

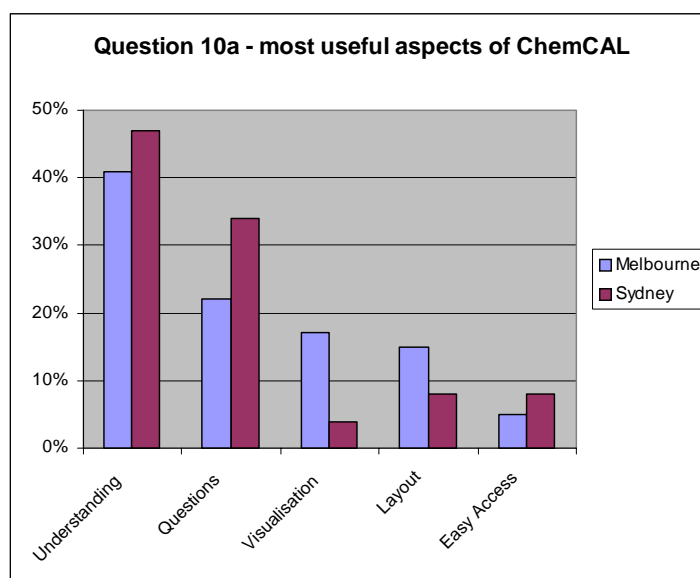
Appendix 6D: Results and analysis of chemistry survey question 10 for the University of Melbourne & the University of Sydney

Q10. Please answer the following questions based on your experience of ChemCAL:

**a) For me, the most useful aspects of ChemCAL are: because:
.....**

In general terms, students who responded to this question (N = 339; 69% Melbourne and 36% Sydney) found the most useful aspects of ChemCAL as an additional learning resource to the traditional methods of lectures and textbooks to be:

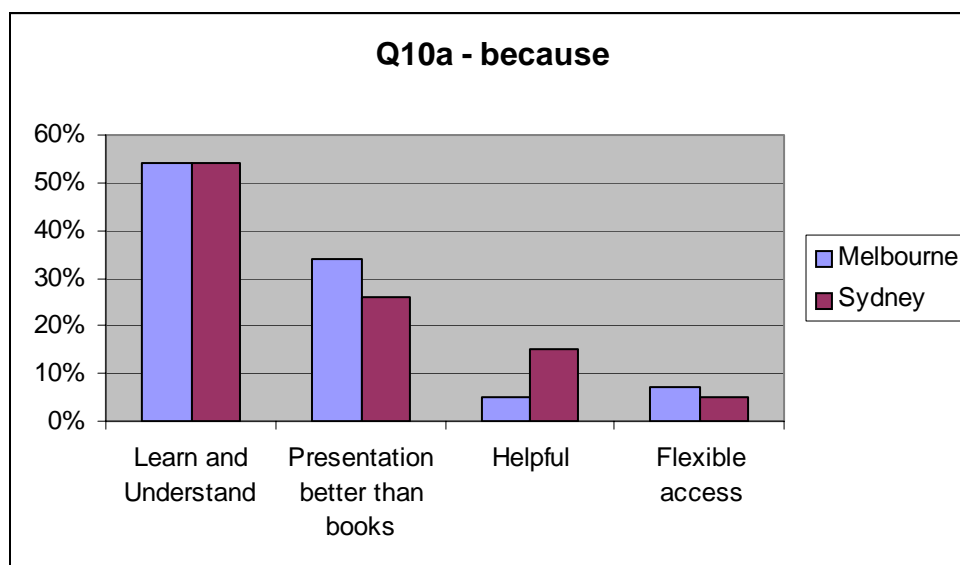
- That it aids students in **learning** and testing their **understanding** of key concepts of first year chemistry by providing relevant summaries of key concepts and topics. This is followed by immediate, step-by-step interactive individual **feedback** with fully solved answers and result scores, which allow students to see where they are at in their understanding of the material. If unable to do a question, clear step-by-step explanations and hints show them how.
- Specifically students found the **questions** to be particularly useful. They liked the question bank, the range and variety of questions, the availability of extra questions, the ability to repeat questions and to practice extra exam questions for exam revision.
- From an aesthetic perspective students liked the **visuals** - 3D pictures, videos, animations and rotating molecules which assisted visualisation. In addition they remarked on the **layout and presentation** of information in weekly modules – which was straightforward, interesting, easy to read, clear, logical and thus better than textbooks
- Lastly they liked the **accessibility** of this resource (computer lab and online) which is immediate, available 24/7, allowing them to revise at their own leisure/pace, reviewing questions and lectures in their own time.



because...

In general terms, students who responded to this question (60% Melbourne and 29% Sydney) found ChemCAL useful because:

- The immediate feedback aids **learning** by allowing students to test, correct and reinforce and consolidate their **understanding** of the material initially introduced in lectures. They state that the learning process is easier and more efficient. Summarised topics, practice problems and the ability to repeat and go back serves as good exam preparation.
- It is **better than** using a **textbook**. The presentation is clear, logical, simple, concise, visually stimulating and interesting, making information easier to digest and understand.
- It is **helpful**, useful by showing how to do things, which encourages, motivates and builds confidence.
- Easy fast **flexible access** to a wide variety of topics and exercises and questions saves time. Students like being able to do the work from home at their leisure and at a pace that suits their style of learning. This suits some students who have a problem keeping up with the speed of lectures.

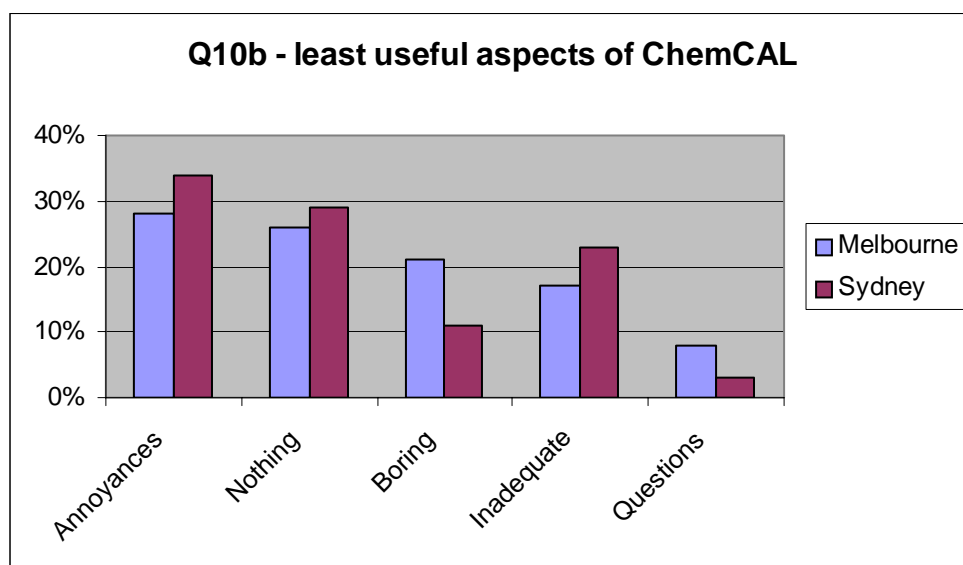


Q10. Please answer the following questions based on your experience of ChemCAL:

**b) For me, the least useful aspects of ChemCAL are: because:
.....**

In general terms, students who responded to this question (N = 168; 38% Melbourne and 19% Sydney) found the least useful aspects of ChemCAL to be:

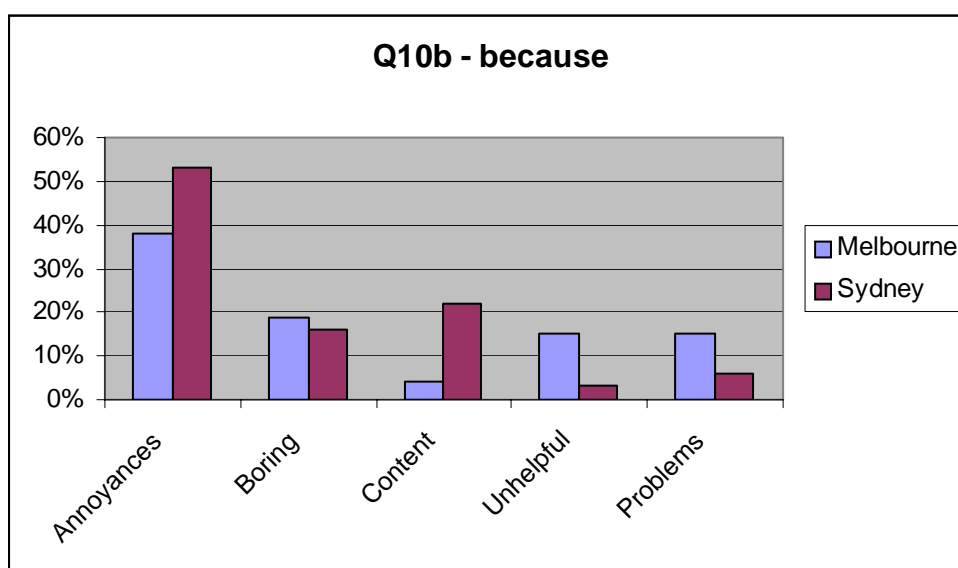
- Problems, difficulties and annoyances associated with using computers that waste time. **Access problems** included: not having internet access at home and finding that it doesn't run on a lot of campus computers or at home. A major **technical difficulty** was not being able to get ChemCAL to work on the home computer, associated with not being able to download shockwave. **Annoyances** included: a lengthy access procedure, slow download speeds even with some cable connections, some images that don't work, having to look at a screen for long periods of time, the next question button, having to do redo a whole exercise if a question is missed by mistake, having to revert back to using paper when doing calculations. Additional annoyances included not being able to: print out information, skip ahead, find section wanted, go back a page without answers to questions being deleted, save section of module that has been done to return to later if out of time, obtain partial points for answers that are partially correct or when sig figs incorrect.
- Approximately one quarter of respondents to this question stated that there was **nothing** wrong and that they like using ChemCAL.
- Long time consuming modules with **dull boring** pages with no interaction and big slabs of information where the writing is too small. And where some sections (eg. visual, audio) are confusing or hard to understand.
- Students have found that they may still not understand a topic because some notes, **explanations** or hints were very general, too brief, **inadequate**, unclear or assumed knowledge not covered. They would prefer to interact with a tutor under these circumstances. It was also felt that some information provided was irrelevant to the course or material to be examined.
- Regarding **questions** provided, students found that these could be too easy, vague, not varied enough and inadequate for exam preparation



because...

In general terms, students who responded to this question (20% Melbourne and 10% Sydney) found ChemCAL least useful because:

- There are various **annoyances** associated with using ChemCAL and computers, resulting in students giving preference to **traditional learning** methodologies. For instance: explanations and hints may be inadequate, insufficient or unclear, so students would prefer getting human feedback or interaction with tutors/demonstrators. Some students find it easier to learn from a textbook because with the modules: they can't gauge how many pages are left to do, they don't like going back a page for information, they can't obtain printouts, they have to start again if they ran out of time, nearly correct answers are not recognised, questions can be easily missed and 3D/audio sections can be difficult to comprehend. There is the usual frustration associated with slow connections or not having access to ChemCAL from home. In addition some students don't like using computers (eye-strain) or find computer areas to be non-conducive for study purposes. They would rather work on paper.
- Students find some big slabs of text tedious, dull, **boring**, repetitive, confusing, uninteresting and irrelevant with insufficient interaction which causes eye strain and disinterest.
- Students are concerned that the material covered is too brief, general, easy or basic, resulting in **inadequate** exam preparation. Students may already understand the material or it has already been covered in lectures, whilst other more difficult material has not been covered or is assumed.
- Some students find sections of ChemCAL to be annoying, uninformative, unchallenging, confusing, **unhelpful** and discouraging. As a result they don't understand the material.
- Some students are frustrated by the **technical difficulties** associated with Shockwave needing to be downloaded on the computer. They may also have difficulty accessing a computer.



Q10. Please answer the following questions based on your experience of ChemCAL:

c) The thing I would change about ChemCAL, if I could, would be:

In general terms, students who responded to this question (N = 208; 42% Melbourne and 21% Sydney) proposed the following changes to ChemCAL:

- Minimise **annoyances**: (1) reduce technical and software problems, (2) increase speeds by having less images, smaller file sizes and simpler version that can run on old computers, (3) indicate how many more pages/questions completed/remaining, (4) make modules shorter, (5) be able to move backwards to previous page/questions without losing correct answers, (6) make clear how many questions on each page. Indicate exactly which section not completed, (7) ability to save part of module that has been done. So can come back later and complete module, (8) be able to retrieve question I have answered incorrectly, (9) broaden range of acceptable answers to questions. Improve **access**: (1) to campus computers, perhaps have official tutorial times for doing chemCAL, (2) advertise ChemCAL, would increase usage, (3) make off campus access easier, eg. make available CD edition and paper hardcopy version for people who have dial-up or no home internet access, or make it possible to print or download information.
- In terms of **content**, students would like: (1) better, clearer and more detailed explanations or hints to questions, (2) more topics covered that are relevant to the course and exam, (3) to be provided with an index, glossary, more detailed module outlines, lecture notes and revision summaries and (4) to have access to a data base containing periodic table, pressure conversions, atomic masses, m.p.'s and b.p.'s. Make formula sheets available
- About one fifth of students noted that they would change **nothing** and that it is useful and good as it is.
- Regarding **questions**, students would like: more variety, easier and more challenging questions, graded with levels of difficulty (easy/normal/hard) up to exam level.
- In terms of **layout and presentation**, students suggest that it would be better to have: (1) more modules/topics that are smaller and shorter and (2) more visual animations and diagrams

