Stimulating Authentic Learning Experiences through a Peer Learning programme: An analysis of Irish undergraduate physics students

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NCE-MSTL
- Conduct best practice, evidence-based research into teaching and learning of mathematics and science.
- Translate existing research into effective best practice in mathematics and science teaching and learning.
- Collaborate and share information.
- Project address national priorities & important issues in mathematics and science teaching and learning.
- All education levels targeted.

IOP HE Group meeting
May 16th 2012
Presentation overview

- Model of Peer Learning
  - Tutorials
  - Support tutorials
- Implementation and set-up
- Findings
- Lessons learnt

Description of PL Model

- In this study Peer Learning represents a two-way, reciprocal learning experience.
- Peer Leaders – 3rd year undergraduate physics teacher students
- First year undergraduate science students
Description of PL Model

- Students/Peer Leaders - **opportunity** to take **responsibility** for their own learning.
- Involves students **working together** to solve physics tutorial problems.
- Students responsible for their own **learning** and **helping** their group members learn.
- Promotes **critical thinking** through discussion.

What is a Peer Leader?

- Undergraduate teaching assistant
- Has direct experience of a particular course
- Role model
- Facilitates learning does not re-lecture
- Facilitator of the learning
Peer Learning models

Tutorial model
- compulsory
- 2005-2008
- Traditional tutorial slot

Support Tutorial model
- voluntary
- 2009-present
- Science Learning Centre (SLC)

PL Model
- Peer leader role
- Student role
- Co-ordinators role
- Lecturer role
- Peer Leader training
- Tutorial worksheets

Tutorial model
- voluntary
- 2009-present
- Science Learning Centre (SLC)
Methodology

- **Action research**
  - Several cases studies
  - mixed research methods employed

- **Data collected**
  - 6 academic years cycles
  - Peer Leaders
  - Students

**Methodology**

Peer Leaders
- Conceptual tests
- Questionnaire
- Semi-structured interviews

Student tutorial
- Questionnaire (pre & post)
- Conceptual tests

Students support tutorial
- Questionnaire (pre & post)
Focus of Presentation

• To investigate the effect participation had on the Peer Leaders and their experience of the Peer Learning programme.
• To investigate students experience of the Peer Learning programme.

Physics Modules

• Lecture (traditional)/ 2 per week
• Tutorial (Peer Learning)/ 1
• Lab (traditional)/ 1 double session
Findings - Tutorial model
– Student response rate 95%
– Spring 2009 students comments...

‘opportunity to discuss questions and answers’
‘I felt relaxed & felt able to ask anything’
‘Easier to understand than in lectures’
‘Good learning environment’

Spring ‘09 students comments
• ‘Good interaction with other students’
• ‘because it is not as boring or hard as trying to work everything out on your own’
• ‘very interactive, solve problems easier’
Spring ‘09 students comments

Comments regarding Peer Leaders

• ‘guidance & answers together with explanations’
• ‘encouraged and guided us’
• ‘because they could help us when we were in trouble’
• ‘Corrected our mistakes’
• ‘Made it easier to understand’
• ‘Sometimes they knew less and were as confused as we were’
• ‘Besides answering questions asked, very little was taught’
Findings – Peer Leaders ‘09

Pre and Post Test Results

Section 1

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<th>Post Test</th>
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Pre and Post Delayed Test Results

Section 1 - Post Delayed

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IOP HE Group meeting
May 16th, 2012
Findings – Peer Leaders

All the Peer Leaders (N = 11) stated that;

• becoming a Peer Leader improved their physics knowledge.
• they enjoyed being a Peer Leader and that they had a positive experience.
• they felt that the students also benefited.
• preparation time took longer than expected.
• they would take part in the programme again.

Findings – Peer Leaders

• The conceptual tests and the semi-structured interviews provided evidence that the Peer Leaders have a naïve view of force as a property of objects.

• post-delayed results showed some positive increases in physics understanding but again the Leaders’ misconceptions remained unchanged.
Research Questions

• Is there a relationship between the 3rd year science teaching students’ participation as Peer Leaders and an increase in their conceptual understanding of physics?

• No, there is no relationship between the 3rd year science teaching students’ participation as Peer Leaders and an increase in their conceptual understanding in physics.

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Research Questions

Does becoming a Peer Leader provide the necessary conceptual change opportunity for overcoming misconceptions?

• No, this research study provides evidence that becoming a Peer Leader did not provide the necessary conceptual change opportunities needed to overcome misconceptions.
Findings – Peer Leaders

- The was no significant difference (P > 0.05) in the number of misconceptions from pre to post to post delayed.

- For the Peer Leaders simply doing the course work tutorials sheets did not seem to have an impact on their misconceptions.

- The results indicate that getting the Peer Leaders to reflect on their pre, post and post delayed responses to the Conceptual test is an effective method of confronting and altering their misconceptions about Newton’s laws, specifically Newton’s third law.

- Studying the Peer Leaders physics understanding and concepts is not the only factor which can affect their conceptual change. Affective and social aspects such as their approaches to teaching and learning physics can have an impact.

Findings – Support Tutorials

- Support tutorials
  - N = 140: Response rate – 35%
  - Academic year Spring 2010
  - Attendance = on average 25/30 students per tutorial
Findings – Support Tutorials

• Students who participated in the Peer Learning programme:
  • More confident in physics.
  • Peer Leaders were of great benefit to them.
  • Better prepared for the final exam.
  • Positive impact on learning.
  • Worked in small groups – same students returned every week, worked with same Peer Leader.
  • Wanted more Peer Learning tutorials.

Findings – support tutorials

• ‘the material is explained slower and in more detail’
• It helped having someone to go through questions with you’
• ‘guides were very helpful and showed how to do exam questions’
• ‘I found it very helpful and teachers were easier to understand than lecturer’
• ‘often on a 1 to 1 basis and didn’t feel embarrassed to ask questions’
Findings – support tutorials

• ‘You felt as if you were being helped out as opposed to having a teacher-student relationship which can often be distant’
• One-to-one support invaluable
• Additional non-judgemental assistance’
• ‘it was good to be able to ask questions’
• ‘the people seemed to be at the same level as the student and so seem approachable’
• ‘small groups, slowly taught’
• ‘the support that is offered is very good, the tutors are clear and well prepared’

Findings – support tutorials

Overall, very positive experience for both students and Peer Leaders.
Lesson Learnt

- Peer Learning model
- Peer Leaders
- Worksheets
- Workload

Acknowledgements

www.nce-mstl.ie

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