

Alternative Forms of Continuous Assessment in Mathematics

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Introduction

- Semesterisation introduced in Dublin Institute of Technology
- More emphasis on continuous assessment (CA)
 - In maths: frequent, short exams
- Common issues in maths at third-level:
 - Difficulty with core concepts
 - Maths seems irrelevant to programme/career
- These lead to
 - Problems with more advanced maths
 - Lack of interest in subject
- In this study, maths assessment through group presentation implemented with two student cohorts

Mechanical Engineering (3rd Year)

- Three year, ordinary degree
 - Maths studied every year
 - About half the class progress to third year of honours degree
- **Presentation:**
 - Topics from basic maths
 - Produced summary on topic for classmates
- **Aims:**
 - All students familiar with core concepts
 - Improve skills in group-work and technical presentations

Product Design (2nd Year)

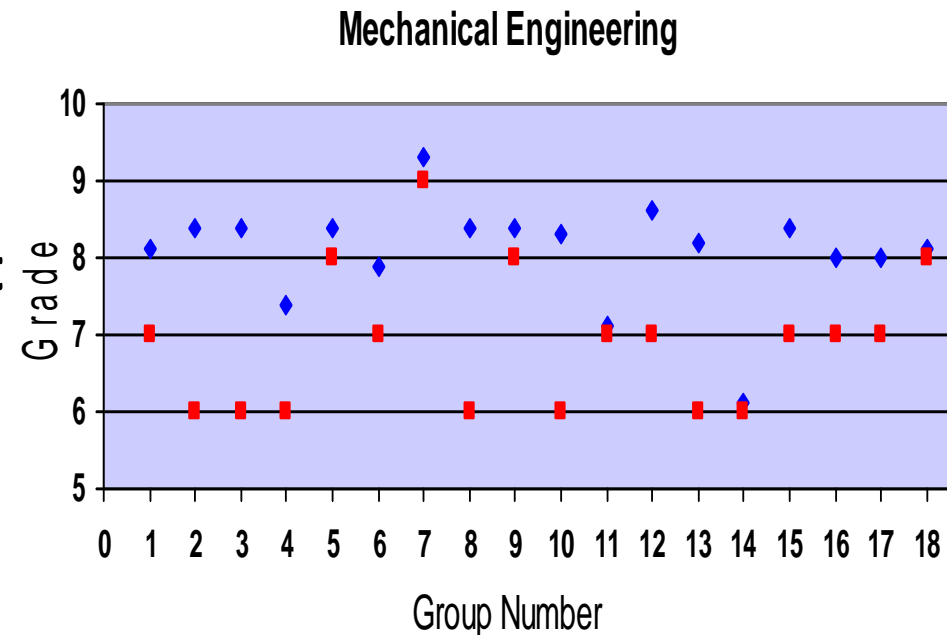
- Four year, honours degree
 - Maths studied for first year and a half
 - Wide range of mathematical abilities within class
- **Presentation:**
 - Possible applications of area from third-level maths to Product Design programme/future careers
- **Aims:**
 - Improve attitudes towards maths
 - Discover relevance of maths
 - Improve skills in group-work and technical presentations

Structure of Assessment

- Students split up into groups of three
- Groups prepared 5-10 min presentation for class, plus short handout
 - Could have every group member actively present or only one
 - 5 weeks to research and prepare
- Each group anonymously awarded mark out of 10 to each presentation
 - Lecturer also marked presentation
 - Peer and lecturer marks compared
- Presentations took place on one day, in single session, with compulsory attendance

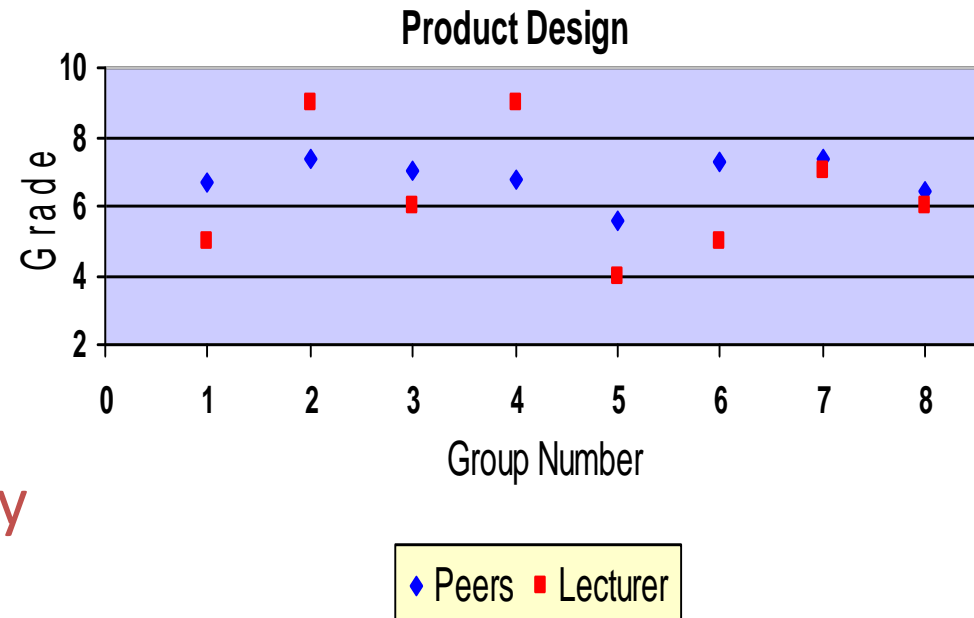
Scatter Plots of Peer Marks versus Lecturers' Marks

- Want to test if perceived difference between peer and lecturers' marks actually exists
- **Chi-squared goodness-of-fit test conducted**
 - At significance level of 0.05, difference statistically significant



Scatter Plots of Peer Marks versus Lecturers' Marks

- Correlation coefficient calculated
 - Little correlation between peer and lecturers' grades



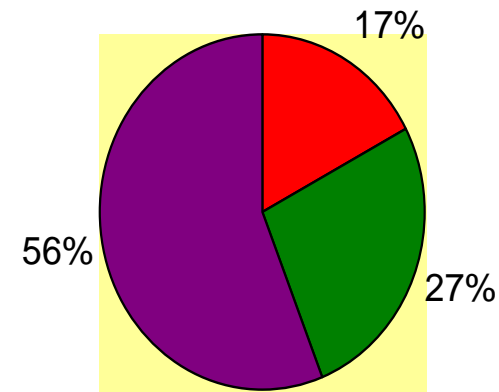
- Conclusion: Peers and lecturers marked differently

Observations on Peer-Marking

- Students were not given rigid assessment criteria
 - Encourage independent thought about marking process
- Mechanical engineers told in advance
 - Some evidence of “deals” struck between groups
- Product designers not told in advance
 - Closer correlation to lecturer’s marks
- Some students marked based on popularity of students
- In future, for greater accuracy, clear criteria will be negotiated with students

Students' Views

- Students required to complete reflective WebCT survey
 - Encourage students to reflect on learning process
 - Give feedback to staff on success of scheme



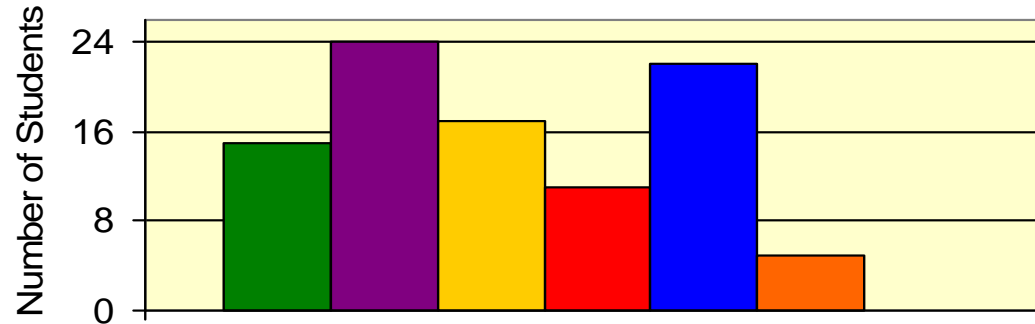
- Presentations more effective than exams
- Exams more effective than presentations
- Mixture of exams and presentations best

Students' Comments

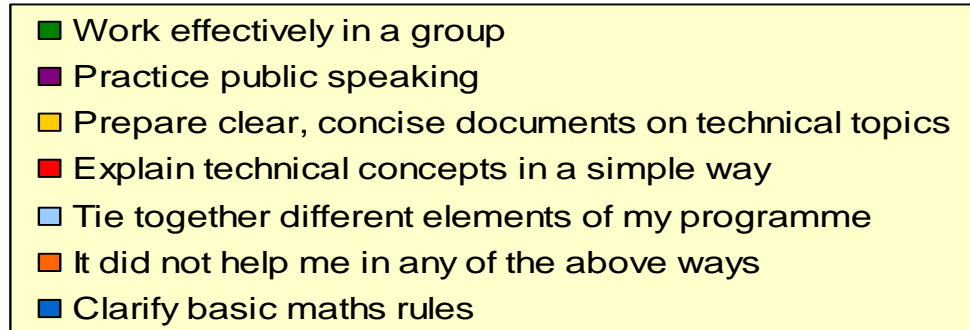
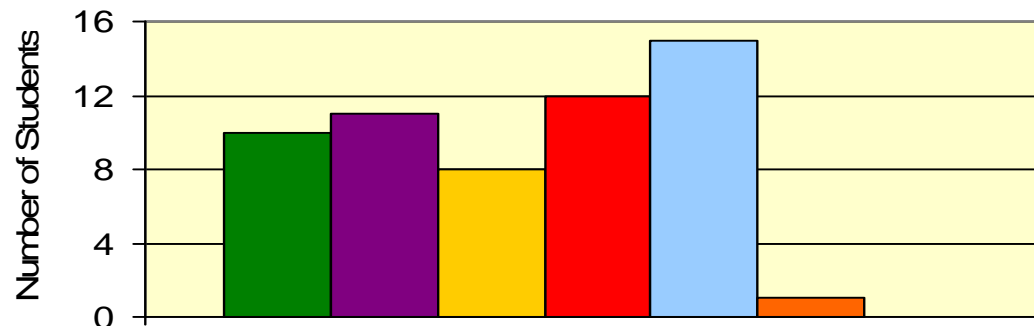
- “Great idea. Made people take interest in maths. They did research and found it surprisingly interesting.”
- “Enjoyed working with group, made learning easier.”
- “Good to get students more aware of purpose of maths in course.”
- “The handouts on basic principles are useful to have.”
- “Depends on how organised other groups are; if they are not clear, it's not always effective.”
- “Should be done every month, helps with public speaking and self-confidence.”

Benefits of Presentation

Mechanical Engineers



Product Designers



Observations

- **Workload**
 - Extra work 1st time but similar work to short exam subsequently
 - No repeat presentations
- **Dumbing down**
 - No evidence that presentation = “easy marks”
 - Students get higher marks in CA exams than in presentations
- **Useful resource**
 - Overall standard of presentations is very high
 - Informs lecturer’s own teaching

Observations

- Peer-Marking
 - Consistent problems with this
 - Extra workload collating marks
 - Students make arrangements with other students

Conclusions

- Increased CA allows diversity in manner of assessment
- Group presentations on maths allow students to develop
 - Different outlook on subject
 - Greater understanding of core topics
- Students' feedback extremely positive
 - Enjoyable experience for students
 - Numerous learning outcomes

Future Work

- Agree peer-assessment criteria in advance
- Develop more rigid marking scheme
- Possible use of clickers to tally marks anonymously