

Harris Teaching Workshop 2011

**Report from Session #4, Topic #3:
Upper Level Labs**

Background

- “Upper level” was defined as 2nd year or higher
 - All institutions represented had a variety of 2nd and 3rd year lab courses or lecture/lab courses
 - All institutions offered a 4th year research project
 - Structured 4th year labs were less common (e.g., four required at UVic and UBC contrasted with only one offered at U of A and seldom taken by undergraduates)
- Consensus that as course level increases, the lab should be less structured to more closely model the research experience

Summary of Discussion

- Given the prevalence of 4th year research projects, should structured 4th year labs also be required?
 - Opinion varied from passionate “yes” (ensuring students continue to receive balanced lab experience in all disciplines) to “no” (placing freedom of student choice first)
 - Consensus was that best scenario could be offering students a **choice** between a focused research project or the more diverse coverage of a structured lab program

Summary of Discussion

- Should 4th year labs be used to “field test” new experiments for 2nd and 3rd year courses?
 - Several participants have successfully used this approach
 - A 4th year student can be given paper(s) as a starting point, emulating research approach
 - If the experiment works for the senior student, there is a high likelihood that the experiment could be developed for the “mass” 2nd or 3rd year experiment (and *vice-versa*)

Summary of Discussion

- Should upper level labs be interdisciplinary / integrated?
 - General agreement that this would be a good thing in principle, but is not common
 - Major impediments to implementation are how to arrange the instructional expertise (both professor and TA), finding suitable experiments, obtaining agreement on curriculum from different disciplines (e.g., are current courses eliminated to create the integrated course?)
 - Those who have tried interdisciplinary labs typically end up “splicing” experiments from existing courses

Summary of Discussion

- Most successful example of interdisciplinary lab courses are those teaching **spectroscopy**
 - Many spectroscopic techniques are used across organic, inorganic, analytical and physical chemistry
 - Successful example at UVic of a 2nd year, 1st term spectroscopy course that is a prerequisite for subsequent labs at 3rd and 4th year
 - Challenges exist at other institutions with finding the space in the curriculum (*i.e.*, 2nd year typically already being course intensive)