

## **Problem-based learning and the traditional lecture: A dysfunctional marriage ?**

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Every so often an innovative approach or new teaching method emerges on the educational scene, to capture the imagination and support of teachers. PBL is one such teaching-learning approach; and, while it is not new, there has been a growing interest in PBL over the past 10 years. The approach was introduced into the education of health professionals at McMaster Medical School (Canada) and Case Western Reserve Medical School (USA) in the 1960s. Today, PBL approaches, in a variety of formats, have found root in educational institutions around the world. They represent a critical feature of the curriculum for professionals whose daily tasks involve examining problem situations, in which diagnoses and decisions have to be made.

According to Boud (1985, p.13), *“The principle behind problem-based learning is that the starting point for learning should be a problem, a query or a puzzle that the learner wishes to solve.”* The problems constitute the content, or subject-matter. The focus is on the process by which students acquire the knowledge they will need. Since the individual case examples or problem scenarios are drawn from real life issues and problems, they have relevance and a powerful motivating influence. As students proceed from examining the individual examples or identifying the problem to be addressed, they determine and search for the content they will need to learn, and are encouraged to understand, rather than simply rote learn and memorize (that is, to engage in ‘deep learning’, according to Marton & Saljo. 1976) In the process, also, students engage with the material to be learned in ways that lead them to construct their own meanings and understandings, of principles and concepts, which they are expected to apply and generalise to other learning settings and contexts.

### **What learning outcomes do we desire for students in the courses we teach ?**

The intentions of the teaching staff are generally quite clear on this question. An examination of course and subject module outlines shows the range of competencies lecturers expect their students to achieve. For polytechnic graduates to succeed in the world of work and as productive members of the community, they are expected to develop and be able to use the following:

- ◆ competent levels of discipline-related technical and professional knowledge;
- ◆ higher-order thinking and problem-solving skills, for analysing and solving real –world and work-a-day problems;
- ◆ initiative and self-reliance, showing independence and confidence in taking responsibility for their own future development;
- ◆ group interactional skills: working co-operatively in teams and small groups, exhibiting sensitivity to ‘people problems’ and the feelings of others;
- ◆ communication skills: speaking and writing skills at an appropriate level for effective oral and written presentations and demonstrations.

Lecturers have the freedom and responsibility to choose those teaching-learning activities that will provide the most appropriate environment and experiences to support the development of these outcomes (objectives).

### **What can best be achieved through the traditional information-giving lecture approach?**

The traditional lecture is totally teacher-centred and controlled in every respect. Very good lectures (well-planned and presented) can be very effective *primarily for providing and transmitting information*, particularly to large groups. A good lecture is rated helpful and effective by students because it

- ◆ can arouse interest and be motivating;
- ◆ can be delivered at a pace that allows thinking, and note-taking about concepts and ideas;
- ◆ possesses structure and an ordered sequence of progression;
- ◆ can prove inspirational, providing additional motivation to explore the subject further.

(One has to however question, in view of present-day advances in ICT, whether there is still the need to use lectures for presenting and transmitting vast amounts of detailed factual information. It could be argued that the traditional lecture is not the most efficient means for doing this, and is therefore an inappropriate use of valuable class time)

### **What can be achieved through problem-based learning ?**

The prototypical PBL approach is totally student-centred and student-controlled. Reviews of research on PBL have confirmed the many advantages that have been claimed for this approach.

- ◆ It has relevance, since the starting point for learning is a problem, related to a real life 'case' or issue and context.
- ◆ It helps the development of generic competencies:
  - identifying what the problem is, and deciding on a course of action
  - identifying needed information
  - search skills to tap into a range of resources
  - sifting through, selecting and organising information
  - utilising higher-order thinking skills in their efforts to find a solution to the problem
- ◆ It helps in the development of other personal, transferrable skills of communication and co-operative team work

In summary, students assume increasing responsibility for their own learning. They identify and understand the objectives inherent in the 'problem scenario'; they undertake to work independently to direct their own searches and explorations to plug their 'knowledge gaps'; and, since the purpose of PBL is to develop understanding, rather than just memorise, students construct their own meanings and explanations through active involvement with the subject –matter to be learned.

## Can they co-exist ?

In their pure and unadulterated forms, PBL and the traditional, information-giving lecture can be represented as two ends of a continuum. From the diagram below it can be seen that the role of the lecturer in each of these teaching-learning environments is vastly different. As such, the two approaches are incompatible. In order for them to co-exist within the same curriculum, some compromises are necessary. These compromises should enable us to devise hybrid versions of both approaches, thus allowing for variation in the amount of teacher intervention, guidance and support with respect to each approach. Such 'cross-fertilization' is seen to be perfectly legitimate, and is endorsed by those who have implemented PBL in the health professions: "*Problem-based learning (PBL) is a continuum of approaches rather than one immutable process.*" (Davis and Harden, 1999, p.1) A hybrid traditional lecture-PBL format that is likely to accommodate the prevailing dominant learning styles and approaches of students, as well as the teaching styles of lecturers at the Polytechnic, is suggested in the diagram below.

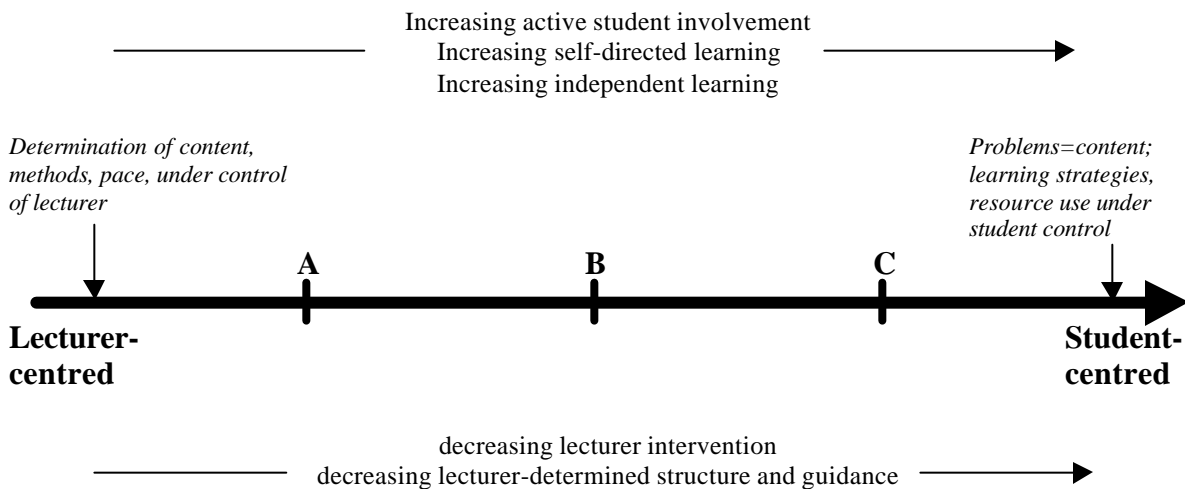


Fig. 1. Problem-based learning continuum. A,B, and C indicate points and extent of lecturer intervention

Lecturers from a traditional, information-giving lecture mould will have to develop competences needed to function effectively in an a PBL context. They will need skills as facilitators: resisting the temptation to supply information, holding back from intervening, encouraging self-reliance, gently probing for clarification and to expose faulty reasoning, and to keep students on track with the problem-solving process. Barrows & Tamblyn, (1980) describe the facilitation of learning as follows: "*...the teacher serves as both a monitor and stimulus to the process by asking leading questions, challenging thinking and raising issues or points that need to be considered. The teacher attempts to help students help themselves in the educational process.*" It needs to be remembered that the particular theory of teaching

lecturers espouse will largely determine their attitude towards choice of teaching method and support for innovations in teaching. Some, being conservative in their values, beliefs and thinking about, and their practice of, the educational process, could quite understandably feel more comfortable with the traditional lecture approach. And, how will students fare in a purely PBL context? Since they also have preferred learning styles and approaches, how will they cope with a totally student-centred method? The dependency-prone students are probably happier with a programme of time-tabled lecture slots, which imposes a 'control' and discipline on their learning. Also, students are provided with well-structured and 'complete' sets of notes. Thus, there is no need for them to make their own notes. While some do, most others do not. The work of Pask in England (1976) is quite illuminating in understanding how learners may be categorized according to their preferred learning styles. His research produced significant and unequivocal results on the holist/serialist distinction in learning styles. There are students who are 'holists': when tackling a learning task, they need to take an overview, to gain the big picture first, before adding details and deriving concepts and principles. There are also students who adopt a 'serialist' approach: they have to start at the beginning, and follow a logical, step-by-step procedure through any learning task. Pask used teaching material which he had structured according to 'serialist' and 'holist' formats. On testing the learners, he found the poorest results among those whose learning styles had been mismatched with the learning materials. As expressed by Sparkes (1999): "*He found that the best performance of those who were mismatched (i.e. holist students with serialist material, and vice versa) was worse than the worst performance of those who were matched to the learning materials!*" In our eagerness to embrace innovative teaching-learning approaches we may run the risk of such mismatches. We need to bear in mind that while some students are 'doers' and enjoy active, discovery learning situations, others are "visualizers", whose learning is assisted by the visual stimulation of diagrams, films, videos, concrete 3-D models, etc. For 'verbalizers', however, the preference is for listening to others, reading, participating in discussions, and writing up their ideas.

Therefore, as we think about the hybrid version of PBL for our students:

***At point A along the continuum we should***

- ◆ first provide students with some knowledge base from which to operate, and then introduce the 'problem scenario'
- ◆ provide guidelines, to assist students along the process of discovery (e.g., resource material); students for whom PBL is new may find it time-consuming to search for needed resource material for themselves. The use of study-guides would help, in identifying needed materials
- ◆ ensure that any hand-outs contain material that has been reasonably structured, organised, and sign-posted; and, that illustrations/diagrams have clear captions and explanations
- ◆ schedule regular tutorials or discussion groups, to monitor progress, give advice, and assist in making available needed information for students
- ◆ at conclusion of project, let students use a lecturer-prepared, structured format for the evaluation of the end product (solution to the problem), and any oral and written presentations

### *At point C along the continuum we should*

- ◆ encourage and expect greater self-reliance and independence among students
- ◆ present the ‘problem scenario’ first, and allow students to determine what information and skills they will need, and what resources will be tapped
- ◆ resist the temptation to offer help; where assistance is needed, act as a crutch to provide minimum support and direction only
- ◆ let students determine the need for and frequency of small-group/team meetings, to discuss progress, difficulties, what is needed, etc.
- ◆ at conclusion of project, students judge the end product (solution to the problem) in terms of objectives that were determined at the start by them in conjunction with the lecturer.

### **Verdict**

Yes, the traditional lecture and PBL approach can survive alongside each other in hybrid form, as shown in the diagram. In deciding what would be a suitable juxtaposition along the continuum, one would certainly need to take into account the level of maturity of students, and their dependency-proneness. Also, one would need to strike a balance between greater student involvement via discovery learning, and the students’ acquisition of discipline-related knowledge (that is, subject-matter content). While “coverage’ is a high priority in the traditional approach, it is of lesser importance in PBL approaches. According to a noted British educator, Entwistle (1992, p. 16), “*The emphasis nowadays should be on providing a conceptual framework and a map of the intellectual territory, with students obtaining details later on from books, handouts, or computer-based materials.*” Therefore, in implementing some variant of PBL, lectures need not be totally replaced. Instead, they should provide an overview and orientation to the subject, while at the same time offering the potential for helpful and meaningful staff-student interaction. If our intention is to promote “active”, “deep” learning to enable students to acquire “functioning knowledge”, then a student-centred approach (of which PBL is an example *par excellence*) is needed. Some variant of PBL must, inevitably, incorporate teaching-learning activities (TLAs) that will match the learning outcomes desired for students, and students’ different learning styles. Biggs (1999, p.207) encapsulates this in a brief, but eloquent, statement:

*“PBL is alignment itself. The objectives stipulate the problem to be solved, the main TLA is solving them, and the assessment is seeing how well they have been solved.”*

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