

Supervision of instructors

Henrik Skov Midtiby and Dorte Moeskær Larsen

Teaching for Active Learning, SDU 2024

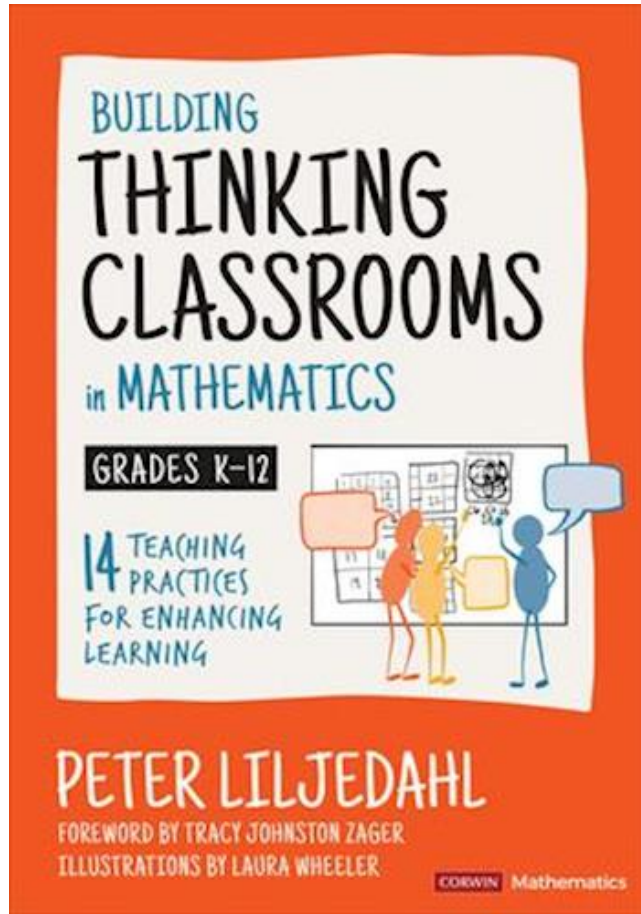
Context: Mathematics 1 for engineers

- One course for all students enrolled in a ba. eng. Education programme at TEK / SDU
- 350 students
- 12 study directions
- Focus on using mathematics as a language

A typical week (for a student)

- Preparation
 - Videos
 - Online exercises
 - Books
- Two-hour exercise class (Monday)
 - 8 sessions
 - Building thinking classroom
- Two-hour lecture (Thursday)
 - Overview
 - Interactive elements
- Homework café (Thursday)
- Video handin (Sunday)
 - Explain calculations
 - Peer feedback

Inspiration



BUILDING THINKING CLASSROOMS

Research: @pjliljedahl
 SKETCHNOTE: @wheeler_laura

- ### ① Begin w/ a Problem

Give a problem-solving task

To start: Problems should be

 - engaging
 - non-curricular
 - collaborative
 - ↳ promote talking

Later: Problems can be curricular eg textbook problems
- ### ② Visibly Random Groups

 - Randomly assigned eg playing cards
 - Daily & in front of students
 - 2 or 3 students / group
 - Sit & stand together
- ### ③ Vertical NonPermanent Surfaces

 - Vertical
 - Erasable

WHITEBOARD CHALKBOARD WINDOW

 - 1 marker or chalk per group
 - ↳ promotes discussion
- ### ④ Oral Instructions

give instructions orally

Project

 - ↳ data
 - ↳ long expressions
 - ↳ diagrams

↳ groups will discuss (instead of decoding text)
- ### ⑤ Defront the room

Desks

 - ↳ orient in various directions
 - ↳ pull away from wall (room to stand @ VNPS)

Teacher addresses the class from a variety of locations.
- ### ⑥ Answering Questions

Acknowledge, but don't answer:

 - ✗ Proximity questions (b/c teacher is close by)
 - ✗ Stop thinking questions

Answer:

 - ✓ Keep thinking questions
 - ↳ give HINTS not answers
- ### ⑦ Build Autonomy

 - Model how groups can visit other groups when they are stuck or done.
 - Hints & extensions come from peers (not just the teacher).

↳ Helps manage flow
- ### ⑧ Hints & Extensions

Manage flow
- ### ⑨ Level to the Bottom

debrief

 - ↳ class discussion
 - ↳ direct teaching the "lesson"

Once all groups pass a minimum threshold.

Debrief 1 or more groups' solutions

Work through a new problem w/ whole group
- ### ⑩ Student Notes

Student created:

 - ↳ select
 - ↳ synthesize
 - ↳ reorganize

ideas

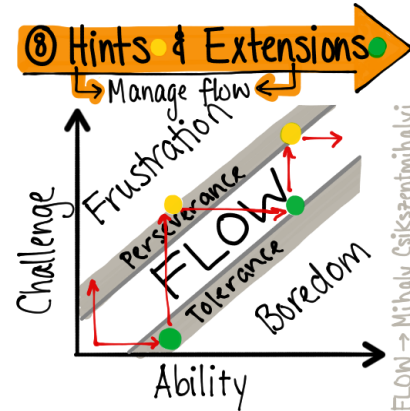
Provide time for this after levelling.
- ### ⑪ Assessment

Process > Product

Group work + Individual work

Student learning

 - ↳ Where are they?
 - ↳ Where are they going?



FLOW → Mihaly Csikszentmihalyi

VISIBLY RANDOM GROUPS

in math classrooms

Strategic Grouping's Goals

- Educational
 - pedagogical
 - productivity
 - peacefulness
- Social
 - diversity
 - integration
 - socialization

Visibly Random Groups

- students need to see!
- ~~teacher assigns~~ ~~students choose~~
- 3s are ideal

SEPT. 1 Can be introduced ANYTIME in a course so start & repeat DAILY!

Students become agreeable to WORK in any GROUP they are placed in

Eliminates social barriers

Mobility of Knowledge between students

Reliance on teacher for answers ↓

Reliance within and between groups for answers ↑

Engagement on task ↑

Enthusiasm for the class (even if the subject is not their favourite) ↑

Sketchnote: @wheeler_laura

Research: Peter Liljedahl

VERTICAL NON-PERMANENT SURFACES

in math class

WHITEBOARD

- VERTICAL (ie, wall mounted)
- ERASABLE
- STUDENTS STAND
- ONE MARKER PER GROUP

You can also use... Chalkboards!

Windows with whiteboard markers

TIME TO 1ST NOTATION ↓

Start writing faster
take risks
erasable!

Eagerness Participation Discussion Persistence ↑

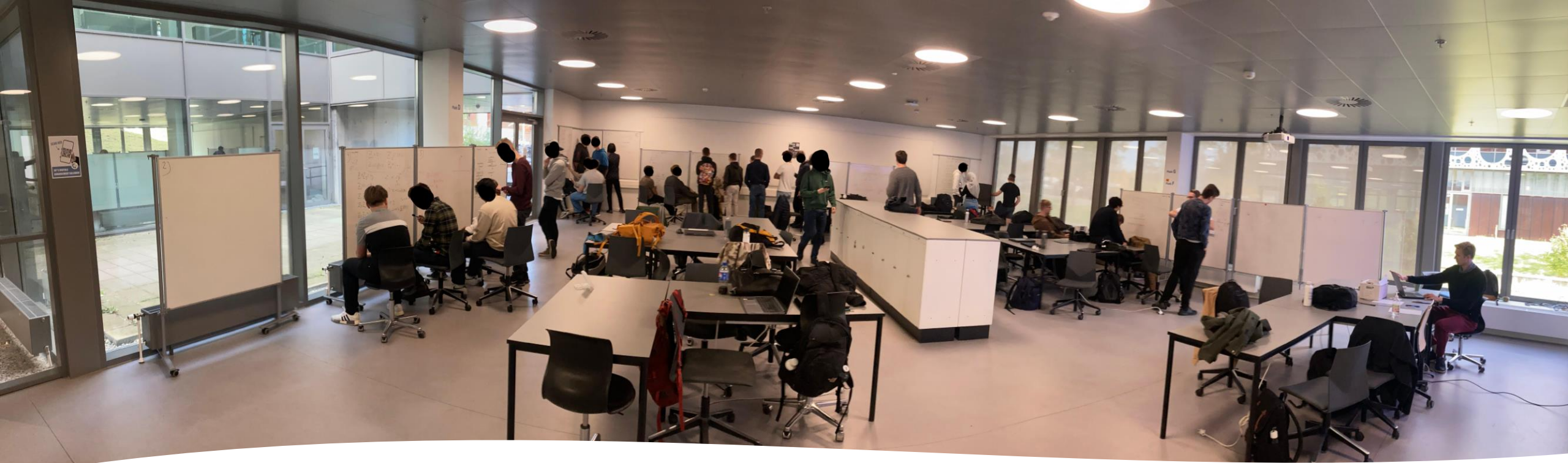
NON-LINEARITY of work ↑

more accurately reflects thinking process

MOBILITY OF KNOWLEDGE ↑

groups talk compare share

Research: @pjljedahl
Sketchnote: @wheeler_laura

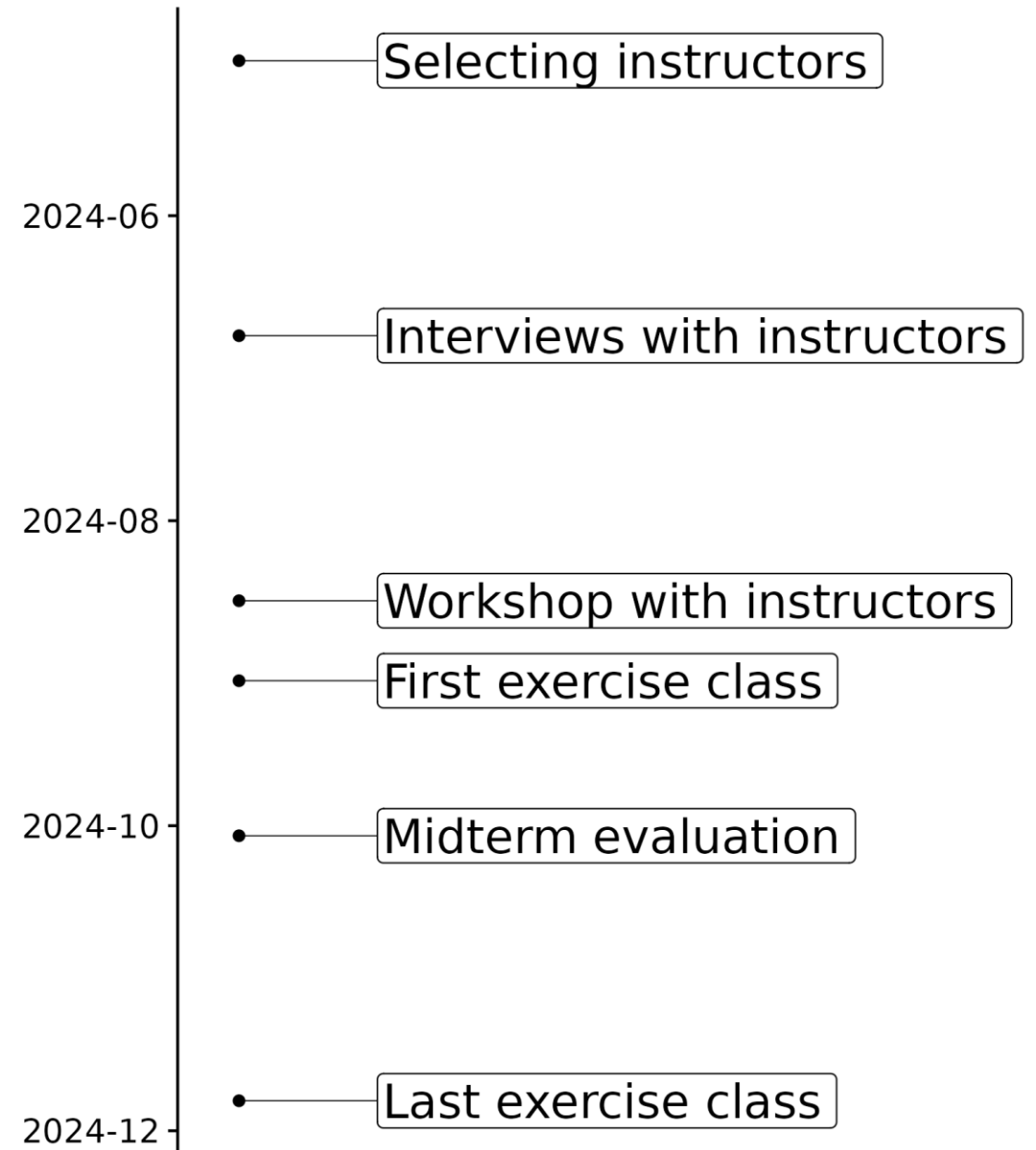


Exercise sessions

- Two hours
- 45 students
- 2 student instructors
- 0.5 supervisor

Instructor training

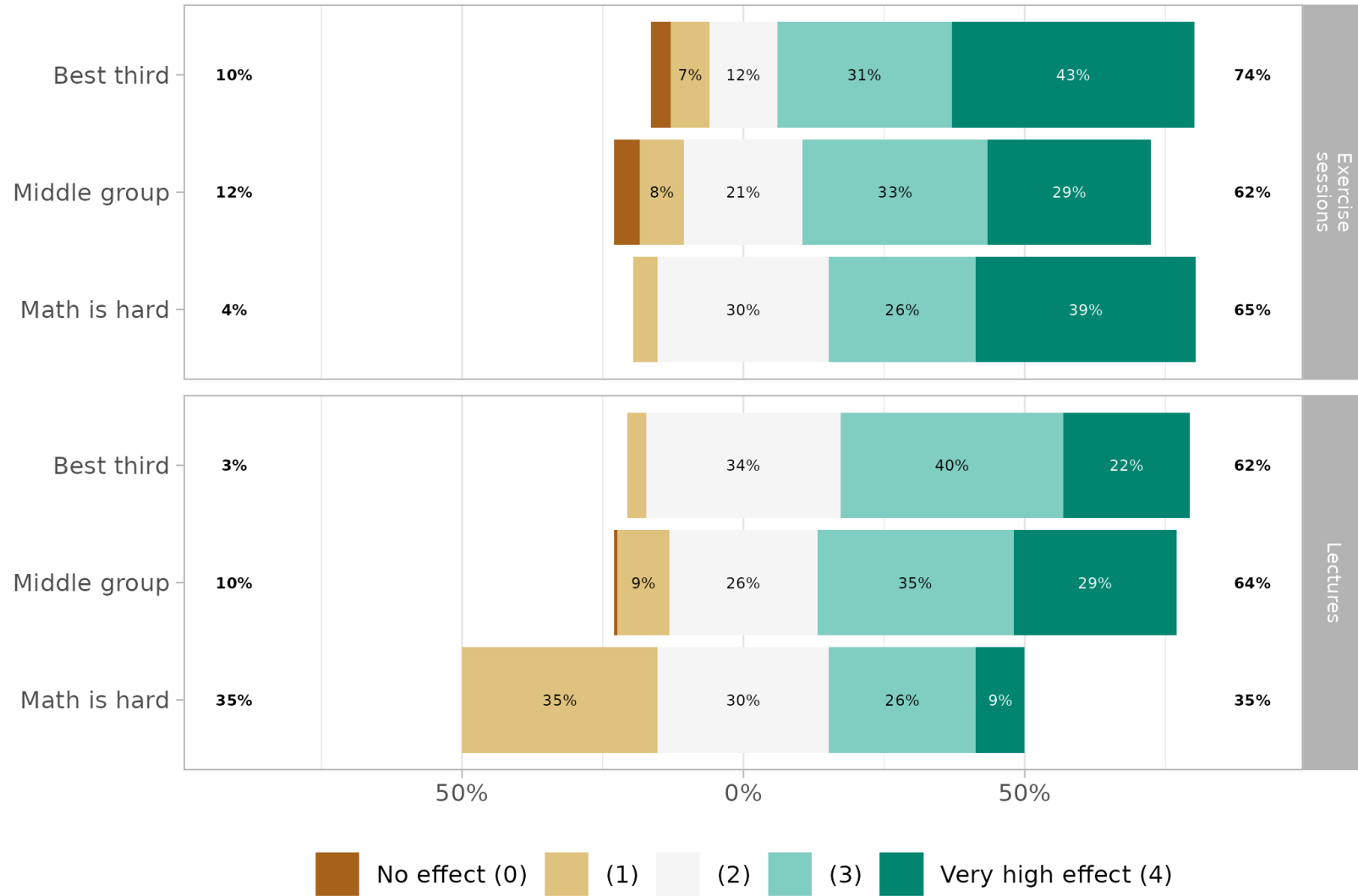
- Selecting instructors
- Interviews with instructors
 - Results
 - Background information
- Supervision of instructors
 - Workshop in August 2024
 - Working at the whiteboards
 - Document with exercises



How is it going now?

- Reflections from the students
 - Base this on the midterm evaluation
- Interviews with instructors (pre: 3 interviews, mid: 4 interview, ...)
- Does BTC work for our setting?

Student assessed effect of teaching elements



Statements from students

- Midterm eval comments

Jeg kan godt lide vi starter blidt med lettere opgaver og arbejder os op på et sværere niveau gennem øvelsestimen.

At man arbejder sammen med andre studerende i løbet af øvelsetimerne, og også at det ikke er de samme hver gang, så man kan se forskellige metoder at gøre ting på, og lære mere af hinanden.

Træning med tavlearbejde og hovedregning i øvelsestimer er godt, da man ikke så tit får mulighed for dette. Siden at publikum er noget mindre ved disse tavler tager det også meget af presset fra.

Data from the students instructors – before the teaching

- **Positive attitude toward the teaching format:** Students appreciate the approach, seeing it as challenging but rewarding.
- **Excitement and uncertainty:** There's shared anticipation about how the new format will be received and whether the instructors' authority will hold.
- **Confidence in preparation:** Trust in the well-prepared material gives students confidence they'll be ready.
- **Relatability through personal experience:** Some students relate to the newcomers, having been in their shoes and understanding the challenges

Data from the students instructors – after 1 month

- **Teaching and learning:** This approach, is seen as beneficial for both student engagement and understanding.
- **Challenges and growth through responsibility:** The experience of managing tasks and presenting in front of the class feels nerve-wracking for some, but also rewarding as it allows them to take on more responsibility and grow in confidence.
- **Group dynamics and peer collaboration:** Group work is praised for encouraging cross-year interaction and helping students explain concepts to one another, with some expressing the value of both giving and receiving explanations.
- **Instructor support and authority:** Students appreciate when instructors provide hints without giving full answers, helping them think independently.
- **Uncertainty and preparation:** Some express concerns about being under-prepared or not knowing how to respond to unexpected questions, but they find comfort in the experience gained over time and the guidance from more experienced peers or instructors.

Next step...

Would this work for the course you teach?

- How might you adapt some of Peter Liljedahl's practices to create a more engaging and dynamic learning environment in your own teaching?
- What opportunities and challenges do you foresee?