

# How to assess large numbers of students: a combination of peer and computer- assisted assessment

Gayle Ferguson  
Ruth Grady\*  
Elizabeth Sheader

*Faculty of Life Sciences, The University of Manchester,  
UK*

**Introduction to  
Laboratory  
Science**

**Compulsory  
Level 1  
Semester 1**

**457 students  
F/M: 56 % / 44 %**

**Home 86 %  
EU 5 %  
International 9 %**

**96 % < 21 years**

**human biology  
8, 9, 10**

**the diversity of life  
Practicals 1, 2**

**shedding light on  
biomolecules  
3, 4**

**nucleic acids  
and proteins  
5, 6**

**switching on genes  
7**

# assessment

**20%** for attending and  
completing work during  
practical sessions

**80%** for SAQs on each of  
the 10 practicals

**Week 7** – deadline for  
submission of *pracs 1 - 4*

**Week 12** – deadline for  
submission of *pracs 5 - 10*



**Exam Structure**

- Exam Paper: BIOL1040207
  - Question 1
  - Question 2
    - Question 2.1
    - Question 2.2**
    - Question 2.3
    - Question 2.4
  - Question 3
  - Question 4
  - Question 5
  - Question 6
  - Question 7
  - Question 8
    - Question 8.1
    - Question 8.2
    - Question 8.3
  - Question 9
    - Question 9.1
    - Question 9.2
    - Question 9.3

ID: Question 2.2      Marks Allocated: 2      Marking Status: 0 out of 111 marked

Name two genera of microorganisms that you may reasonably expect to be present on the  $10^{-2}$  dilution SAB plate

Answers 11 to 20 of 103 (8 excluded)

**Model Answer**

Any of:  
 Mucor, Rhizopus, Saccharomyces, Penicillium, Aspergillus, Candida  
 Do NOT give marks for: 'fungi', 'bacteria' or any bacterial genera names.

Marks Awarded (out of 2)  
2

**Student Answer #28**

Yeast such as Saccharomyces or Candida species.  
 Fungus such as Penicillium species or Aspergillus species.

Marks Awarded (out of 2)

**Student Answer #44**

Penecillin, Aspergillus

Marks Awarded (out of 2)

**Student Answer #81**

penicillium and saccharomyces are two genera you could expect to find on the SAB plate

Marks Awarded (out of 2)

**Student Answer #31**

streptococcus  
 fritschea

Marks Awarded (out of 2)

**Clusters of Answers**

- Question 2.2

# CAA – advantages and disadvantages

- Being able to complete & submit work from home
- Reduces staff/demonstrator marking time
- Detects plagiarism
- Potential for less variability between markers
- Easy to administer anonymous marking
- **Need access to internet**
- **Possibly need to tailor questions to the technology**
- **Have to read answers and allocate marks on-screen**
- Sheader E, Gouldsbrough I & Grady R. 2006. Staff and student perceptions of computer-assisted assessment for physiology practical classes. *Advances in Physiology Education* 30: 174-180

# Why peer assessment ?

- Students actively engaged in the process
- Can judge performance relative to peers
- Students given insight into how assessment “works” at University
- “Feed-forward” - how to tackle next assessment
- Training in critical appraisal, in preparation for the “world of work”
- Would not increase the burden of marking for staff

# Implementation

- SAQs submitted Monday Week 7
- Peer marking sessions Wednesday Week 7
- 50 minute session; 230 students; anonymous
- Penalties for non-attendance (lose 50 % marks)
- Marking scheme by PowerPoint presentation
- Academic moderation
- Marks released in Week 8
- Students had 1 week to challenge their mark

# What were our concerns?

- Would the students take it seriously?
- Affect on marks – how robust?
- Are weak students able to mark good scripts?
- What would the students think of it?
- Did it improve the feedback to students?

# Would students take it seriously?

**Of 457 students registered for the unit:**

- 4 were excused
- 8 didn't submit

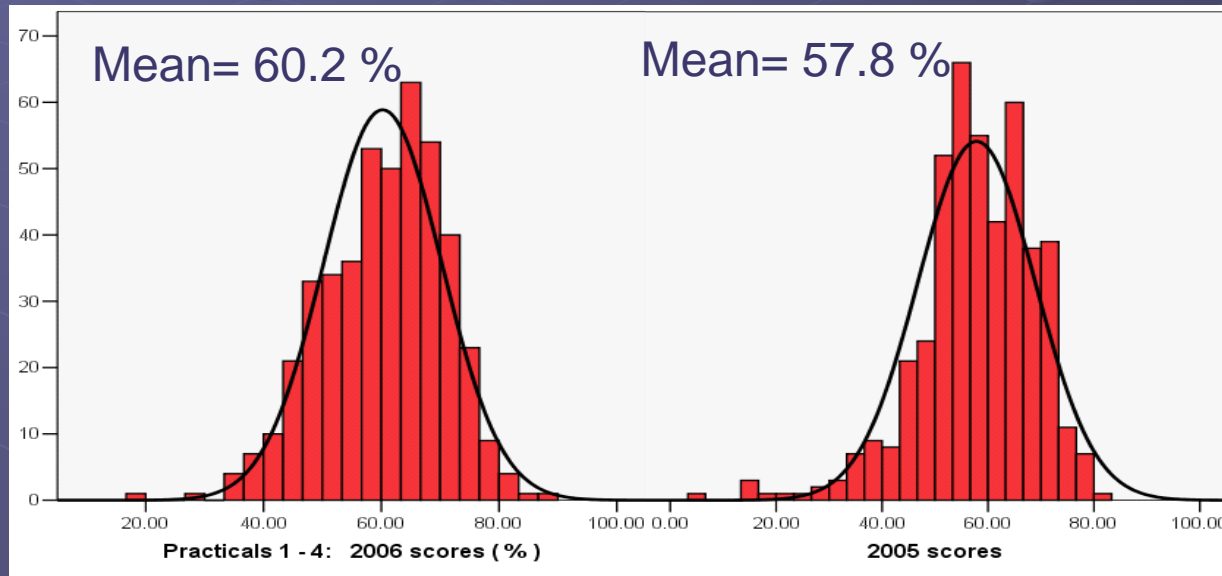
**445 students expected to attend the PA sessions:**

- 6 were absent without reason
- 2 presented sicknotes
- 10 challenged their mark following release of results
- 5 subsequently requested a remark

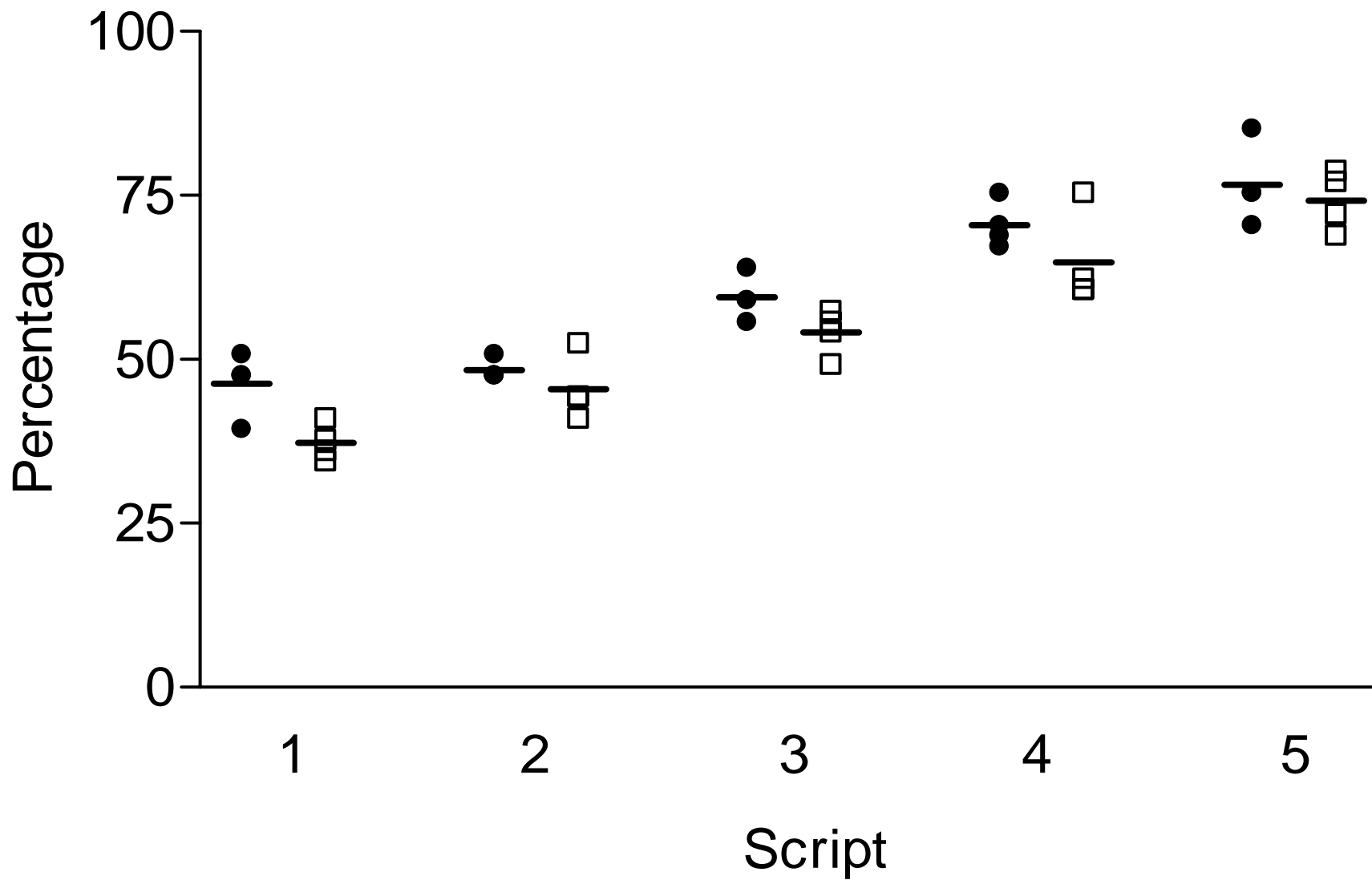


# How robust is PA?

- Academic moderation of scripts
- Comparison with previous year's results



- Replication (4 x 5) of random student scripts for comparative marking (peers vs PG demonstrators)



● Student      □ Demonstrator

# Are “weak” students poor markers ?

- No correlation between mark student gave and mark student got at either upper or lower ends of distribution
- Marking by “weak” and “strong” students was equally robust

# What did the students think of it ?

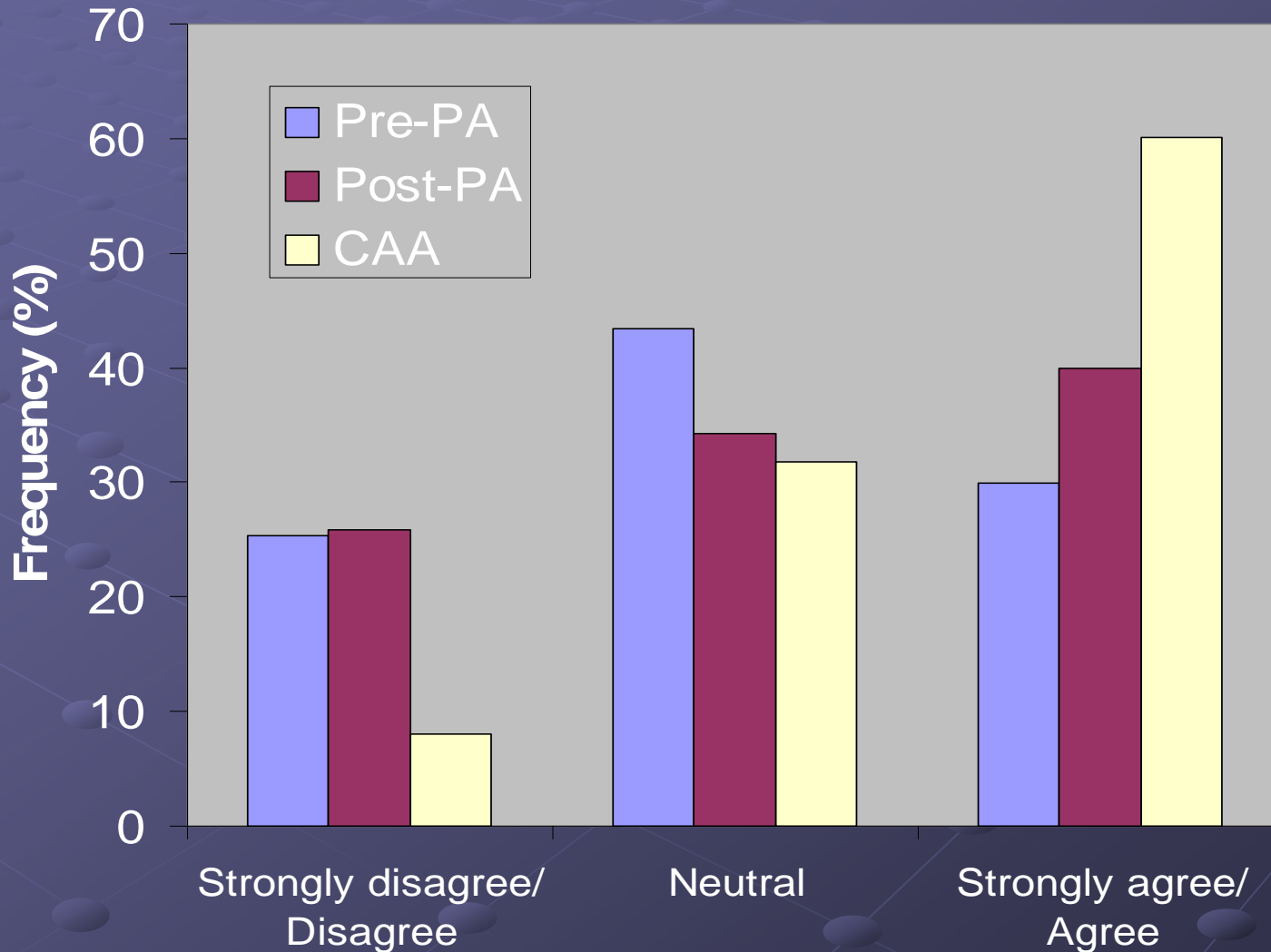
## ● Pre- and Post- assessment questionnaires

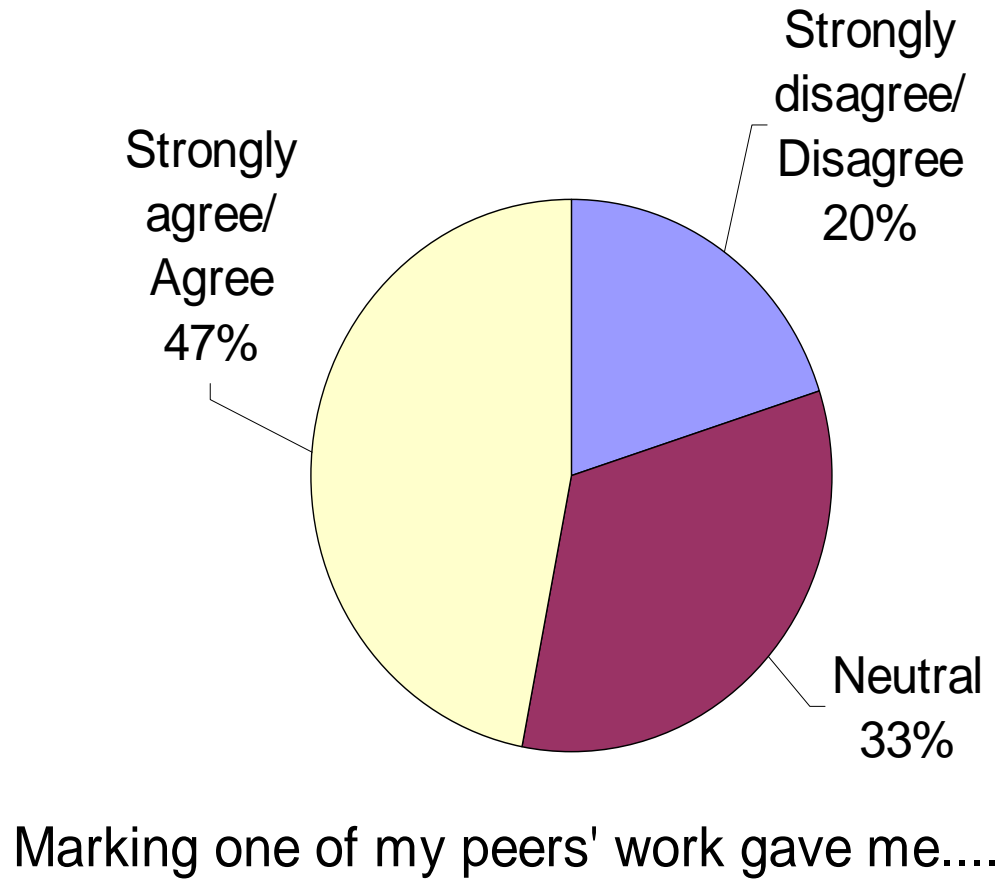
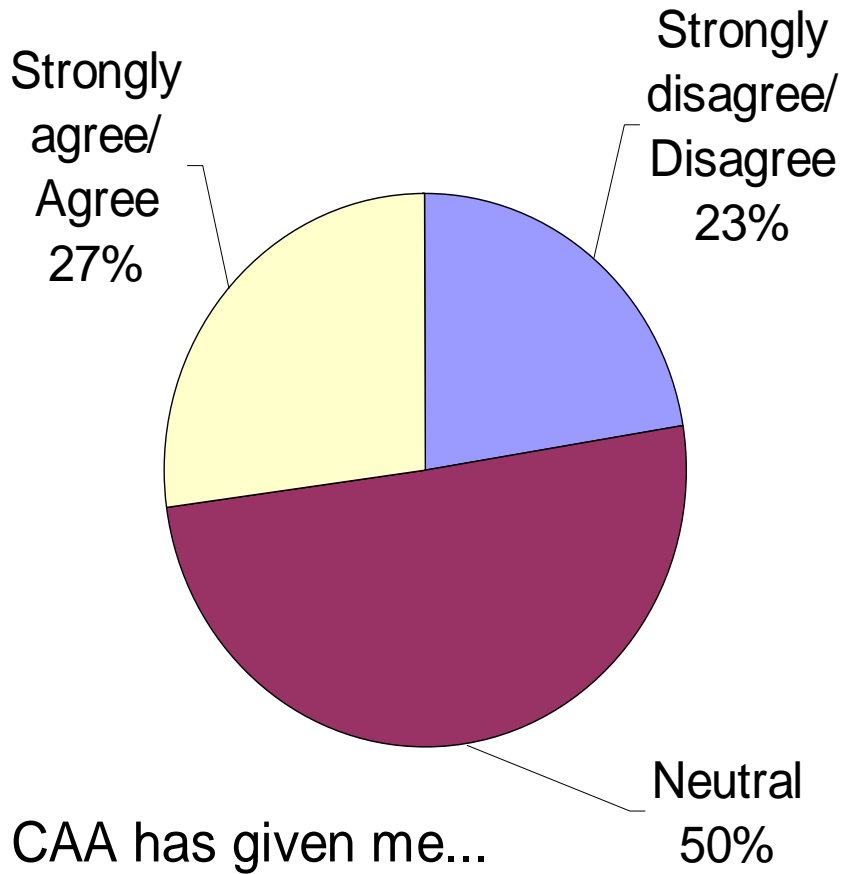
- ~ 60 % return rate
- 19% had done PA before; 70% had never done PA before; 11% didn't know

## ● Focus groups

- !

# *“I think PA/CAA is a fair method of assessment”*

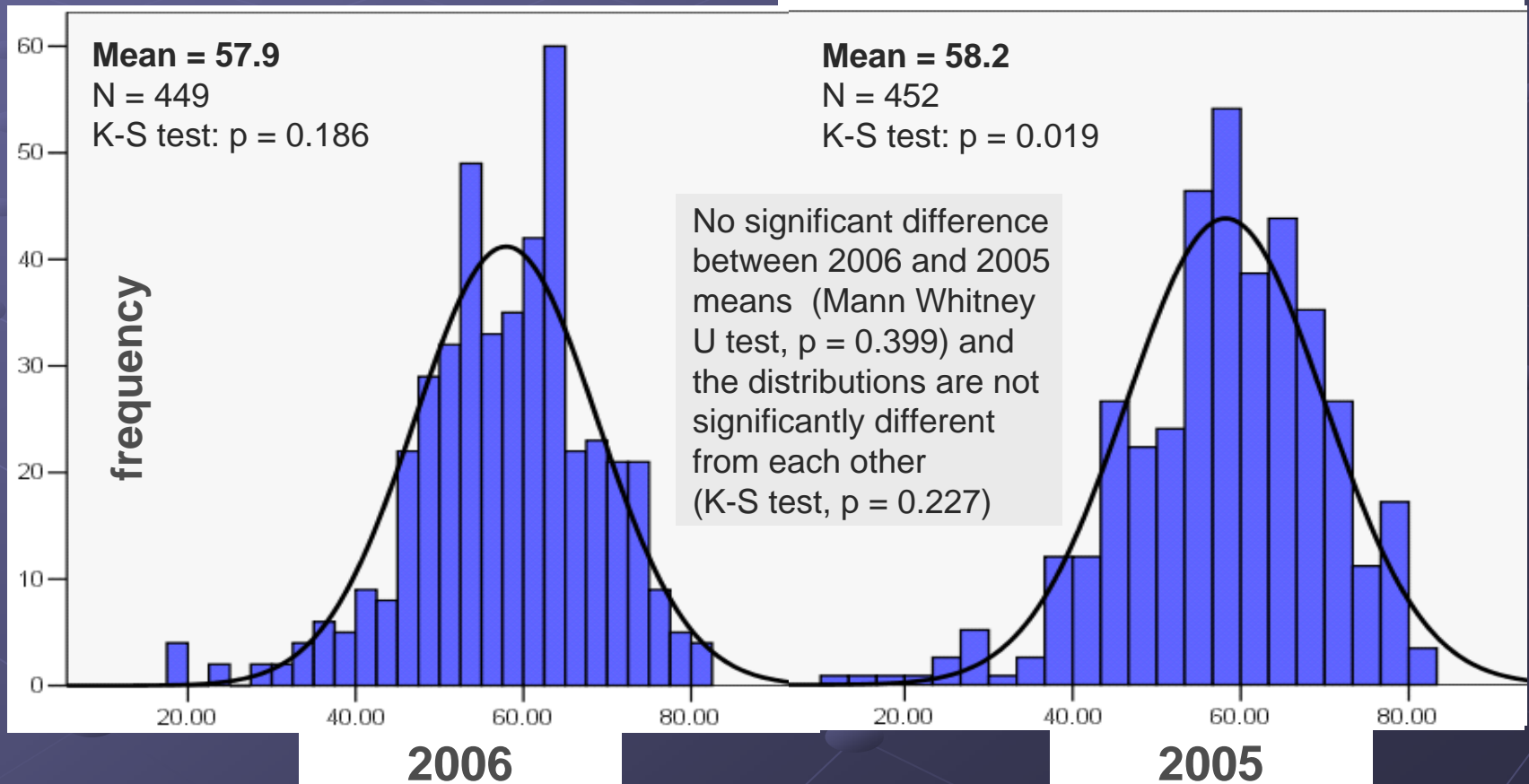


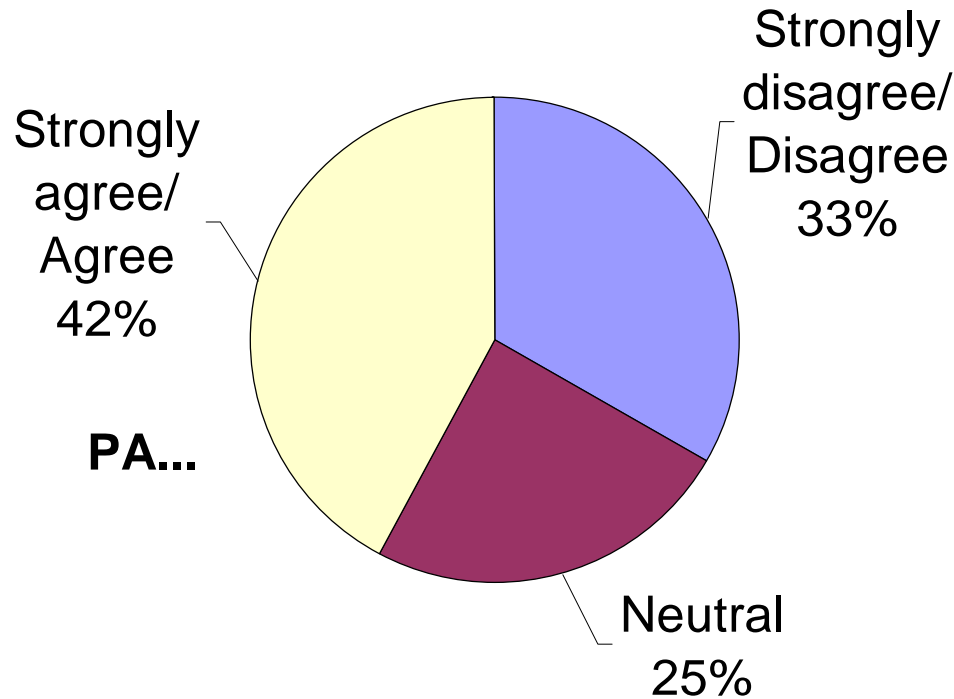
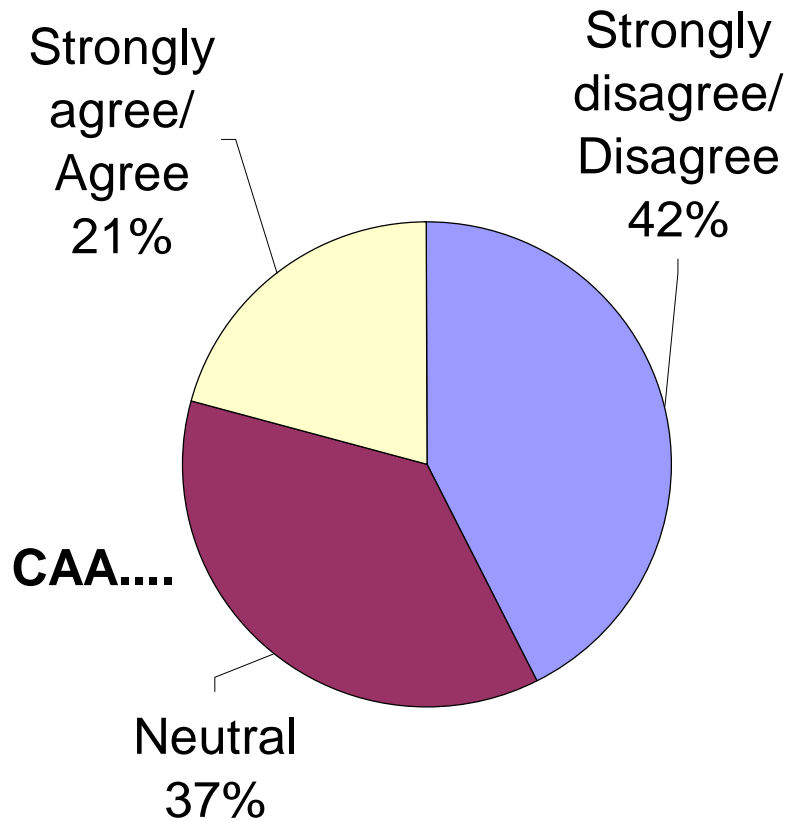


*... confidence in answering further assessment questions*

# Did the experience of PA improve student performance in CAA ?

Considering practicals 5-10 assessment scores: no convincing evidence in support of this





*... provided me with adequate feedback  
about my own performance*



Was there an improvement in our overall rating for feedback ?

## Student Satisfaction Survey

2005:  $0.35 \pm 1.03$

2006:  $0.97 \pm 0.87$

[ Scale: -2 to +2 ]

# Summary

- The majority of students were happy to assess and be assessed by peers (62 %); happy to use CAA (74 %)
- Teaching staff were happy with the level of ‘academic rigour’ of student peer marking:
  - Peer-generated marks were similarly distributed to last year’s marks
  - Generally, students mark more generously than PG demonstrators but not significantly so
  - 2006 mean was significantly higher than 2005 mean (marked by demonstrators) ( $p = 0.002$ )
  - No correlation between mark student gave and mark student got
- CAA was generally seen as a ‘fairer’ assessment
- Students felt that they had learnt by PA and had gained confidence in answering future assessment questions
- PA generated a more favourable ‘feedback rating’ than our traditional assessment methods

# Acknowledgements

- *Ian Hughes & Ruth Anderson-Beck*, University of Leeds
- *Phil Reed & John Sargeant*, School of Computer Sciences
- *Michelle Webb*, Faculty of Life Sciences
- BIOL10401 teaching staff: *Amanda Bamford, Maggy Fostier, Carol Wakeford, Tristan Pocock and Tracey Speake*
- Administrative Staff, FLS Teaching Office

This project was supported by funding from the Higher Education Academy Centre for Bioscience *Departmental Teaching Enhancement Scheme*

# Further Reading

- **Hughes, I.E.** 1995. Peer assessment of student practical reports and its influence on learning and skill acquisition. *Capability* 1: 39 - 43.
- **Hughes, I.E.** 2001b. But isn't this what you're paid for? The pros and cons of peer and self assessment. *Planet* (the LTSN Centre for Geography, Earth and Environmental Sciences Bulletin), pp 20-23.
- **Orsmond P.** 2004. Self- and peer-assessment: guidance on practice in the biosciences. In *Teaching Bioscience Enhancing Learning Series*, S. Maw, J. Wilson, and H. Sears, eds. (Leeds, The Higher Education Academy Centre for Bioscience), pp. 1-47.
- ABC (Assessment by computer): <http://www.assessment21.com>
- [John.Sargeant@manchester.ac.uk](mailto:John.Sargeant@manchester.ac.uk)
- Sheader E, Gouldsbrough I & Grady R. 2006. Staff and student perceptions of computer-assisted assessment for physiology practical classes. *Advances in Physiology Education* 30: 174-180