Numbas in everyday work at Brighton[1]

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In this talk we will share our experience of introducing and leading the adoption of Numbas e-assessment system at University of Brighton. We will talk about learning the Numbas as a user, the student experience, about involving and teaching colleagues, and getting support of the institution.

[1] School of Architecture, Technology and Engineering at University of Brighton.

Plan:

- Numbas in Brighton.
- Case study in robustness.
- Involving and teaching academic colleagues.

Numbas in Brighton.

Numbas is mainly used in Maths and Engineering subject groups, and in teaching level 4 maths in biosciences. The adoption went from individual initiative to school support.

Table 1: Numbas usage at University of Brighton

Module	Usage	Students
Individual usage before COVID		2014–2019
Maths modules across University: Engineering, Business, Biosciences, Maths	Formative	400? L4
Widening usage due to COVID		2019–2021
Engineering Mathematics	Weekly formative + 2 exams	150 L4
Energy Systems	Final exam (with mock exam)	80 L4
Essential skills for Biosciences	Summative portfolio task	230 L4
Engineering Mathematics	Formative	55 FY
School funding for LTI		2021–2022
Core Mathematics	Weekly formative + Final exam	55 FY
Mechanics and geometry	Weekly formative + 2 exams	55 FY
Embedded Systems	Final exam (with mock exam)	20? L4
Linear Algebra and Calculus	Formative	20?
Plans		2022–2023
Computational Fluid Dynamics x3	Hybrid final exam	100 L6
Maths for Civil Engineering	Final exam	70 L4

The student experience.

Quite positive. Mainly, students appreciate clarity in what to expect from assessment[2].

Key principle: plenty of practice opportunities before usage in summative assessment.

Also, a variation of "show, don't tell": Numbas exercises are built in to every lecture and tutorial[3].

Students don't notice it, but we can do more specific targeting of different ability levels within same cohort.

[2] In one of the modules, 80% of exam question came from formative exercises.

[3] This is not true anymore for all new modules using it.

Institutional support.

Years of individual usage paved the way for support from institution. Also COVID.

Main arguments:

- Positive student experience from the individual adoption stage.
- Tight feedback loop in formative assessments. Students can control their learning pace. Lecturer is not a bottleneck anymore.
- Flexibility in assessment mode[4]: remote online, local online and paper-based are possible.
- Anonymous non-biased marking[5].
- No lock-in: can use LTI, SCORM, embed, produce pdf, and run own editor if needed.

Key factors are still human related – in-house expertise developed and confidence built over years.

[4] Not all advised, but all possible.

[5] Although there still biases in other areas, such as IT literacy, connection availability, access to devices, etc.

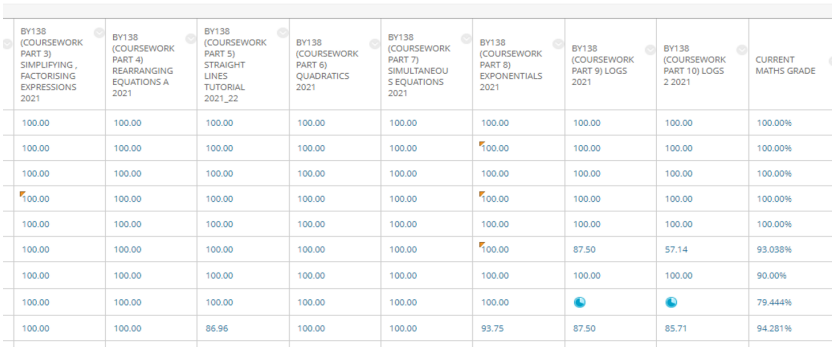
Living with no LTI: Case study on the practical use of Numbas on Blackboard VLE.

Essential skills for Biosciences module with 234 students is a short 6 week course to review and enhance maths skills (ranging from percentages to work on logs and exponential equations).

Assessed via 10 short Numbas tests, the mark awarded is the average of these. (Pass mark 40%).

Final results:

- Students passing 206 (88%).
- Students failing 28 (12%) (Including 25 students (10.7%) with no engagement).



BY138 (COURSEWORK PART 3) SIMPLIFYING , FACTORISING EXPRESSIONS 2021	BY138 (COURSEWORK PART 4) REARRANGING EQUATIONS A 2021	BY138 (COURSEWORK PART 5) STRAIGHT LINES TUTORIAL 2021_22	BY138 (COURSEWORK PART 6) QUADRATICS 2021	BY138 (COURSEWORK PART 7) SIMULTANEOUS EQUATIONS 2021	BY138 (COURSEWORK PART 8) EXPONENTIALS 2021	BY138 (COURSEWORK PART 9) LOGS 2021	BY138 (COURSEWORK PART 10) LOGS 2 2021	CURRENT MATHS GRADE
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00%
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00%
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00%
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00%
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00%
100.00	100.00	100.00	100.00	100.00	100.00	87.50	57.14	93.038%
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	90.00%
100.00	100.00	100.00	100.00	100.00	100.00			79.444%
100.00	100.00	86.96	100.00	100.00	93.75	87.50	85.71	94.281%

Figure 1: Blackboard Grade centre view (Semester one 2021/22).

Table 2: Essential skills for Biosciences

Question	1	2	3	4	5	6	7	8	9	10	Totals	
Total attempts	209	208	208	208	207	205	205	203	201	196	2050	
Manual Input	5	6	3	3	5	7	3	9	6	3	50	2.40%

Getting students to record their results (to send if SCORM/VLE problems).

Clear information about how to "print" to pdf (Note different for each browser).

Starting message of each test tells the students to save a pdf of their results.

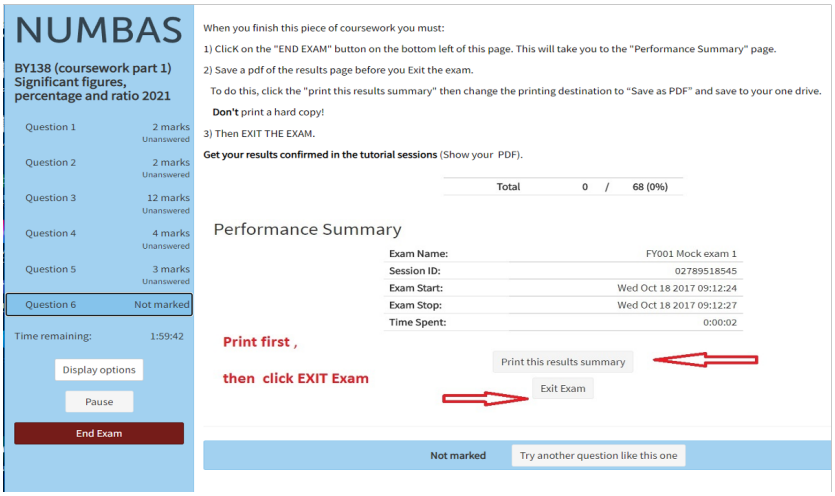


Figure 2: The last question of each test reinforces the message for students to save a pdf copy of their results in case of any issues with the VLE.

Involving and teaching academic colleagues.

Making tool recommendation is a big responsibility. An honest way to do it is leading by example: develop in-house expertise and share stories of zero-time marking.

Years of using Numbas without much interest. When feedback from students is shared on student-staff forums, and colleagues see my happy ”no-marking” face, it starts to get noticed.

Once colleagues are interested, there is a new problem: academics as students. As any students under time constraints, they look for shortest path to profit. So it helps if there is someone who know what is possible, how to do it, and if it is worth the time investment.

My suggestions:

- Keep it simple. Getting comfortable with variables shared between parts and expression marking satisfies most everyday needs.
- From reusing to own questions.
- Show, don’t tell: developing some question with colleagues goes a long way.

Sample size: 2 professors and 6 lecturers from different STEM backgrounds. Estimated 4 days with 3-6 30-minute consultations with me to comfortably develop own questions.