PROBLEM BASED LEARNING (PBL):

WHAT IS PROBLEM BASED LEARNING?

Problem based learning is one of those pedagogic phenomenon that is both a learning activity and an assessment. Problem based learning is a student centred learning strategy in which learners confront contextualised, ill-structured problems similar to real world situations. PBL guides learners to discover the knowledge themselves by confronting the problem and activates their prior knowledge with very little initial content knowledge given; it encourages deep learning as well as learners to be responsible for their own learning. PBL is also renowned for shaping learners in collaborating teamwork and allows the development of critical thinking, content knowledge and problem-solving skills.

STRUCTURE OF PROBLEM BASED LEARNING

In a PBL process,
1. Learners should discuss problems.
2. Define what they know and what they need to know.
3. Active process of new information.
4. Share prior knowledge by discussion.
5. Generate hypotheses.
6. Restructure of knowledge and construction of a semantic network.
7. Derive learning goals.
8. Brainstorm.
9. Allocate work.
10. Organise further work.
11. Outcomes may be presented to large groups
12. Reflect on learning by self, peers or facilitator.

Y	Declarative	
Y	Functioning	
Y	Timely to Set	
Y	Timely to Answer	
Y	Timely to Correct	CHARACTERISTICS
Y	Timely to provide Feedback	
	Suitable for Large Class	
	Can substitute with Computers	
	Passive	
Y	Active	
Y	Process Oriented Method	
Y	Product Oriented Method	

Y	Yes
P	Possibly

Above shows the general characteristics of the assessment method and the type of skills that are *typically* assessed by the method. Both Blooms' taxonomy and Biggs' Solo taxonomy are indicated.

Y	Knowledge			
Y	Comprehension			
Y	Application of Knowledge	Blooms Level of Taxonomy		
Y	Analysis			
Y	Synthesis			
Y	Evaluative Skills			
Y	Pre-structural	Quantitative	SOLO Taxonomy	MEASURABLE QUANTITIES
Y	Uni-structural			
Y	Multi-Structural			
Y	Relational Level	Qualitative		
Y	Extended Abstract Level			
P	Leadership		OTHER QUANTITIES	
	Life long Skills			
Y	Creative skills			
	Writing Skills			
Y	Team Work			
Y	Communication Skills			
P	Presentation Skills			
	Memorizing Skills			
P	Practical/ Physical Skills			
Y	Think under pressure			
Y	Project Management			
	Time management			

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ADVANTAGES OF PROBLEM BASED LEARNING

- PBL encourages deep learning by replacing lectures with discussion forums, faculty mentoring, and collaborative research, students become actively engaged in meaningful learning.
- Direct instruction is reduced; students are forced to take responsibilities in their own learning which often increase motivation.
- PBL activates prior knowledge.
- PBL encourages critical thinking.
- PBL learners tend to be more competent in information seeking skills than traditional learners.
- PBL is related to real-life situations, these skills are highly transferable.
- Learning is driven by challenging, open-ended problems.
- Social interaction is a very important skill. PBL promotes group dynamics, peer evaluation, and present opportunities for learners to develop confrontation and persuasive skills.
- Learners gain quality learning through greater student autonomy.

DISADVANTAGES OF PROBLEM BASED LEARNING

- A good PBL design is very timely to set and timely to engage. It needs careful consideration in the design and monitored throughout the entire PBL process.
- Not all teachers can become good facilitators, they need to be dedicated and trained. However, when learners engage in PBL, facilitators receive large amount of satisfaction and fulfillment.
- PBL requires more contact hours and more contact staff.
- For many course coordinators, they worry that PBL means reduce specific content knowledge, which is true. PBL is probably more suitable on subjects which do not depend too much on prior content knowledge.
- To design a perfect PBL problem with multi disciplines in a curriculum, it requires excessive amount of organisation and requires the course to be validated.
- Assessing students in teamwork is a common issue in group assessments. Recognized individual outputs and teamwork are important. Clear assessment criteria are always important.
- Good PBL outcomes greatly depend on group dynamics, and not all learners are team players.

HOW TO DESIGN A GOOD PROBLEM?

PBL has many forms according to Atherton, J S (2005). In general, a good PBL project should have the following elements:

- Problems should be related to real-world.
- Unlike traditional method of problem solving where learners receive prior content knowledge to apply on well-defined problems, problems in PBL are not usually questions that students can easily answer with prior input of knowledge. They must explore.
- Problems in PBL are presented to learners deliberately at the beginning of the learning process.
- Problems should allow teamwork (i.e.) the project should be large and effective enough for each team member to contribute and benefit from the collaboration. It will produce negative effect if the problem can be done as effectively (or more effectively) by an individual.
- Teacher becomes a facilitator whose role can be a subject matter expert, resource guide and a task group consultant.
- A good PBL problem should be given long enough time for learners to participate.
- PBL is most effective if it is defined across multi-disciplines.

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GRADING CRITERIA AND GRADING STANDARDS

Below is a sample rubric, "Collaborative Work Skills: Problem Based Learning", accessed 14 July 2008, http://rubistar.4teachers.org/index.php?screen=ShowRubric&rubric_id=1491488&)

GRADING CRITERIA	Excellent	Proficient	Average	Poor
Problem-solving	Actively looks for and suggests solutions to problems.	Refines solutions suggested by others.	Does not suggest or refine solutions, but is willing to try out solutions suggested by others.	Does not try to solve problems or help others solve problems. Lets others do the work.
Focus on the task	Consistently stays focused on the task and what needs to be done. Very self-directed.	Focuses on the task and what needs to be done most of the time. Other group members can count on this person.	Focuses on the task and what needs to be done some of the time. Other group members must sometimes nag, prod, and remind to keep this person on-task.	Rarely focuses on the task and what needs to be done. Lets others do the work.
Preparedness	Brings needed materials to class and is always ready to work.	Almost always brings needed materials to class and is ready to work	Almost always brings needed materials but sometimes needs to settle down and get to work	Often forgets needed materials or is rarely ready to get to work.
Contributions	Routinely provides useful ideas when participating in the group and in classroom discussion. A definite leader who contributes a lot of effort.	Usually provides useful ideas when participating in the group and in classroom discussion. A strong group member who tries hard!	Sometimes provides useful ideas when participating in the group and in classroom discussion. A satisfactory group member who does what is required.	Rarely provides useful ideas when participating in the group and in classroom discussion. May refuse to participate.
Working with Others	Almost always listens to, shares with, and supports the efforts of others. Tries to keep people working well together.	Usually listens to, shares, with, and supports the efforts of others. Does not cause "waves" in the group.	Often listens to, shares with, and supports the efforts of others, but sometimes is not a good team member.	Rarely listens to, shares with, and supports the efforts of others. Often is not a good team player.
Monitors Group Effectiveness	Routinely monitors the effectiveness of the group, and makes suggestions to make it more effective.	Routinely monitors the effectiveness of the group and works to make the group more effective.	Occasionally monitors the effectiveness of the group and works to make the group more effective.	Rarely monitors the effectiveness of the group and does not work to make it more effective.
Time-management	Routinely uses time well throughout the project to ensure things get done on time. Group does not have to adjust deadlines or work responsibilities	Usually uses time well throughout the project, but may have procrastinated on one thing. Group does not have to adjust deadlines or work responsibilities	Tends to procrastinate, but always gets things done by the deadlines. Group does not have to adjust deadlines or work responsibilities because of this	Rarely gets things done by the deadlines AND group has to adjust deadlines or work responsibilities

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	because of this person's procrastination.	because of this person's procrastination.	person's procrastination.	because of this person's inadequate time management.

WEB REFERENCES AND RESOURCES:

Problem Based Learning Web Resources

"Teaching and Learning: Problem Based Learning", Atherton, J S. Learning and Teaching OnLine. Accessed on 07 July 2008, http://www.learningandteaching.info/teaching/pbl.htm

"Problem Based Learniing", Wikipedia. Accessed on 10 July 2008, http://en.wikipedia.org/wiki/Problem-based_learning

"Resources on problem-based learning (PBL)", the Higher Education Academy, UK Centre for Legal Education. Accessed on 14 July 2008 http://www.ukcle.ac.uk/resources/pbl/resources.html

"Problem based learning", London Metropolitan University. Accessed on 14 July 2008 http://www.londonmet.ac.uk/deliberations/problem-based-learning/

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http:// edweb.sdsu.edu/clrit/learningtree/PBL/PBLadvantages.html

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"TLC Teaching Tips", TLC, Eastern Kentucky University. Accessed on 14 July 2008 http://tlc.eku.edu/tips/problem-based/

Tips for Students Web Resources

"Becoming a student in a PBL course: twelve tips for successful group discussion", Azer, S A., Medical Teacher, Vol. 26, No. 1, 2004, pp. 12–15, Taylor and Francis Health Sciences. Faculty Education Unit, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Victoria, Australia. http://www.geocities.com/sayliang.geo/12tips.pdf

To Reference these pages

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Chan C (2008) *Assessment: Problem Based Learning Assessment,* Assessment Resource Centre, University of Hong Kong [http://arc.caut.hku.hk/assMethod.html]: Available: Accessed: DATE

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