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Interprofessional Education  
The University of Hong Kong

# Problem Based Learning

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- What is PBL ?
- How is PBL done at HKU?
- What to do during PBL?



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# What is PBL?

# PBL

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- **Student-centered** Not teacher centered
- **Small groups**, usually 6-10 students
- **Facilitators** or tutors guide students rather than teach
- A **specific problem** serves as the focus of the group and stimulates learning
- The **problem** is a vehicle for the development of problem solving skills, thereby stimulating the cognitive processes
- New knowledge is obtained through Self-Directed Learning (**SDL**).

Barrows and Tamblyn (1980)

# PBL

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“is the learning that results from the **process of working** toward the understanding or resolution of a problem. The **problem** is encountered first in the learning process and serves as a **focus or stimulus** for the application of problem solving or reasoning skills, as well as for the **search** for or study of information or knowledge needed to understand the mechanisms responsible for the problem and how it might be **resolved**.”

Barrows and Tamblyn (1980)



# PBL

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is “a method of learning that emphasizes:

- a) the study of **clinical cases**, either real or hypothetical,
- b) **small discussion groups**,
- c) **collaborative independent study**,
- d) **hypothetico-deductive reasoning**, and
- e) **group process** rather than imparting information.”

Vernon & Blake (1993)

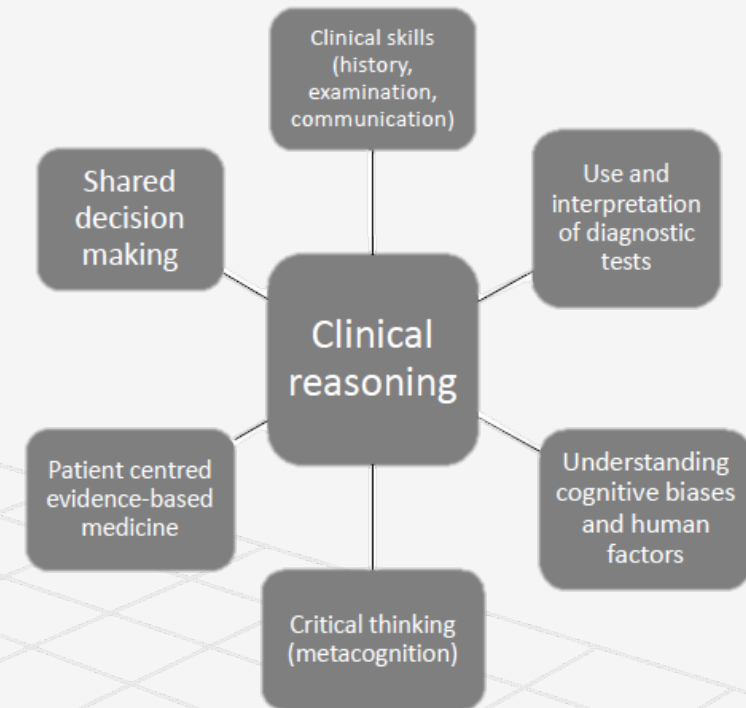


# Clinical Reasoning

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Clinical reasoning describes the **thinking** and **decision-making** processes associated with clinical practice

- Diagnostic reasoning
- Therapeutic reasoning
- Management reasoning



# Clinical Reasoning

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- Lifelong skills and habits
- Highly dependent on **knowledge**: clinically relevant and is more likely to be recalled

Patient's problem



Clinical features



Hypothesis driven data

# Diagnostic reasoning

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An iterative process of **matching** the details of a patient's story to stored knowledge in the form of 'illness scripts' – Disease Condition.

- **Defining features:** those that are characteristic of a particular illness
  - **Discriminating features:** those that allow the clinician to distinguish related illnesses
- 
- Aware of the need for additional information
  - Gathers more details to refine the search
  - Mental representation of the patient's problem evolves
  - Finds the 'match' (I) → working diagnosis (D) → final diagnosis (E-A) : **IDEA**



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# How is PBL done at HKU?

# PBL in LKS Faculty of Medicine

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- Seating plan; around 10 students; 1 facilitator
- Interactive whiteboard
- Internet access, dictionary
- X-ray box




# PBL: paper case

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- Easy to use
- Easy to produce
- Low cost
- Widely used

STUDENT COPY INTRODUCTION TO HEALTH AND DISEASE BLOCK: Case 1 1

**Tutorial 1 (Page 1)**

 **Patient Presentation**

Mr. Wong is a 25 year old project manager in an  
Mr. Wong is a 25 years old man complaining of back pain for 2 months. The pain is in the lower back. Sometimes, it is so serious that he needs to take painkillers. He can now walk for only half and hour. But before the onset of the pain, he was able to walk for hours. His urinary and bowel habits are normal.

 **Learning Issues Identified**

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## PBL: video case

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- More realistic
- Less logistic problems
- Avoid depersonalisation
- Easy to use



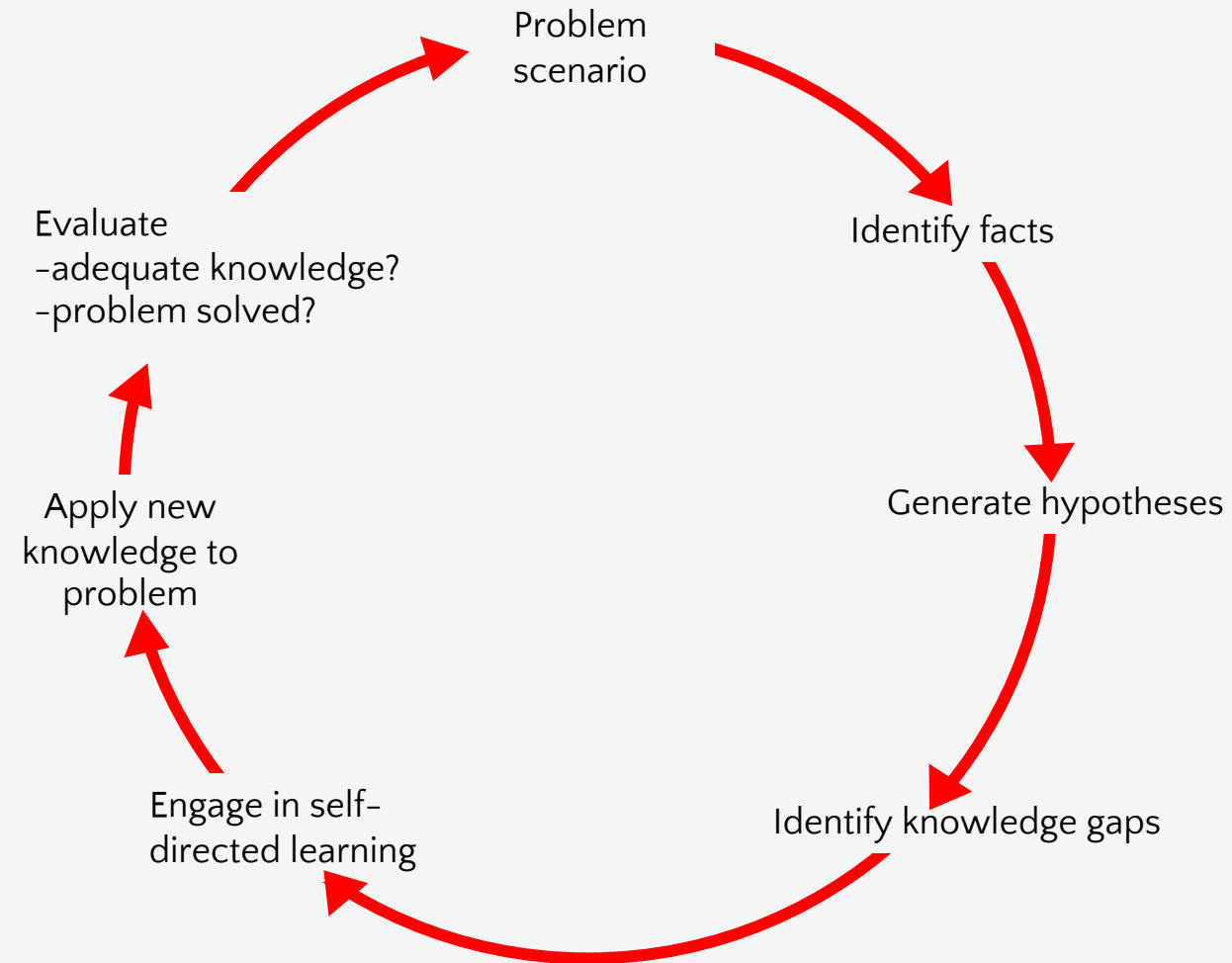
# Asynchronous and Synchronous e-triggered PBL

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- How to enrich your PBL?
- How to get your students engaged?
- What is the role of technology?

# Dynamics of PBL

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# PBL processes

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- List of key information
- List of hypotheses
- List of further information needed
- List of learning issues



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# What to do during PBL?

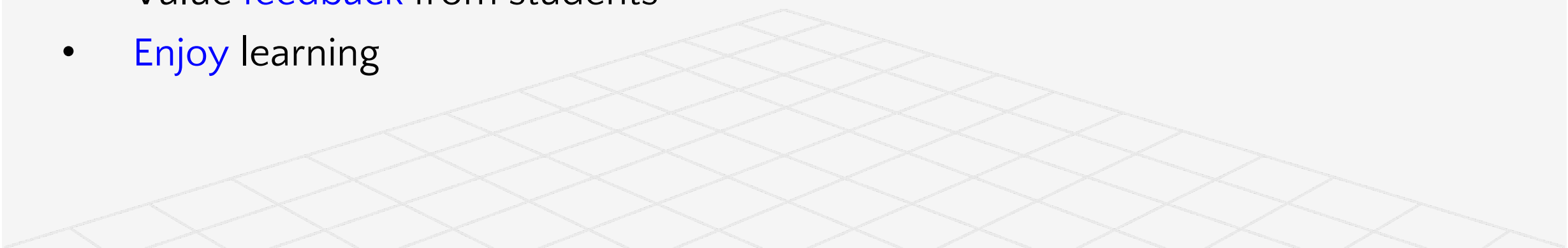
# Responsibilities

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- Chairperson (Moderator)
- Scribe
- Group members
- Facilitator (Guide)

# The roles of teacher / facilitator

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- Not necessarily a **content expert**
  - Not an **information provider**
  - Not to **lecture**
  - Not to **answers** to students questions
  - **Empower**, not control
  - **Intervene** only appropriately
  - Value **feedback** from students
  - **Enjoy** learning
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## Tips for PBL (For Tutors)

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- **Clearly define your purpose for doing PBL:** Know the procedures/dynamics and your expectations.
- **Preparation:** Refer to the tutor guide; if uncertain, ask the case writer to clarify.
- **Refrain from Providing Information:** However at certain occasions, provide some context for the problem.
- **Allow Time for Collaboration:** Ensure that all students are involved in the problem-solving process.

## Tips for PBL (Ground Rules for Students)

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- **Facilitate Peer Feedback:** Encourage students to listen to one another, respond and comment to others' viewpoints; respect each other's view
- **Mid-term/final assessment:** Feed backs to students are important and valued; quality assurance purpose
- **Silent participants:** Prompt questions; call specific students for comments; find out why
- **Dominant participants:** Encourage to try new things; remind them about the dynamics of PBL – team work (quality vs quantity of information)

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# Thank you!



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# Facilitating skills and group dynamics in PBL

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# PBL tutor

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- Facilitating skills
  - Questioning, probing, suggesting, and challenging ideas that are raised during discussion

# Questioning examples (Hmelo-Silver & Barrows, 2008)

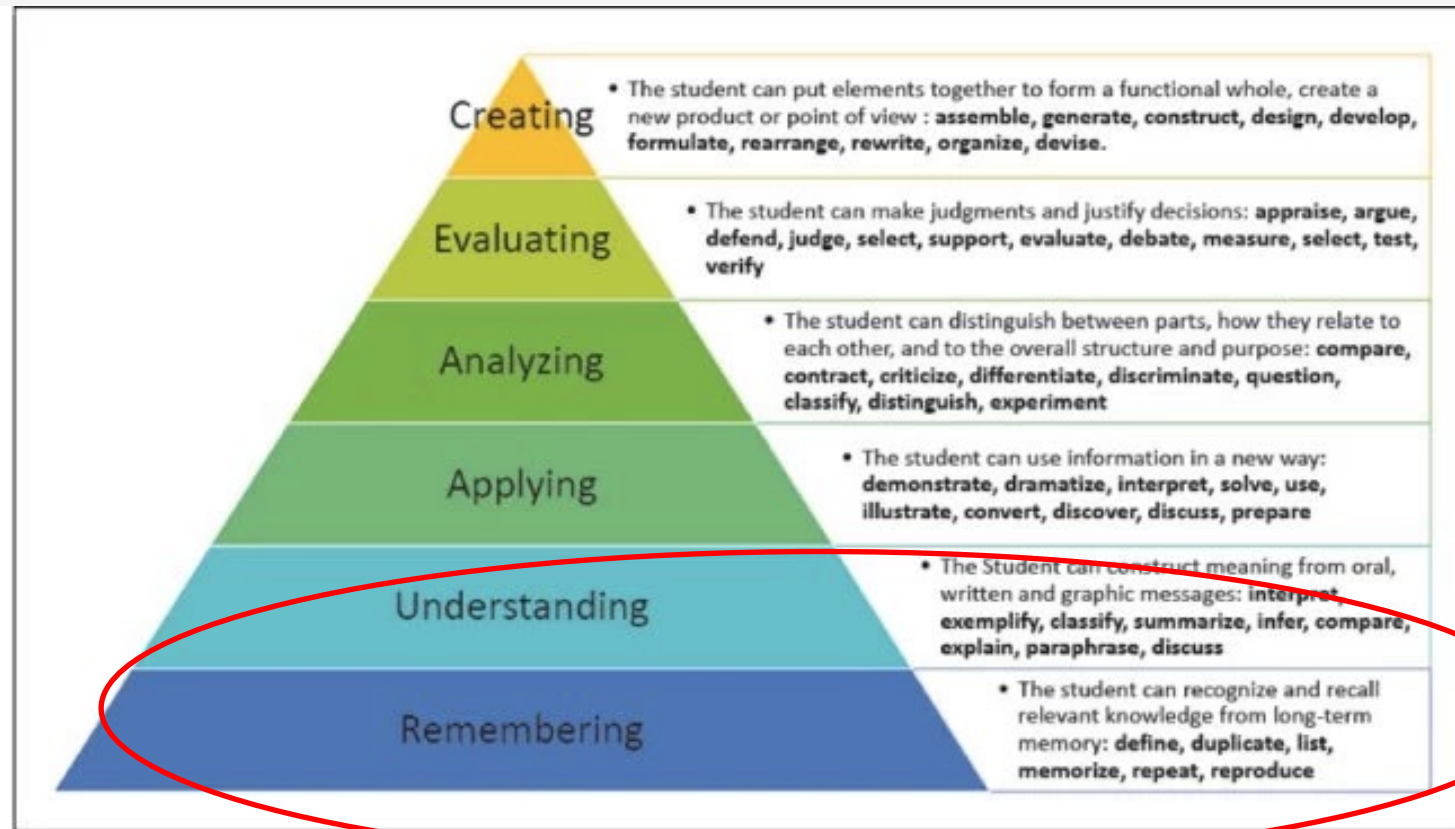
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- Closed/short-answered questions

Question type	Description	Example
Verification	Yes/no response to factual questions	Are headaches associated with high blood pressure?
Disjunctive	Require a simple decision between two alternatives	Is it all the toes? Or just the great toe?
Concept completion	Filling in the blank or the details of a definition	What supplies the bottom of the feet? Where does that come from?
Feature specification	Determine qualitative attributes of an object or situation	Could we get a general appearance and vital signs?
Quantification	Determine quantitative attributes of an object or situation	How many lymphocytes does she have?

# Bloom's Taxonomy

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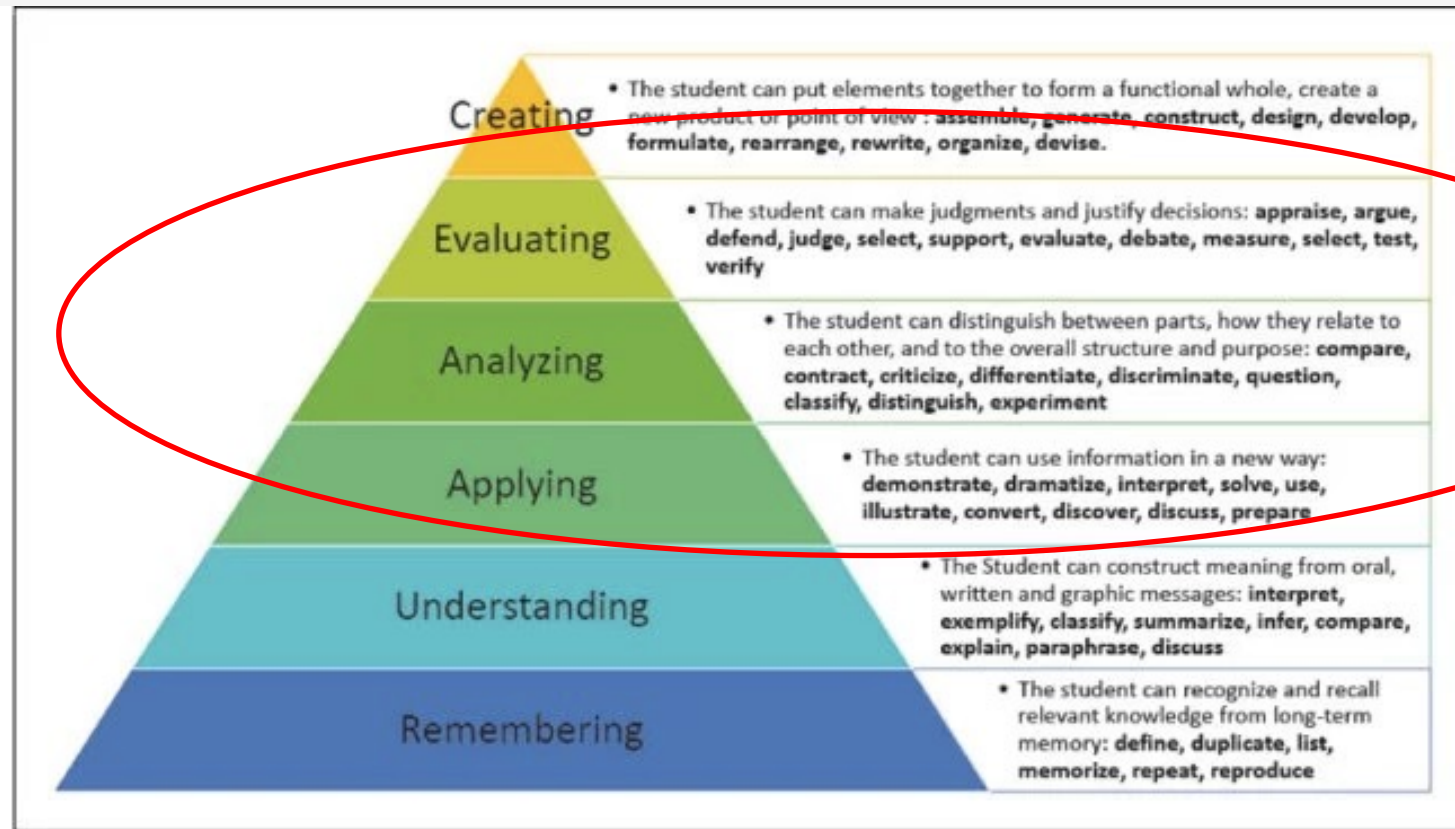
# Questioning examples (Hmelo-Silver & Barrows, 2008)

- Open/long-answered questions

Question type	Description	Example
Definition	Determine meaning of a concept	What do you guys know about pernicious anemia as a disease?
Example	Request for instance of a particular concept or event type	When have we seen this kind of patient before?
Comparison	Identify similarities and differences between two or more objects	Are there any more proximal lesions that could cause this?
Interpretation	A description of what can be inferred from a pattern of data	You guys want to tell me what you saw in the peripheral smear?
Causal antecedent	Asks for an explanation of what state or event causally led to the current state and why	What do you guys know about compression leading to numbness and tingling? How that happens?
Causal consequence	Asks for an explanation of consequences of event/state	What happens when the neuron is demyelinated?
Enablement	Asks for an explanation of the object, agent, or processes allows some action to be performed	How does the involvement of veins produce numbness in the foot?
Expectational	Asks about expectations or predictions (including violation of expectation)	How much better are her neural signs expected to get?
Judgmental	Asks about value placed on an idea, advice, or plan	Should we put her to that trouble, do you feel, on the basis of what your thinking is?

# Bloom's Taxonomy

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# Questioning examples (Hmelo-Silver & Barrows, 2008)

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- Task-oriented and meta-cognitive questions

Question type	Description	Example
Group dynamics	Lead to discussions of consensus or negotiation of how group should proceed	So Megan, do you want to share with us?
Monitoring	Help check on progress, requests for planning	Um, so what did you want to do next?
Self-directed learning	Relate to defining learning issues, who found what information	So might that be a learning issue that we can take a look at?
Need clarification	The speaker does not understand something and needs further explanations or confirmation of previous statement	Jonathan are you talking about micro vascular damage which then cause the neuropathy?
Request/Directive	Request for action related to PBL process	Why don't you give Jonathan a chance to get the board up?

# PBL tutor scaffolding

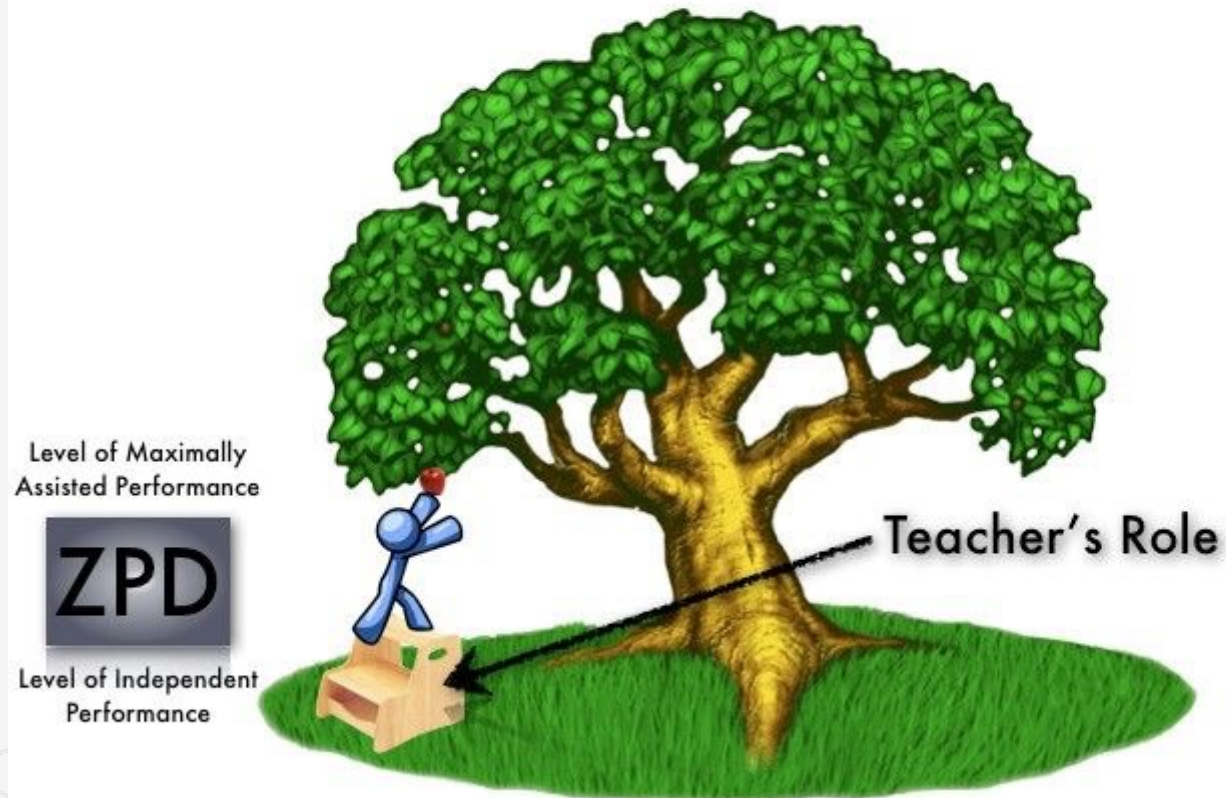
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“The key is *when*, *how*, and *how much* guidance should be provided” (Hamdy, 2008)

# Zone of proximal development (Vygotsky, 1978)

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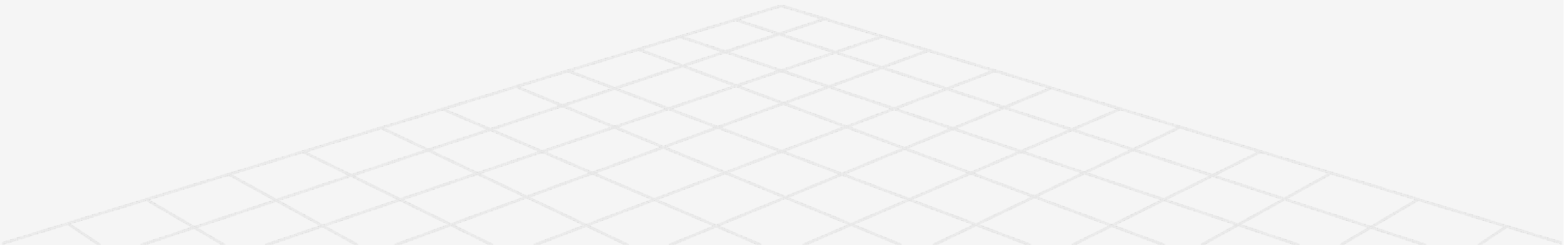
## Zone of Proximal Development



# PBL tutor scaffolding

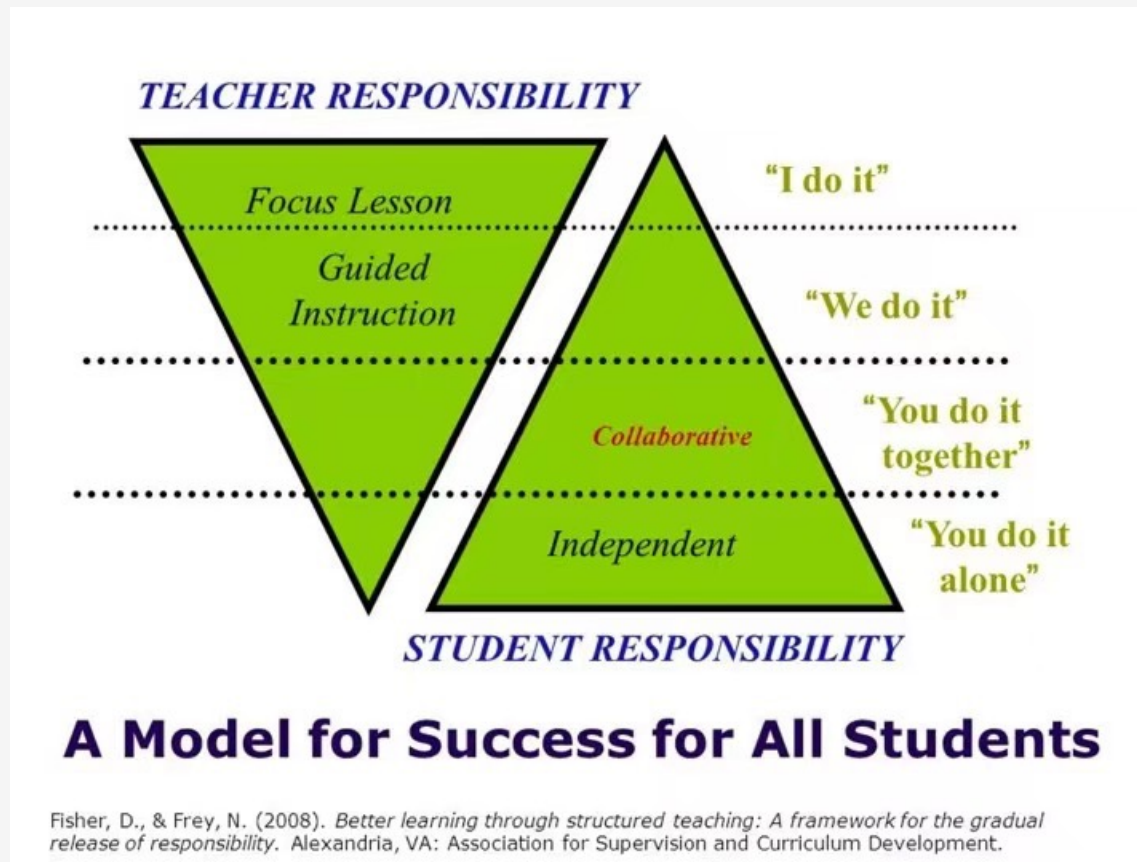
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- First year novice learners: More scaffolding should be provided; model how to ask questions and build on others' thoughts
- As students' expertise increases, they become more responsible for their own learning. Tutors should withdraw scaffolding gradually



# Gradual release of responsibility

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# PBL tutor

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- Social congruence (Schmidt and Moust, 1995)
  - Interpersonal qualities such as the ability to communicate empathetically with students
  - Could influence student learning even more than content knowledge and facilitating skills
  - The importance of creating a less threatening environment which would promote an open exchange of ideas among students

# PBL tutor

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- Creating psychological safety (probe but not prod)
  - Questions are asked at an appropriate level for the learners
  - Allow learners to say 'I don't know' or ask for help from others
  - Prompt when learners 'don't know' to help them voice what they do know and help them build connections to what is known
  - Use verbal and non-verbal communication to show support to learners while they are challenged

# PBL tutor

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- Don't be afraid of silence!
  - Short silence (10–20 seconds) could be constructive
  - Give students time to think through new ideas, to reflect
  - It can even be used as a useful tactic, e.g., let's spend a minute thinking about that

# Group dynamics

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- **Introversion versus extroversion**
  - An introvert needs quiet time, even a minute or two, to collect his thoughts and reactions to a given problem or situation.
  - Use body language to show affirmation, acknowledgement, and encouragement

# Strategies for Introverted students

for 30 seconds

for 1 minute

during class

before class

## THINK

Ask students to respond to a question independently.

with pen and paper

or a laptop

in writing

as you doodle

turn to your neighbor

walk across the room

group size = 2

group size = 3 or 4

## - PAIR -

Have students compare answers in small groups.

come to consensus

agree to disagree

explain your reasoning

share your opinion

with the whole class

with another group

verbally

in writing

## SHARE

Ask students to share their work with the class.

via polling software

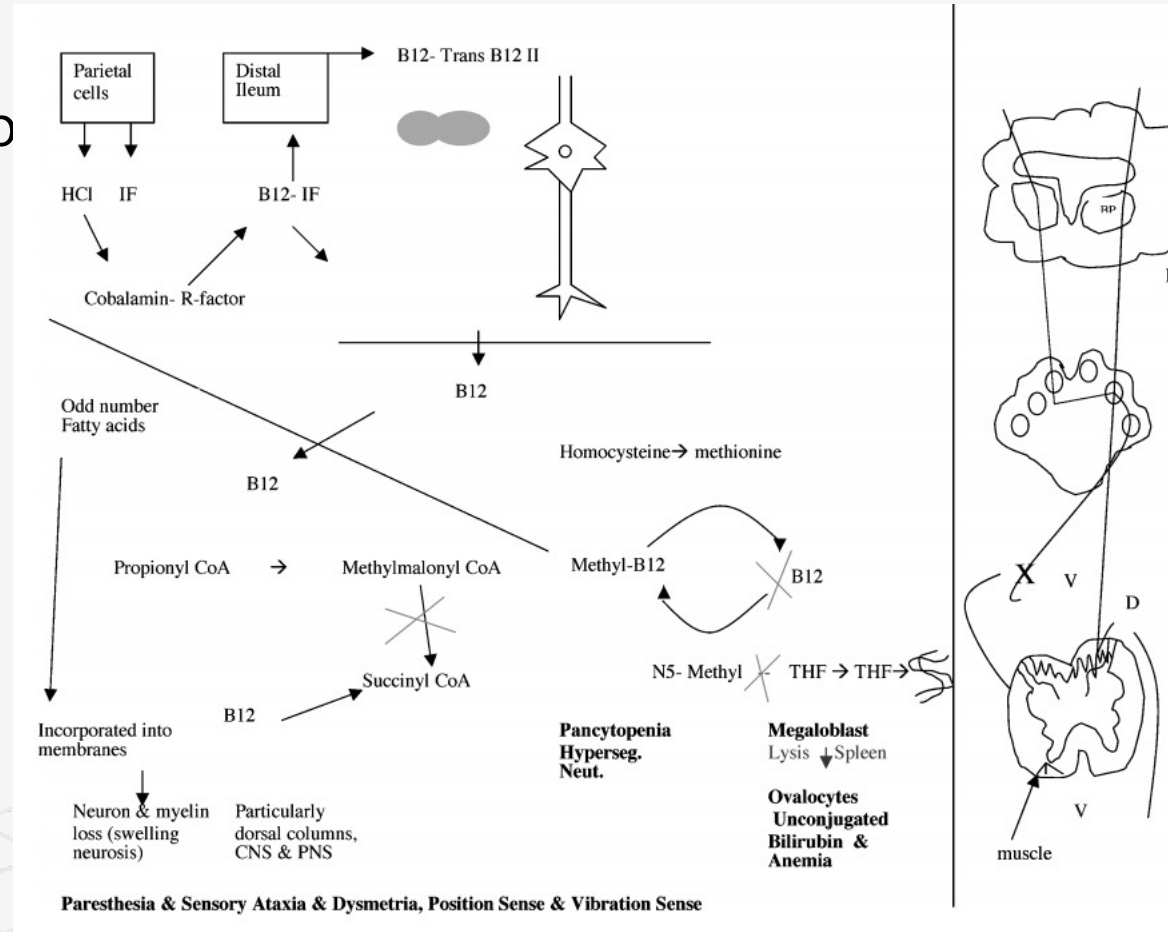
via whiteboard

class discussion

time for telling

# Strategies for introverted students

- Think aloud
- With the sup



Adopted from Hmelo-Silver & Barrows, 2008

# Strategies for introverted students

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- Visualization

Facts	Ideas	Learning issues	Action plans



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# Thank you!

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