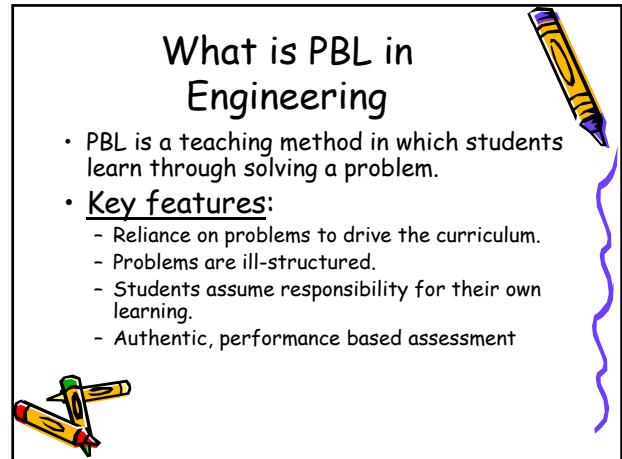



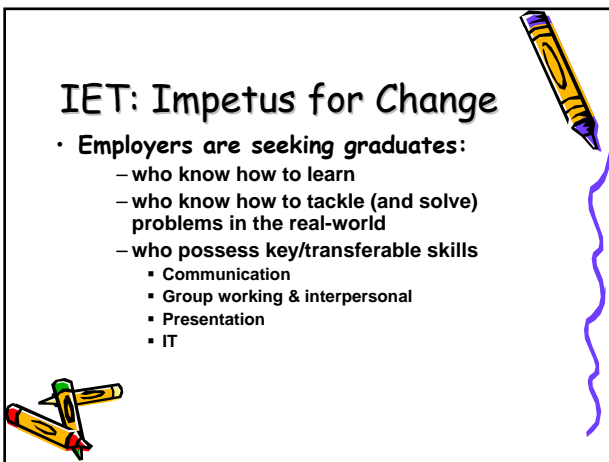
Problem Based Learning in Engineering

Dr. Patrick Walsh




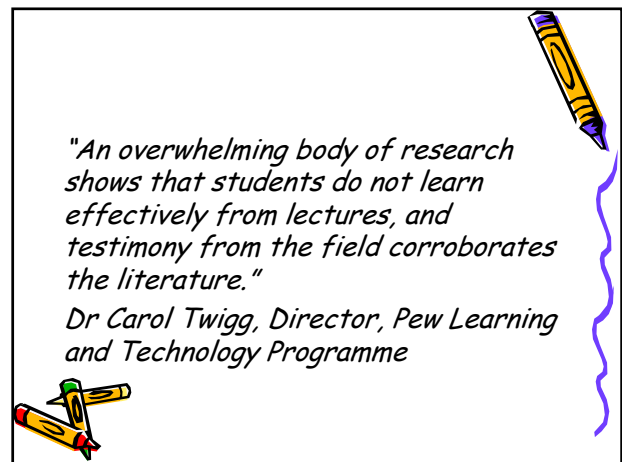
What is PBL in Engineering

- PBL is a teaching method in which students learn through solving a problem.
- Key features:
 - Reliance on problems to drive the curriculum.
 - Problems are ill-structured.
 - Students assume responsibility for their own learning.
 - Authentic, performance based assessment


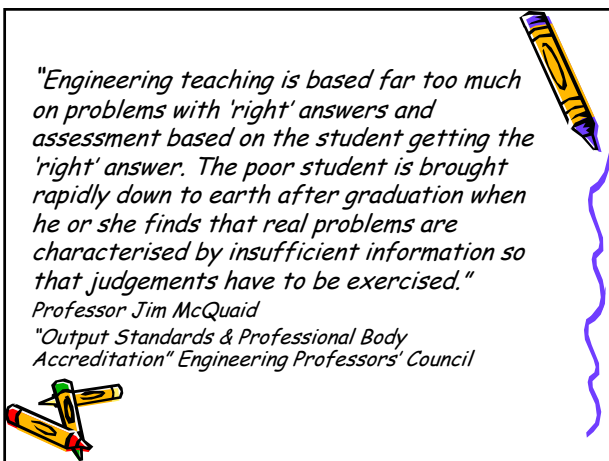
IET: Impetus for Change

- **Employers are seeking graduates:**
 - who know how to learn
 - who know how to tackle (and solve) problems in the real-world
 - who possess key/transferable skills
 - Communication
 - Group working & interpersonal
 - Presentation
 - IT



"An overwhelming body of research shows that students do not learn effectively from lectures, and testimony from the field corroborates the literature."

Dr Carol Twigg, Director, Pew Learning and Technology Programme


"Engineering teaching is based far too much on problems with 'right' answers and assessment based on the student getting the 'right' answer. The poor student is brought rapidly down to earth after graduation when he or she finds that real problems are characterised by insufficient information so that judgements have to be exercised."

Professor Jim McQuaid
"Output Standards & Professional Body Accreditation" Engineering Professors' Council

Chinese Proverb :

*Tell me, I will forget
 Show me, I may remember
 Involve me, and I will understand*



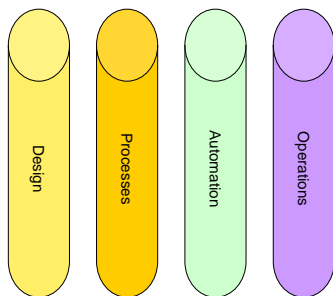
Advantages and Disadvantages of PBL:

- **Advantages of PBL:**
 - Positive attitude / Creativity
 - Deeper understanding
 - Knowledge and skills are more likely to be transferred later
- **Disadvantages of PBL:**
 - Time
 - Comfort level
 - Higher cost
 - Difficult to assess

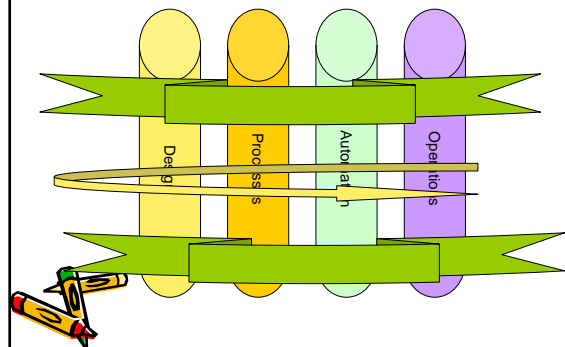
Conclusion

- PBL can deliver graduates that will be highly prized by industry
- The time, effort and money required to implement a PBL-based programme is substantial - but so are the potential rewards

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Developing a Good Problem

- Three essential elements:
 - Learning context
 - Students
 - Curriculum and standards

Implementation of PBL

<i>Teacher's role</i>	<i>Student's role</i>
Teacher monitors and coaches students' thinking.	Students are active problem solvers and learners.
Teacher maintains dual roles as a participant in the investigation and as a cognitive coach.	Students identify what they know, what they need to know, and their ideas.

PBL - a vital step towards
a new work environment

Roger G. Hadgraft

Department of Civil Engineering, Monash University, Melbourne, Australia.

International Conference on Problem-based Learning in Higher Education, Linköping, Sweden, Sep 1994



	TQM	PBL
1	constancy of purpose	A shared (negotiated) vision for the department is required.
2	adopt quality as a guiding principle	Management must be committed; changing academics is the hard part!
	base dependence on mass inspection	Reduce the number of formal exams; ensure quality rather than

