

Paper-Based Support

The Maths Revision Booklet as Part of a Programme of Support at University of Newcastle upon Tyne

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Abstract

Computer-based diagnostic testing has been used for new engineering students for some years at University of Newcastle upon Tyne. Follow-up support has been available only in some departments. In summer 2001, new students were issued (in advance or on arrival) with a 'Maths Revision Booklet' covering the basic maths topics that we didn't intend to teach. Following the diagnostic test, lunchtime classes were offered for six weeks, based on the booklet, for those students who wished to attend. We report on the student opinion, analysis of diagnostic and examination performance.

The Execution

A Maths Revision Booklet was issued to new Foundation and First Year Engineering students. Most (64%) received it in advance, following confirmation of offers in August, and the remainder on arrival. This case study focuses principally on First Year students, though Foundation Year students had similar arrangements and used appropriate parts of the same test and booklet.

About 75% of First Year students receiving the booklet in advance also used it before arriving (i.e. about 50% of all students), with a further 25% of all students using it later on. Overall, about 44% of all students used the booklet after arrival. The booklet included number, algebra, trigonometry, graphs, units and dimensions and basic calculus – it covered topics the students were expected to know on arrival and which would not be taught in normal classes. The idea of the booklet, but not its content, was based on the “An Algebra Refresher “ produced by Tony Croft at Loughborough (and reported in another of these case-studies).

Diagnostic testing (with DIAGNOSYS) took place in Induction week. From test results and qualifications, some students were recommended to attend lunchtime tutorials. These classes ran for six weeks, and were based on the same booklet.

The normal first year mathematics course of two lectures and one tutorial each week was running in parallel and had a one-hour examination in January counting 20% of the total for this 20-credit module.

Foundation Year students also had access to a DIAGNOSYS back-up booklet on basics of algebra etc. and attended credit-bearing classes; this case-study does not cover this group in detail.

What Support Was Needed?

Diagnostic testing sessions in Induction Week were supervised by a member of staff in each participating department – mostly an administrative job. Test results were collected, printed and distributed by the same staff.

From one to three staff attended lunchtime tutorials twice weekly for six weeks, depending on student numbers, but the intention was that students took responsibility for their own needs, aided by materials and test results. (Foundation Year students receive credit-bearing classes, organised separately.)

The Barriers

- Departments did not all send out workbooks in advance – should be fixed for 2002/3.
- Getting all students to the diagnostic testing sessions is difficult; some students arrive late or are sorting out finance or accommodation. Approximately 80% of First Year students were tested.
- Finding a suitable time for support tutorials is difficult. Lunchtimes were not a popular choice (though we suspect that no time would be universally popular!).

The Enablers

- The ‘message’ of the booklet and test was that students should take responsibility for their own needs. Some questions did not have answers provided, to emphasise this.
- The demands on staff time were limited.
- Printed materials can be used by students wherever they wish, can be sent in advance and can be used for both self-study and for tutorials. They were also used for summer schools and other purposes. The ‘work-book’ format makes them easy to use. The cost was about £0.60 per copy, internally duplicated.



Evidence of Success

- Feedback on the materials and classes was generally favourable, though many students thought the diagnostic test understated their actual knowledge.
- 75% of students receiving the booklet in advance used it before arriving. 75% of all students used it at some point. 44% used it after arriving. This is evidence of usefulness in content or in confidence.
- The diagnostic test average for First Years improved this year after a steady but gentle decline (Lawson 1997). Results for 1996-2001 were: 61,60,60,58,56,59%, reflecting some preparation by many students.
- The Semester 1 maths examination results were maintained despite widening intake. Semester 1 exam results for 1996-2001 were: 47,50,54,52,55,53%, suggesting some success in remediation.
- The predictive power of the diagnostic test has reduced, implying a more effective remediation over the first semester, probably partly due to this year's programme. R^2 values for diagnostic mark as a predictor of exam mark for 1999-2001 were: 0.37, 0.28, 0.23 (correlations 0.61, 0.53, 0.48).

How Can Other Academics Reproduce This?

The general policy of setting out clearly to students what we expect of them in respect of knowledge and of responsibility is generic. The workbook is more likely to be used than a text or optional Computer-Aided Learning (CAL) modules, because it is not too long, contains specific and useful content, is easy to organise (finding and using it), can be used anywhere and can be used before arrival, in class or at home. Overall, there are no problems in others using the same approach and our booklet could be used if desired.

Quality Assurance

- The diagnostic test – DIAGNOSYS – is well-established, used in over fifty universities and colleges in the UK and abroad.
- The survey and results gave clear indication of general satisfaction.
- There were no aspects of the maths support that would be expected to affect the normal process of First Year maths teaching, or to increase significantly the burden on participating students. Although some said the lunchtime tutorials were an extra load, these were voluntary and time-limited.

Other Recommendations

- The Revision booklet was largely satisfactory, but will be edited in a few minor points.
- Use of the booklet by sub-A-level students needs to be made clearer.
- Ensuring all new students receive the booklet in advance is important.
- The booklet could also be made available as a document or pdf file on the web.
- More cross-reference between diagnostic test and booklet could be useful.
- Evidence here and elsewhere is that printed support materials are popular if specific, cheap and easy to use. This applies to course notes and some texts also.

Reference

What Can We Expect of 'A' Level Mathematics Students?
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