



Maastricht University



Maastricht UMC+

# Introduction of the medical curriculum and undergraduate pathology education in the University of Maastricht

Dr. Ir. Jack Cleutjens

*Dept. of Pathology, Maastricht University, Faculty of Health, Medicine and Life Sciences, Maastricht, the Netherlands*

# Medicine in the middle ages...



Jan Sanders van Hemessen: The Surgeon of 1555 (Museo del Prado, Madrid)

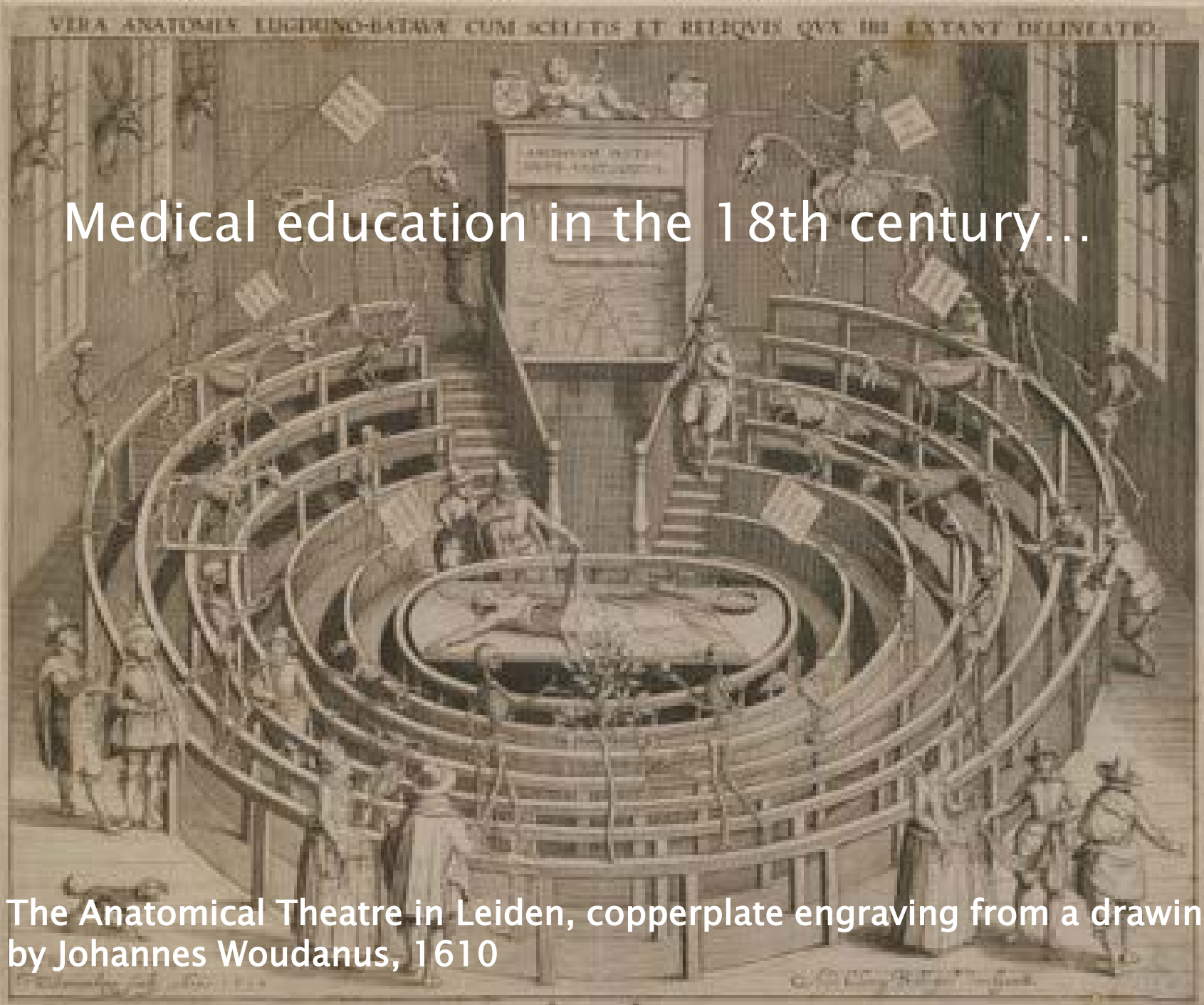
... and now!



VERA ANATOMIAE LEIDENSIS-BATAVAE CUM SCELIS ET RELIQUIS QVAE IBI EXTANT DEINCATIO.

# Medical education in the 18th century...

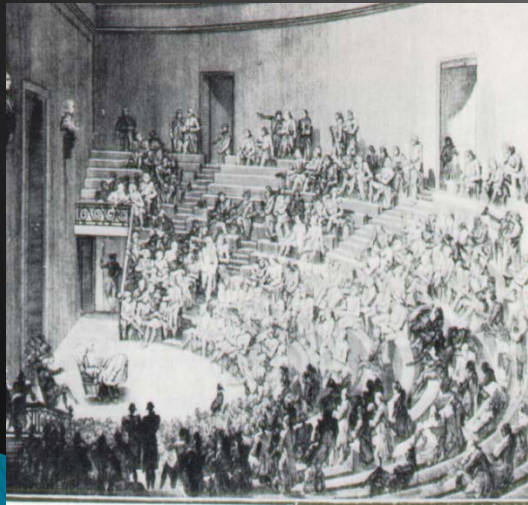
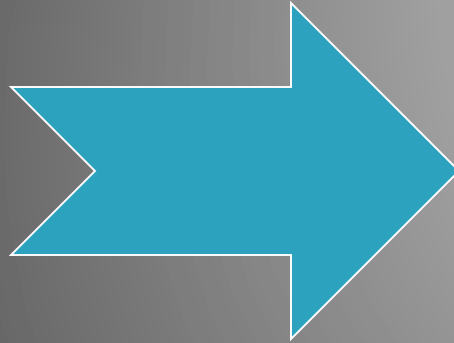
The Anatomical Theatre in Leiden, copperplate engraving from a drawing by Johannes Woudanus, 1610



... and now!



# Anything changed?



misconception

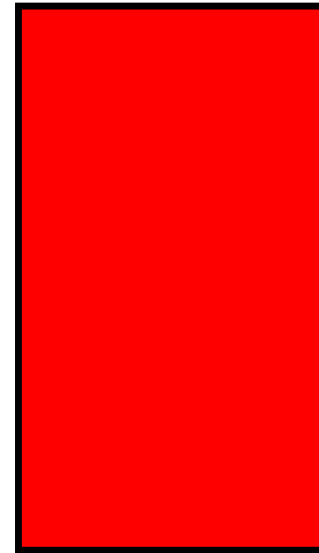
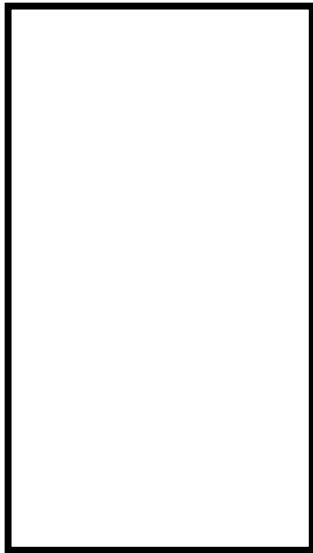


Teaching = learning





# ★ Information transfer



The future is unknown

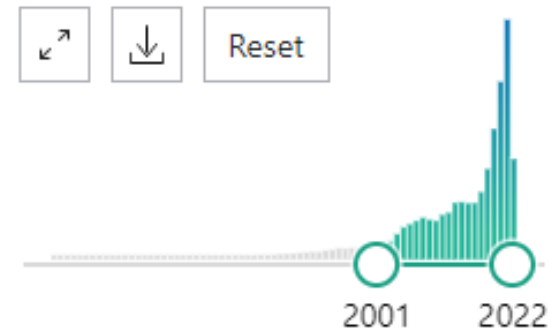
We train students for the unknown future by means of our actual knowledge. This actual knowledge is changing rapidly.

## Artificial intelligence in medicine

1951–2000: 9,806 abstracts

2001–2022: 153,811 abstracts

RESULTS BY YEAR

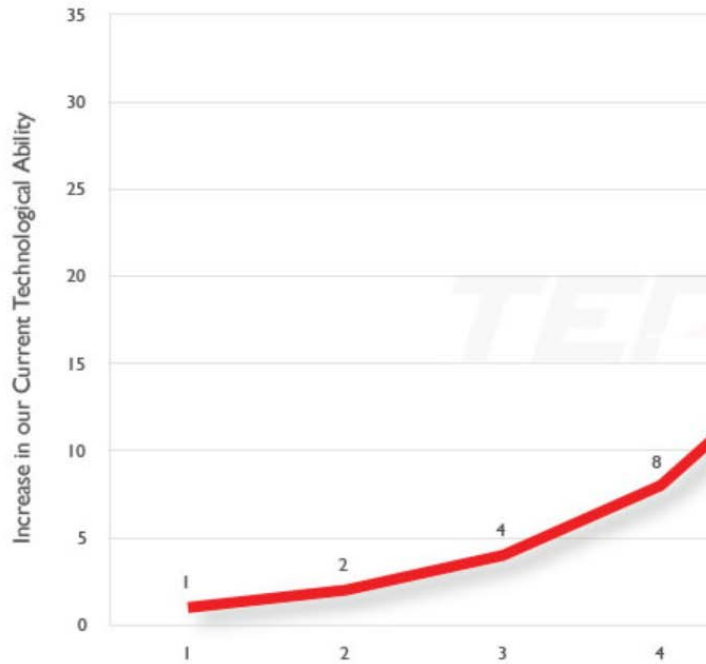


(Pubmed, May 13, 2022)

## Human Intuitive Perspective of Technological Advancement

in Five Years

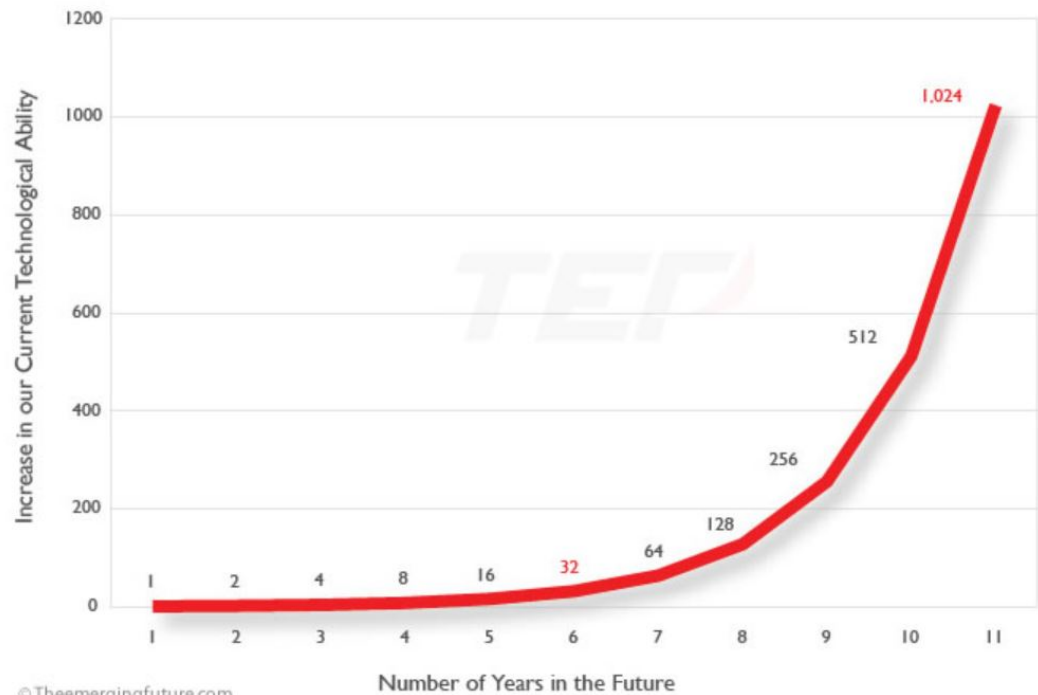
Thirty Two Times More Ad



## Human Intuitive Perspective of Technological Advancement

in Ten Years

A Thousand Times More Advanced



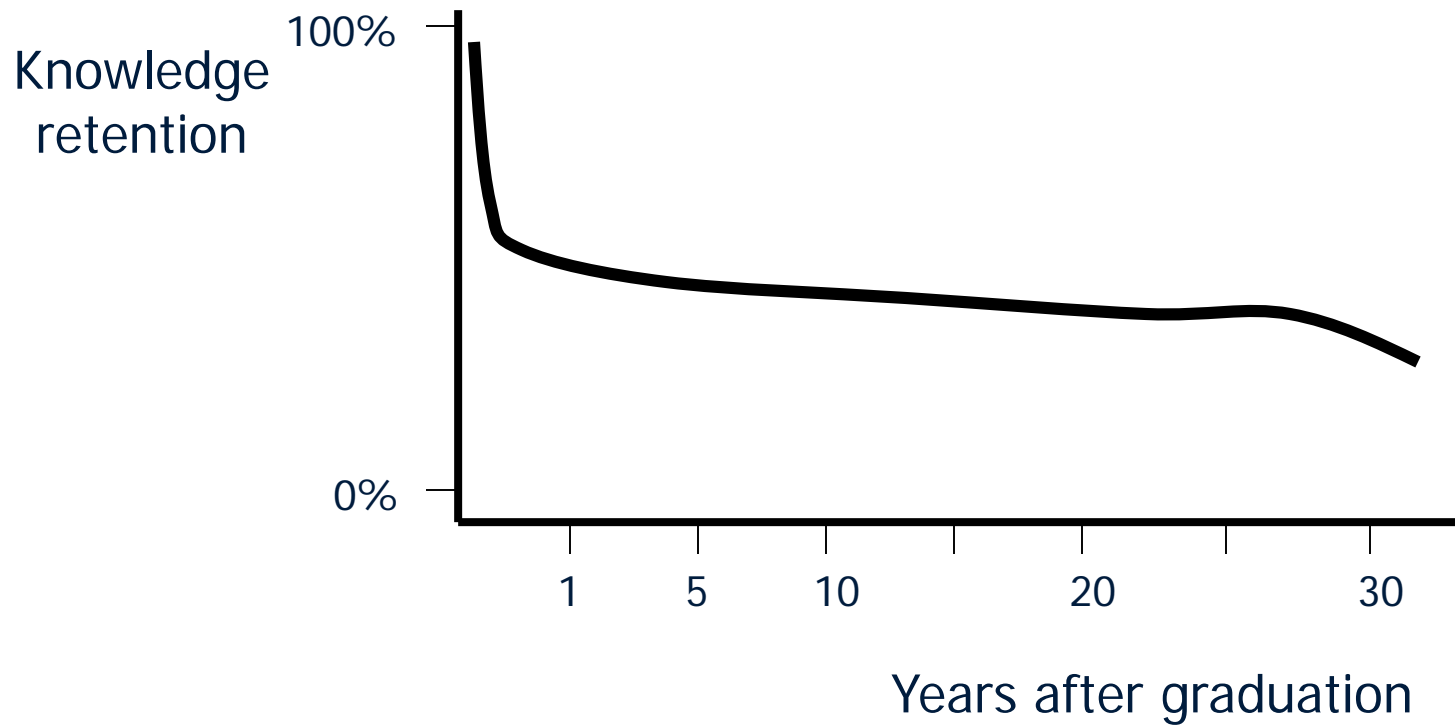
©Theemergingfuture.com

<http://theemergingfuture.com/speed-technological-advancement.htm>

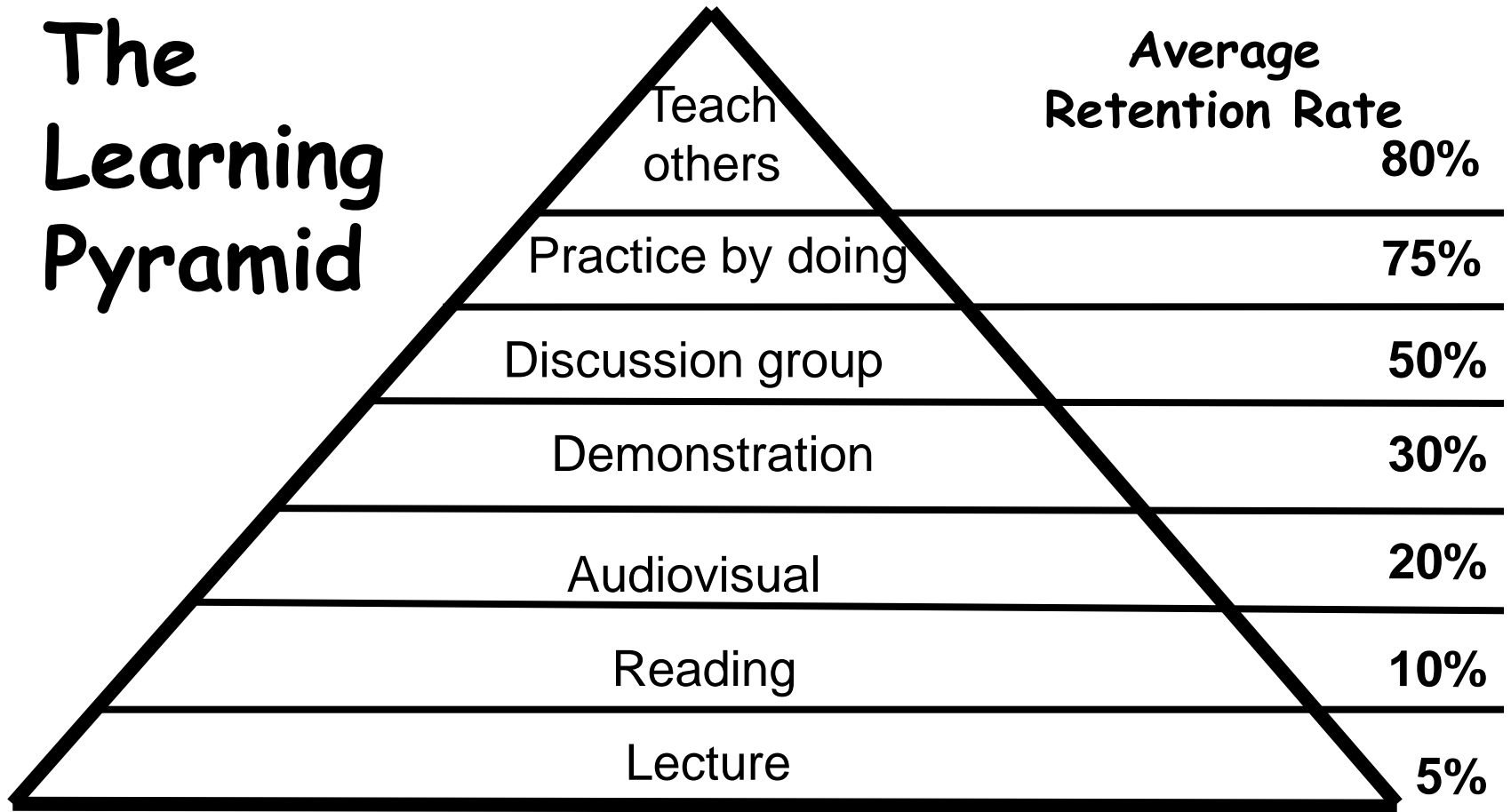
# What do we see in practice:

- ▶ It is very difficult to retrieve knowledge from your long-term memory
  - ▶ Students have difficulties in applying knowledge in practical situations
- Learning should become more effective!**

# Retention of knowledge



# The Learning Pyramid



National Training Laboratories, Bethel, Maine, USA

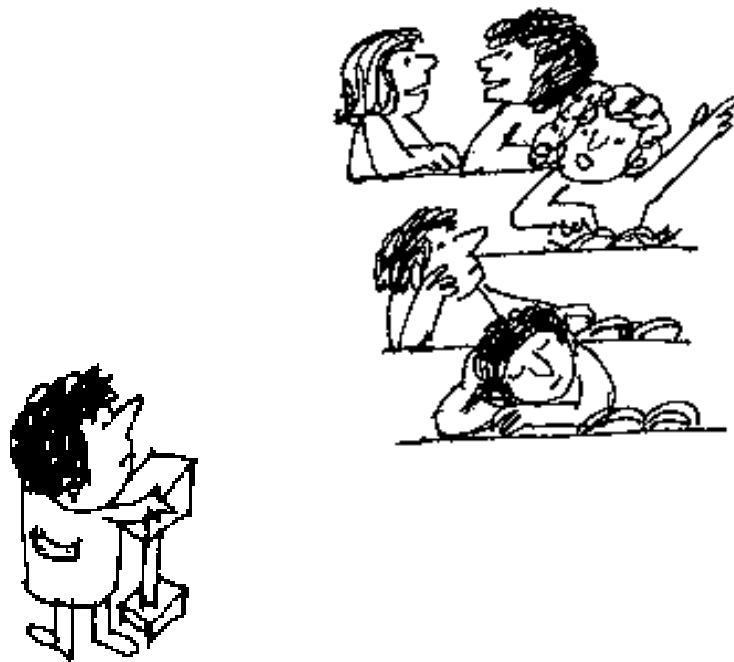
Bales, E. (1996)

# What determines **effective** learning?

Which conditions facilitate:

- The acquisition of knowledge
  - (how it gets in)
- The construction of knowledge
  - (how it gets stored)
- The application of knowledge
  - (how it gets out)

# Educational Learning principles





# When do we learn most?

**PBL**

Average  
Retention Rate<sup>1</sup>

**80%**

**75%**

**50%**

Demonstration

**30%**

Audiovisual

**20%**

Reading

**10%**

Lecture

**5%**



<sup>1</sup> National Training Laboratories, Bethel, Maine, USA

# Core principles of PBL

**C-C-C-S:** contextual, constructive, collaborative, and self-directed

- ▶ **Contextual** – PBL uses real everyday problems. Hence the learning material is more relevant and will be easier to apply on real situations
- ▶ **Constructive** – PBL is a student centered approach in which learners construct their own knowledge and the teacher or tutor serves as a guide on the side
- ▶ **Collaborative** – PBL stimulates students to co-construct knowledge, and to share ideas and knowledge
- ▶ **Self-directed** – PBL promotes self-directed learning skills among students. Examples are planning, reflection, evaluation of understanding, and managing information and resources

# Maastricht university

Founded 1976 as Rijksuniversiteit Limburg

Closing coal mines

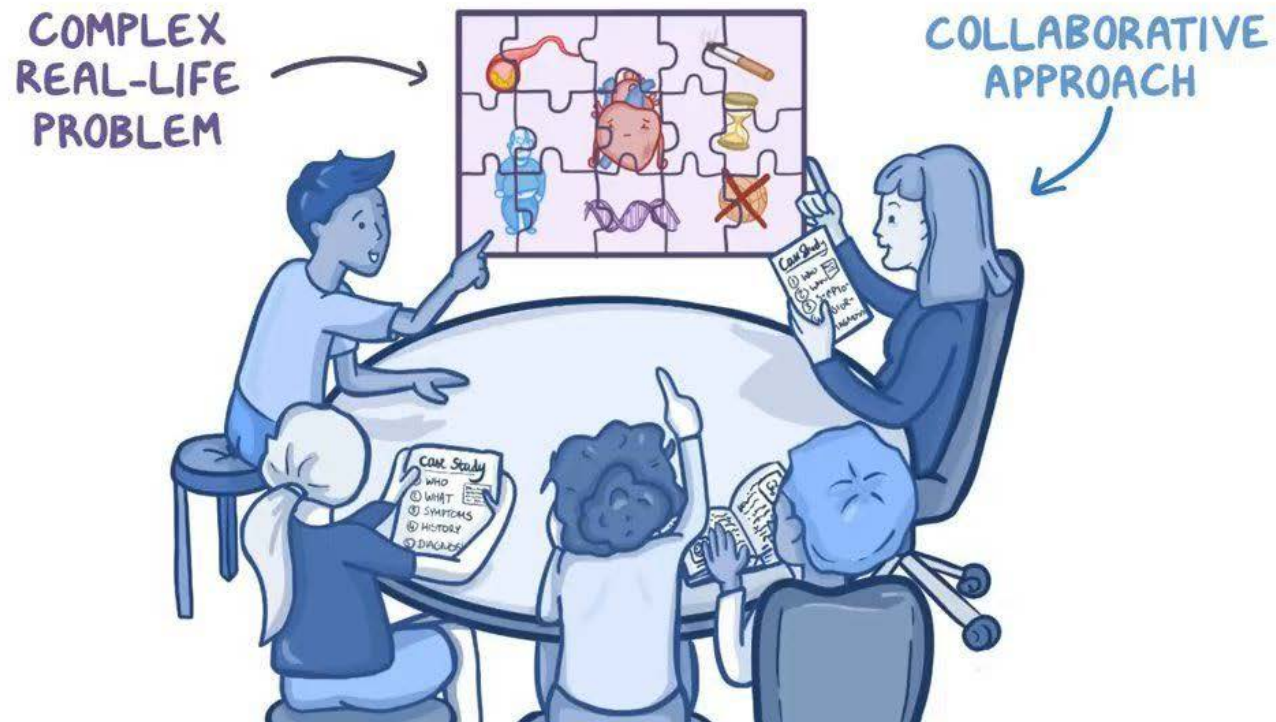
Youngest medical faculty in the Netherlands

New teaching method → discriminate from established universities

- Problem Based Learning (PBL)

# Problem based learning

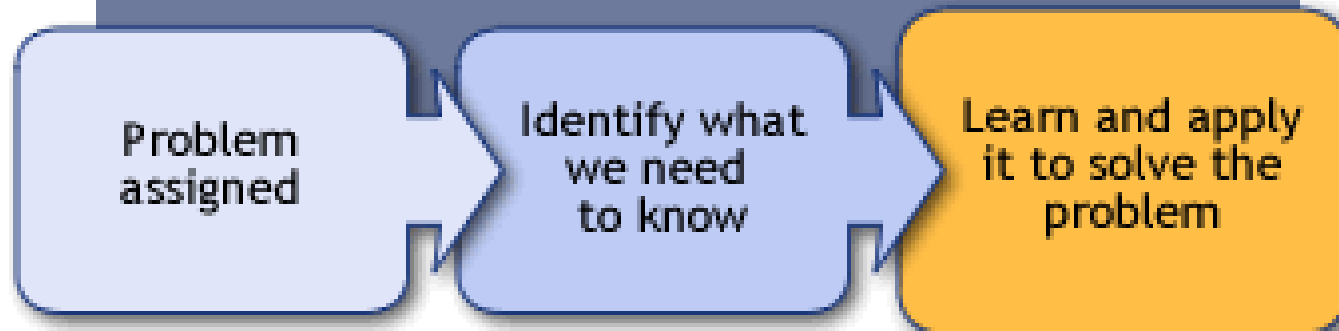
## PROBLEM-BASED LEARNING (PBL)



## Traditional Learning



## Problem Based Learning (PBL)



# Roles in the tutorial group

- ▶ Group members
- ▶ Chairman
- ▶ Scribe
- ▶ Tutor



# PBL – tutorial group



 Maastricht University *Leading in Learning!*

## Problem Based Learning

- Real life situation (disease, conflict, project)
- Tutorial groups
- Interaction  $\leftrightarrow$  Self directed > develop your own style
- Collaboration
- Formative tests
- Evaluation, Reflection

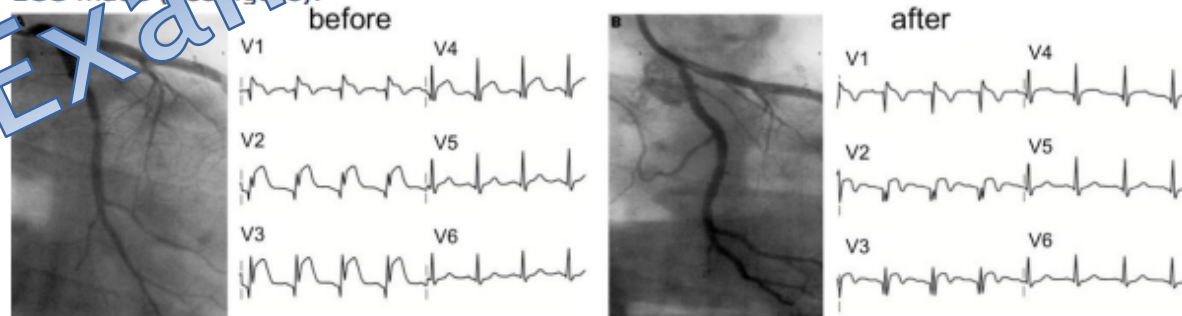
## Case 2: Chest pain II

### Required prior knowledge

Block 1.2 discussed the regulation of blood pressure and heart rate in general. Case 14 of block 1.2 introduced chest pain. ECGs had already come up in case 9 of block 1.2. In this block, the ECG will be discussed in detail in case 4. However, typical changes in the ECG as a consequence of ischemia are discussed here.

### Case Study

Two months later, Mr Peters (see case 1) suddenly suffers a severe, crushing pain in the chest that is much more severe than the pain he felt earlier. His wife immediately calls the doctor, who is on the spot within 10 minutes. The GP finds a grey, clammy and perspiring man, who is rather dizzy and whose hands are very cold. His blood pressure is 90/50 mmHg, with a heart rate of 110 min<sup>-1</sup>. An ambulance is called straight away to take Mr Peters to the emergency cardiac unit at Maastricht University Hospital. The duty cardiologist takes Mr Peters' history, carries out a full physical examination and has an ECG made (see figure).



She concludes that a coronary artery is obstructed, creating a shortage of oxygen in the heart muscle: a myocardial infarction. Based on these findings, a PTCA procedure is performed. The chest pain fades after 40 minutes, the ECG normalises (see figure) and the patient already feels a lot better; both the blood pressure and the heart rhythm return to normal. The concentration in the blood of high-sensitive cardiac troponin T (hs cTNT) from cardiomyocytes has increased. After 24 hours, the maximum AST concentration is 198 U/litre. There are no further complications after that; he does not seem to have lost much of the heart's pumping capacity. Mr Peters is allowed to go home after a week.



# **PBL SEVEN STEPS**

**1) Clarify terms  
and concepts**

**2) Define the  
problem**

**3) Explain the  
problem  
(brain-storming)**

**4) Arrange the  
explanations  
proposed**

**5) Formulate  
learning goals**

**6) Individual  
study**

**7) Share findings**

# Teach the alphabet of pathology



# Example of a practical



# The PBL concept in practicals

- ▶ Home assignment
  - Literature (read certain chapters)
  - Go over the home assignment → Contextual
  - Recognize the cell types
  - What is the function of these cells in wound healing
- ▶ Practical
  - Answer the questions
  - Work together with your neighbour → Collaborative
- ▶ Interactive explanation by the pathologist → Constructive
  - Quiz

Self-directed

# CANVAS



- ▶ [https://canvas.maastrichtuniversity.nl/courses/4929/pages/home-assignment?module\\_item\\_id=327228](https://canvas.maastrichtuniversity.nl/courses/4929/pages/home-assignment?module_item_id=327228)

# Histological sections Quiz

Every year

Monitor progression in the knowledge of the pathologists in training

5 years → kind of progress test

Previously, glass slides (10 or more consecutive sections).

- Disadvantage first and last section are not the same

Now, digital test (Via Google forms or other software packages).

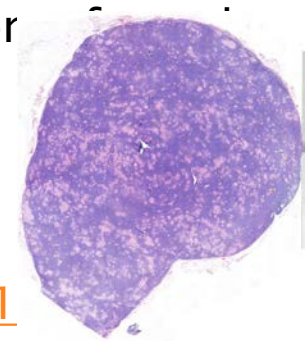
Maximum time 2.5 hours

# Histological sections Quiz 2021

1. Email address: \_\_\_\_\_
2. Name: \_\_\_\_\_
3. Start time: \_\_\_\_\_

## Case 1

- ▶ Clinical data: woman 76 years old.
- ▶ Type of material: SN lymph node excision near a melanor axilla on the left.
- ▶ Clinical question: melanoma metastasis ?
- ▶ Click on the link below for the virtualslide:  
<https://pathpresenter.net/public/display?token=42d381>



4. What is the (preferred) diagnosis?

- ▶ \_\_\_\_\_

# Histological sections Quiz 2021

57 questions

Monitoring the time the pathologist in training took for answering the questions

Digital evaluation by the pathologist

By filling in their e-mail, the student will receive his/hers answers in the mail

Feedback:

- Written feedback or only the score,
- Discussing the answers in a lecture hall
- Digital feedback with demonstration of the most important areas in a section.



# Histological sections Quiz 2021

- ▶ Discussion
  - Digital feedback

<https://pathpresenter.net/public/presentation/display?token=6581bc30>

