Attainment in mathematics and numeracy has been on the agenda for the last 15 years. The problem (Howson et al., 1995) first came to light for STEM subjects in the early 1990’s. Only recently, the Conservative Party announced that HMS Vorderman was steering to the rescue of mathematics teaching in schools and the Cambridge Primary Review made a case for embedding numeracy within the broader curriculum. In between, we have had the Leitch report (2006) and the Skills for Life (2003) review which concentrated on the desirability of improving numeracy skills for employability, albeit at the lower levels of attainment. There have been several recent surveys carried out by employers’ organisations on the employability skills needed by graduates.

Numeracy Skills and Employability

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Graduate employability and numeracy

Recent studies of graduate employability include:

1. The Institute of Directors (IoD), Graduates’ Employability Skills (2007)

The IoD commissioned a survey of 500 directors in order to identify skills valued in graduate employees. They found that 77% of respondents thought that numeracy skills are very important and a further 21% thought that numeracy skills were quite important. This ranked numeracy skills as 6th in importance out of the 28 skills that were surveyed. Problem solving skills were considered slightly less important. In addition, 21% said that their graduates demonstrated numeracy skills only occasionally or never while only 33% said that they demonstrated numeracy skills always.


Application of numeracy was among the seven employability skills identified in the CBI survey of Chief Executive Officers (CEO’s). Both the CBI and IoD surveys rated general employability skills as a graduate’s most valuable asset. Just 30% of respondents demand a degree in a specific discipline and this is much more likely in engineering, science, technology and maths.


This report lists numeracy immediately below literacy as 9th in their list of employability skills with 68% of respondents thinking it important. Another report from the CIHE (Degrees of Skill: Student Employability Profiles. A Guide for Employers; 2008) lists numeracy skills or more advanced mathematical skills directly in 31 out of 51 career areas, and some form of data analysis skill in some others. Rather surprisingly law and medicine are not in the list but Classics, Ancient History and Health Visiting are.

4. ‘Every Student Counts’: Promoting Numeracy and Enhancing Employment

is an on-going three-year collaborative project between the University of Central Lancashire, MMU and Sheffield Hallam University addressing undergraduate numerical skills. The project is funded under the National Teaching Fellowship scheme. (see http://www.ceit.mmu.ac.uk/ltia/issue14/bids.php)

Professor David Nicholls of the History Department at MMU is looking nationally and internationally at provision in history. Their survey of first year single honours history students at the 3 partner institutions has already shown that, although the majority of students thought that developing numeracy skills would not enhance their historical learning, 81% of these students thought that developing numeracy skills was important with regard to future employment. Their
evidence also points to history undergraduates overestimating their mathematical competence. A survey of international practice in regard to teaching numerical skills on undergraduate history programmes will be undertaken shortly. A paper presenting key findings will be given at a conference at Oxford University in April 2009.

Professor Vicki Tariq’s group at the University of Central Lancashire (UCLan) has carried out a survey of numeracy testing in graduate recruitment. Preliminary results, published at the Mathematics, Statistics and Operational Research (MSOR) Conference at Lancaster 2008, show that of the employers responding to the survey, 51% used some form of numeracy testing in their graduate recruitment and among the largest (10000+ employees) organisations this rose to 80%. In 70% of cases where a numeracy test is used it is necessary for recruits to pass the test. The majority (62%) of employers use commercially available tests, while the rest use bespoke tests. Numeracy tests can be carried out cheaply online so they are used as filters at an early stage in the recruitment process.

**MMU context**

Employability is a central objective in the MMU Learning, Teaching and Assessment Strategy (Draft, April 2008), specifically in Key Objective 3 as follows:

To enhance students’ employability by encouraging the development of students’ intellectual powers, creativity, independent judgement, critical self-awareness, confidence, imagination and skills that will enhance their lifelong employment opportunities.

Sub-section 3.1 states that ‘We will ensure that all programmes provide for the development of core and transferable skills commensurate with the creation of world class professionals.’

Numeracy skills are essential for the employability for our graduates.

**Which numeracy skills do employers want?**

The tasks that are set in numeracy tests often involve problem solving with multi-step calculations and extraction of data. Some organisations have example tests on the internet. Examples of trial tests can be found at [http://www.kent.ac.uk/careers/tess/mathtest.htm](http://www.kent.ac.uk/careers/tess/mathtest.htm) and [http://practicetests.cubiks.com](http://practicetests.cubiks.com)

Here are a couple of examples of the type of questions that may be asked. Questions are usually presented as multiple choice with, typically, six choices.

1. **Figure 1** is a graph of oil price (Brent crude) versus time for a 12-month period. The grid is at the first of the month named on the axis.
   a) What was the oil price on December 1st?
   b) In which month was the maximum price reached?
   c) Which calendar month saw the greatest percentage reduction in the oil price?
   d) Which 3 month period saw the most stable prices?

2. **Figure 2** is a plan of an office building, (not to scale).
   a) How much will it cost for paint to cover the interior walls of the Executive suite, given that:
      i. 2 coats will be applied and the second coat uses two thirds of the paint as the first coat
      ii. the coverage of the first coat is 12m² per litre
      iii. the cost of the paint is £6.50 per litre and it is available only in 2 litre tins.
      iv. the walls are 3m high and there is 15m² of window.
   b) Given that the scale of the drawing is 1 to 50, what is the area of the men’s room on the drawing?
What can we do to promote numeracy skills for employability?

The prize for promoting numeracy skills goes to Foundation Year where all students do a 20-credit unit in Applied Numeracy which seeks to develop the skills that employers want. This provision could be criticised on the grounds that skills development is generic rather than subject related, that it is studied in Year 0 of a course, a long time before graduation, and that the pass mark of 40% is not sufficient to establish the all round competence with numbers and number problems that employers want.

David Nicholls’s research as part of ‘Every Student Counts’ will establish the degree to which numeracy skills are embedded in history courses and it will make recommendations on how curricula can be developed to include numeracy for employability. Since the emergence of the ‘maths problem’, there has been a tendency to reduce the mathematical content of courses. It is time now to reverse this trend and reintroduce data handling and other numerate techniques into courses to improve the employability of our graduates.

Numeracy problems arise in many subject areas and they are often dealt with by individuals or small groups of colleagues. We need a way of pooling experience and helping each other so how about forming a Community of Practice in numeracy at MMU?

As a short-term fix, I have written a Vista Learning module for revision of basic number skills. This is being trialled as part of the SkillsOnline Vista module. In the longer-term, this module could be extended to include more test questions and material on solving problems with a view to preparing students for numeracy testing in graduate recruitment. Students will be encouraged to develop their numeracy skills if numeracy is specifically included in the MMU Professional Passport.

Extension of the Maths Support provision outside the Faculty of Science and Engineering would allow numeracy for employability problems to be addressed both online and by the provision of targeted sessions.

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References


