



Problem-Based Learning Applied

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What is PBL?

- An instructional method in which **the problem drives the learning**.
 - before students **learn** some new knowledge they are given a problem.
 - The problem is presented so that students discover that they **need to learn** before they can solve the problem.



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How to form a problem?

Carefully selected and designed problems demand from the learner ...

1. acquisition of critical knowledge,
2. problem solving proficiency,
3. self-directed learning strategies, and
4. team participation skills



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“The principal idea behind PBL is that the starting point for learning should be a problem, a query, or a puzzle that the learner wishes to solve.”

Boud (1985)



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A family of approaches

PBL is one of a family of cooperative and experiential approaches to learning

- e.g., case-based learning, project based learning, anchored instruction, inquiry-based learning, context rich learning etc.
- the distinction is blurred and hybrid approaches abound



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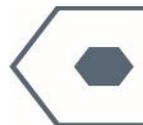
Essential components of PBL

In all variation of PBL:

- *the problem comes first* – all content knowledge is introduced in the context of complex real-world problems
 - important distinction from teaching methods where the concepts are presented in a lecture format followed by "end-of-the-chapter" problems
- emphasis on self-directed learning



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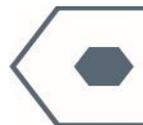
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PBL features

- Learning is initiated by a problem
- Problems are based on complex, real-world situations that do not have a single correct answer
- All information needed to solve problem is **not** initially given
- Students identify, find, and use appropriate resources
- Students work in small, permanent groups
- The teacher acts to facilitate the learning process rather than to provide knowledge
- The teacher uses different forms of assessment such as reflective journals etc.

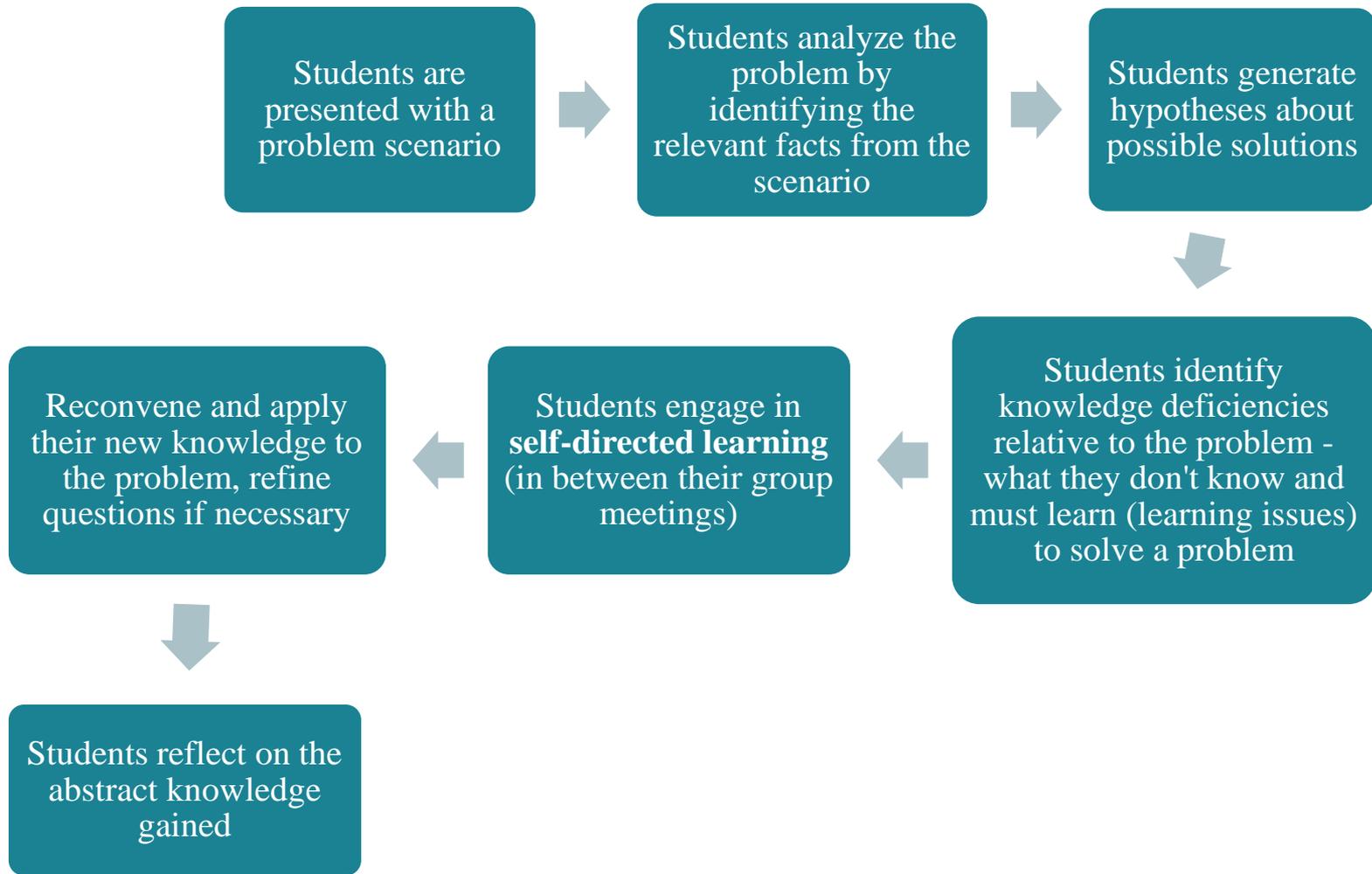


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The PBL cycle or PBL tutorial process



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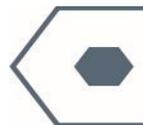
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Example 1 Equipping Tiny Devices Ltd.



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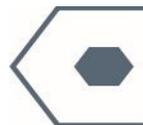
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Equipping Tiny Devices (1)

- ✓ Title: Equipping Tiny Devices
- ✓ Author: Mr. Ethan Pang Loke Wee, School of Business & Accountancy, Ngee Ann Polytechnic
- ✓ Discipline: Information Technology
- ✓ Target Audience: Introductory; all majors
- ✓ Keywords: Budget, Computers, Devices, Information Technology, Peripherals, Office Needs
- ✓ Length of Time/Staging: 1 week
- ✓ Objective: At the end of the PBL activity, students will have a complete appreciation of business IT needs, costs, and hardware/software/network functions
- ✓ *Source: The PBL Clearinghouse - University of Delaware*



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Example - Equipping Tiny Devices (2)

Scenario:

You have just been hired by software development start-up firm, Tiny Devices Ltd, as an IT Support Specialist. You met the Chief Technology Officer, Mr. Chong, this morning as he welcomes you to the company and briefed you on your duties and job scope.

Tiny Devices Ltd is a brand-new setup and is located in Chai-Chee Techpark. The office space is about 2,000 sq ft and other than the rooms being partitioned and furnished, it is still quite bare. You are brought to meet your immediate supervisor, Mr. Ong, who is the IT Support Manager, and the IT Support Team. The IT Support Team has 5 members, including yourself.

Mr. Ong gathered the team and said, "We have to get down to work fast. Amongst the many urgent tasks, we need to equip the office for staff IT needs. And we have only 3 weeks from today. We are a start-up and bottom-line is very important. I need a proposal with budget from the team in 1 week's time for me to vet. Once it is ok, you will have to present it to top management. Expect tough questions."



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Example - Equipping Tiny Devices (3)

Format of Delivering:

- Large class size: 40.
- Groups of 5. Total of 8 permanent groups per class.
- Meeting Schedule: Twice a week. Each meeting is 2 hours.
- There is only one tutor (facilitator). During scheduled PBL time, the tutor will facilitate students' discussion (see discussion questions) in order for them to achieve *learning issues* relevant to the core learning objectives of the problem. Students are free to consult the tutor further during the week of research/self-study time.
- Each student group is given 15 minutes to present their findings and proposal to solve the problem to the whole class (seminar style). The tutor will act as Mr. Chong during the presentation and students are expected to answer his questions.



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Example - Equipping Tiny Devices (4)

Discussion Questions:

(These discussion points should be handled in sequence)

- Define the specific problem that your team has at hand.
- In what way(s) can the problem be solved? Elaborate each one.
- What further information would your team need in order to accomplish the job well? Where can these information be found?
- What do you think is expected in the budget proposal?
- How would your team prepare to present to the company's Top Management?
- What will be your team's action plan?



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Example - Equipping Tiny Devices (5)

Student Learning Objectives:

- Analyze computing needs of businesses.
- Evaluate computing hardware and applications best suited for use based on feasibility and constraints.
- Appreciate the cost of equipping an office with IT.
- Appreciate the current IT trends and developments.
- Describe the classifications of computers and give examples of each.
- Distinguish between the various types of software and give examples of each.
- Explain the 4 basic computer operations: Input, Processing, Output, and Storage.
- Explain the principal components of a computer and their uses.



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Example - Equipping Tiny Devices (6)

- Resources:
 - The scope of work of the IT support team
 - The organization chart
 - Background of Tiny Devices Ltd
 - Brief job descriptions of various Tiny Devices Ltd departments.
 - Discussion notes and guidelines on how to accomplish the task.
 - Assessment checklist (for learners and tutor)



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Example 2 Helping Uncle Sean



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Example - Helping Uncle Sean (1)

- ✓ Title: Helping Uncle Sean
- ✓ Author: Mr. Ethan Pang Loke Wee
School of Business & Accountancy
- ✓ Discipline: Information Technology
- ✓ Target Audience: Introductory, all majors
- ✓ Keywords: Access, Car Rental, Computerisation, Database Management System
- ✓ Length of Time/Staging: 1 week
- ✓ Objective: By the end of the PBL activity, students will have built a fully functional database management system for the car rental business.
- ✓ Source: The PBL Clearinghouse - University of Delaware



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Example - Helping Uncle Sean (2)

Scenario:

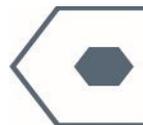
You received a call from your uncle, Sean Cheng, one afternoon and he asked if you know anything about computers. You know that Uncle Sean runs a car rental company called "Universal Car Rentals" in town. He went on to tell you his situation.

"You see, it is getting tougher to keep track of my cars and my customers. My business is growing and there is more and more paper-work to be done. You know lah, I hate paper-work! Ah Leng [his assistant] is not helping much, she just messes things up. I think she now has a boyfriend and so is very easily distracted! I also don't know what Ah Heng is doing at my airport branch. The booking chits and rental slips are always misplaced or lost.

Anyway, I have been getting complains from several clients recently and I really need to get things ironed out quickly. So, can help me or not?"



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Example - Helping Uncle Sean (3)

Format of Delivering:

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- Groups of 5. Total of 8 permanent groups per class.
- Meeting Schedule: Twice a week. Each meeting is 2 hours.
- There is only one tutor (facilitator). During scheduled PBL time, the tutor will facilitate students' discussion (see discussion questions) in order for them to achieve *learning issues* relevant to the core learning objectives of the problem. Students are free to consult the tutor further during the week of research/self-study time.
- Each student group is given 15 minutes to present their findings and proposal to solve the problem to the whole class (seminar style). The tutor will act as Uncle Sean during the presentation and students are expected to answer his questions.



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Example - Helping Uncle Sean (4)

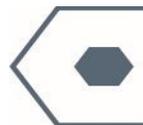
Discussion Questions:

(These discussion points should be handled in sequence)

- What exactly is Uncle Sean's problem?
- In what way(s) can the problem be solved? Which is most appropriate?
- Is it possible to solve such a problem permanently?
- What further information do you need in order to help him?
- How would you explain your solution/proposal, if any, to Uncle Sean?



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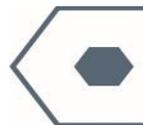
Example - Helping Uncle Sean (5)

Student Learning Objectives:

- Analyze business computing needs of businesses.
- Evaluate computing applications best suited based on feasibility and constraints.
- Appreciate and describe databases and database management systems.
- Appreciate the functions and features of MS Access.
- Distinguish between Data and Information.
- Understand the components of a database table.
- Design a database without redundancy.
- Create tables and define fields with proper validation.
- Enter and manipulate records in an Access table.



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Example - Helping Uncle Sean (6)

- Resources:
 - UCR vehicle rental slip (xls)
 - UCR vehicle booking chit (xls)
 - Background of “Universal Car Rentals” (UCR)
 - Employees
 - UCR’s major clients and tourist
 - Discussion notes and guidelines on how to accomplish the task
 - Assessment checklist (for learners and tutor)



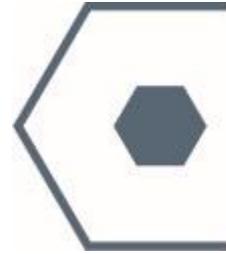
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