

Integrating Problem-Based Learning in traditional teaching framework

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What is PBL?

- Rhem J “an instructional strategy in which students confront conceptually ill-structured problems and strive to find meaningful solutions”
- Two types
 - Group work (used extensively in medical degrees)
 - Problem solving

The Group Approach

- Small groups given a problem
- Requires knowledge acquisition
- Synthesis of concepts from different subject areas
- Usually part of integrated teaching approach
- Facilitated by staff acting as tutor/guides
- Labour intensive

Problem-solving Approach

- Complex problem
- Knowledge acquisition
- Tutor input via facilitation
- Application of knowledge
- Solution to problem
- Variety of ways to introduce problems

Difficulties with PBL

- Labour intensive
- Development costs
- Group work means weak students 'hide'
- Dealing with plagiarism and collusion
- Process or product assessment?

Supporting PBL with TSL

- Advantages
 - Allows individualisation
 - Reduces tutor input
 - Forces students to learn independently
 - Many advantages of PBL retained
 - Reduces risk of collusion and plagiarism
- Disadvantages
 - Downside is high development cost

Example of TSL/PBL

- Second level biochemistry module
- Protein purification taught
- Separation of mixtures of proteins
- To obtain a pure protein
- Using a variety of standard methods
- Analysis by protein assay/ electrophoresis
- Replace with simulation software
- Combined with clear assessment criteria

ProteinLab software

- Allows simulation to take place
- Can repeat laboratory experiments
- Can create libraries of protein mixtures
- Allows individual protein to be purified
- Software has excellent help pages
- Source of information on the separation techniques

Methodology

- Students not taught methods
- Tutorial introducing software
- Assignment to purify protein from mixture
- Assessment Criteria emphasise
 - understanding of principles
 - success at set task
 - Ability to analyse and interpret data

Mark schemes match criteria

Criterion:

- i. Explain the tools used to analyse the outcome of each stage of the protein purification protocol in your methods section.

Grade

E/F Criteria for a D grade have not been met.

D Principles of one technique used is described showing some understanding of the method or material is largely transcribed without showing understanding

C Principles of some techniques used are described in the student's own words showing good understanding of the method.

B Principles of all techniques used are described in the student's own words showing good understanding of the method.

A Principles of all techniques used are described in the student's own words showing clear understanding of the method.

Evaluation of method

- Tutor perspective positives
 - Encourages deep learning
 - Student centred (individualisation of task)
 - Low staff contact
 - Incentive both from task and assessment
 - Student grades improved on average
 - Failure dropped
- Negatives
 - Checking on students
 - Processes to diagnose weaker students problematic
 - Loss of tutor control of learning process

Student perspective

- Positives
 - Like simulation-type software
 - Get better grades
 - Understand topic better
- Negatives
 - Have to work harder
 - Lack of understanding hard to identify

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