Practical Courses and their relevance to the education of Health Professionals: The Three R’s
Reduction, Refinement and Replacement

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• Active learning, where students are participants, for example participation in practical work, is more likely to be associated with a deep approach (Biggs, 1999, Teaching for Quality Learning at University, Open University Press).

• However practical courses have issues around learning experience (to be addressed), cost, health and safety, and changing profile of Health graduates - limited scope for direct application of practical work for majority of students.

“However, if they are ill-considered or poorly executed, practicals have the potential to be educationally counter-productive and a waste of substantial teaching resources. You may yourself recall undergraduate practicals in which you found yourself adopting an uninvolved and superficial approach in order to engage in more stimulating interactions with your fellow students or to ‘get it over’ as quickly as possible. If a practical seems to the students to be irrelevant, excessively burdensome, poorly taught or if it fails to “work” then it will fail as an educational tool and may encourage negative approaches to learning on the part of the student.”

(Guidance for Lecturers, University of Oxford)

• What is gained from the practical work?

Usual justification: develop understanding of concepts & acquire knowledge

“For meaningful learning to take place, it is the brain and not just the hands that need to be active” (Byers, 2002, U. Chem. Ed.)

• What is gained from the practical work?

“XXX is a practical subject and so we must do practical work”

• The three R’s- Reduction, Refinement and Replacement.

• Replacement: need for humane education in life sciences.
• Extensive range of multimedia computer simulations available freely since early 1990’s.
• Support the development of enquiry skills.
Refinement ??? or a need for practice???

- 0.05% of all prescriptions are extemporaneously prepared.
- However all Australian schools of Pharmacy maintain practical classes in extemporaneous preparation.
- UniSA approximately 50 hours total
- Why?

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Refinement ??? or a need for practice???

- ....baby Matthew Young died after being given a peppermint water mixture (1998).
  The error Mr K had made was to put 75ml of concentrated chloroform water into the 150ml of mixture for Matthew Young, rather than 3.75ml. In his police interview, Mr K had said that he had not realised there was any difference between concentrated chloroform water and double strength chloroform water.

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Refinement

- Need to develop practical courses which provide a quality learning opportunity for students.

Exercises

Problem solving

“Problem solving is what you do when you don’t know what to do, otherwise it’s not a problem” (Bodner & Domin, 2000, U. Chem. Ed.)

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Refinement

- (shift to patient focussed rather than solely drug centred)

Mr Carroll is a 70 year old male with hypertension. He is currently receiving a number of medications, including an Angiotensin-Converting-Enzyme (ACE)-inhibitor, and a diuretic. He has been troubled with a cold, with symptoms including a blocked nose and a nagging unproductive cough.

- He presents the following prescription for dispensing. The product is available as proprietary products (label only required).
  Pholcodeine linctus (mdu)

- Take the appropriate steps in dispensing this prescription and counsel the patient accordingly.

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Refinement

- (shift to student focussed rather than academic focussed)

- “Learning trail” in anthropometry. Small group of students instructed in technique. Peer instruction by this group to other small groups. Final stage is full class discussion with sources of technical error identified. Technical accuracy improved.

- (Dollman, 2005, Advances in Health Sciences Ed.)

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Refinement

- (shift to student focussed rather than academic focussed)

- Research-based projects have been associated with more sophisticated levels of intellectual development i.e. the higher order cognitive tasks described in Bloom’s taxonomy.

- Simply stated “If researchers recognise the ways in which their activities parallel those of students and take steps to involve students in research-like activities, research can inform practice in facilitating learning” (Brew, 1996, Studies in Higher Ed.)
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- **Refinement?**
  - 8/10 manuals required learners to operate at three lower levels of Bloom’s taxonomy.

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- **Reduction??**
  - There is a strong link between social interactions, critical thinking and deep learning and group work is an excellent way of allowing social interaction and thus developing cognitive skills. (Entwistle & Ramsden, 1983 Understanding Student Learning. Croom Helm.)

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- **Replacement.**
  - Wide gap in the vision between the “active” and the practice in most laboratories.
  - Or do the teaching practitioners see the arguments of the active as “reasonable in principle, but unattainable in practice”. (Johnstone & Al-Shuaili, 2001, U. Chem. Ed.)

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- **Reduction??**
  - “Our XXX Course has traditionally had a high content of laboratory work (‘practical classes’) ……….With increased student numbers … marking the reports long and tedious.
  - The new initiative aimed to streamline the marking process. … Rather than allowing the student to design their own report format, students are now issued with a ‘proforma’ report with spaces for them to complete in specific ways……but would typically include spaces for the following types of response (a) answers to specific questions posed during the practical; (b) description of specific aspects of their results; (c) presentation of their data in table…… (d) reporting overall conclusions; (e) describing any specific problems encountered. ……..This new approach also makes it easier and quicker for the students to summarise their achievements in the class.”

- **Refinement??**
  - “M1 Antibodies
    M2 Not antibodies – toxins
    M1 I think its antibiotics
    M2 Yeah
    M1 I’m seriously confused
    M2 Yeah, Yeah
    M1 I might be wrong, it’s antibiotics. It’s not anti- it’s not antibiotics. Anti-toxins. I’m getting confused now”