



## **Designing for Problem-based Learning: Issues to consider**

The purpose of this document is to help you understand the issues involved with designing your course to include problem-based learning (PBL). As such, after reading you will have information on:

- Two different types of PBL implementations: curriculum level vs. course level
- The instructional design process for PBL
- How to create an instructional structure within problem-solving process
- How to identify knowledge resources and tools to support students' learning

### **Different Scopes of PBL implementations**

Problem-Based Learning (PBL) was first introduced as way of innovating the medical education curriculum to give students an opportunity to engage in typical problems they would encounter in their careers. At McMaster University, the PBL curriculum structure consists of a series of interdisciplinary blocks or units, which has been designed to involve medical students with a broad range of health problems throughout their education. The curriculum is organized in sequential units with early exposure to patients and case management (Barrows, 1996).

While successful in medical and professional schools on the curricular level, the PBL approach has since been adapted and implemented in other disciplines at the individual course level. Rhem (1998), the executive editor of the National Teaching & Learning Forum, recognizes such changes in the implementation of PBL and states that generally advocates accept course long continuity since that gives the students the most exposure and practice in the problem-solving process. The exploration of the PBL approach in this document is intended to support you to redesign of your course. Hopefully, through your understanding of the PBL approach and the issues involved with its design, you will find this particular approach beneficial to students' learning.

### **Instructional Design Process for PBL**

The process of designing a course involves five fundamental phases: analysis, design, development, implementation, and evaluation. Each phase involves specific tasks to complete different ends. The following table shows a basic outline of the phases:

<b>Phases</b>	<b>Tasks</b>
<i>Analysis</i>	<p><b>Examine the contextual information about the course:</b></p> <ul style="list-style-type: none"> <li>• Where does the course fit within the program/curriculum?</li> <li>• Who are the target learners? What's the class size?</li> <li>• How long is the class time?</li> <li>• What types of classroom is the course held in?</li> <li>• What types of technology are available in the classroom?</li> </ul> <p><b>Identify course goals</b></p> <ul style="list-style-type: none"> <li>• What is the purpose of the course?</li> <li>• What abilities does the course help students develop?</li> <li>• What do you want to accomplish in the course?</li> </ul>
<i>Design</i>	<p><b>Determine learning objectives</b></p> <ul style="list-style-type: none"> <li>• What does the instructor expect students to be able to do and to know as a result of taking the course?</li> </ul> <p><b>Plan the methods and activities</b></p> <ul style="list-style-type: none"> <li>• What are appropriate strategies and activities to help students achieve the objectives</li> </ul> <p><b>Design an Assessment Plan for student learning</b></p> <ul style="list-style-type: none"> <li>• How should you measure student learning?</li> <li>• What assessment techniques will measure the learning objectives?</li> </ul>
<i>Development</i>	<p><b>Produce Materials</b></p> <ul style="list-style-type: none"> <li>• What materials are needed to produce based on the design specifications for instruction?</li> <li>• Where and what are the resources?</li> <li>• What are the media and tools?</li> </ul> <p><b>Produce Assessment Instruments</b></p> <ul style="list-style-type: none"> <li>• What are the test items or other assessment methods?</li> <li>• What are the criteria to evaluate students' work?</li> </ul>
<i>Implementation</i>	<p><b>Implement the Plan</b></p> <ul style="list-style-type: none"> <li>• Who is involved in the implementation process?</li> <li>• What are the barriers to adopting the instruction?</li> <li>• What are the infrastructure issues, such as access to equipment?</li> </ul>
<i>Evaluation</i>	<p><b>Design Assessment for course design, development and implementation</b></p> <ul style="list-style-type: none"> <li>• What are the evaluation methods, e.g. classroom observations, pretest-posttest, surveys, etc.?</li> </ul> <p><b>Conduct the evaluation</b></p> <ul style="list-style-type: none"> <li>• How successful were the changes to the course?</li> <li>• What needs to be improved or changed?</li> </ul>

These five phases are indispensable for a course design and while they are listed in a linear order, when you are designing a PBL course, or any course for that matter, you should focus on a step and then take the time to look at how the whole design fits together.

The PBL approach is different from the traditional lecture-based instruction in areas: instructor purpose, student engagement, learning environments, and assessment. In the traditional course, the design focuses on an *instructor-centered* plan about what to teach, how to teach and how to know students have learned it. However, in a PBL course, the instructor acts as a facilitator of learning where student engagement in the problem-solving process drives the instruction and dictates the type of student support that is needed. Students in PBL environments are not lectured with a sequence of topics, but are led to learn the topics by solving problems. Savin-Baden (2000) identified a distinctive design focus of PBL.

“...students are not expected to acquire predetermined series of ‘right answers’. Instead they are expected to engage with the complex situation presented to them and decide what information they need to learn and what skills they need to gain in order to manage the situation effectively.” (p.3)

In other words, the emphasis of a PBL plan is not on what to teach but how to provide an environment to engage students in learning, to create the student initiative to learn, to assist students in identifying learning issues, and to support the learning process. The major tasks in the instructional process for PBL consist of:

1. Identifying/developing problems: The analysis phase for the PBL approach is not limited to the identification of knowledge and skills that students need to learn. The critical outcome of the analysis is to identify problems that are relevant and realistic in the field of study.
2. Organizing pedagogical structure of problem solving activities: The syllabus for PBL is not structured with a series of lecture topics and exercise activities that support students to apply or practice what they have already learned. Instead, the syllabus is structured with topical units of problems. Students learn through solving problems.
3. Identifying knowledge resources and tools to support students’ learning: The analyses of what information and skills are needed to solve the problems help identify resources. Some of these resources might be located on the web, in videos, or within the context of a short lecture.

The purpose of this document was to give you some introductory information on the issues involved with designing a problem-based learning course. If you would like to meet with a consultant to discuss changing your course to problem-based learning, please send an email to the Schreyer Institute for Teaching Excellence site@psu.edu .

## References

Savin-Baden M (2000) Problem-based learning in higher education: untold stories Open University Press. Buckingham: UK.