



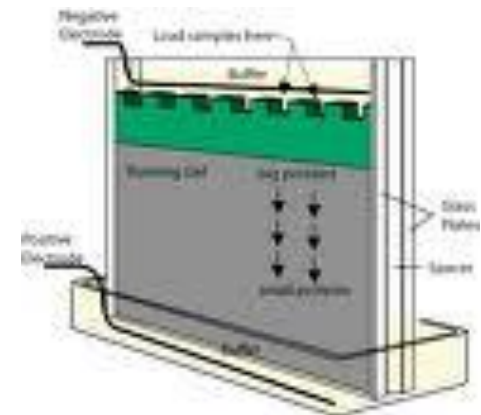
UNIVERSITY OF LEEDS



On-line resources to help students maximise their learning in practical classes



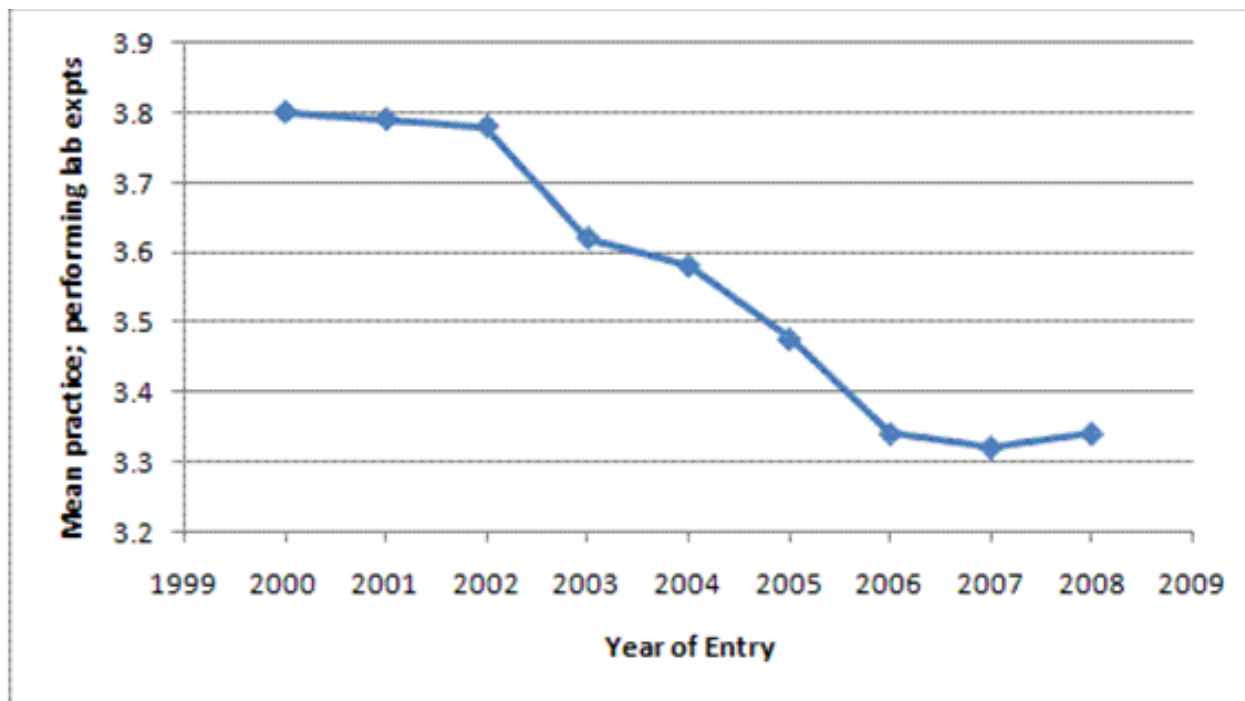
Sue R Whittle
Sue Bickerdike





Background

A growing concern about students' practical skills





UNIVERSITY OF LEEDS

Increased focus on developing practical skills

Separate practical skills module

- Increase practice in laboratory
- Take more responsibility for planning experiments
- Recording results as experiment progresses



Preparing for practical classes

- Reading module manual
- Recommended reading from texts
- Answering 'preparation questions'
- Receiving feedback on preparation during the class

BUT

Students found it hard to prepare effectively
Staff didn't always find time to check preparation
Misunderstandings not addressed at the start of class



UNIVERSITY OF LEEDS

Confusion



leads to mistakes



and frustration





UNIVERSITY OF LEEDS

ADF bid - objectives

1. support students in preparing for laboratory practicals using interactive materials to improve their understanding of techniques involved, and their engagement with self-directed learning from the start of their university studies
2. improve the formative feedback they receive prior to practicals
3. introduce students to techniques used in the research environment which are unavailable in teaching laboratories



UNIVERSITY OF LEEDS

Using the VLE to improve the student experience

On-line preparation materials:

Theoretical background to technique - text, diagrams, animations

How to use equipment - video, photographs

On-line self-assessment linked to Gradebook



Practical topics addressed

- Spectrophotometry
- pH & buffers
- molecular exclusion chromatography
- ion exchange chromatography
- affinity chromatography (IMAC)
- thermodynamic determinations
- SDS polyacrylamide gel electrophoresis
- enzyme assays (kinetics & inhibition studies)
- molecular biology techniques (PCR, restriction digestion)
- agarose gel electrophoresis



UNIVERSITY OF LEEDS

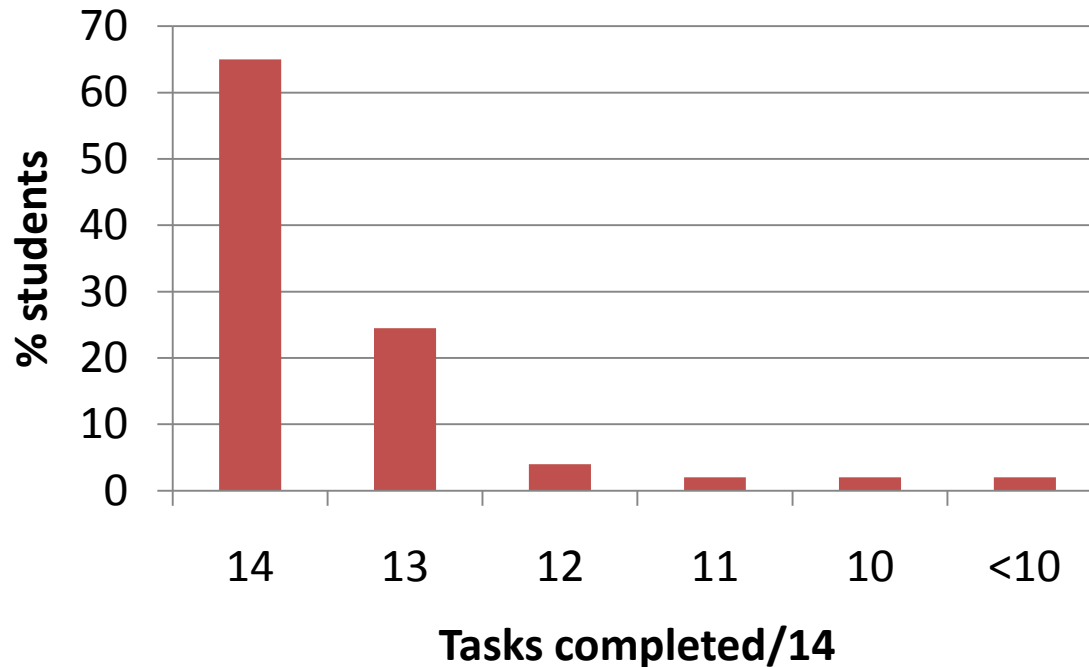
Units supporting wider aspects of the module

- Laboratory safety
- Recording experimental data (Using a lab notebook effectively)
- Writing practical reports



Evaluation - compulsory tasks

Completion of preparation tasks



90% of cohort completed 13/14 tasks



Usage of non-compulsory materials Semester 1 variable

Resource	% students accessed
Lab safety	49
Writing a lab book	78
Writing a practical report	79
pH & buffers practice exercises (action mazes)	14
Separating protein practice exercises (action mazes)	23

Feedback on Resources

Question	% agree
It was easy to access the pre-practical information on the VLE.	85
The structure and the layout of the VLE pre-practical information was clear and easy to understand.	73
The video demonstrations of the methods to be used in the practical gave me a clear idea of what I was expected to do.	68
The pre-practical information helped me to understand the theoretical background to the techniques I was going to perform in class.	75
The information and video demonstrations helped me to understand the procedures I had to conduct.	77
The pre-practical briefing via the VLE enabled me to work at my own pace allowing me to get a better understanding of the work to be done.	77

n = 109 (84%)



Feedback on Resources

Question	% agree
The combination of commentary with video and still photographs was effective in describing the work to be undertaken.	74
The pre-practical information helped me understand the material delivered in lectures.	72
I would like to see this type of pre-practical briefing used for other complex practical exercises.	77
The additional quizzes and MCQs gave me the opportunity to test my understanding of the theory behind the practicals.	77
The action maze quizzes on pH and buffers helped with my understanding of the subject.	17
The action mazes on separation techniques helped me to design my experiments.	17



UNIVERSITY OF LEEDS

What did you like about the pre-practical information?

‘The information provided helped me to gain a better understanding on what had already been discussed in lectures.’

‘It provided clear and specific theoretical information, which was difficult to ascertain simply from reading the manual. Using the pre-practical information let me understand what it is I was doing, and why it worked.’

‘I liked the practical activity actually being performed as it made me more confident when I came to perform it myself in the lab.’



What did you dislike about the pre-practical information?

‘I didn't feel there was enough information on how to read SDS-PAGE results. It would have been helpful if an actual SDS-PAGE photograph had been shown so that it was clear how to measure distances migrated versus the standard proteins from the origin.’

‘Certain parts, especially mathematical equations or calculations were not explained very well.’

‘The mazes were very confusing and difficult to remember what you'd written beforehand, and what the overall picture was.’

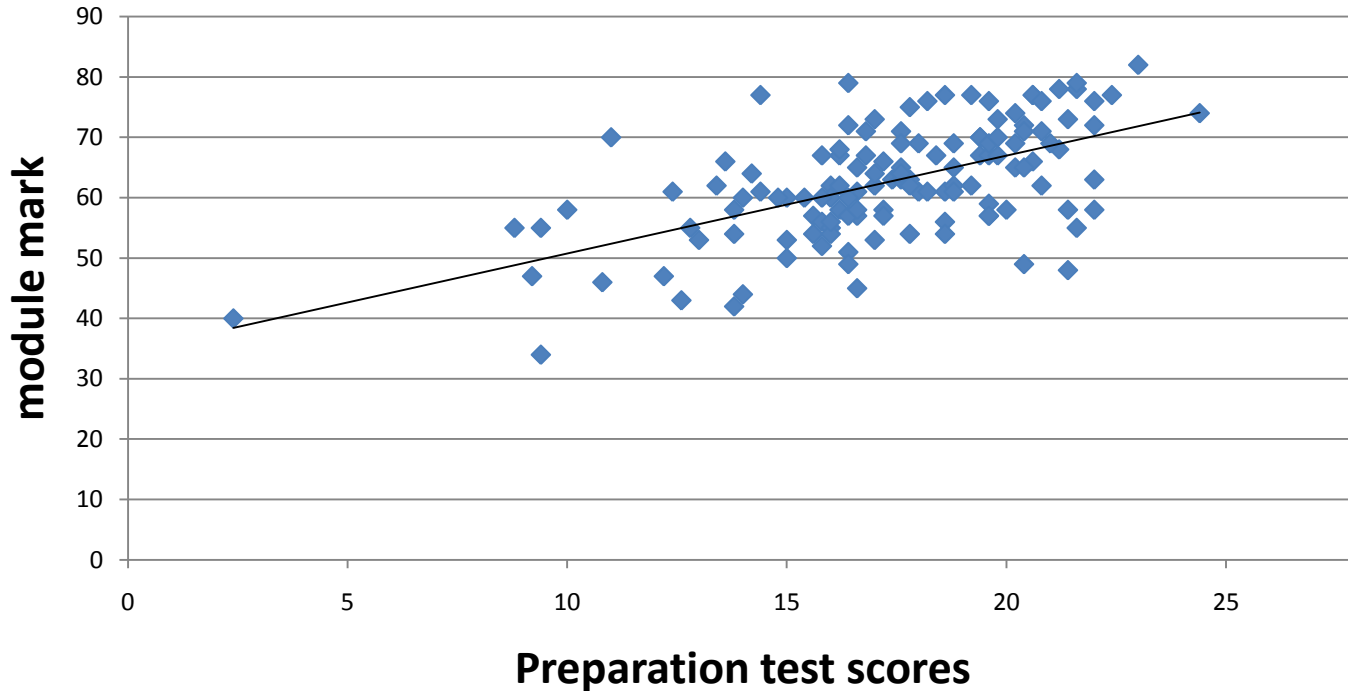


Responses to student feedback

- action mazes have been rewritten to improve clarity
- additional formative self test material has been incorporated into the presentations
- some individual presentations have been clarified/altered

Performance on preparation tests

Correlation between preparation test scores and module mark





UNIVERSITY OF LEEDS

Lessons learnt

Usage of 'compulsory' materials has been very good

Feedback has allowed us to improve resources during the year

Students have found the materials easy to access and use

Student performance on the preparation test material has been good



UNIVERSITY OF LEEDS

Resources available for use

JORUMOPEN versions are licensed under a Creative Commons license and contain all the source files that will enable users to amend them to their specific requirements if necessary