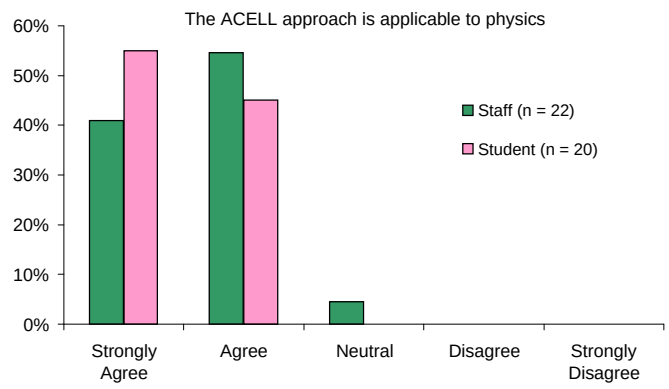
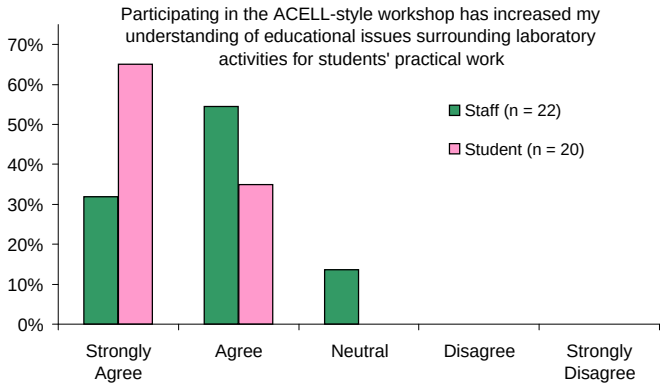
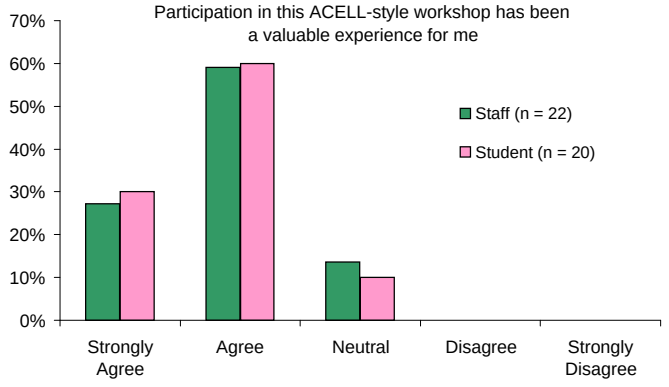
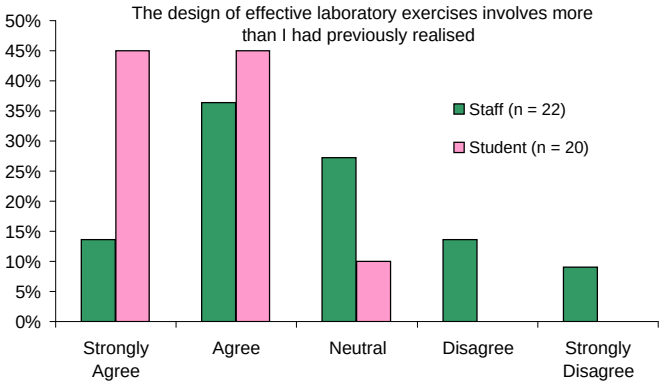
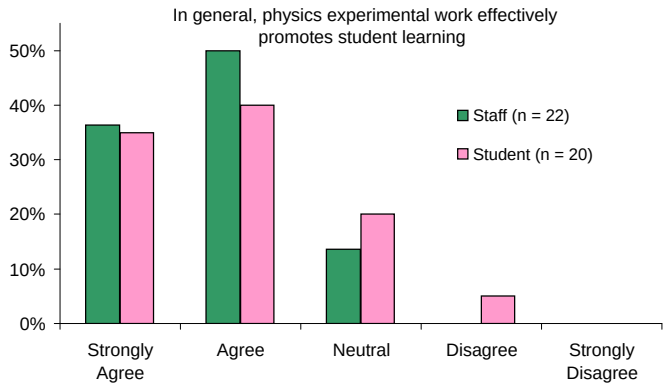
Delegate Evaluation of ACELL-style Physics Workshop

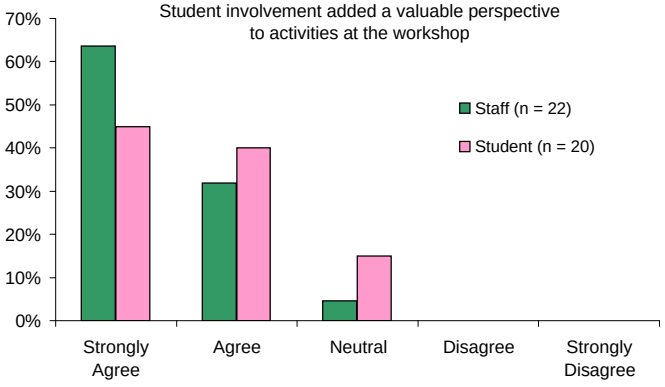


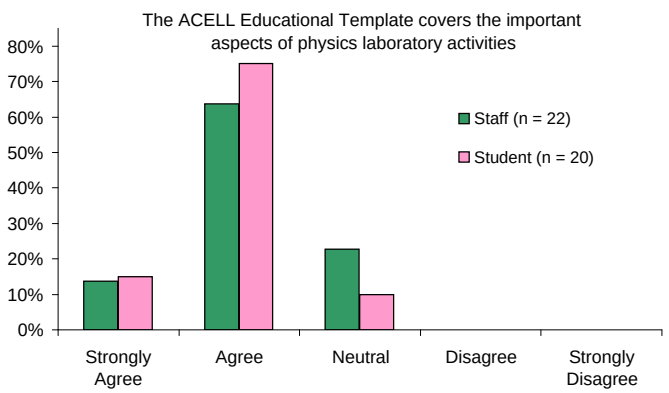


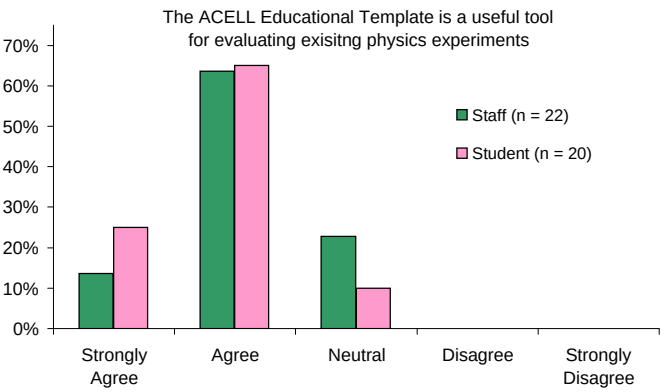












Data collected by ACELL Directors pursuant to University of Sydney HREC project 12-2005/2/8807

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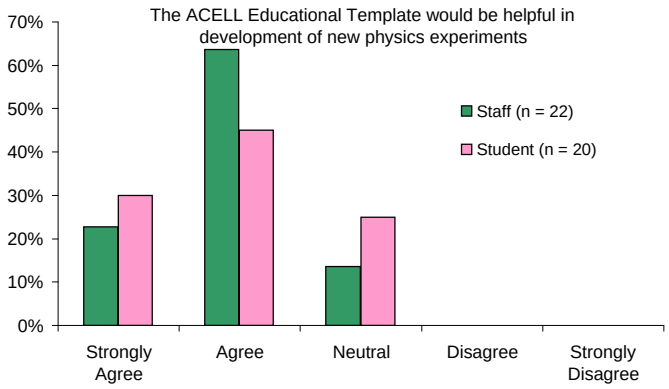

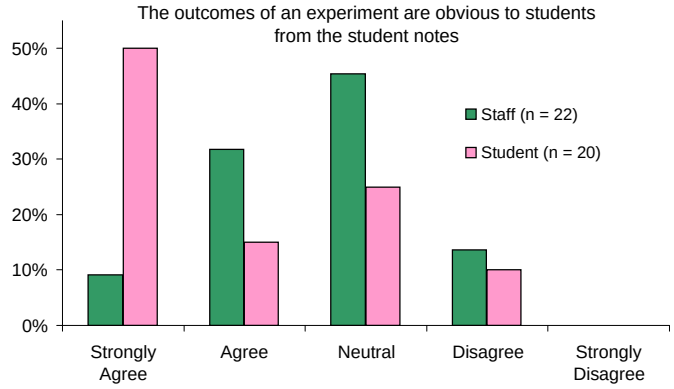

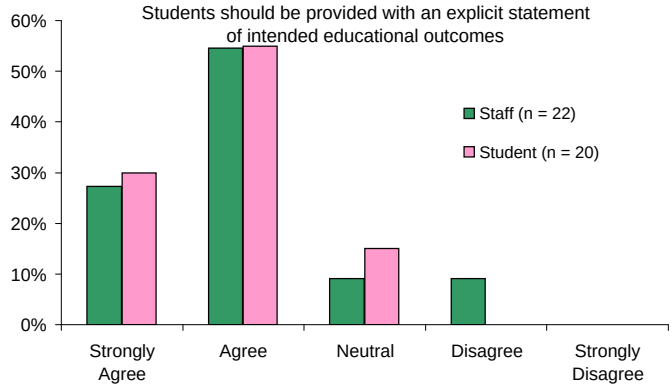

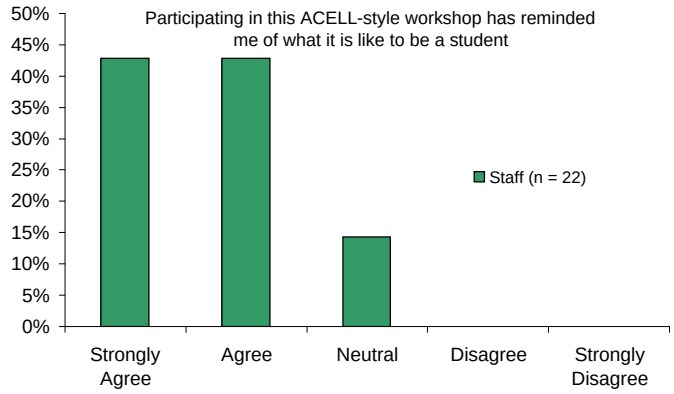

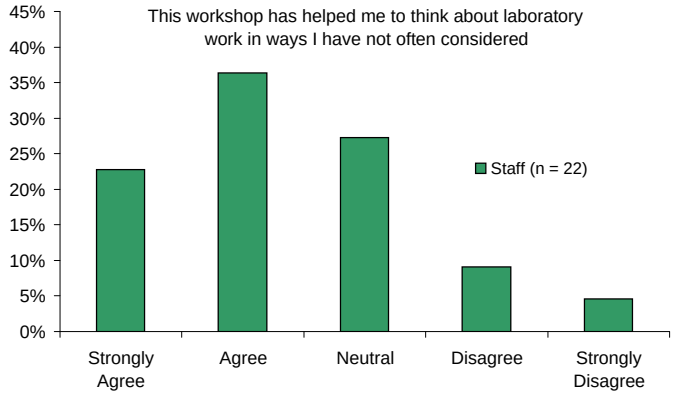

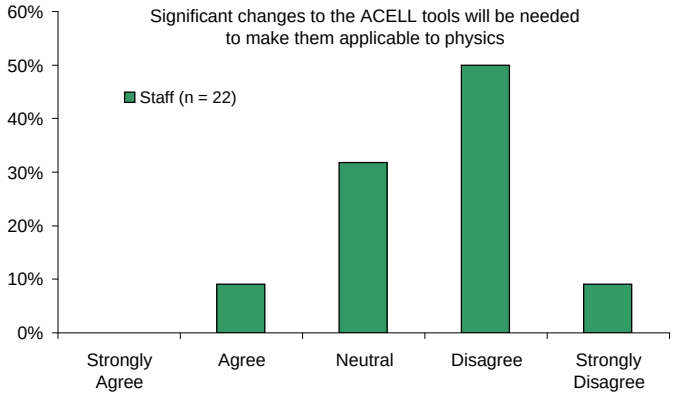

Q1: No Difference ($t_{40} = 1.10$, $p = 0.278$)
Q2: Difference ($t_{40} = 2.58$, $p = 0.0137$)
Q3: No Difference ($t_{40} = 0.328$, $p = 0.745$)
Q4: Difference ($t_{40} = 3.46$ $p = 0.00131$)
Q5: No Difference ($t_{40} = 0.728$, $p = 0.471$)
Q6: No Difference ($t_{40} = 1.42$, $p = 0.163$)
Q7: No Difference ($t_{40} = 0.807$, $p = 0.424$)
Q8: No Difference ($t_{40} = 1.30$, $p = 0.848$)
Q9: No Difference ($t_{40} = 0.193$, $p = 0.848$)
Q10: Difference ($t_{40} = 2.28$, $p = 0.0281$)
Q11: No Difference ($t_{40} = 0.671$, $p = 0.873$)

Two sided homoscedastic *t*-tests on the staff v student response average show that significant differences are observed for items 2, 4, and 10 only.

The number of respondents in each group is too small to be able to carry out non-parametric chi-square testing to compare patterns of responses.

Overall, both quantitative and qualitative data strongly support both the potential value of the ACELL approach for incremental improvement in physics laboratory work, and the general applicability of the processes used in chemistry - both workshop format and tools.

Delegate Evaluation of ACELL-style Physics Workshop

What did you find to be the most valuable aspect of this ACELL-style workshop? Why?

Responses from Staff Delegates	Responses from Student Delegates
Useful feedback from staff and students	Getting a chance to see how much is actually involved in putting together an experiment
Template useful in reminding one of points that should be covered.	Seeing how important it is to understand and demonstrate concepts
Doing an experiment under defined time pressure in an unprepared way - I have never had to do this, even as an undergraduate (where the minimum time per experimetn was 14 h). This time pressure forces the need for VERY clear lab scripts with the assessable components very clearly defined.	The feedback given to experiment designers - it appeared that there were definitely alternative views / approaches they had not considered
	The ability to discuss the lab with the author / creator - it gave a chance for improvement and made me more involved
Talking with participants	Student and staff get to work on the experiments together
Interaction and feedback with my peers and disinterested students.	The feedback / debrief sessions
Meeting and discussing physics education with fellow physicists.	Being taught about what goes into planning experiments
Peer-assessment and feedback on experiments provided in the experiment sessions.	The interaction with experiment makers and discussion of our ideas for improvement
Working with a range of academics	Working with the Dean and other uni students outside UTS
Having an experiment critiqued properly	Gaining a deeper understanding of how physics experiment can be improved
Discussion with colleagues, including students!	Educated us about the complex nature of making ideas better suited to the target group
Input from other disciplines is useful.	Talking and expressing ideas with staff and students about the experiment and improvements.
Reflection	
I had forgotten how tedious some of the tasks we get students to do are. We can do better with modern technology.	Evaluation of each experiment can be carried out using comments from both staff and student groups
Gives structure and focus to designing new experiments and evaluating existing ones.	Working together to produce good experiment for students seems a good goal
Experiencing the experiments helps in design strategy for other experiments.	Learning how physics pracs are done in various universities
Ability to reflect on design aspects with designers and fellow "students".	Experienceing a range of expeimental formats
Being able to see the structure, methodology of assessing the labs - provides a template for creating labs.	The actual process of going through and being aware of what is required in a goo laboratory exercise.
Made me think about the reasons for doing labs and what / how much should be in a lab.	The discussion of the experiment afterwards each time.
Grappling with real world fuzziness (errors in measurement) in the context of observation and analysis.	Getting to give some input on how experiment should be done i.e. more exciting :) so that in the future, they can be changed.
Found out how experiments are designed and liked being able to provide my input into how I found the experiments	Debrief sessions because they outlined what did / did not work well in the experiments and why.
Exposure to experiments from other universities	Experiencing the different approaches to experiment in physics at different uni's - there is a great diversity among different universities
We got to look at a series of old experiments, they were surprisingly interesting	
Learning processes of other unis	It provides a good template to assess existing experiments and to effectively create new experiments. This type of critical analysis is essential for experiments and demonstrators, so these experiments have had a great service today.
Student participation - the "consumer's" view	
I learned that I would not like to be an undergraduate student again.	
Different point of view	

What changes or improvements wouold you suggest to make the process better suited to laboratory work in physics?

Responses from Staff Delegates	Responses from Student Delegates
O.K. - process works well for physics	Possibly using more current first year students and comfy chairs!
It will be easier to do a workshop like and develop an ACELL experiment the second time around. Preparation for participation could have been better explained.	Make everything as simple as possible - students just want to get out of there and they're not going to pay attention to something complicated.
An indication of the level of detail required in the template.	A larger pool of first year students to give first hand impressions
Give out notes in advance so that templates can be considered	Need pre-knowledge for some of the labs
Reviewing experiments will be of more value if experiments and templates were of 'best' experiments - some seen today were only brief-complete (??)	Longer times to complete experiments as well as more time devoted to thinking about the physics concepts involved.
More emphasis on student responses since they are representatives of "end-users".	Student - lecturer pairing
Staff see 'holes' in the template responses that students may find hard to evaluate	More focus on the link between theory and analysis which play major roles in physics work
Model suits physics well.	Liquid nitrogen!!
Include time for pre-work?	Later start for interstate visitors
More time to fill out these evaluation forms.	The porocess itself needs to address more what is covered in lectures - maybe a summary sheet is needed along with the template to fully explain the required knowledge. This was a big issue raised in debrief sessions.
Experiment review - make lab more realistic in that "students" have to do pre-work	
Get / enforce more time spent on filling out review surveys	
Match academics with students	More emphasis on circuits
None - I believe that the process is great as is	Need first year students if evaluating first year type experiments, second years for second year type experiments, etc.
	Give a good example template to make it clear what knid of answers to put - perhaps this is done externally - unifromity seems to be needed for a database
	Cross-section of students of different abilities and years - making this level to the experiments they are asked to test.
	Make sure each experiment has an introduction with the group and a summary at the end so we have the [erspective of where the students have come from, and where they are going

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What aspect(s) of the workshop did you find most surprising or unexpected?	
Responses from Staff Delegates	**Responses from Student Delegates**
Too much is determined by a demonstrator's approach / knowledge / personality	How much work had actually gone into preparing and designing the experiments.
Getting checked In the lab! Someone looking over my shoulder, while I wanted or needed to ponder!	The level at which the experiments were aimed at (i.e. there were only first year experiments).
Enthusiasm of student in doing the experiments and provided feedback in the review sessions.	How some were so simple and straigh-forward, while some were explained badly and too repetitive
The level of cooperation between everybody during the experiments (no hierarchy and it worked).	There is a lot of work and consideration put into experiments, which is really impressive
Just how difficult it is to kick into experimental mode.	The level of participation
Responses from Staff Delegates (cont.)	**Responses from Student Delegates (cont.)**
Research experiments are different to undergraduate experiments - very different.	The general freedom to voice your opinion in discussions.
Lab equipment at my uni is no older than lab equipment at other unis.	How much everyone got involved and enjoyed the day
The difficulty of the task for the unprepared (I have no physics background) - a glimpse into the life of a surface-learner.	Also, technological resources available to students differed greatly, precluding "porting" of experiment to different unis.
How much work it takes to try and get into the shoes of students and how easy it is to forget the way you felt back when you were a student.	The thank-you presents were awesome, I was very ahppy to receive these
U/grads happy to put views forward and contribute positively	Also, how open the demonstrators were to new ideas and opinions.
The number of surveys	Equality of academics and students, and the open environment
That these old experiments were interesting	The thought that has to go into lab activities
First impressions of a lab exercise (upon seeing the manual) may<u>not</u> reflect the true experience	Different attitudes to group work and usefulness of using pairs / teams.
Degree of variation between different uni's teaching style	The workshop was excellently catered.

Please provide any additional comments on the workshop here	
Responses from Staff Delegates	**Responses from Student Delegates**
The materials shoud have gone out to the participants before the workshop.	I found this experience very valuable and enjoyable.
Great workshop!	It was good.
Identifying primary purposes of experiments is critical - in the feedback sessions we were finding out a lot about how the experiment is actually implemented and assessed and what background information / guidance is In place at the institution - needs to be explicitly included (eg. between template and experimental script)	Q10: If this reads "the students' notes should sho their comprehension of the outcomes", this is surely an obviouos necessity. If it reads "the printed notes make the objectives of an experiment clear", this is something which must be ameliorated by simplifying and bolding aims in notes, i.e. avoiding educational jargon
Very Happy :)	Need more clarity of purpose of template
How do you judge similar experiments done in different institutions? Surely on<u>ne</u> would get through the whole process. This response may sound a bit negative - it's more that I have thought about these issues before.	The workshop is a very valuable thing for physics education as this field is often be 'boring' by many people and I feel that this is in part due to the way experiments are carried out. In short, the more fun the experiment, the greater the enthusiasm from the student!
Valuable experience ++	I think he workshop should have first year students as part of feedback process
Useful networking process with a focus on labs.	Make the coffee better!
Useful to be able to talk with students and get their point of view on many things.	Thanks! It was informative
It was good and everybody had a chance to reevaluate the basis once again	Very worthwhile for all parties involved.
Excellent idea	
I intended to apply ACELL template to our experiments but quickly realised it would be a big job - this is much better!	
Still noit sure about changes needed to apply to physics	
I am quite pleased to have a new perspective on the undergraduate experience, seeing it from "this side of the fence"	
Applying the ACELL methodology to each experiment in our physics programs is not practical under current workplan arrangements.	