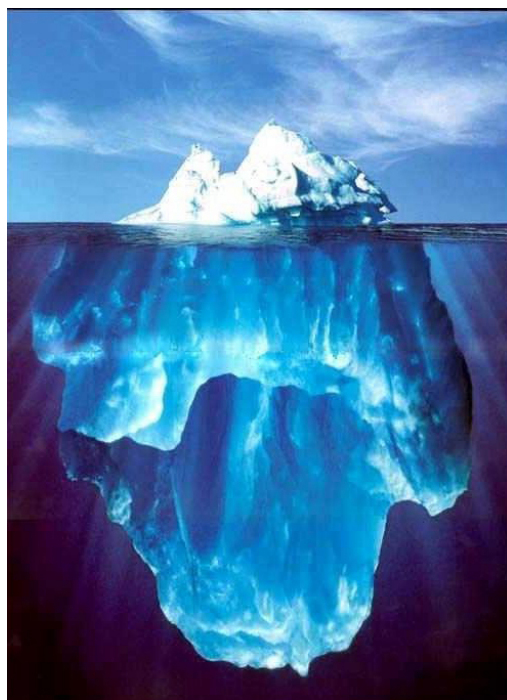- Students feel their progression.

# Good for the teacher!
- ≈1-3 minutes per paper.
- Final grading is no extra work ☺

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# Invest 0,20 €



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# The Iceberg Principle

## Group work with random presenter

*Tell them on day one:*
All students in the group should be ready to present the whole project and take questions on all parts

*Last minute:*
Choose the presenter randomly



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## When students choose

- It is possible to hide behind strong students
- There is little incentive to learn about each others work
- Only the best presenter will practice presenting
- Towards the end it is mainly the presenter who is working

## With random choice

- Everyone knows you cannot hide
- Everyone must learn about all parts
  - what questions can we expect to get on X?
  - why did we choose to Y?
- Everyone will practice presenting
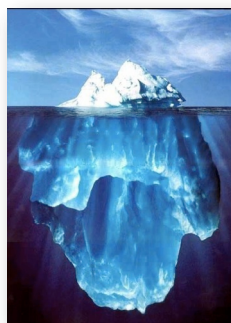
# What is the cost?

### About 20 cent?

### The real cost is explaining the setup for the students

Some students will say:
- *It is unfair!*

You explain:
- *Sure, it is. But, you see, the previous setup was unfair too. But now the learning will be much better for all!*

# Seven minutes

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## The teaching trick:

Do less of that which does not contribute to learning

**Spend less time on…
designing and correcting exams!**

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## Oral exams are really good for learning

- Create the right expectations and influence student preparation
  - Students know they must show "real" understanding in real-time

- Compared to written exams:
  - Better test of understanding
  - More individually tailored
  - More authentic "work-life" situation



*Katrin taking an oral exam*

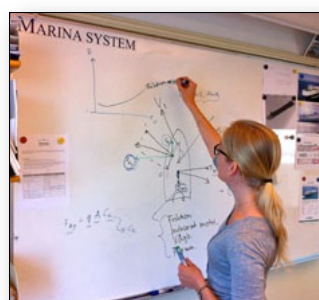**And, as it turned out, they transform better to remote teaching than written exams!**

## Oral exams are really good for learning

# BUT

we worry about

1. students telling each other what I asked
2. grading
3. having to fail students
4. the time it takes
5. big classes
6. fairness
7. covering the content
8. that students will not like it



*Katrin taking an oral exam*

**BUT** what about students telling each other what I asked? **(1)**
**I have to come up with so many different questions!**

# The 7 minutes trick
## – reverse the burden of proof

On the first day of the course, explain:

"*The oral exam will last 25 minutes. **The first 7 minutes are yours**, to present something to show me that you have reached the learning outcomes*"

During the course:
- Students will pay attention to the intended learning outcomes – please refer to them
- They will think *"How can I show that I can …"*

When they present:
- Follow-up questions pop up without effort (check their understanding behind, what they leave out)
- Keep the intended learning outcomes in focus

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**BUT** what about grading? **(2)**
**How can I possibly determine the grade in 25 minutes?**

# The Fail-Pass-Brilliant trick
## – use a coarse grading scale

- 0, 10 or 20 points

- If the final grade is more fine-grained, the oral exam is weighed with something else (coursework, written reports, projects, etc)

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**BUT** what about failing students?                                      **(3)**
It would be so embarrassing!

# Failing productively
## – be kind and feed forward

- Ask them kindly: "*How do you think this went?*" (most students will offer a fair self-assessment)

- Ask them to book a new timeslot, and give advice for studying – referring to specific learning outcomes, what chapters to study etc (perhaps write a note)

- Finally smile and say (mean it): "*I am so much looking forward to seeing you again, when you can do this!*"

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**BUT** what about the time it takes?                                     **(4)**
This is only possible in the smallest classes!

## Let's just bust the myth that oral exams take more time

- Oral exams are cheaper for a course of up to *N* students

- What is *N* for your course?
    *Let's do the math!*

45

# Written vs. oral exam, teacher time

**Written:**

Constructing one exam and solution-sheet takes ≈ **10-16** hours.
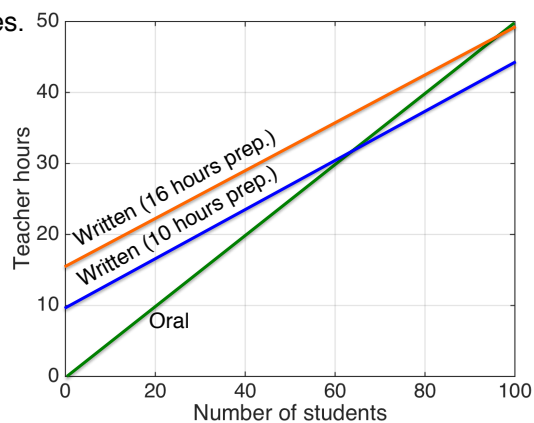Correcting them takes ≈ **20** minutes per student.

**Oral:**

The exam takes ≈ **30** minutes.

*But consider also the re-exam!*

**Let's do the math:**

- 16 hours to prepare exam
- 80% passing rate (oral and written)
- One re-exam

Break-even is at **≈160** students



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**BUT** what about even bigger courses? **(5)**

*"We have 400 students in Introductory Physics…*

*…but we also have more than 10 professors who know the subject!"*



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**BUT** what about fairness? **(6)**
How can I be sure that I am not charmed by irrelevant factors?

# Focus on the intended learning outcomes

- Really consider the quality thresholds
  - What is required for a Pass?
  - What is required for a Brilliant?

- Keep a page with the intended learning outcomes with you – and focus on them

- Make audio recording

- If more than one teacher in parallel:
  - start with 10 students together to calibrate
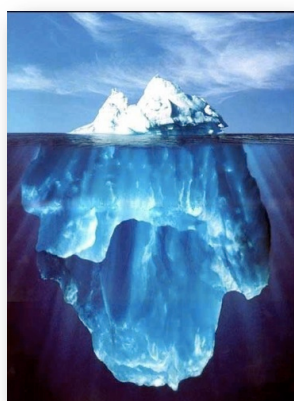  - now and then, do 2 more

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**BUT** what about covering the content? **(7)**
Subjects are different!

# The randomization trick
## – *leveraging learning*

Tricks to encourage breadth and appropriate studies:

- Ask students to prepare a 7-minute presentation for each three parts of the course. But they don't know which one(s) they will actually present ☺

- Randomise from a bank of questions or topics to talk about

- Randomise from students' written work (6 reports, solved examples, etc) which one(s) to discuss – they will have to revise all ☺

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# Master test
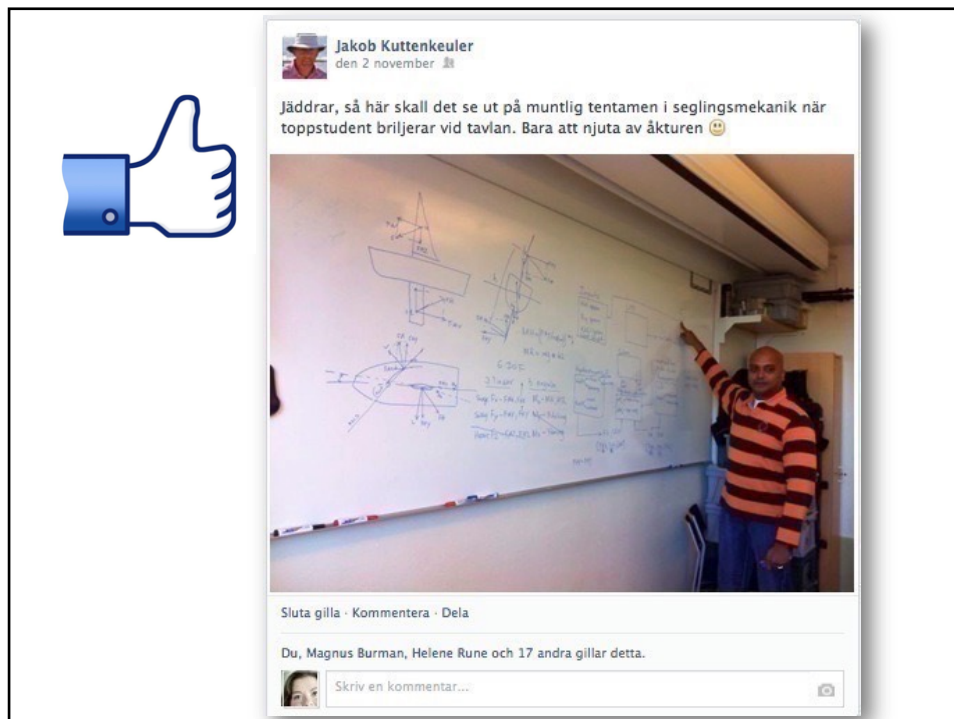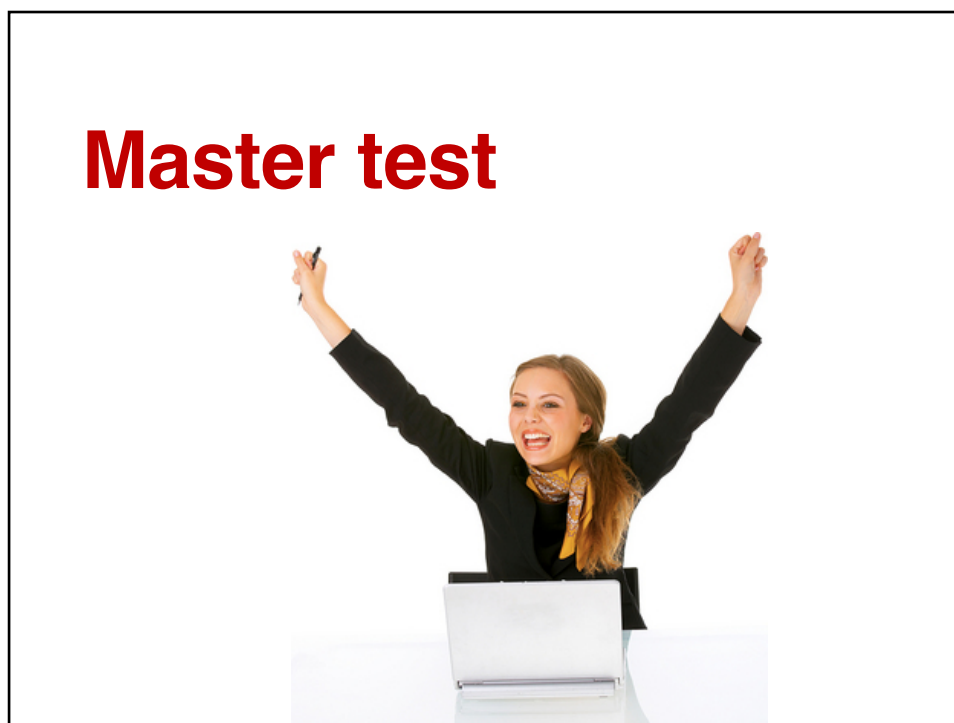
51

## The teaching trick:

Do less of that which does not contribute

**Spend less time (energy) on…
listening to students complaints!**

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**Before:**

There were two individual assignments in the course:

▪ **Homework 1 & 2**

The tasks were complex and theoretical…

Students complained bitterly and endlessly:

▪ *The assignments come too EARLY before we know how to do this!*
▪ *They are far too DIFFICULT and take TOO MUCH TIME!*

**What Professor V did:**

**The assignments were renamed:**

▪ **MASTER TEST 1 & 2 (MÄSTARPROV)**

What happened?

▪ Complaints just stopped
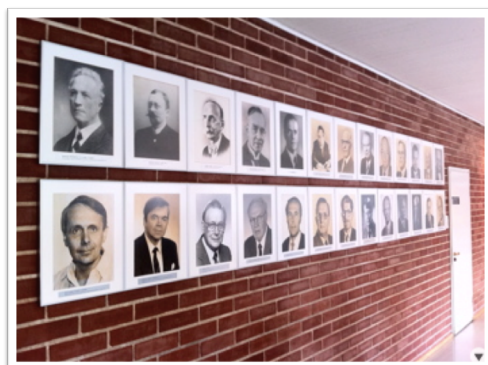▪ Students take the assignments very seriously – and are very proud!

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## …other interesting words… ⏏

Accident investigation
Weekly challenge
Show
Master test
Demonstration
Gymkhana
Show & Tell
Fair
Keynote
TED talk
Potluck
Conference
Deadline
Inspection
Q&A session

Evaluation
Summit
Negotiation
All hands on deck
Campaign
Consultancy
Pitch
Elevator pitch
Pecha kucha
Speed dating
Match
Audition
Ceremony
Installation
Inauguration
Boot camp

Time out
Grand challenge
Dress rehearsal
Opening
Court hearing
Stop-press
Workout
Personal training
Vernissage
Hearing
Review
Test pilot
Advisory group
Working party
Quest

Certificate
Jam session
Dissection
Hackathon
Talk show
Level up
Expert panel
Investigation
Workshop
Emergency room
Launch
Countdown
Pit stop
Meeting

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# Inheritance



55

## The teaching trick:

Do less of that which does not contribute

**Spend less time…
lecturing to passive students!**

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## Professor B inherited a course

7 weeks course, 90 students

**Each week**

1. 2 lectures

2. A tutorial in groups of 30 students with teaching assistants

**Problems:**  the usual evergreens ;-)

- The teachers perceived the **students** as **lazy** and **passive** during lectures.

- Towards the end of the course, the students had a big heap of raw notes as the only result of 56 hours contact time.

- Students started studying too late.

- Many students had poor results on the exam and poor understanding…

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## What Professor B did

**A material for self studies was handed out**
(reference to chapter + problem exercises).

**Weekly cycle** was introduced:

1. Individual work on the problem sheets.

2. **A workshop** with teaching assistants in 3 parallell tutorial-groups of 30, where the students could ask about difficult things.

3. A **meeting** with 9 students (no teacher) in jigsaw-groups (mixed from different tutorial-groups). The task is to make a list of things that are still problematic and unclear. The list is sent to the lecturer.

4. One lecture based on the issues the students had listed. This is the only lecture.

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⏏

### Good for learning!
- At first, they are pretty confused...
- System settles during second week!
- Students work continuously during the course.
- Students spend much more time actually engaging with the subject.
- Excellent exam results!

### Good for the teacher!
- The weekly lectures attracted a full audience and were considered excellent.
- One lecture/week instead of two!
- More preparation time for the single lecture
- The lectures now have a clear purpose - helping students with the problematic parts of the subject ☺

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# Fireworks
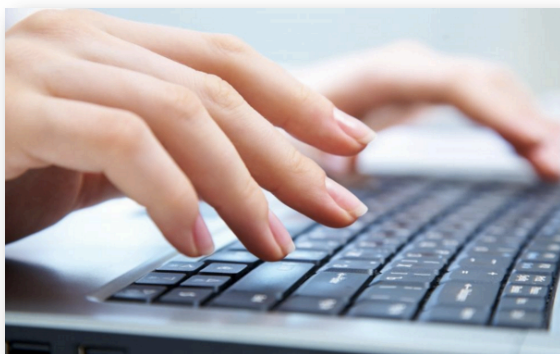
60

## The teaching trick:

Do less of that which does not contribute
(especially if it is expensive)

### Spend less time on…
### writing feedback

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**~ 40 students write an open-ended assignment of 4 pages**
**(e.g. essay, design, reflection…)**



- The assignment is personal and important (a credo).

- It would take several days to write good feedback!

- Instead a final seminar
  - Intensive learning activity
  - Plenty of peer feedback and some from the teacher
  - Minimal summative assessment, sufficiently fair (pass/fail grade)

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- The teacher skims essays and makes quick decision:
  - **Accepted** to join the seminar
  - **Pending acceptance**, allowed to join but must submit improved version after the seminar (and they must tell the group and ask for guidance)
  - **Reject**, cannot join and must redo assignment the next time the course is given

- Divides the students in groups of 4
  (Usually one excellent essay, two medium good, and one needing improvement)

- Sends mail with instructions
  - **Download** your colleagues' work (from the digital platform).
  - **Write ½ page constructive comments** to each colleague, *strong aspects and how the work can be improved*.
  - **Bring** prints of comments to the seminar
    (4 for the group + 1 to the teacher).

- This takes maximum 2 hours…

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## Teacher prepares feedback before the seminar

- Merges all essays into one big pdf.
- Searches for **a strong aspect** in each text, making sure to cover the things that are important in the course.
- Marks the passage with a "star" in the margin with some keywords.
- This takes just as long time as a hockey game ☺

[Recommending the GoodReader app for annotations]

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## At the seminar – group feedback

- Discuss each essay with the aim to improve it (4*30 minutes).
- Meanwhile, the teacher reads the written comments (to see that they were taken seriously + as input)
- Their feedback is quite useful
  - Students are really good at pointing out deficiencies
  - Getting three different comments on your essay is great

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# End with fireworks

**1 hour in plenary:**

- Display the pdf and discuss each "Gold Star" full of enthusiasm and passion (fireworks). Bring it on!
- End by recommending 3 – 4 essays to read before writing version 2.0 (for most students it is voluntary).
- Publish the pdf in the digital platform as an invitation to browse.



66

# Experiences ⏏

- An excellent way to summarise the most important points in the course through the students' own work
- Creates a positive final chord, a feeling that we have really achieved something together
- Social motivation (teachers and friends)
- Rich feedback
    - It is a good learning activity to comment on the others
    - Peers are excellent to spot deficiencies
    - The teacher adds the positive things for which the students lack frames of references
- Exposes quality and variation (considerately but clearly)
- Handles poor work fairly but discreetly
- Course evaluations are written immediately after the seminar, in a rush of excitement ☺

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**2+2**

68

## The teaching trick:

Do less of that which does not contribute

**Spend less teacher time on…
grading exams!**

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## 4-hour exam in two steps

**First part** (2h)
- Students write the exam and hand in
  (During the break exams are photocopied as cheating safeguard)

**Second part** (2h)
- Hand out exams randomly (and a red pen)
- Joint class discussion to agree on the marking scheme
  (teacher has the last say of course)
- Students mark the exam

**Afterwards**
- The teacher takes home the bunch for some extra check
  (especially results near boundaries, random checks,
  feedback to teacher)
- Good marking work is rewarded with points!

*A+ Excellent!*

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## Advantages ⏏

### Good for learning!
- **Repetition is built in**
- **Fast and detailed feedback**
  - Students get to see what they could achieve on their own, and not…
  - They go home with the whole *and correct* answer
- **Exposure creates social pressure to do well**
- **See variation when correcting each others and discussing**
- **Students are active and involved**
  - Criteria for quality are made visible and explicit
  - Transparency and sense of fairness

### Good for the teacher!
- **Robust against cheating**
  - It can be the basis for grading
- **Less routine teacher-work**

*A+ Excellent!*

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# Stroke of genius



72

## The teaching trick:

Do less of that which does not contribute
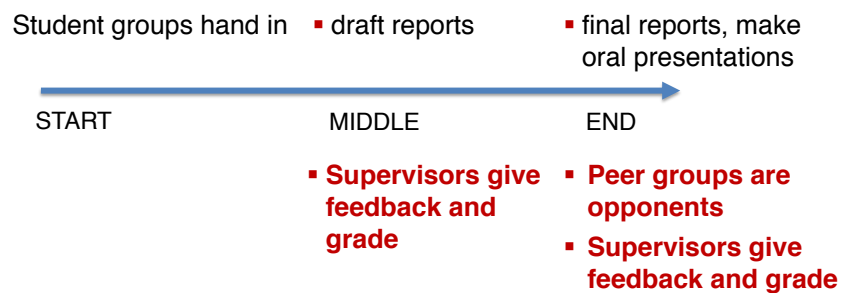
**Spend less time on…
ineffective group supervision!**



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# Professor E's students do a project

- Big first-year course, 140 students in groups of 5
- A handful of teaching assistants as supervisors

**HOW THE COURSE USED TO WORK**

Student groups hand in · draft reports · final reports, make oral presentations

START        MIDDLE        END

**· Supervisors give feedback and grade**

**· Peer groups are opponents**

**· Supervisors give feedback and grade**

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# Problems

- Lots of teacher time for
  - reading and commenting on reports – twice!
  - students who repeatedly ask: "Are we on the right way?"
- Groups that
  - pause the work, waiting for feedback on drafts (2 weeks)
  - fix only what supervisors commented on, with little reflection
  - divide the work focusing mostly on "their own" part

**Classical problems! What can be done?**

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**Professor E's NEW MODEL with 2 peer reviews**

**THE NEW MODEL**

Student groups hand in ▪ draft reports ▪ final reports, make
oral presentations

→

START          MIDDLE          END

▪ **Peers comment**     ▪ **Peers comment again**
▪ **Supervisors meet**    ▪ **Supervisors grade**
**groups**                     **revised reports**
▪ **Supervisors**         **(without feedback)**
**approve revised**
**drafts (without**
**feedback)**

Supervisors very sceptic in advance:
▪ they would get even more work, reading the reviews
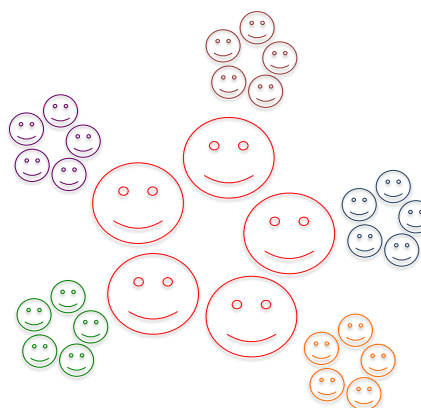▪ peer feedback would be of low quality ("*a blind leading a blind*")

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**HERE COMES THE TRICK: Professor E's stroke of genius**
**Peer review was made individual**

Instead of "groups reviewing groups"
it is **individuals reviewing groups**

▪ Thus, each group received
**five different sets of comments**
▪ Also, the group had **access to**
**five other reports** that they
had read and analysed

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## Template for reviews

Examples of questions:

- What are the strongest aspects of the work?
- What are the most important areas for improvement?
- Other comments?

- The questions or issues that I want to discuss with this group are (DESCRIBE):
- The issue is relevant because (RATIONALE):

- After having read and analysed this work, what is the most important reflection, for yourself – for your group project – for your future professional role?

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## Mid-course review on drafts

- *"BUT THEY SAID DIFFERENT THINGS, AND WE DON'T AGREE IN THE GROUP EITHER…"*
- *"ON THE ONE HAND… BUT ON THE OTHER…"*

Compulsory meeting with the supervisor:
- Discuss the comments you have received, your thoughts about the **different views**, what **reflections you made when making your reviews** and how you want to **proceed** with your own work.
- After this meeting they can **revise their draft** before **handing in for approval** by the supervisor (no further feedback).

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## Second review
### (of final draft and oral presentation)

- Students deliver their written comments the day before the presentation. Many groups quickly revised their work and prepared to answer the questions.
- After the seminar, groups are allowed to revise their reports before submitting for grades (without feedback).

Note:
- Students reviewed the same group's work both times. This was mainly meant to save them some time. But it also opened up for comments about the progression of the work, and on how the group had handled the earlier comments.

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## RESULTS ⏏

**Better learning:**
- Work of higher quality:
  - more "finished" and worked out in detail
  - aligned with the instructions
  - better justifications for decisions
- Student feedback much faster than supervisors could have achieved.
- Students thought that the reviews took much time, but was rewarding.

**More effective teaching:**
- Supervisors' time is used to discuss face-to-face with students and guide them in interpreting and using the comments.
- Fewer students came to check "if they were on the right way".

**Supervisors:**
- They all saw the improvements in student learning
- Still, some thought it felt "unprofessional" not to give written and detailed comments

> **The acts of teachers need to be judged in the light of their impact on student learning.**

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# Ultimate frisbee

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## Dear Professor, ⏏

I coach the women's ultimate frisbee teams and based on your workshop I changed our program for the practice weekend.

Normally, since a game only involves 14 players, we would rotate and the others would do some drill on the side.

*Now, instead, I had a non-playing team standing on the sidelines and assigned each of them a player. Then I stopped the game periodically and had the sideline players give individual feedback to their assigned player.*

*It went over remarkably well. A number of the ladies had very positive feedback, and said they had numerous strategy talks that they found incredibly helpful. It was also great for me, since I can't possibly watch every player all the time. It was incredibly time efficient!*

So in conclusion, thanks again for the workshop. I thoroughly enjoyed it, and I thought you might like hearing about an application in a completely different "field"!

Best regards,
Professor D

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## 3-2-1 Reflection

**3 things I take with me**

- 
- 
- 

**2 questions, problems or issues I have going forward**

- 
- 

**1 thing I can use right away**

- 

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- 

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## How to talk with students about this

**NEVER SAY:**
**this is "alternative" – I learnt a trick – I'm saving my time** 😱

## Show that this truly belongs in the education

Several tricks address competences relevant for most educational programs. Make this explicit in the learning objectives!

After the course you should be able to (for instance)
- evaluate your own work and the work by others…
- critically analyse and give feedback on…
- critically assess alternative solutions…
- orally present and discuss your conclusions and the underpinning knowledge…
- argue and contribute in discussions about…

Student: *Why do I need to read their report?*
Teacher: *Look at the course learning outcomes. This is how you practice to…*critically review and give feedback on technical solutions! You will need that in working life.

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## The tricks are not just "oil in the machinery"

More importantly they imply
## QUALITY TIME WITH YOUR STUDENTS
- more meaningful and fun, because it is value adding!



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**It is also about a more stimulating role for teachers**
**Value-adding processes are often more stimulating**
**The least value-adding processes are often boring routine tasks**



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Also note that the most value-adding processes
are the last to be replaced…



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**And we only live once…**



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**Feel free to send our materials to any colleague, but please don't say:**

The teacher can save time.

**What was our message?**

# Students can learn better
**without more work from the teacher.**

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# The (not so) hidden agenda

**Enabling educational development by addressing implementation issues**

**Furthering a learning perspective by gift-wrapping it**

**Challenge the image of educational development as self-sacrifice**

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