Peer to peer tutorials – broadening the skills of undergraduate physicists

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“It’s quite different to understanding something in your head to come to explaining it well to someone.”

Outline

* Definition of “peer tutoring”
* Our peer tutoring scheme
* The benefits of peer tutoring for the tutors
* What our tutors gained through our peer tutoring scheme
**What is “peer tutoring”?**

Broad definition (Topping, 1996):

“people from similar social groupings who are not professional teachers helping each other to learn and learning themselves by teaching”

Colvin (2007) describes the process of peer tutoring as one that:

“involves those of the same societal group or social standing educating one another when one peer has more expertise or knowledge”,

where

“peer tutors help other students either on a one-to-one basis or in small groups by continuing classroom discussions, developing study skills, evaluating work, resolving specific problems, and encouraging independent learning”.

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**Our peer tutoring scheme**

**Peer to peer (P2P) tutorials:**

- Honours level students acting as tutors to non-Honours students
  - Honours = levels 3/4/5
  - Non-honours = levels 1/2

- Questions set ahead of each tutorial covering areas of current course
  - Tutors get questions & solutions ~ 1 week ahead
  - Students get questions ~1-2 days ahead

<table>
<thead>
<tr>
<th>Aims</th>
<th>Detail</th>
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<tbody>
<tr>
<td>A</td>
<td>Assist with student learning/revision of physics.</td>
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<tr>
<td>B</td>
<td>Help to integrate level 1 and 2 students into the School of Physics &amp; Astronomy through communication with level 3/4/5 students.</td>
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<td>C</td>
<td>Give level 3/4/5 tutors an opportunity to develop/improve their teaching skills and their understanding of the basics of physics.</td>
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What are the advantages of peer tutoring?

Colvin (2007) identified three key goals for “peer tutoring” schemes in the literature:

- the elimination of typical hierarchical structure,
- increased motivation and learning for students and student-tutors,
- and empowerment for student-tutors.


What are the advantages of peer tutoring?

Topping (1996):

“Just preparing to be a peer tutor … enhance[s] cognitive processing in the tutor by increasing attention to and motivation for the task, and necessitating review of existing knowledge and skills. Consequently, existing knowledge is transformed by re-organisation, involving new associations and a new integration. The act of tutoring itself involves further cognitive challenge, particularly with respect to simplification, clarification and exemplification.”

By preparing work for a tutorial, the student-tutors improve their own knowledge and their ability to communicate that knowledge.

What are the advantages of peer tutoring?

Benware and Deci (1984):

- Compared a group who studied a topic with the goal of teaching it to others, with one who studied it towards an exam.
- The group who studied with the aim of teaching the subject gained a higher order of conceptual understanding and found the experience more interesting.
- Topping (1996) linked this to the saying “to teach is to learn twice”.

Rubin and Hebert (1998) reported that:

- Student–tutors gained satisfaction from their experiences, both in terms of improving their own knowledge but also in broadening their skills base (e.g. communicating with an unresponsive audience).
- Student-tutors became more empathetic to their own teachers, leading them to be more proactive in their studies at an earlier stage than they might have done had they not been tutors.
- Carroll (1996): tutors’ referenced a broadening of their skills base as a benefit of being involved in the peer-tutorials.

Watters and Ginns (1997) reported that tutors felt that their confidence, facilitation skills and insight into their subject were improved by acting as tutors.
## Graduate attributes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Academic dimension</th>
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<tr>
<td>Subject specialists</td>
<td>Understand and respect the values, principles, methods and limitations of their discipline(s)</td>
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<tr>
<td>Investigative</td>
<td>Are intellectually curious and engage in the pursuit of new knowledge and understanding</td>
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<tr>
<td>Independent &amp; critical thinkers</td>
<td>Identify, define and assess complex issues and ideas in a researchable form</td>
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<tr>
<td>Resourceful &amp; responsible</td>
<td>Are experienced in self-directed learning and authentic research-led enquiry</td>
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<tr>
<td>Effective communicators</td>
<td>Articulate complex ideas with respect to the needs and abilities of diverse audiences</td>
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<tr>
<td>Confident</td>
<td>Defend their ideas in dialogue with peers and challenge disciplinary assumptions</td>
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<tr>
<td>Adaptable</td>
<td>Experience multi-disciplinary and/or inter-disciplinary learning in an internationally renowned institution.</td>
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<td>Experienced collaborators</td>
<td>Engage with the scholarly community and respect others' views and perspective</td>
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<td>Ethically &amp; socially aware</td>
<td>Consider and act upon the ethical, social and global responsibilities of their actions</td>
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<tr>
<td>Reflective learners</td>
<td>Use feedback productively to reflect on their work achievements and self-identity</td>
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## What our student-tutors gained

### Why they wanted to be tutors …

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<tr>
<th>Theme</th>
<th>% of comments</th>
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<tbody>
<tr>
<td>Improving/developing skills of tutor</td>
<td>34</td>
</tr>
<tr>
<td>Improve knowledge of course work</td>
<td>26</td>
</tr>
<tr>
<td>Want to help</td>
<td>18</td>
</tr>
<tr>
<td>Enjoy tasks associated with teaching/tutoring</td>
<td>16</td>
</tr>
<tr>
<td>Personal benefit of tutors</td>
<td>6</td>
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</table>
Reflecting on their experiences …

Tutors all agreed or strongly agreed with the following statements

- “Tutoring students in lower levels helps with my understanding of physics.”
- “Acting as a tutor makes me feel more confident in my understanding of physics.”
- “I get a feeling of satisfaction from tutoring other students.”
- “Acting as a tutor makes me feel more a part of the School of Physics and Astronomy.”

These views were confirmed in focus group interviews.

Interviews showed that the student-tutors had gained an opportunity for critical self-reflection.

- Observed different tutoring methods and were able to make informed comparisons:

  “This week instead of walking around and asking if everything was ok I waited until someone put their hand up. Although this worked, I felt that there wasn’t the same number of questions asked.”

- They also realised that to be the best they could be, they would need to be well prepared for tutorials, be pro-active and approachable.

Collaborative learning – tutors working together to address student questions

Communication skills – conveying complex physics ideas to students; initiating student discussions on work and future student life.
Conclusions

- Peer tutoring provides an environment for students to develop skills that are not automatically part of a physics degree.
  - Tutors go into the scheme wanting to develop these skills, and succeed.
  - Skills improved include – communication, critical reflection, basic course knowledge.
- P2P is a “light touch” way of doing this that yields benefits for all involved.
  - Little effort required from School/Department - but both student-tutors and students consider their studies improved by its presence.