Problem Based Learning

EU Tempus Project, Ulan Ude
**Facilitators**

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- Mr Paul Axmann
Sharing experiences and issues
Overview of session

1. PBL: An Overview

2. Issues for PBL:
   Student’s Learning Experience;
   Assessment

3. Identifying innovative approaches
to assessing

4. The Way Forward!
Content

- What is Problem Based Learning
- Models of PBL
- Characteristics of PBL
- Issues for PBL
- Exploring the introduction and implementation of PBL
What is Problem Based Learning - (PBL)?

- An approach to learning rather than a teaching technique (Charles Engel 1989)

- Development of curricula around key problems in professional practice
What is Problem Based Learning (PBL)?

- Problems are the triggers/stimuli for learning
- Learning is constructive, participative and builds on existing knowledge
- Learning is multi-perspective: social, cultural and contextual factors impact the quality of learning
- Develop learners’ skills and capabilities – for example higher order skills: analysis, synthesis, problem solving, making valued judgement and critical evaluation, adapting to change, creativity and critical thinking, and collaborative and group interactive skills
- Develops metacognition (reflection)
**Characteristics of PBL**

- Problems reflect real world situations and promote authentic learning. Problems are key for knowledge acquisition.
- Posing questions, queries, puzzles and seeking answers.
- Enables sequencing of learning experience.
- Integrated learning [multi-disciplinary education] (knowledge and learning are not fragmented).
- Promotes small group working thus encouraging collaborative and cooperative learning.
Characteristics of PBL

- Promotes team working via sharing of ideas, roles and responsibilities
- Encourages learners to ask appropriate questions and to challenge assumptions
- Provides learners with alternative perspective
- Promotes self directed learning
- Resource intensive

* PBL is not problem solving and not suitable for all topics
Models of PBL

McMaster University Model
- Tutorial process: student-centred, multi disciplinary education as a basis for lifelong learning

Harvard Model
- Uses problem based tutorials, lectures, conferences and clinical sessions integrated into weekly theme teaching and learning
Models of PBL

Maastrict PBL University Model

- A seven stage process: student-centred, multi-disciplinary education as a basis for developing required skills and lifelong learning
Maastricht 7 stage PBL

1. Chair reads the problem, seeks clarification from the group if they understand the problem and resolves any queries.

2. Chair asks the group to share their thoughts about the problem statement. No transmission of knowledge is offered by educators.

3. Group brainstorm to ascertain what the members know and/or believe regarding the subject/topic.

4. The Minutes Secretary notes the key points and issues that have been discussed. The Chair ensures clarity of what is known and what is unclear and needs to be further investigated. This will help further understand the problem.
5. Group agree their learning objectives and tasks that have to be carried out prior to the next meeting/session.

6. Individual study (inquiry-led): the learner can tackle own learning objectives (problems with gaps) or the learner can tackle all learning objectives (time intensive). Educator provides relevant resources and scaffolding.

7. Group meets for the second time. The minutes secretary reminds the group of the learning objectives. Each member shares with the group their findings. Knowledge is constructed and consolidated through discussion, negotiation and sharing alternative perspectives. Chair ensures that the summary of group’s discussion is distributed to each member for records.
Types of Problems
<table>
<thead>
<tr>
<th>Types</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Logic problems^1</td>
<td>Rubric cube puzzle</td>
</tr>
<tr>
<td>2 Algorithmic problems</td>
<td>Factor quadratic equation</td>
</tr>
<tr>
<td>3 Story problems</td>
<td>How long for car A travelling at 80 kph to overtake car B^2</td>
</tr>
<tr>
<td>4 Rule – using problems</td>
<td>Search an online catalogue</td>
</tr>
<tr>
<td>5 Decision making problems</td>
<td>Should I move in order to take another job</td>
</tr>
<tr>
<td>6 Troubleshooting problems</td>
<td>Trouble shoot financial crisis in a company</td>
</tr>
<tr>
<td>7 Diagnosis – solution problems</td>
<td>Medical diagnosis and treatment Engine and systems failure diagnosis</td>
</tr>
<tr>
<td>8 Strategic performance problems</td>
<td>Landing an airplane under emergency situations; Teaching in live class; Arguing points to Law</td>
</tr>
<tr>
<td>9 Case analysis problems</td>
<td>Harvard Business Cases^3</td>
</tr>
<tr>
<td>10 Design problems</td>
<td>Designing products (e.g. personal computer mouse) for universal use, i.e. to suit both right- and left-handed individuals</td>
</tr>
<tr>
<td>11 Dilemmas</td>
<td>Should abortions be banned?^4</td>
</tr>
</tbody>
</table>
Footnotes

1 Logic problems involve performing numerical and logical operations or problems which involve following sets of rules and procedures, for example solving the rubric cube puzzle, electronic and computer operations or analyses of patterns of reasoning by which conclusions are drawn
2 Constitute about 80% of educational problems
3 Suitable for management and advocate/solicitor training
4 Very appropriate and used in the teaching of ethics, and for issues in which there is no single right or wrong answer

Source: Adapted from Professor D. Jonassen; Keynote address to ED MEDIA Conference 2001.
Example of Problem
Stages of PBL

- Process – Presentation of a problem
- Objectives/goals – Learners to learn by practise
- Outcomes: – What is it we intend to achieve at the end of the session, activity, module or course? - Development and acquisition of the generic and desired skill, capabilities and attributes
PBL – Process Diagram
Issues for PBL

Curriculum: – must be based around key problems in professional practice
Curriculum Design in PBL

- Curriculum Design
- Project based approach
- Heuristic models
- Case (case study)
- Field and community based work
- Concepts (idea based social constructivism)
Issues for PBL

◆ Outcomes: – develop outcomes that are fit-for-purpose: specific, measurable, achievable, valid and transparent
Issues for PBL

- Implementation: –
  - Planning
  - Development of the learning materials e.g. writing cases)
  - Briefing to include professional responsibility e.g. ethics, (Tutor’s facilitation role)
  - Student activities – ‘real life or simulated near to realistic work environment/conditions’, small group work – learning may be re-iterative
  - Supervision and/or expert guidance
Issues for PBL

Implementation contd.: –
- Dealing with issues blocking progress, Tutorials and de-briefing sessions
- Knowledge capture
- Giving and receiving feedback (completing the feedback loop)
- Critical reflection to help ensure that learning has occurred
Issues for PBL

◆ Assessment:
  Contextualised, Fit-for-purpose, Authentic, and Sustainable.
Assessment

Fit for Purpose Model of Assessment

- Why are we assessing?
- What are we assessing?
- How are we assessing?
- Who is best to assess?
- Where do we assess?

[Source: Sally Brown, 1999]
Progression to Employment or Further Studies

Cognitive Skills

Transferable/Core skills

Competencies/Capabilities

Attributes and attitude

Values and ethics

Personal Development

 Attributes and attitude
Activity
<table>
<thead>
<tr>
<th>Module Learning outcomes</th>
<th>Professional abilities</th>
<th>Is the current assessment model sustainable?</th>
<th>New strategies and approaches to assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Work/Assignment</strong></td>
<td>State which outcomes you wish to assess by coursework</td>
<td>Which skills are being developed and assessed?</td>
<td>Yes or No</td>
</tr>
<tr>
<td><strong>Exam</strong></td>
<td>State which outcomes you wish to assess by coursework</td>
<td>Which skills are being developed and assessed?</td>
<td>Yes or No</td>
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Plenary Session and Discussion
The Way Forward!