



Presenting and Lecturing in Engineering

Day 1

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Joelyn de Lima Ph.D.

Teaching Support Centre
cape.epfl.ch
February 2024

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Schedule Day 1 2024

MORNING	AFTERNOON TENTATIVE
9:00 Introduction, Good teaching defined	13.30 Intro to mini lessons
10.00 Structuring a lesson	14.00 Group warm up Mini lessons
10:30 <i>break</i>	15:00 <i>break</i>
10:45 Creating and using presentation supports	15.15 Mini lessons, continued Mini lesson summaries
11.30 Using learning objectives	16.30 Meta LOAFS Conclusion, prep for Day 2
12:15 Reflective activity	17.00 END
12:30 <i>lunch break</i>	



***submit your Daily Reflection on EduFlow

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Course Objectives

By the end of the course, you should be able to:

- Structure presentations to effectively communicate key messages, including a special focus on modeling thinking
- Use slides/blackboard/paper to present information in a clear, organised manner
- Elicit, interpret and manage student responses to improve learning
- Differentiate one's own response to a presentation from the message of the presentation
- Take on board feedback (critique) in assessing one's own level of skill acquisition, and plan personal learning goals

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What makes a course difficult?

1. Think of a very difficult course that you followed as a student. What made it difficult?
2. Choose the 3-4 most important characteristics and write each on a separate post-it note.
3. What categories can we use to sort the characteristics?

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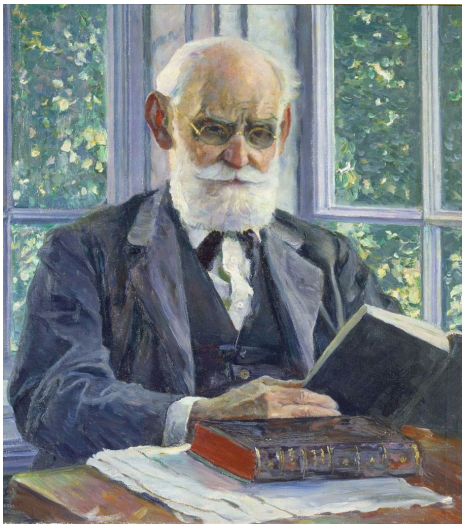
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Good Teaching

- Results in increased learning

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Learning is a change in the observable behaviour of the learner.

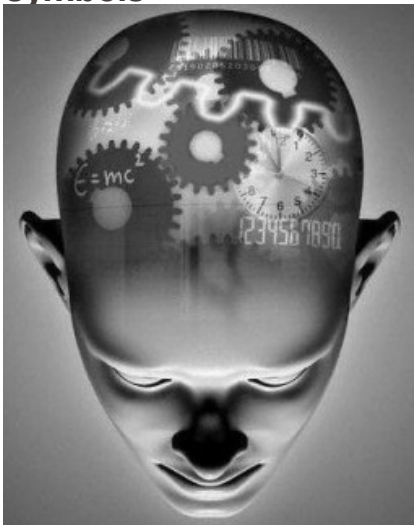


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Behaviorism

Mikhail

Learning is a complex mental process involving the manipulation of symbols



Cognitivism

kingcolemedia.c

Learning is an active, constructive process performed by the learner
and reinforced through interactions with others and the resulting cognitive conflict.

constructivism

socio-constructivism



Piaget et Vygotsky

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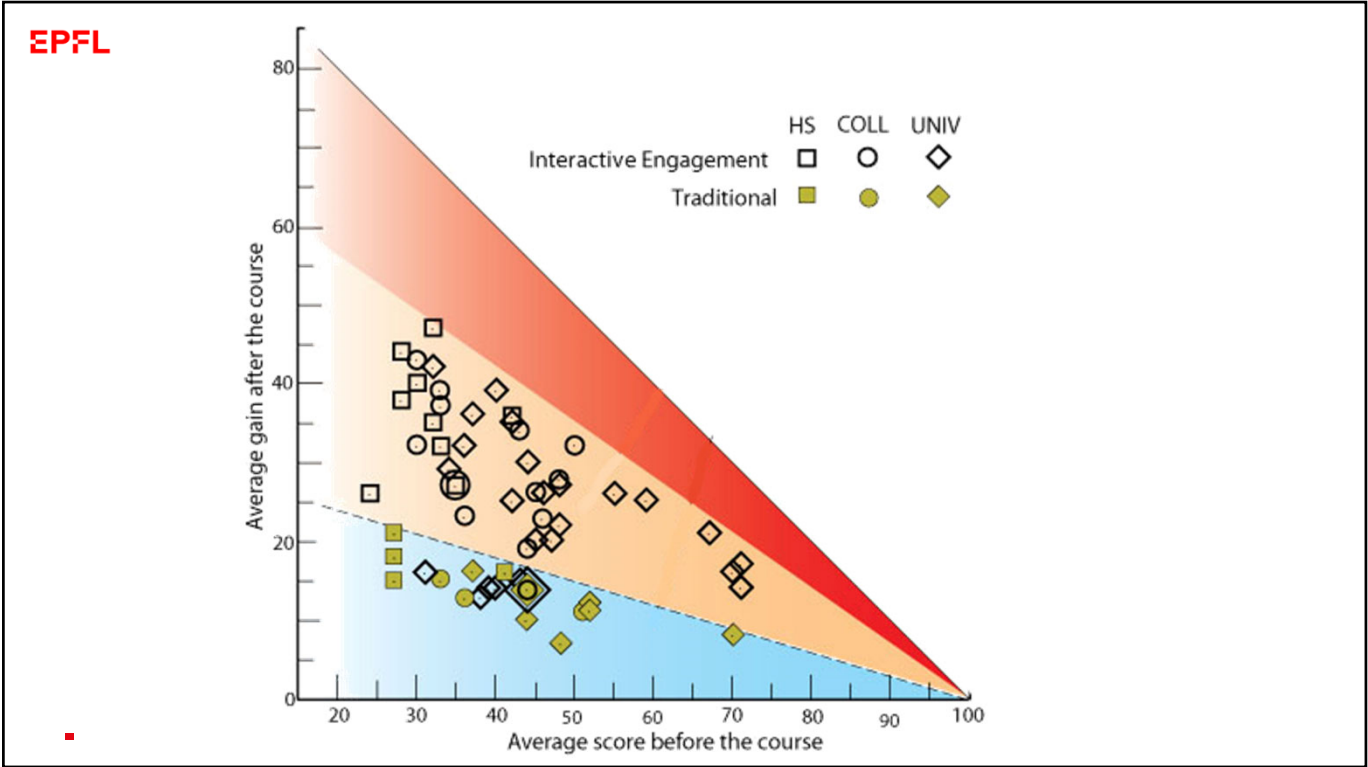
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Data: Introductory Physics courses

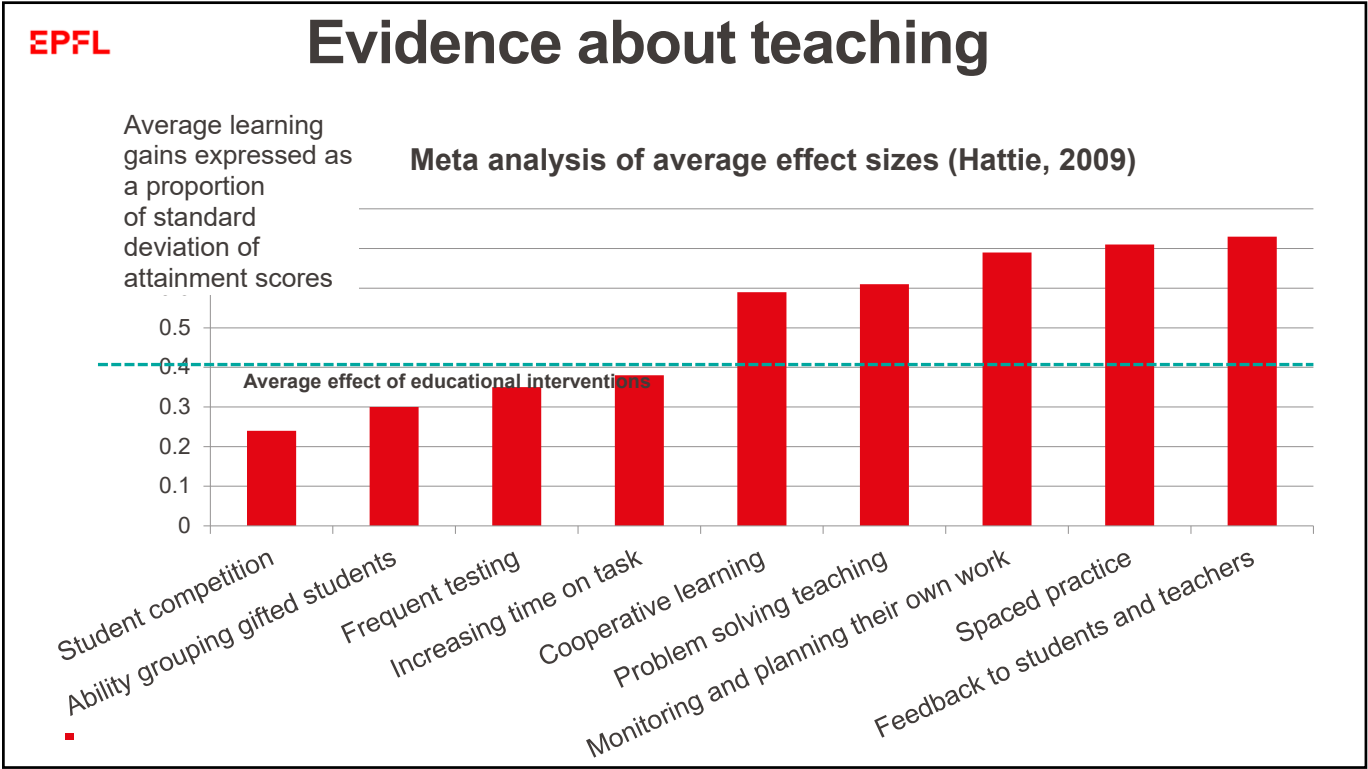
- Halloun-Hestenes Mechanics Diagnostic Test (1985)
 - Pre- and post tests
 - Evaluate conceptual knowledge gain
- Hake's study
 - 6542 students
 - 14 courses that used **traditional** methods (T)
 - 48 courses that used **interactive engagement** methods (IE)

Hake, R. R. *Am. J. Phys.* **1998**, 66, 64-74.

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Brainstorm

What are the main reasons that students don't participate in class ?



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Structuring your class

Effectively using your time and supports

Joelyn de Lima Ph.D.
(some slides courtesy Cécile Hardebolle)
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Structuring your class

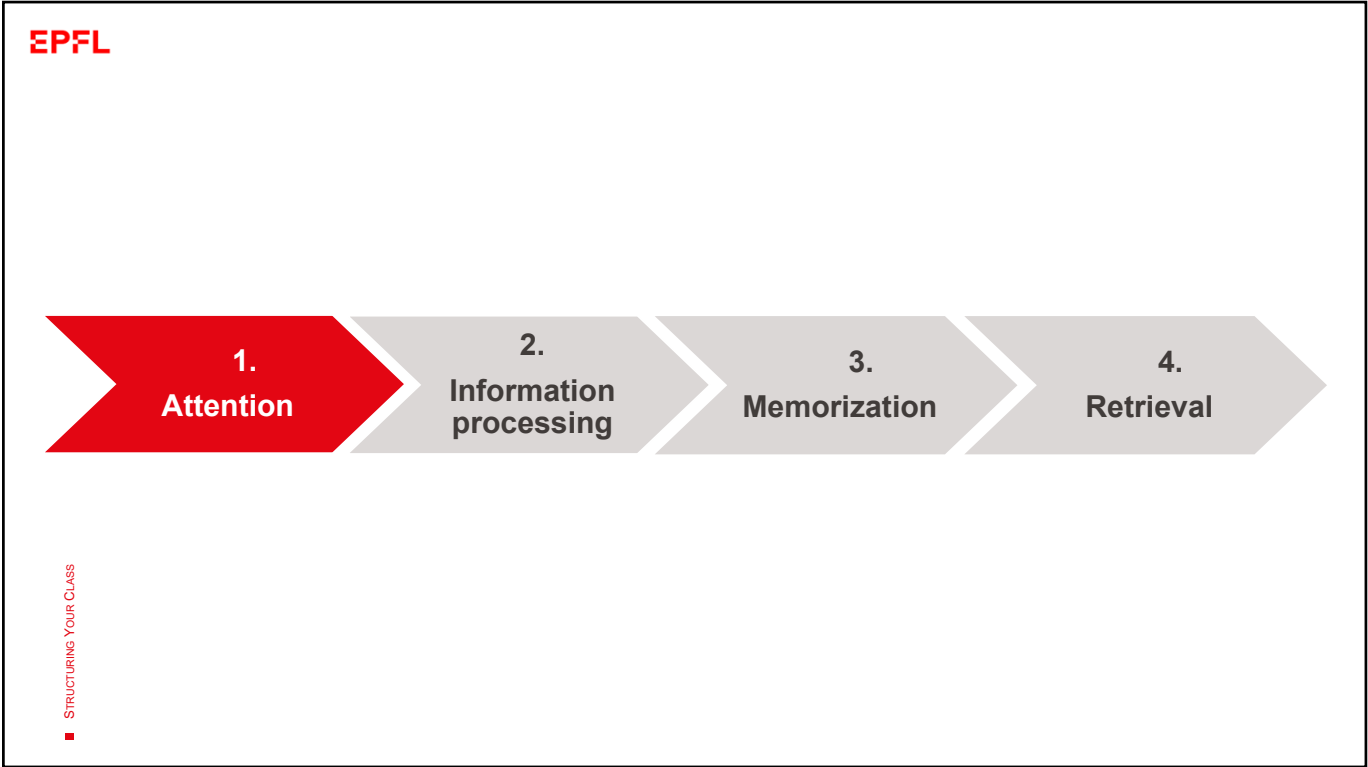
Learning Objectives

At the end of this presentation, you should be able to:

- **Structure** your lectures/presentations **to support learning**
- Explain **how we process and learn** new information according to the work by Baddeley & Hitch and Miller
- **Choose, design and use** supports to convey your message effectively

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☒

Identify key points

List 1-3 important points that you would like your audience to remember in your mini-lesson:

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■

■

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1.
Attention

2.
Information
processing

3.
Memorization

4.
Retrieval

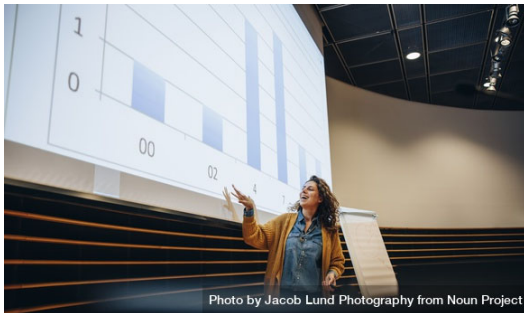
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Helping your audience to focus

Contrast

Body language

Supports



ATTENTION : Si Verbe + infinitif

1) Le participe passé, suivi d'un infinitif, s'accorde avec son COD placé avant **si le COD fait l'action exprimée par le verbe à l'infinitif.**

« *Les oiseaux que j'ai entendus chanter* » = *j'ai entendu [les oiseaux qui chantent]*

Les oiseaux est COD de *entendre*, *sujet de chanter* ↔ accord au verbe *entendre*

2) Le participe passé, suivi d'un infinitif, ne s'accorde pas avec le COD placé avant **si le COD subit l'action exprimée par l'infinitif.**

« *La chanson que j'ai entendu chanter* » = *j'ai entendu [chanter la chanson]*

La chanson est COD de *chanter* ↔ pas d'accord au verbe *entendre*

3) **Jamais accord pour « fait » + infinitif** même sous forme pronominal : il fait corps avec l'infinitif et constitue avec lui **une périphrase factitive.**

« *Les amis qu'il a fait entrer.* » et « *elles se sont fait prendre* »

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Text

Space draws attention

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- Use a legible font
- Adapt the font size
- Write short key phrases

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Pharmacologie concepts de base

Pharmacodynamique

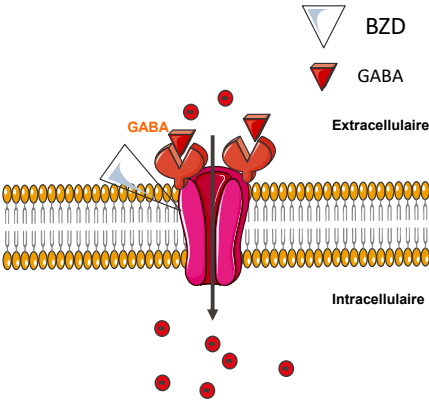
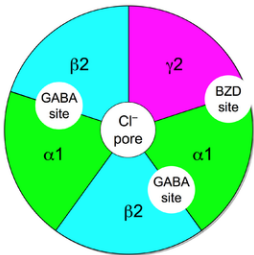
Agonistes allostériques

(liaison à un site différent de ce qui lie l'agoniste endogène)

Exemple : le récepteur GABA_A

Agoniste endogène Médicament

Il est perméable aux ions Cl⁻ qui produisent une hyperpolarisation du potentiel de membrane (action inhibitrice)



Les benzodiazépines (BZD) augmentent la perméabilité du récepteur GABA_A

Effet sédatif (ex diazépam « Valium ») et antiépileptique

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Colors

Contrast improves readability

- ≤ 3 colors
- Check how they render
- Check:
Accessibility
Meaning
Consistency

- ≤ 3 colors
- Check how they render
- Check:
Accessibility
Meaning
Consistency

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Information processing



Information processing

The **working memory** is the cognitive system that **holds** and **processes new information** as that information comes through your senses.

A common model includes 4 components:

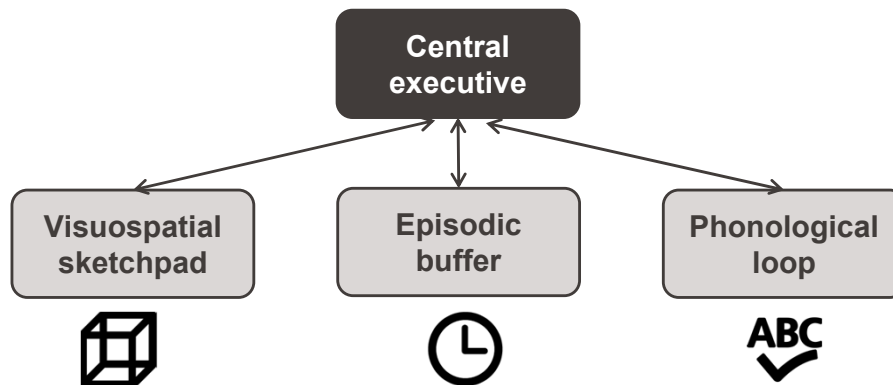
- The **phonological loop**, which deals with verbal information
- The **visuospatial sketchpad**, which deals with visual information
- The **episodic buffer**, which integrates information and links with time sequencing
- The **central executive**, which controls and regulates the cognitive processes

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Information processing

Working memory =
cognitive system that **holds** and **processes new information**



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Baddeley & Hitch, 1974

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How do you support your message?

- Use **visuals** (diagrams, graphs, icons, tables, pictures...) in **combination** with text
- Ensure that your oral and written messages are **consistent**

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Using visuals



Go back to your three key points:

- Think of at least one visual that you can use to complement one of the key ideas
- (diagrams, graphs, icons, tables, pictures ...)

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Memorisation



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Limitation of the working memory

- Very short - Approx. 1 minute,
- Can hold only a **limited number of 'chunks'** – 7 ± 2

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Baddeley & Hitch 1974, Miller 1956

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Memorisation = Encoding

- Efficient memorisation = encoding information
- Encoding is facilitated by **making associations**:
 - With new information
 - With existing information

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Baddeley & Hitch 1974, Miller 1956

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Practices which support memorization

- Limit the **quantity** of simultaneous information
- Make sure students **actively process** information
- **Organize** information using an explicit structure

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Structuring information



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Using an explicit structure

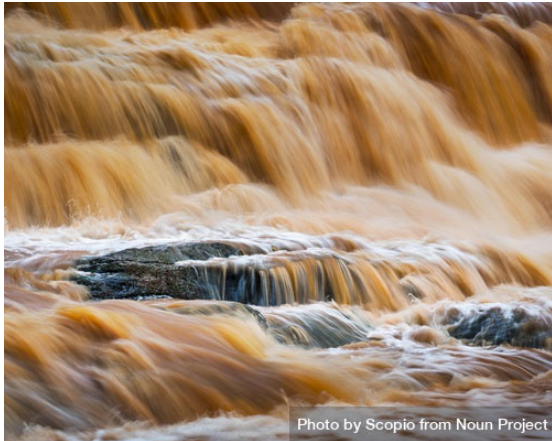


How are the different pieces of information / concepts / messages / ideas contained in your presentation **related to each other**?

- Create a “map” that you could use in your presentation (visual if possible)
- Get inspiration from your colleagues:
how could you improve your own structure?
- Share great practices you have seen in others’ work

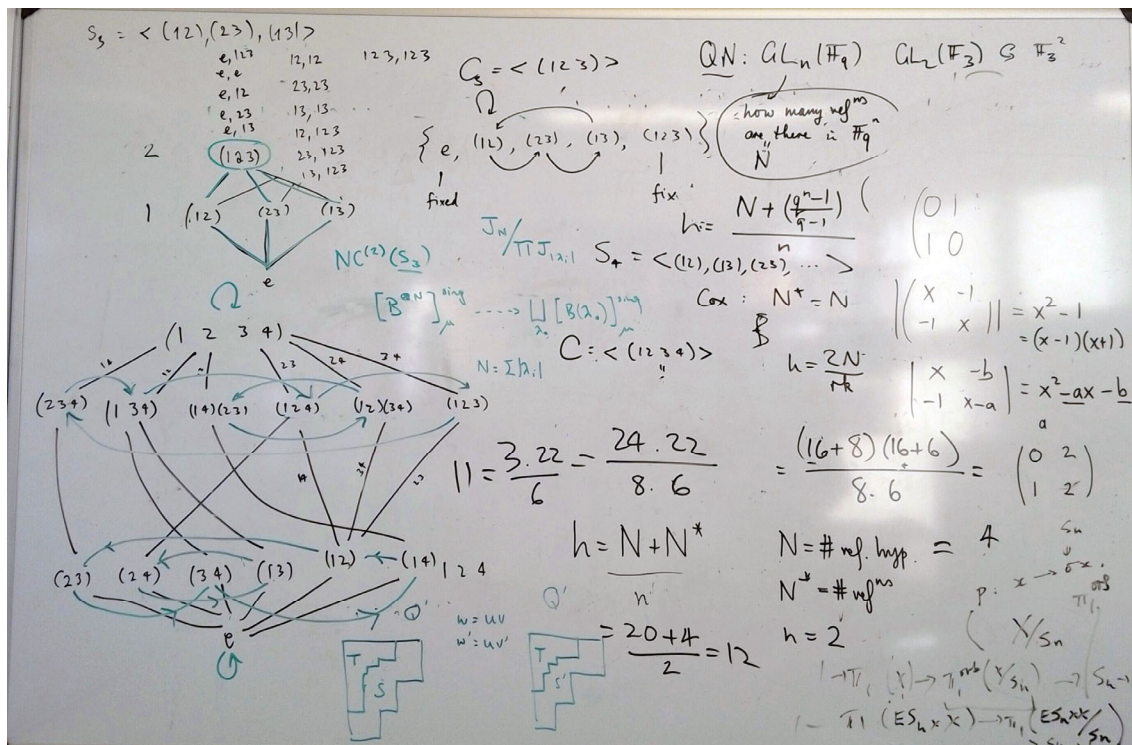
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Structure vs. Flow



A lecture/presentation is **linear** by definition.

How to make its structure visible?



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Preparing for using a board



- Prepare a one page “on-the-board” summary presentation of your thesis, thinking about use of space and structure
- Show your page to your neighbour – without explaining the content – and give each other feedback:
 - How is space used?
 - Is the structure identifiable?
- Share great practices you have seen in others’ work

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Check your learning so far



- Draw the **model of the memory** presented in this talk
- List practices that can be used in lectures/presentations to:
 - Draw attention:
 - Make information processing easier:
 - Facilitate memorization:

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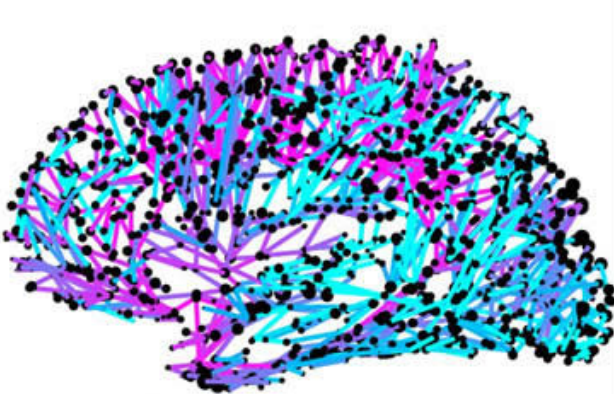
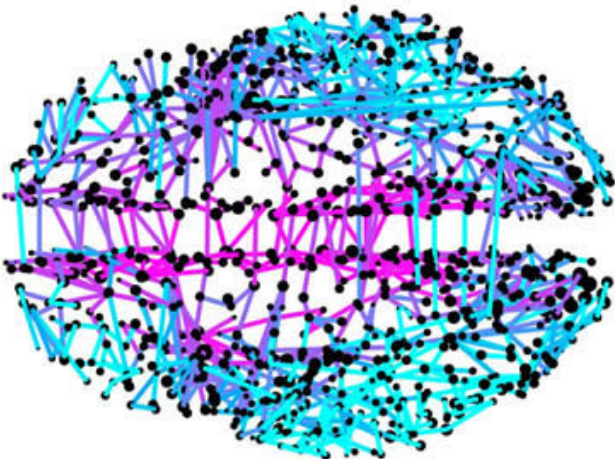
Retrieval



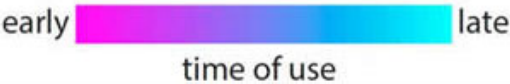
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Retrieve = reconstruct



Times at which different connections in the brain are used to spread information.



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Misić et al., 2015

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Impact of retrieval practice on learning

Read

Read

Read

Read

Read

Read

Read

Read

Read

Recall

Read

Recall

Karpicke and Blunt, 2011

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STRUCTURING YOUR CLASS

Impact of retrieval practice on learning

Read

Read

Read

Read

Read

Read

Read

Read

Read

Recall

Read

Recall

Results on comprehension test

Study Method	Proportion of correct answers
Reading	~28%
Repeated reading	~48%
Retrieval practice	~65%

Karpicke and Blunt, 2011

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1.
Attention

2.
Information
processing

3.
Memorization

4.
Retrieval

- Use **contrast** in supports and body language
- **highlight** important points
- Use **visuals + text**
- **limit the quantity** of simultaneous information
- **Organize** information using an **explicit structure**
- **Make connections** with prior knowledge
- Have students **practice retrieval**

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1.
Attention

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Information
processing

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Memorization

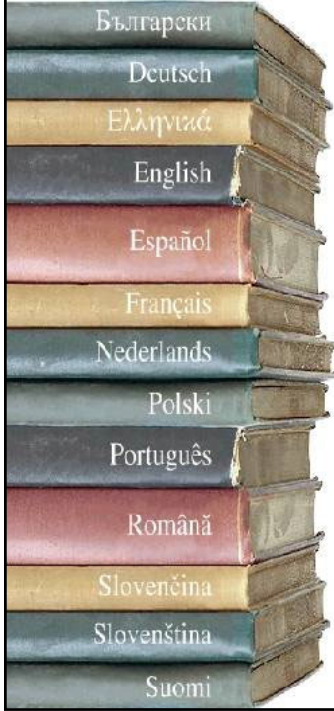
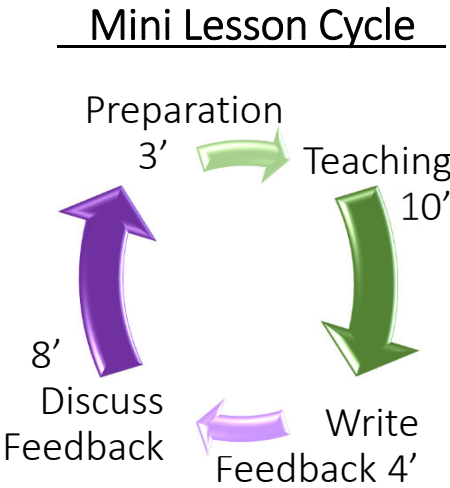
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A mini-lesson on learning outcomes



skills

content

learning

teaching

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skills



content

Learning objectives

specific statements of what students should be able to **DO** after the course

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a Learning Objective

is a clear, concise statement of what a student should be capable of doing at the end of the instruction period.

Criteria

- Focused on student action, i.e. verb
- Important
- Observable
- Challenging
- Obtainable

1. Ramsden, P (2003) *Learning to teach in Higher Education*, London Routledge

2. Jenkins, A. & Unwin, D. *How to write learning outcomes*.

▪ www.ncgia.ucsb.edu/education/curricula/giscc/units/format/outcomes.html

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Action Verbs for Learning Objectives

- Define, order, identify, reproduce
- Describe, explain, express, situate, choose
- Illustrate, show, solve, use
- Estimate, compare, critique, discriminate
- Evaluate, justify, predict, defend
- Construct, develop, plan, prepare, propose

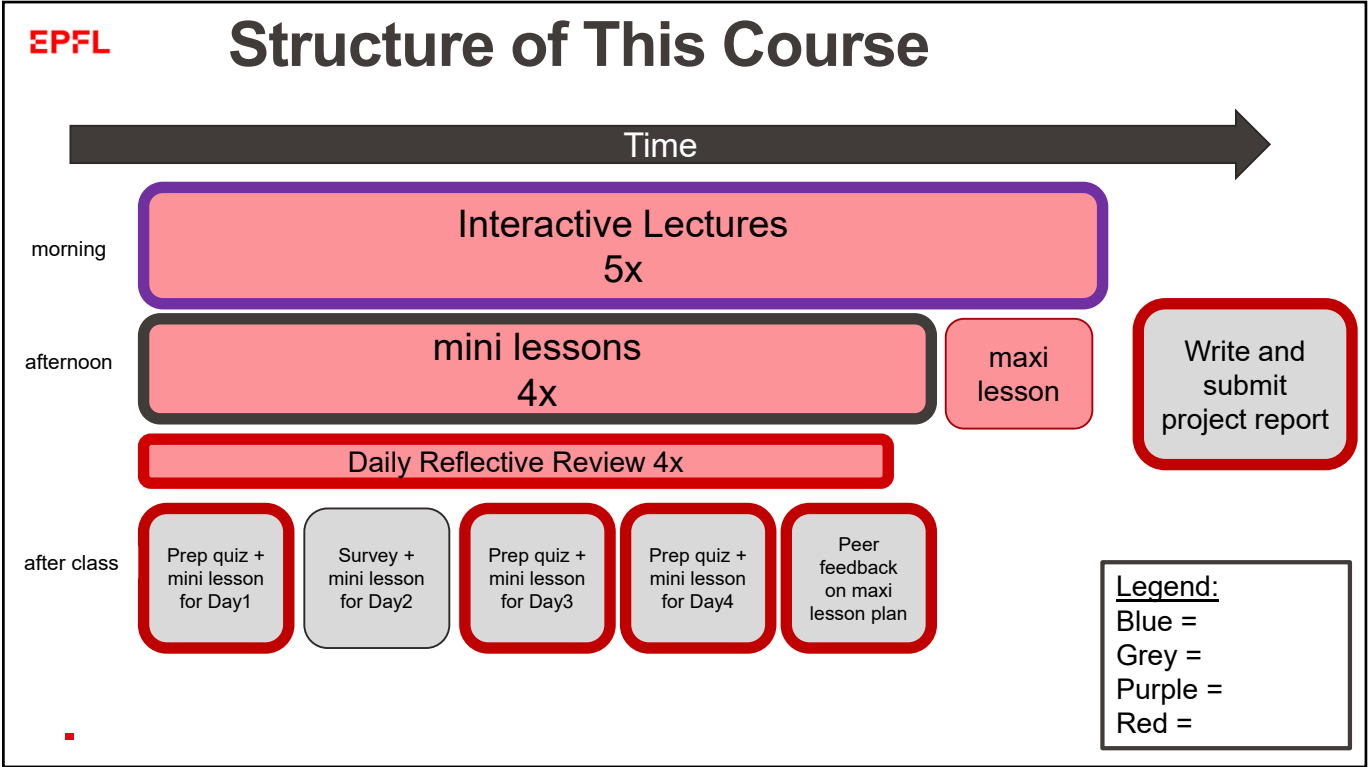
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Verbs to Avoid for Learning Objectives

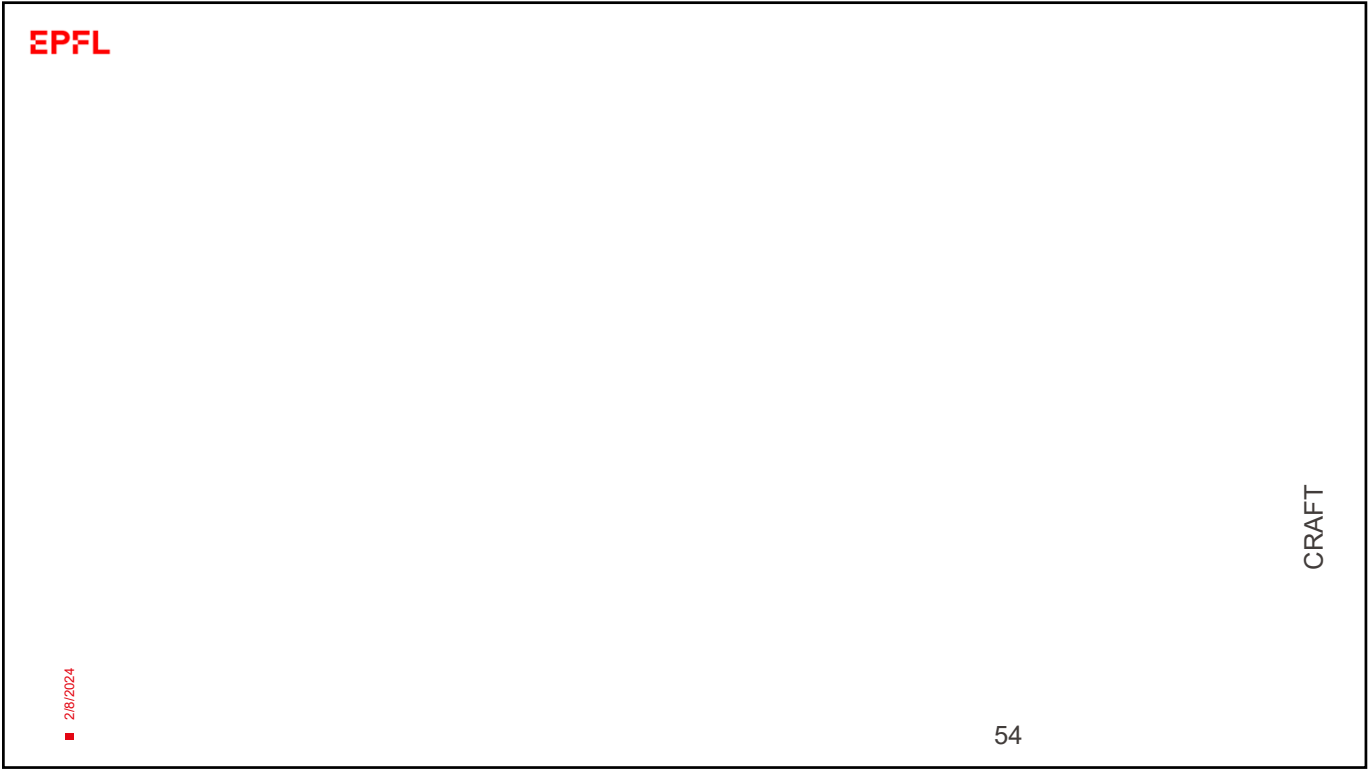
- | | |
|-----------------------------|--------------------------|
| ▪ Understand | ▪ Comprendre |
| ▪ Familiarise | ▪ Prendre connaissance |
| ▪ Recognise | ▪ Reconnaître |
| ▪ Appreciate the importance | ▪ Sentir les bien-fondés |
| ▪ Express in words | ▪ Exprimer avec des mots |
| ▪ (re)activate | ▪ (re-)activer ... |

Biggs J, (2003) *Teaching and Learning in Higher Education: New Trends and Innovations*. University of Aveiro, 13 – 17 April 2003; Bingham, J. (1999) *Guide to Developing Learning Outcomes*, The Learning and Teaching Institute Sheffield Hallam University, Sheffield; Ramsden, P (2003) *Learning to teach in Higher Education*, London Routledge.

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Introduction to the MINI LESSONS

Day 1

Siara Isaac, Ph.D

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March 2022

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What are mini lessons?

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- An opportunity for low-stakes, mastery-focused deliberate practice
- A structured cycle of practice and feedback
- An opportunity to teach, to observe teaching and to reflect on effective teaching prompted by self and peer feedback questions.
- A daily iteration of a practice-feedback loop, with a new challenge and focus each day.

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Mini Lesson Cycle – Day 1

20' cycles



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There are 3 roles in addition to the mini-lesson instructor

Time keeper

1. Monitors the schedule and keep an eye on the time.
2. Enforces timing for each step, especially transitions and overall limits, so that the group finishes on time.
3. Redistributes roles as required to release mini lesson instructor.

Video recorder

1. Writes down the presentation order of all mini lessons BEFORE the first lesson.
2. STARTS RECORDING for each mini lesson !!!
3. Stops recording AFTER the discussion and makes video files available to the mini lesson instructor.

Feedback quality manager

1. Prompts people to fill out self + peer feedback forms at the appropriate moment of the cycle.
2. Ensures that the discussion explores themes on feedback sheet and adheres to group rules.
3. Encourages the mini lesson instructor to hear peer feedback WITHOUT responding or explaining.

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Mini Lesson Groups

The EPFL logo is displayed in red, consisting of the letters 'EPFL' in a bold, sans-serif font. It is positioned to the right of the slide title, with a vertical red line running alongside it.

- These groups will be stable over the course.
- You will mutually teach your mini lessons + provide each other feedback.
- Your first group task (10 minutes)
Write a set of guidelines for your group for (1) offering feedback and (2) receiving feedback

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Giving Constructive Criticism

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- *Be direct and specific.*
- *Offer ideas for how to improve.*
- Focus on the **goals**
- Include **positive** aspects!
- Comment on the **performance**, never on the person

pp 257-259 from A. Saroyan and C. Amundsen (Eds.), *Rethinking university teaching: A course design workshop and a framework for faculty development*. (2004). Sterling, VA: Stylus.

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Receiving Constructive Criticism

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- *Specify the type of criticism that you want.*
- *Be sincerely receptive.*
 - *Almost any criticism can be helpful.*
 - Avoid being defensive
 - Decide what to do with it
- *DO NOT respond, rather confirm your understanding of the criticism.*

Adapted from Verderber & Verderber (1983) in Leptak, J. (1989). Giving and receiving constructive criticism. *Lifelong Learning*, 12(5), 25-26).

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Mini Lesson Cycle – Day 1

20' cycles

▪ Time keeper

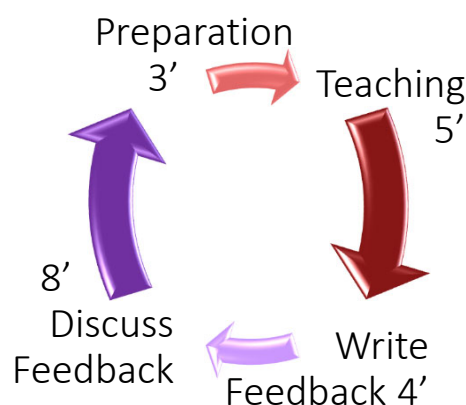
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Day 1 – small group warm-up @ 14.00

20' TOTAL

▪ Objectives

- To identify for yourself what you will focus on in your practice teaching (deliberate practice)
- To ask your peers for relevant feedback (data)

▪ Instructions

1. Take 2 posts-its. On the first, write 1-2 personal development goals for your teaching practice today. On the second, write down the type of feedback that will be most useful for you to assess your personal progress.
2. Once everyone has completed step 1, take turns sticking your post-its onto the matrix below and explaining your answers to the rest of the group.
3. Review your group feedback guidelines and check that they are adequate to provide the feedback necessary for each person to progress towards their goals

▪

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Mini lesson summaries 16h00-16h30

1. Review the feedback from you mini lesson from your peers and yourself. **Prepare an on-the-board version** of your mini-lesson, perhaps using the summary you created this morning with Joelyn.
(8 minutes)

This version should take 2-3' to present.

Take particular care to provide your learners with a clear structure to support their contextualized learning.

2. Each person will present their mini-lesson **using the board** (2-3')
3. Give **verbal feedback** on structure + other relevant aspects (2')
4. Repeat steps 2+3 for each person
5. Be sure to be back **for 16.30**

▪

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2/8/2024

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CRAFT

	<i>Teaching Focus</i>	<i>Learning Focus</i>
Orienting questions	What do I want to teach?	What do students need to learn?
Teacher's role	How can I cover the designated course material?	How can we accomplish specific learning objectives?
	Provide/deliver instruction	Produce learning
	Transfer knowledge to students	Elicit student discovery and construction of knowledge
Success criteria	Classify and sort students	Develop each student's competencies and talents
	Teacher's performance	Students' performance
	Inputs, resources	Learning, student-success outcomes
Assumption about teachers	Any expert can teach	Teaching is complex and requires considerable training

SOURCE: Adapted from Barr and Tagg (1995, pp. 6-7).

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Use LOAFS



L Lead-in



O Objectives



A Active-processing



F Formative assessment



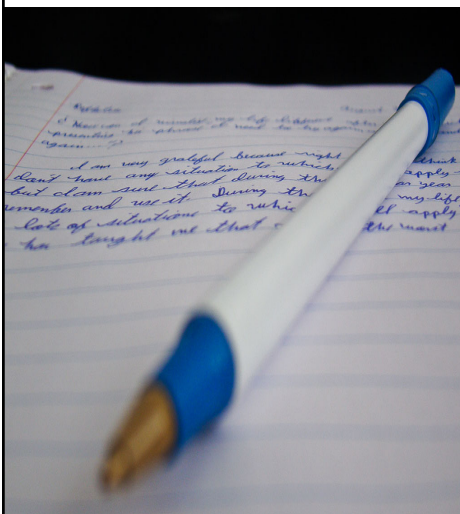
S Summary

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Tormey & Isaac, 2022

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Homework



1. Daily reflection -> submit before you leave
2. Prepare your mini lesson for Day 2
 - Choose an exercise or problem solving activity
 - Use the Day 2 lesson planning matrix
 - 10 minutes
 - Only blackboard or paper flipcharts (No Powerpoint)
 - Ask questions of your participants!
3. Anonymous feedback on Day 1

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