



A Student's View of PBL Physics

Robert Howard*, Carl Horan, Jennifer O'Reilly,
Virginia Urbano, Brian Bowe*

*Physics Education Research Group
School of Physics, Dublin Institute of Technology



Problem Based Learning at Physics DIT

- First PBL physics module in 1999
- First PBL physics programme in 2001
- Level 8: Honours Physics Degree (25)
- Level 7: Ordinary Science Degree(35)2006

PBL Physics





Level 8: Honours Degree

Physics Technology, Medical Physics,
Nanotechnology

- 25 students
- Majority have done physics
- PBL-Model: 2 x 2 hrs, 1 tutorial, 3 PBL lab
- 2 tutors
- 'Weekly' Assessment + Feedback via WebCT
- Open book exam

Students' Views - Positives

- Solving real-life problems in different ways
- Get to know class mates and lecturers, developed close and positive relationships.
- Everyone was involved, couldn't avoid participating
- Developing other skills, like; working in groups, presenting and communicating
- Relaxed atmosphere
- Actively encouraged to learn and interact

Students' Views - Positives

- “Having to constantly explain your knowledge and ideas to your tutors and group members makes you try to have a complete understanding of what’s involved”

Students' Views - Negatives

- No introductory lecture
- Not enough time to develop the required knowledge and understanding
- Very stressful at the start as it was not clear what we were meant to be doing.

Students' Views – Learning Experience

- Challenging, but I learned a lot
- Changed the way I think about physics and learning
- Changed the way I interact with others
- Learned to work in a group and on my own
- “There was a genuine ‘want’ to know how to solve the problems because they were presented with interesting situations”



Level 7: Ordinary Degree

Applied Science: Biology, Chemistry, Physics

- 35 students
- Majority have not done physics
- PBL-Model: 2 + 1 hrs, 1 tutorial, 2 lab
- 3 tutors
- 'Weekly' Assessment + Feedback via WebCT
- Closed book exam

Students' Views - Positives

- Relate theory to the real world
- Interaction with class and lecturers
- Easy to ask questions
- Develop understanding by explaining to each other
- Continuous assessment
- The pre-class tutorials really help

I like PBL because...

- It helps me to understand the physics *
- It's challenging
- I get marks for the work I do all year
- It makes me work
- It's social, I like working with others
- I don't like PBL
- It's fun

Students' Views - Negatives

- Difficult for students who haven't done physics
- Other students not attending or not pulling their weight
- Workload - was viewed as excessive but not now.

I like don't like PBL because...

- I like PBL
- It doesn't help me understand the physics
- It's boring (if I don't understand)
- Other (too hard if no physics)
- It's too challenging

Students' Views - Learning

	1 Low	2	3	4 high
Level of enjoyment	4	4	10	8
Level of Physics learning	4	9	6	7
Level of learning of other skills (e.g. group skills, communication, report writing etc)	0	6	5	14
Impression of Physics as a subject	4	4	3	14

Given a choice, I would choose a
physics.....

- Lecture based course in 1st year – 7/26
- PBL based course in 1st year – 19/26

Conclusion

- **Positives** – similar for both levels 7 and 8
- **Negatives**
 - Level 8: No introductory lecture, time to develop understanding
 - Level 7: No Physics, Poor attenders,
- **Learning**
 - Level 8: Well developed view of learning & physics
 - Level 7: not as aware of physics learning, awareness of other skills, good impression of physics.