# Creating a Culture of Co-Learners with Problem-Based Learning

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With roots in medical education, problem-based learning (PBL) has spread throughout professional education to undergraduate as well as K-12 programs. Although there is significant variation among PBL practitioners, PBL is distinguishable from other case-based or problem-solving methods in that "the problem is encountered first in the learning process" (Barrows & Tamblyn, 1980, p. 2).Students typically work in small groups with coaching from their facilitator, a faculty member in the ideal situation, but students may also be trained for this role. Through inquiry and application of prior knowledge, students reason through problems (i.e., situations that present unresolved or perplexing issues from the standpoint of the learners), identifying areas where their current knowledge is insufficient. After a period of self-directed learning in which students determine their own strategies for pursuing their individual and collective learning needs, they return to the group setting to apply their newly acquired knowledge back to the problem situation, identifying new learning needs as they emerge.

## Creating a Learning Culture

PBL originated in the late 1960's when a new medical school opened at McMaster University. Interestingly, PBL emerged from practice rather than theory, based on a small group of medical educators' dissatisfaction with the traditional curriculum and its outcomes. Howard Barrows (2000a), one of the original McMaster

faculty members, complained that "students were passive and exposed to too much information, little of which seemed relevant….They were bored and disenchanted" (p. vii). This concern has been expressed throughout all levels of education and has stimulated significant interest in PBL as well as other learner-centered pedagogies.To address these problems, the McMaster faculty designed an educational system centered on learning rather than teaching. Instead of discipline-based courses and topics conveniently organized to match the expertise of the faculty, their innovative curriculum contained real medical problems presented as they occur in real life. Underlying basic science concepts were naturally integrated with clinical applications. This integration allowed even first year medical students to practice "doing what doctors do" while learning information relevant to their future professional lives.Roles and responsibilities of students and teachers also reflected this new learning culture. Rather than passively absorbing neatly packaged lectures presented by the faculty according to a pre-set schedule, students confronted realistic problems in small group settings guided by faculty who were carefully trained to facilitate, rather than lead, the student-generated discussions. Encouraged to investigate their learning needs first, students primed with new knowledge consulted faculty experts for help with difficult concepts or further guidance to pursue their questions.Although these changes challenged many core beliefs and expectations about education, they were made solely for the purpose of empowering learners. In this environment, students became actively engaged while investigating and solving problems, developing the ability and willingness to monitor and assess the adequacy of their knowledge and skills as well as continue learning as a lifelong endeavor.

## Recognizing the Challenges

Rules and responsibilities traditionally assigned to teachers and students must shift dramatically to truly empower students as self-directed learners. By taking responsibility for his own learning, "the student learns to determine what he needs to know" (Barrows & Tamblyn, 1980, p. 9). This aspect of PBL is crucial to developing active, intrinsically motivated, self-determined, lifelong learners.

Many PBL courses and curricula are teacher-centered in subtle

ways. Facilitators may intentionally or unintentionally give students too much guidance during group sessions by providing information, correcting students' thinking, asking pointed questions, or answering questions that should be pursued as learning issues. Students may encourage these behaviors. However, if student-dependence on faculty continues, students will fail to take responsibility for their own learning. PBL then becomes a "game" of trying to guess what the teacher-intended learning issues are and what will be on exams.

Barrows (2000b) recommends that PBL practitioners "closely monitor the many ways in which the teacher-centered, parental approach to teaching works its way back into the process, as it is an all-too-easy reflex behavior for faculty" (p. 96).Successful implementation of PBL requires a thorough understanding and valuing of the component parts of PBL and how one's choices in implementation affect the learners and resulting outcomes.

According to Evensen and Hmelo (2000, p. xi), "PBL runs the risk of becoming something it is not through misunderstanding of its philosophical and epistemological underpinnings and of misapplication through the use of highly simplified methods.…[PBL] is a sophisticated design that requires attention to learner and to teacher, to content and to context."Many variables can alter PBL's effectiveness. One such variable is the extent to which students are responsible for their own learning. Others include problem design, faculty development, facilitator methods and skills, competition with other courses, institutional support and acceptance of PBL among faculty and students, and alignment between PBL goals and assessment methods. Since assessment drives learning, the intended goals of PBL will not be realized unless assessment methods reflect these goals. However, use of such assessments threatens many widely accepted values and procedures of traditional education, especially the reliance and over-dependence on "objective" and efficient testing methods.

## Assessing the Outcomes
The only large-scale PBL outcome studies published to date have been in medical education. Interpretation of this literature is complicated. First, there is wide variation in PBL implementation as well as a lack of awareness regarding these differences and their

effects on the resulting outcomes. In addition, many articles do not adequately identify nor describe these variables, making it impossible to draw valid conclusions about specific programs. According to Kelson and Distlehorst (2000), "PBL…has become a generic category [for] any teaching approach that incorporates a patient problem in any format" (p. 180). Variations arise for many reasons including insufficient time and other resource deficits, implementation within a single course or discipline, and lack of trust that PBL will lead to the expected outcomes.

Kelson and Distlehorst urge PBL practitioners and researchers to identify essential elements of PBL and determine which objectives are not achieved when specific elements are modified or completely absent. Norman and Schmidt (1992) identify potential advantages for medical students in PBL curricula compared with traditional programs: increased motivation; enhanced learning, retention, and recall; greater integration of basic and clinical sciences; and better problem solving and self-directed learning abilities.

Although their review of the literature indicates a "paucity of critical research evidence available to address some, if not all, of these questions," they acknowledge that PBL has "a large and potentially long-lasting impact on self-directed learning skills [and its role] in students' motivation appears fairly conclusive…[PBL students] find the learning environment more stimulating and humane than do graduates of conventional schools" (p. 564). Blumberg (2000) analyzed the PBL and self-directed learning literature for evidence that PBL students demonstrate self-directed learning skills. Her findings indicate that faculty, students, and medical school accreditation boards perceive PBL as fostering self-directed learning. In addition, PBL students actively use the library, develop study strategies resulting in deep-level processing, and believe they continue to improve their self-directed learning abilities.

According to Blumberg, "much more research [is needed] to better understand how, when, and why PBL fosters the development of self-directed learning" (pp. 224-225). Effective PBL practices can only be identified by rigorously investigating the processes leading to intended and unintended outcomes. Studies should concentrate on the goals of PBL, namely developing learners who demonstrate

initiative and enthusiasm as well as effective problem solving, self-directed learning, self-assessment, and group collaboration abilities. Outcomes must be interpreted in light of the educational culture that produced them. Achieving the intended goals and objectives of PBL ultimately depends on the extent to which the culture in an educational environment shifts from teaching to learning.

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