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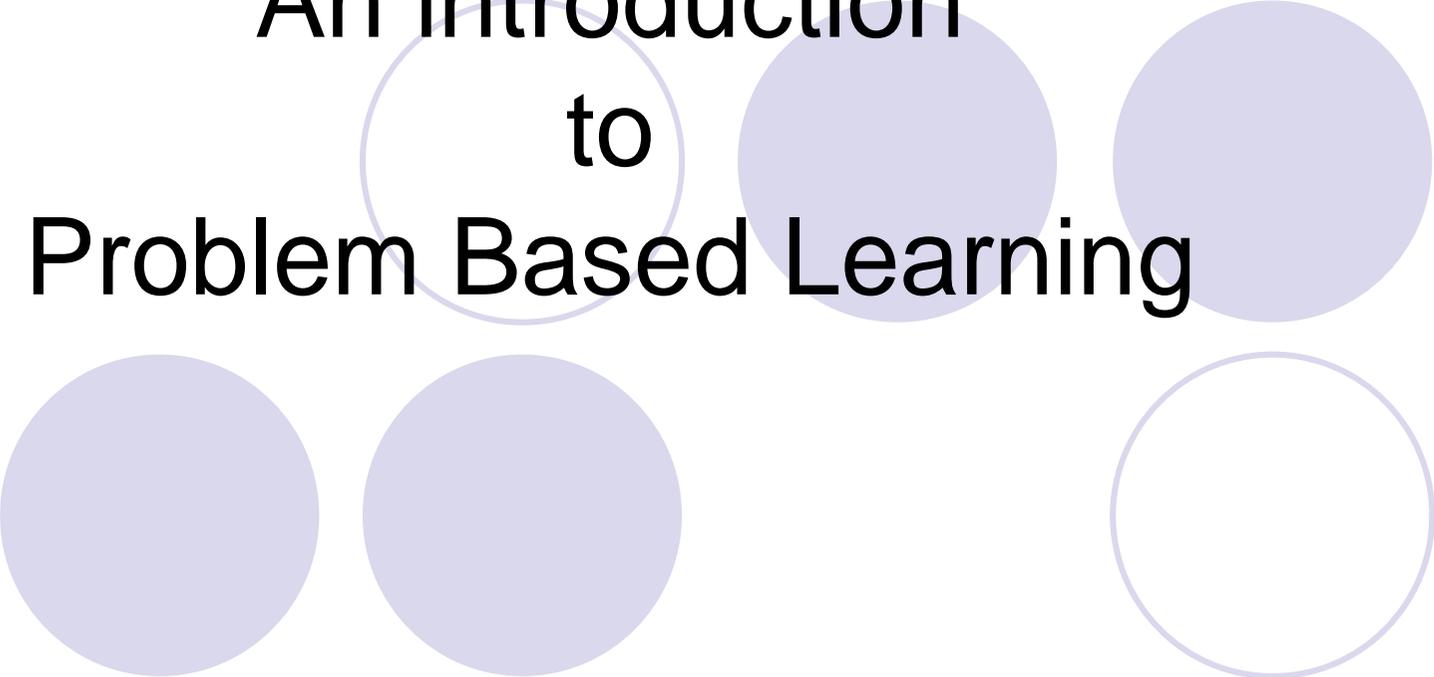
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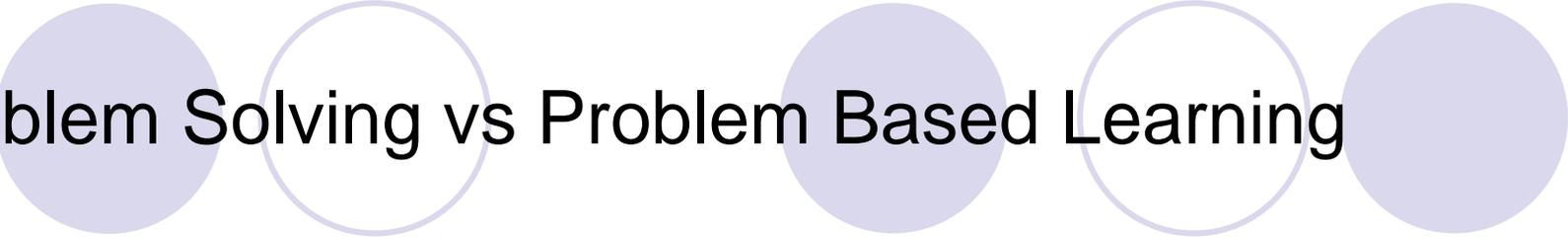
An introduction  
to  
Problem Based Learning

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Jill McCarthy

# What is Problem Based Learning?

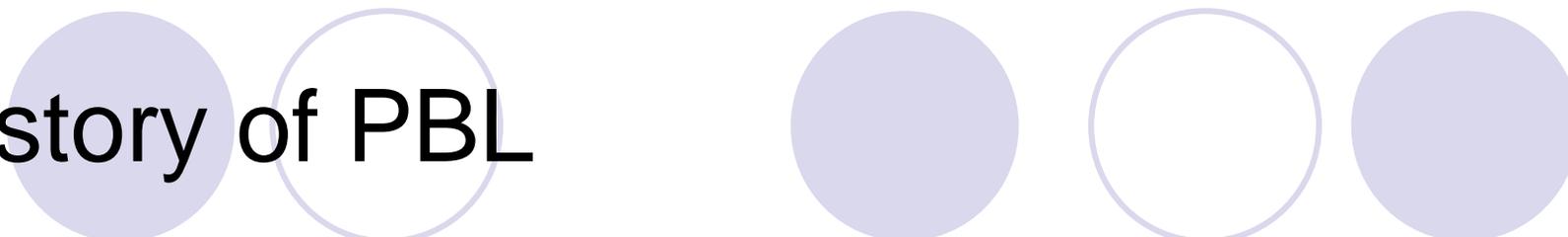
- In Problem Based Learning (PBL), small groups of students are presented with contextual situations and asked to define the problem, decide what skills and resources are necessary to investigate the problem and then pose possible solutions. (Duch, Groh & Allen, 2001)
- PBL courses start with the problems rather than with exposition of disciplinary knowledge.
- Students acquire knowledge skills and understanding through a staged sequence of problems presented in sequence.



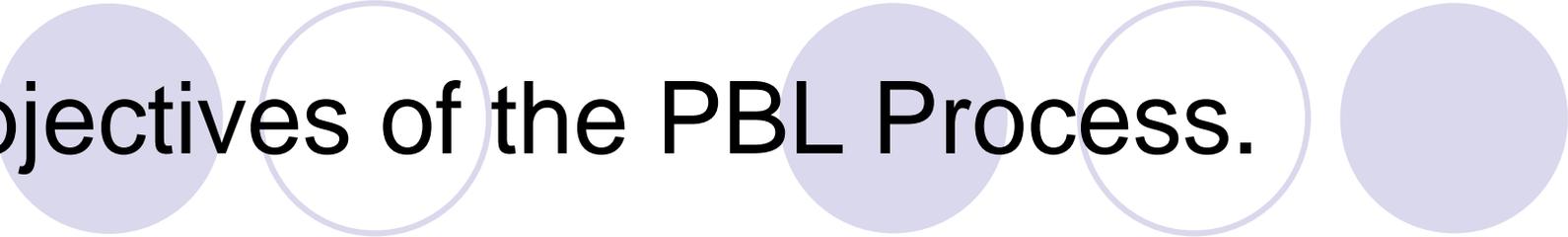
## Problem Solving vs Problem Based Learning

- Problem Solving: Arriving at decisions based on prior knowledge and reasoning
- Problem Based Learning: The process of acquiring new knowledge based on recognition of a need to learn.

# History of PBL



- Background –
  - Information is not all you need to solve a problem
  - The amount of information is growing exponentially no one person can keep up
- Started in medical school
  - 1913 Sir William Osler (concerning the education of medical students) “ too great a reliance on lectures and on students’ capability of memorising a growing number of items of knowledge.”
  - 1950’s integrated systems teaching in USA medical school
  - 1960’s PBL introduced in Canadian medical school
  - 1970’s many USA and worldwide medical schools adopted PBL
  - 1990’s introduced into medical schools in UK by Manchester, Glasgow and Liverpool universities.

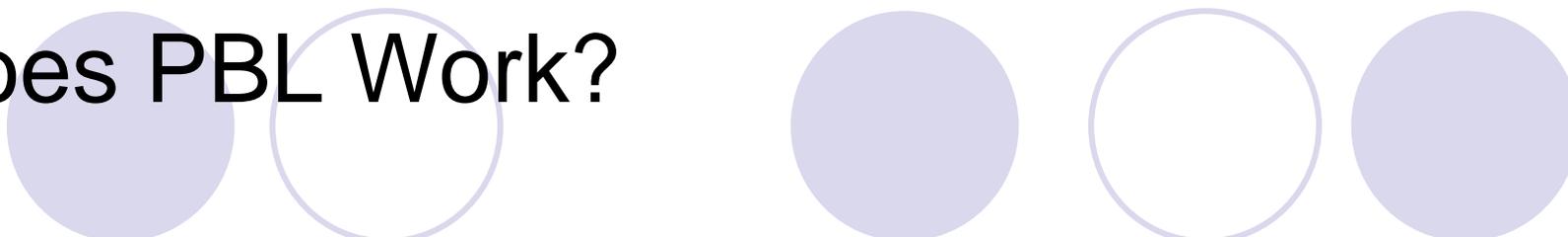


# Objectives of the PBL Process.

Development of:

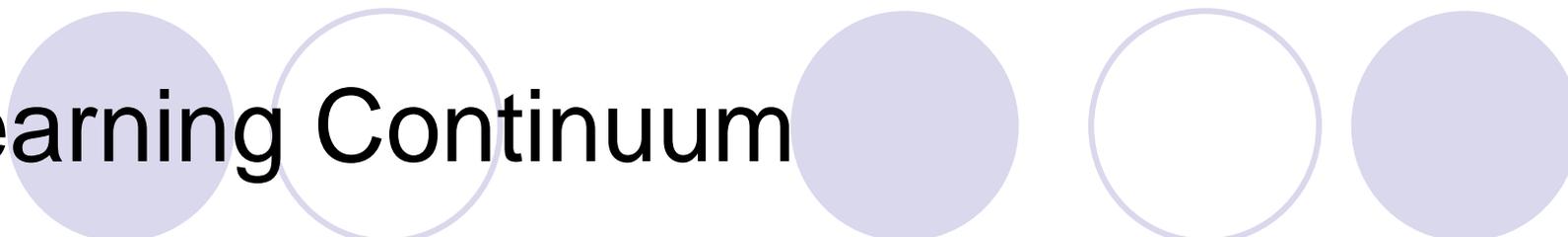
- Knowledge
  - Theoretical
  - Clinical
- Skills
  - Scientific reasoning
  - Critical appraisal,
  - Information literacy
  - Self directed, lifelong learning.
- Attitudes
  - value of teamwork
  - interpersonal skills
  - the importance of psycho-social issues.

# Does PBL Work?

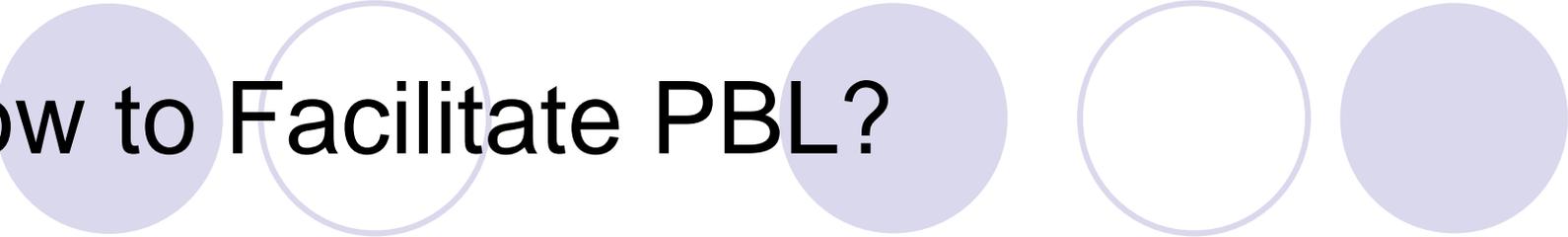


- “PBL students generate explanations that are more accurate, coherent and comprehensive than non PBL students. They transfer the reasoning strategies that they are taught and are more likely to use science concepts in their explanations. The effect is stronger for the full-time PBL students.” (Hmlo, 1998)
- However, not all studies have found in favour of PBL

# Learning Continuum

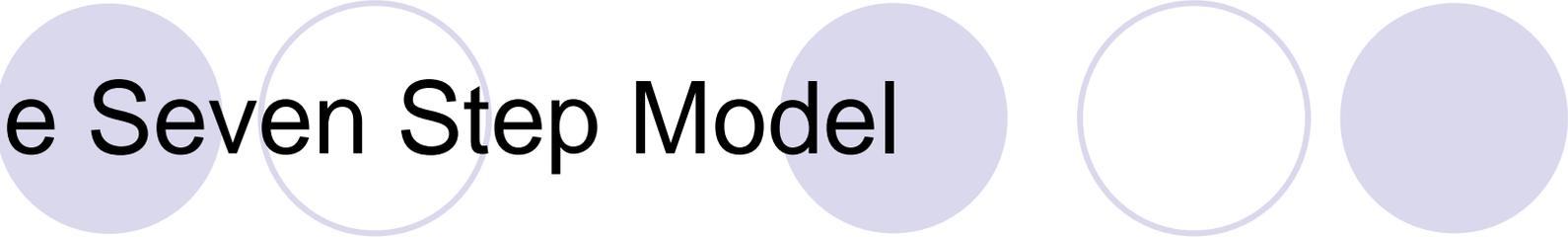


Problem based.....	Passive acquisition
Student centred.....	Teacher centred
Integrated.....	Discipline based
Electives.....	Standardised
Opportunistic.....	Systematic



# How to Facilitate PBL?

- Small groups of students (<8) work with a PBL tutor or facilitator
- Groups usually meet twice a week for around 2-3 hours
- At the first meeting, students are presented with an unfamiliar situation or problem (trigger)
- Students identify the main issues and formulate questions to work on
- Following a period of individual study (2-3 days) the group reconvenes
- They discuss what they have learnt and apply this to the original problem
- Supporting activities (labs, lectures) are timetabled as 'fixed resource sessions' during the period of individual study



# The Seven Step Model

- *Step 1* Identify and clarify unfamiliar terms presented in the scenario, (allocate a scribe and a chairperson, define rules)
- *Step 2* Define the problem or problems to be discussed;
- *Step 3* Ideas storming session to discuss the problem(s),
- *Step 4* Review steps 2 and 3 and arrange explanations into tentative solutions;
- *Step 5* Formulate learning objectives;
- *Step 6* Private study (all students gather information related to each learning objective)
- *Step 7* Reconvene - Group shares results of private study

(Wood, 2003)



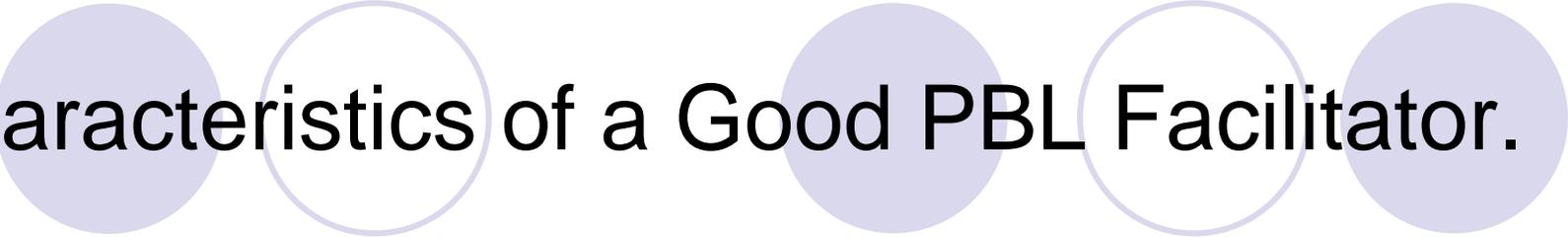
# PBL Variety

- PBL courses vary in many ways, such as
  - Whole course is PBL or only specific modules
  - PBL is introduced to combine modules or not
  - Lectures are chosen by students or set
  - Learning outcomes are set or negotiable
  - Learning resources are provided or 'set'
  - The scenario is structured or loose
  - The facilitator directs the group or is laissez faire
  - Students run some of their own group sessions or not
  - Group size, varies from 6 - 16
  - learning takes place on-line or not



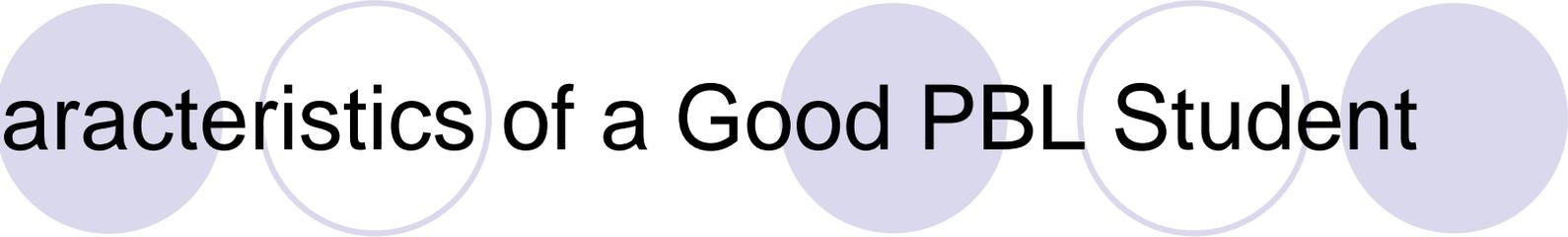
# The Tutor as Facilitator

- The 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 should be used to foster student metacognitive growth.
- A wait-time is essential to allow the student to process the information and formulate their ideas – they should not be rushed.
- As students participate in PBL over time, they become self-directed learners who are able to ask their own questions, and identify what they need to know to continue their learning. Creating PBL Scenarios



# Characteristics of a Good PBL Facilitator.

- A knowledge of the PBL process
- Commitment to student directed learning
- Ability to generate a non-threatening environment whilst still acting to promote discussion and critical thinking
- An ability to facilitate and not teach.
- Willingness to make constructive evaluation of student and group performance.



# Characteristics of a Good PBL Student

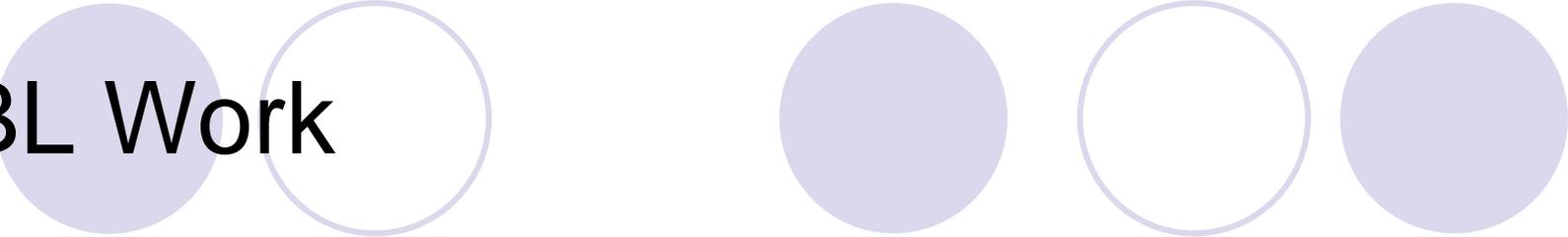
- Prompt and present for all sessions
- A knowledge of the PBL process
- Commitment to self/student directed learning
- Active participation in discussion and critical thinking whilst contributing to a friendly non-threatening environment
- Willingness to make constructive evaluation of self, group and tutor



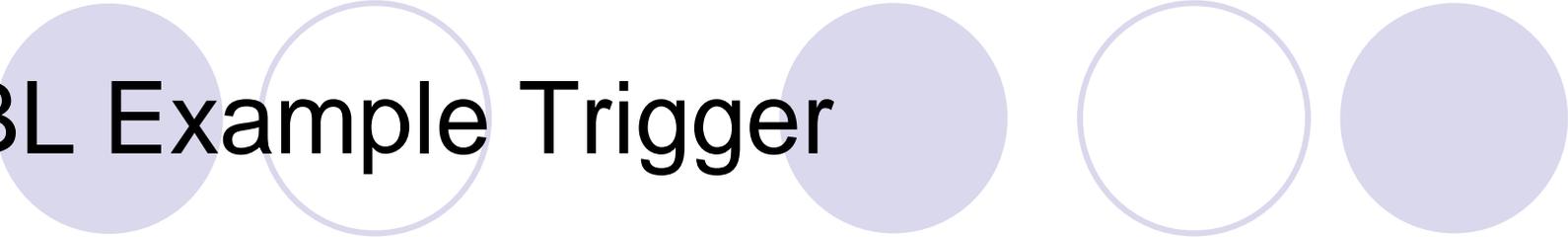
# Problems with PBL in a Hybrid Curriculum

- Staff/student ratio- an ideal PBL group is around 6-8 students. Any more than 12 students becomes unmanageable.
- Faculty busy with traditional curriculum
- Quality control on triggers (scenarios) is difficult to maintain
- Heavy on library, computer and support resources
- Inherent conflict with traditional lectures

# PBL Work



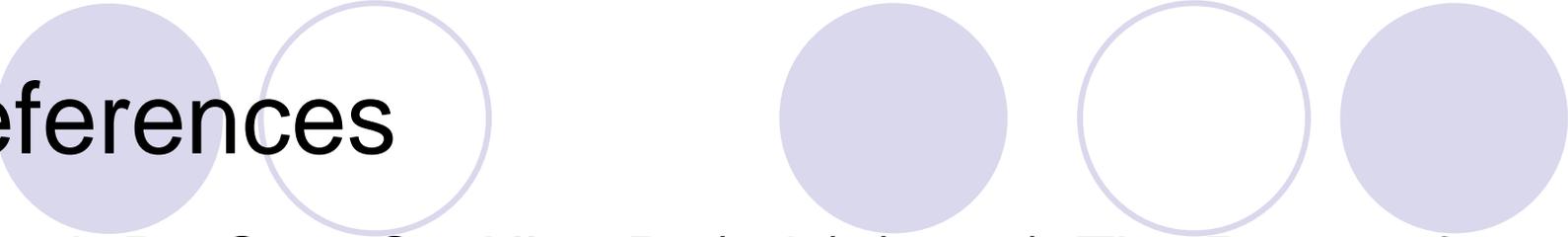
- Imagine you are first year students undertaking a moral philosophy module.
- You are presented with a scenario on the first day of the module. The facilitator informs you that you can request the content of two fixed resource sessions which are timetabled for Monday and Wednesday, the group is then reconvening on Friday to review the individual research and decide the next steps in the process.
- Using the 7 step approach, enact the first PBL session deciding what you need to learn, how you will divide this up equally and what is required as content for the fixed resource content.



# PBL Example Trigger

## "Dax's Case."

- In the early 1970's Douglas "Dax" Cowart of the USA severely burned over 65% of his body in a propane gas explosion. The explosion left him blind, severely disfigured, and in tremendous pain. He requested to be allowed to die. The Hospital refused his request. Dax survived his ordeal and today is a successful attorney, yet he still argues that he should have been allowed to die.



# References

- Duch, B., Gron, S., Allen, D. (eds) (2001) *The Power of Problem Based Learning*. Stylus Publishing
- Hmlo, C.E. (1998) 'Does Problem Based Learning Work' *Teaching and Learning in Medicine*. 10: 92-100
- Wood, D.F. (2003) 'ABC of learning and teaching in medicine: Problem based learning' *British Medical Journal* 326: 328-330

## Recommended Reading

- Burgess, H., Taylor, I (2001) 'From University Teacher to Learning Coordinator: Faculty Roles in Problem-Based Learning' *Journal of Excellence in College Teaching*, special issue on Problem-Based Learning