You Teach Mine and I’ll Teach Yours

A case study in Collaborative Physics Teaching Across Australia

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Physics @ UNE?

- Physics is one of the oldest disciplines at UNE.
- The department has been conducting research for over 65 years.
Physics @ UNE?

and teaching for over 65 years
Physics @ Murdoch?

- Physics was there at the start of Murdoch University in 1975.
- They have been offering the Physics degree internally and externally ever since.
- Programs that started in the Physics department and then took on a life of their own are:
  - Computer Science
  - Energy Studies
  - Nanoscience
Physics @ Murdoch?

Research at Murdoch includes

- Thin film deposition
- Surface analysis
- Nanoscience
- Science communication
- Learning and teaching
Why?

- Physics departments face increasing financial pressure to reduce unit offerings.
- To have accredited degrees they have to retain breadth and depth of topics.
- Few universities have the experience / expertise in external Physics units.
- Compulsory residential schools
  - students spend time away from their home institutions
  - travel expenses
The Project

• Reciprocal teaching arrangement between
  – Physics and Electronics at University of New England
  – Physics, Energy Studies and Nanoscience at Murdoch University
  – Started in 1998

• Students from Murdoch enrol in UNE
  – Photonics
  – Quantum Physics and Spectroscopy

• UNE physics students enrol in Murdoch
  – Physics of Materials
  – Nuclear and Particle Physics
Collaboration Model Rational

- Science students need to complement theoretical knowledge with hands-on practical experience
- Important students have access
  - to enough sets of top quality equipment
  - for long enough, to get a thorough understanding of the concepts
- Undergraduate labs are very expensive to resource and usually the first casualty of ‘economic rationalism’
Issues

Both Murdoch and UNE have different approaches to dealing with laboratory experiments

- Murdoch send its external students an experimental kit, study guide and written laboratory instructions and then expects the student to get on with it
- UNE brings the students on-campus and provides an intensive residential school
- Both sets of students were unhappy
  - UNE’s students because they perceived they were not receiving the same level of care they were used to
  - Murdoch students because they had to travel to Armidale NSW to do labs in what they considered was an external unit
Issues Resolved

• The UNE redeveloped Photonics so the experiments can travel. Now Murdoch University students enjoy a 5-day residential school for UNE’s Photonics at Murdoch during the internal teaching period.
Issues Resolved

• Photonics went on-line, giving students access to internal lecture slides, chat room, and lecturer feedback.
Issues Resolved

• For the Murdoch units at UNE a set of laboratory equipment is sent over for use in a ‘supervised’ residential school during the internal teaching period

• Murdoch units are also on-line

• This ‘tuned’ approach to providing practical experience for students has yielded a significant improvement in student satisfaction.
Characteristics of Successful Collaboration

• UNE and Murdoch staff work closely to coordinate assessment tasks and arrange the transfer of equipment across Australia
• Murdoch staff are the on-campus-contact for their students during the semester as are UNE staff for UNE students
• The collaboration is successful because
  – roles and responsibilities of each university are well defined
  – good communication between the staff at both institutions
  – all working towards the common goal of maintaining a viable physics program at our respective universities
How was / will it be evaluated?

- Both universities still have Australian Institute of Physics accreditation for their Physics Degrees
- Both universities have undergraduate physics students.
Growing? Shrinking?

• Getting the external units included in the both university’s degree programs was not a big problem thanks to supportive Deans of Faculties
• It took time for
  – the units to progress into the handbook
  – for the students to know about them and enrol in them
  – Academic Renewal at both universities means staff need to continuously make students aware of the opportunities available to them
• Hopefully this will be rectified in due course
Challenges

• Technical
  – Do it yourself kits

• Managerial
  – Exam timetables

• Network oriented
  – University school stability

• Support
  – Technician time
  – Continued support of heads of schools and Deans
Lessons Learned

• There is a need to keep everyone informed – staff and students
• Web based materials assist in this process
• It is useful to have an “on site” representative for the unit who can deal with student questions about the organization of the unit
Our vision …

• Establish Physics residential school *nodes* at UNE and Murdoch to draw in external students from universities all over Australia