



Bern University
of Applied Sciences

Introduction to Problem Based Learning

Dr. Ingrid Fromm

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What is Problem-based Learning (PBL)?

- ▶ Educational method of **active** learning
- ▶ First introduced in 1969 at McMaster University in Canada for medical curriculum
- ▶ 1974: Maastricht University
- ▶ 2007: HAFL
- ▶ Nowadays: 500-1000 curricula worldwide

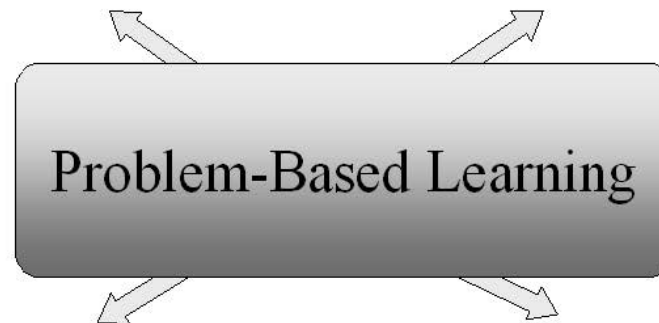
What's Problem Based Learning?

- ▶ PBL is an educational method and a pedagogical strategy of active learning according to these principles:
 - ▶ Learning should be a constructive process
 - ▶ Elaboration is crucial to learning
 - ▶ Contextual learning facilitates learning
 - ▶ Learning should be a self-directed process

PBL is an instructional method that challenges students to "learn to learn," working cooperatively in groups to seek solutions to real world problems (Duch, 1995).

Characteristics of PBL

- **Self-Study**
 - Responsibility for own learning process
 - Management of information
 - Application of learning strategies
- **Challenging problems from professionally relevant contexts**
 - Learning from meaningful situations
 - Problems are the starting point for the learning process



- **Small groups**
 - Group as stimulus for interaction
 - Verbalisation, elaboration, support, feedback
 - Moderation
- **Role changing**
 - Teachers take on the role as facilitators of learning

PBL

- ▶ Student centered method: You decide what to learn (group agreement)
- ▶ Few contact hours, a lot of self-study
- ▶ The professor acts as a coach, as a facilitator and as an expert (tutor)
- ▶ A **Problem Case** is simply an authentic situation that should motivate and guide students in their learning
- ▶ Useful in finding out what students already know (previous knowledge) and what they don't know (knowledge gaps)
 - ▶ Based on the knowledge gaps, they formulate **learning questions**

How to Organise PBL?

- ▶ Small group (<8) work with a PBL tutor or facilitator
- ▶ Groups usually meet twice a week for around 1.5 hours
- ▶ At the first meeting, students are presented with an unfamiliar situation or Problem Case
- ▶ Students identify the main issues and formulate questions to work on
- ▶ Following a period of individual study (2-3 days) the group reconvenes to discuss what they've learned
- ▶ Supporting activities (skills labs) are timetabled as 'fixed resource sessions' during the period of individual study
- ▶ A wrap-up session by the problem case author gives more explanations and respond to Open Questions

PBL: Development of Skills

Knowledge

- ▶ Theoretical
- ▶ Link to reality

Skills

- ▶ Scientific reasoning
- ▶ Critical appraisal
- ▶ Information literacy
- ▶ Self directed learning

Attitudes

- ▶ Value of teamwork
- ▶ Interpersonal skills, moderation skills

Analyzing the Problem: The 7-step Method

Seven step method

1. Clarification of unclear terms

Do I understand everything?



2. Defining the problem

What are the key issues in this problem case?

Which mechanism, principles, processes should be explained?



3. Problem analysis

Formulating hypotheses based on existing knowledge; brainstorming



4. Discussion

Discussion of ideas, topics, theories
Identifying gaps in existing knowledge
Clustering of ideas



5. Formulating learning questions

Formulation of challenging learning questions



6. Self-study

Selecting resources, finding and prioritizing information, studying texts, taking notes, activating existing knowledge, answering learning questions



7. Synthesis, application of new information

Discussion of learning questions and problem case, comparison of theories, findings and conclusions, fostering a deeper understanding of the subject matter



The seven step method
Analysis of a PBL
problem case

Steps	Time	Entry questions	Results at the end
1	5'	What do I not understand?	We understand the terms
2	10'	What is this problem all about? What are the key issues here?	2-6 statements (or questions) of the key topics of the problem in own words
3	15'	For each key issue: What do I know (or suppose to know) already?	Hypotheses for each key issue
4	20'	What are the relationships between the hypotheses? How can we cluster them?	Topics are discussed and clusters (with titles) are built*
5	20'	Which learning questions can we derive from the topics?	3-5 learning questions, possibly with sub-questions**

* Go back to the problem (step 2) and check if all aspects are properly addressed

** Prioritize questions. Go back to the PC and check if all aspects are properly addressed

Different Roles in PBL

Block Coordinator

Tutor

Moderator

Participant

Scribe

**Problem Case
Author**

The Tutor as Facilitator

- ▶ Facilitator's role is to prompt, guide and question, *when necessary*, to ensure that predetermined learning issues are identified, researched and discussed
- ▶ Open-ended questions used to foster student metacognitive growth
- ▶ A wait-time is essential to allow students to process the information and formulate their ideas
- ▶ Over time, students become self-directed learners able to ask their own questions, identify what they need to know to continue their learning



Characteristics of a Good PBL Student

- ▶ Present in all sessions
- ▶ Knowledge of the PBL process
- ▶ Commitment to self/student-directed learning
- ▶ Active participation in discussion and critical thinking while contributing to a friendly, non-threatening environment
- ▶ Able to moderate a group (moderation skills)
- ▶ Willingness to make constructive evaluation of self, group and tutor

The 7 Steps of PBL

Read carefully the PC text given by the tutor (a scribe and a moderator, define rules)

Step 1: Identify and clarify unfamiliar terms presented in the PC

Step 2: Define/identify the issues/problems to be discussed

Step 3: Make hypothesis about the problems

Step 4: Brainstorming on issues coming from step 2 and 3 and arrange explanations into tentative clusters

Step 5: Formulate learning questions

Step 6: Private study → Students gather information related to each learning question

Step 7: Reconvene → Group shares results of private study