DEPARTMENT OF MATHEMATICAL SCIENCES University of Bath



### Using Numbas for Formative and Summative Assessment of Health Students

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#### **Overview**



- 1. About the Course
- 2. Rationale for using Numbas
- 3. Homework Quizzes and how they were used
- 4. The Final Exam

#### **About the Course**



#### Research and Study Skills for Sport, Health and Exercise Scientists

- Year-long module for first-year students on Sport and Exercise Science and Health and Exercise Science degree programmes.
- Maths content taught from November to February, with exam in March.
- Approximately 150 students.
- Two Maths staff: one lecturer, one tutor.

Students' mathematical experience varies considerably:

- Maths entry requirement: GCSE Maths, at least grade 4 or C.
- Some students on the course did A level Maths.

Maths content: mechanics, trigonometry, vectors, functions.

#### Rationale for using Numbas



- Repeatable assignments.
- Instant feedback.
- Well suited to calculation questions.
- Some appropriate questions already available.
- The exam closely resembles the homework assignments.
- Randomisation discourages copying.
- High student numbers, low staff numbers.
- Time invested pays off later (unlike marking written homework).

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#### Homework quizzes



Students were set weekly homework quizzes using Numbas LTI and Moodle. How were the homework quizzes used? Did this meet my expectations?

#### Numbers of attempts:

- About 40 students didn't use them at all.
- Mean number of attempts per student ≈ 2.
- Typically 1–3 attempts per student.
- Some students consistently made about 5–7 attempts.

#### When were the attempts made?

- Additional attempts were usually made the week before the exam.
- Students who made only one attempt usually did so shortly before the exam.

#### **Final exam**



#### **Exam format:**

- Online open-book,
- 1-hour time limit,
- Completed within a 48-hour window.

Questions were similar but not identical to homework questions.

I used data from the homework quizzes to classify the difficulty of different topics and question types.

Mean score: 83% (impossible to compare this with previous years)

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#### Final exam



```
Course: Research and study sk x Semester 2 Online Test (group x Foundations of sport and exerc x + course. Research and study sk x Semester 2 Online Test (group x Foundations of sport and exerc x + course.)
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#### Numbas has failed

Sorry, Numbas has encountered an error which means it can't continue. Below is a description of the error.

```
Numbas Error: Error loading question 6: Variable x is not defined.

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at new Numbas.Error (https://numbas.bath.ac.uk/media/extracted_zips/Exam/eb92366d-6586-4d2e-8271-32e9180c0918/scripts.js:78:13)

at scorm.SCORMStorage.loadQuestion (https://numbas.bath.ac.uk/media/extracted_zips/Exam/eb92366d-6586-4d2e-32e9180c0918/scripts.js:42808:19)

at Numbas.Question.resume (https://numbas.bath.ac.uk/media/extracted_zips/Exam/eb92366d-6586-4d2e-8271-32e9180c0918/scripts.js:40201:31)

at QuestionGroup.createQuestion (https://numbas.bath.ac.uk/media/extracted_zips/Exam/eb92366d-6586-4d2e-82732e9180c0918/scripts.js:15209:22)
```

- Students don't always report errors!
- It can be hard to tell if you can fix them yourself.