

# What is Problem-Based Learning?

**STU:** What is problem-based learning (PBL)?

**LW:** The long term objective for education is to establish learning institutions in which enrichment replaces memorization; project work replaces drill; and assessment goes beyond measuring inert intelligence and instead measures successful intelligence (defined as analytic intelligence, creative intelligence and practical intelligence).

Problem-Based Learning unleashes the creativity, diversity, talents and resources of learners by allowing them to chart their learning journeys and holds them accountable for their learning. PBL creates powerful learning environments where students clarify and identify the problem; formulate their learning issues, seek new knowledge; apply and synthesize such knowledge to produce their own solutions; and perform reflective learning. The behaviours exhibited in the PBL class mirror those demanded in real-work situations. This prepares them to be real-work ready. The result is a cohort of students with integrated and relevant knowledge and lifelong skills (such as those of communication, problem-solving, team work and self-directed learning).

In brief, the essence of PBL is:

- Students work on problems that they are likely to encounter after graduation.
- Problems should be presented in the same format as those in the real world. It should permit free inquiry by students and allow them to engage their prior knowledge.
- Problems are multi-disciplinary and allow students to integrate contents from different disciplines.
- Because of free inquiry posed by the problems, students practise problem-solving

## *A Conversation with Dr Lynda Wee (LW), Deputy Director of The Temasek Centre for Problem-Based Learning at Temasek Polytechnic, Singapore*

skills guided by tutors as coaches who can facilitate the learning process as required.

- Students learn to identify problems, generate hypotheses and formulate learning issues.
- Students develop self-directed learning skills. They recognize when/where they need more information and know how to acquire them on a just-in-time basis.
- Students learn to apply new knowledge to the problem. They critique and revise their prior reasoning, decision and discussion based on new findings.
- On solving the problem, students review what they have learnt, discuss its potential application to future problems and make generalisations.
- Knowledge, structured for future use/contexts, is learnt based on problems encountered and will be stored in the same manner for easy recall and application.
- Students work on problems together in small groups with a tutor or tutors. They develop team skills.
- The sequence of behaviours required of the students in the classroom parallels those in the real world.
- Students are motivated to learn, understand and solve the problems.

**STU:** What is meant by a "problem" at the classroom level?

**LW:** According to Professor Howard S. Barrows, a problem occurs when something has failed, is broken, malfunctions, or does not work correctly; a puzzle or an unexplained phenomenon that needs an answer or explanation; or a better way to accomplish something needs to be found.

Many problems can be found in the real workplace. These problems can be identified in one or both of these challenges:

- The cause is unknown and needs to be determined; and/or
- The resolution of the problem is unknown or uncertain.

In a classroom, a problem represents *intellectual challenges* that students should be able to solve. A problem should not have one right answer or one that can be solved by tapping a single information resource. In this way, students must inquire and clarify to identify the problem statement. Once they have their problem statement, they can embark on self-directed learning to seek information to bridge their knowledge gap so that they can solve the problem.

**STU:** It is claimed in one of the Temasek Polytechnic publications (2000) that PBL "will be associated with educational progress in this century". Could you please elaborate on this statement?

**LW:** The advances of information communication and computers offer

*instant connectivity.* Now, we can conduct cross-border trading as well as learning. Hence, we are dealing with globalisation and an accelerated pace of change. Information is everywhere. To command a premium salary, we must create value. There is a need to develop our students to be more enterprising, with a global outlook.

The industrial age approach to education is based on efficiency in delivery. Educators determine with certainty the skills and knowledge that their students need. They plan for this knowledge in their curriculum. They hold large size classes to transmit this knowledge and conduct assessments to see if students have retained this knowledge.

A knowledge-based economy means information is everywhere. The ability to seek, use and manage information is *key*. The ability to create new knowledge is most desired. At this stage, teachers should be coaches and facilitators to hone students' problem solving skills in discovery or research-based learning environments.

PBL empowers students. It is student-centred in the sense that a group of students try to solve a problem together. In the process, they gather new knowledge in a learning context full of socialization.

**STU:** In what way(s) can PBL be applied in the primary and secondary classroom, given the present curriculum structure?

**LW:** Whether pre-school or primary school, we learn best when learning is relevant to our needs, when we are engaged and involved in the process; when we can tap our prior knowledge as a base to build on and when we can transfer what we have learnt to another setting. Hence, PBL can be contextualised to any level of students. For a start, teachers can integrate subjects and formulate a problem based on these subjects. For example, how can we keep our school clean? To do this project, students will practise communication skills, social studies and even science and maths (if there is computation

and budgeting).

**STU:** How can you convince the busy, skeptical teacher that PBL is not just "old wine in a new bottle"?

**LW:** The role of teachers is to inspire students to maximize their potential. We should unleash the capabilities in each child and allow them to grow. Perhaps, we can ask teachers to re-examine their role in education today. Does transmitting knowledge produce good learners? Questions to reflect on:

- Describe what you currently do as a teacher.
- Describe the changes in the business environment and how these impact on the desired profile of the workforce for Singapore to stay competitive.
- Reflect on your current teaching tasks. Will they produce the type of worker profile that industry needs?

# AUTHENTIC PROBLEM-BASED LEARNING



WEE KENG NEO, LYNDIA  
KEK YIH CHYN, MEGAN

- If not, as a teacher, what and how would you change?

To produce this new breed of students, teachers must change, too. We must unlearn, learn and relearn so that we can continue to stay relevant and inspire our students to maximize their potentials.

**STU:** How are creative thinking strategies incorporated in PBL?

**LW:** To solve problems, we must be able to generate possible hypotheses. This is a segment for divergent and creative thinking. At the solution stage, students must evaluate and synthesize information. This is where convergent and critical thinking happens. To come up with new knowledge and new insights, creative thinking is involved.

**STU:** Has PBL been empirically evaluated as a teaching approach? What are the findings, in brief, so far?

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