Every Student Counts

Promoting Numeracy and Enhancing Employability

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2. Executive Summary

Aims and objectives

This three-year project investigated factors that influence the development of undergraduates' numeracy skills, with a view to identifying ways to improve them and thereby enhance student employability. Its aims and objectives were to ascertain: the generic numeracy skills in which employers expect their graduate recruits to be competent and the extent to which employers are using numeracy tests as part of graduate recruitment processes; the numeracy skills developed within a diversity of academic disciplines; the prevalence of factors that influence undergraduates' development of their numeracy skills; how the development of numeracy skills might be better supported within undergraduate curricula; and the extra-curricular support necessary to enhance undergraduates' numeracy skills with a view to enhancing students' employment prospects.

Overall approach

This study involved undergraduates and tutors in a diversity of academic disciplines at a post-1992 UK university, and included a collaborative study of national (UK) and international dimensions for history. A multi-method approach was adopted, resulting in the collection of both quantitative and qualitative data. Online- and paper-based questionnaires were complemented with numeracy tests, student focus groups and tutor interviews which provided undergraduates', graduates', tutors' and employers' perspectives on key issues.

Findings

The results of an employer survey highlighted the importance that many employers attached to graduates' numeracy skills and their increasing use of numeracy tests as part of their graduate selection procedures. Contributions to the project made by undergraduates and tutors across a diversity of academic disciplines supported the findings of previous studies in terms of students' conceptions of mathematics, their attitudes towards and approaches to learning mathematics and developing numeracy skills and the nature and prevalence of mathematics anxiety. They also revealed the extent and diversity of existing opportunities for intra- and extra-curricular numeracy skills support across a variety of academic disciplines, as well as students' preferred methods of support and potential barriers to increasing support within some areas or disciplines. The findings revealed a general lack of awareness amongst undergraduates and tutors of the importance of numeracy skills to students' attainment of graduate employment. At the same time and encouragingly, in the case of history the evidence suggested that improvements could be accomplished by relatively modest changes to the curriculum. The relevance and susceptibility of historical data to quantitative analysis, the skills within the profession, and the pre-university mathematical qualifications of history students make such improvements eminently attainable within this discipline.

Achievements

The project generated a substantial quantity of research data, which has been analysed and presented and disseminated in a range of formats and via a variety of forums to the main stakeholder groups, including employers, academic colleagues (in the UK and overseas), undergraduates and graduates (see Appendix 2 of the report for a list of publications and other outputs). In addition, a variety of valuable resources have been identified which support students in the practice and further development of their numeracy skills; these have been advertised via the project's website and the student drop-in support sessions introduced at the lead institution. In addition, a website is being created with higher education history programmes to disseminate 'good practice' in the teaching of quantitative skills within this discipline.

Conclusions

This study revealed that history students can all too easily over-estimate and be over-confident about their mathematical capabilities and tend to resist their incorporation into history degree programmes. Nevertheless, the means whereby the situation may be remedied are present, if there is the will to address the issues identified. The main overall conclusion from this study is that it is vital that universities ensure that their undergraduate populations are equipped not only with the numeracy skills necessary for progression and success within their academic disciplines, but also with those numeracy skills necessary for them to attain graduate employment and to be effective subsequently in their workplace. Assisting undergraduates to develop more positive attitudes towards numeracy skills is also vital as their attitudes can influence their approach to learning and further developing their numeracy skills. One way in which students' attitudes can be influenced favourably is by making the numeracy relevant to their academic disciplines and/or applicable to their future employability.

3. Background

Importance of numeracy skills in history

E.P. Thompson described history as 'the queen of the disciplines' (Thompson, 1978). By this, he meant not just that all disciplines have their own history but that history itself draws from, and requires knowledge of, a wide range of other disciplines: economics, literature, sociology, law, languages, politics, archaeology, anthropology and so on. Mathematics can just as readily be included in this list; indeed, certain branches of history have made systematic use of quantitative and statistical approaches, most notably econometric history.

The Dearing Report (1997) designated numeracy as one of the key skills that should feature among the outcomes of all UK higher education programmes. This proposal was not welcomed by all historians; while quantitative techniques certainly feature in the discipline, they are by no means universally valued within it. Moreover, even historians who use these techniques harbour concerns about their students' limited understanding of mathematics and about their lack of interest in, and often antipathy to, applying their existing mathematical skills, let alone to developing new ones (see below).

Recognising these limitations, the Quality Assurance Agency's (QAA) benchmark statement for history, first published in 2000 and then in a revised form in 2007, is far more permissive. It does not include numeracy among the generic skills that history undergraduates might be reasonably expected to acquire. However, it does recognise that some branches of the discipline might incorporate methodologies taken from other disciplines and makes the "strong recommendation" that, where appropriate, provision should be made in undergraduate history courses for developing at least one from a list of several additional skills, which includes numeracy and quantitative methods (QAA, 2007). As far as benchmarking recommendations are concerned, then, numeracy need not feature in undergraduate history courses, despite the value that can be attributed to it in terms of historical study, employability and life skills.

Nevertheless, over the years, historians with an interest and expertise in numeracy have provided a good deal of guidance on the types of quantitative techniques that are useful in historical investigation. In some instances, attention has been focused on explaining these techniques, incorporating examples of how they can be applied in historical investigation (Archdeacon, 1994; Darcy and Rohrs, 1995; Feinstein and Thomas, 2002; Floud, 1973; Hudson, 2000). In other instances, a case study approach has been adopted, demonstrating how quantitative techniques can be applied in investigating a varied range of historical themes (Aydelotte, *et al.*, 1972; Haskins and Jeffrey, 1990; Lorwin and Price, 1972: Wrigley, 1972). For the most part, but by no means entirely, discussion in these works is pitched at a basic level, thereby providing history undergraduates, as well as their teachers, with helpful advice on the types of quantitative investigations they can undertake. Publications in several specialised branches of the discipline also demonstrate the value of applying simple numerical techniques, with historical demographers being to the fore (Drake, 1961-2, 1974, 1982; Wrigley, 1966). The journal *Local Population Studies* contains numerous short articles that employ a varied range of quantitative approaches that undergraduates and others can readily apply in analysing demographic data. Rather less has been written specifically about the teaching and learning of quantitative techniques in undergraduate history, although some instructive and welcome examples have been offered, dealing with the types of source material that can be used and the investigative approaches that can be adopted (Charlton, 1977; Freeman, 2010; Johnson, 1993; Rodger, 2009; Rosner, 1993).

Further guidance on using quantitative techniques in historical investigation has featured in books and articles dealing with ICT, with one historian depicting computers as "the handmaiden" of quantitative history (Anderson, c.2008). Coverage embraces the uses to which ICT can be put in studying history, including database and spreadsheet applications. Again, much of the discussion is pitched at a level that requires fairly basic numerical understanding, a key aim being to demystify the terminology and concepts that ICT usage involves. The trailblazing volumes published by the *Association for History and Computing* during the late 1980s and early 1990s mainly present case studies, but also incorporate learning and teaching sections (Denley and Hopkin, 1987; Denley, *et al*., 1989; Mawdsley, *et al.*, 1990). Other works, however, focus specifically on learning and teaching matters, including classroom approaches (Lambe, 2003; Lloyd-Jones and Lewis, 1994, 1996, 2000; Perkins, *et al.*, 1992; Spaeth, 1996; Spaeth *et al*., 1992). Yet others are aimed at a more general audience, but the approaches covered nonetheless have application in teaching history undergraduates (Cameron and Richardson, 2005; Davis, *et.al*., 1993; Greenstein, 1994; Mawdsley and Munck, 1993; Schick, c.1990; Trinkle, 1998). In addition, there is a specialist volume on the use of databases in historical research, again aimed at a wide audience, including undergraduates (Harvey and Press, 1996).

Useful though much of this guidance on quantitative methods has been, it has not persuaded the majority of history tutors, or their students, about the value of numeracy as a key skill. Indeed, the contributions relating to ICT usage may well be valued more with regard to 'soft' ICT skills, such as word processing, internet use and presentational skills, than to quantitative approaches. While such skills are certainly important for history undergraduates and assist them considerably in their studies, it cannot be assumed that where ICT feature*s* in their courses it involves quantification.

The publications dealing with numeracy in undergraduate history courses have aired the advantages that incorporating a numerical dimension can bring, particularly in fostering historical understanding (Floud, 1973; Hudson, 2000). However, in recent decades, numeracy has also become strongly linked with employability issues, as noted above. The 1980s began an economy-driven shift towards a more 'enterprising' curriculum that led to the eventual incorporation of the skills agenda in external and internal quality assurance and validation procedures. This shift was encapsulated in the Dearing Report and, subsequently, in the government's decision in 2001 to make 'employability' a performance indicator for higher education (HEFCE, 2001). The new paradigm incorporates the development of a range of key or transferable skills, numeracy amongst them, in degree-level courses and history has not been immune to it.

Despite the benefits that numerical techniques can have for history undergraduates in terms both of their historical studies and their future job prospects, other dimensions of the history curriculum have been accorded much higher priority. This point is well-illustrated by the decline that has occurred during recent decades in the provision of degree-level courses in economic history, where quantification in one form or another is standard fare. Since the 1980s, economic historians have commented on this decline, at all levels of education, charting its course and reflecting on the means by which it might be halted (Coleman, 1987, 1995; Daunton, 1985; Harte, 2001). Only two UK universities now have distinct economic history departments, namely the London School of Economics and Glasgow University, with stand-alone undergraduate programmes in economic history. Nor is this trend confined to the UK, as is evident from a recent study charting the decline in economic history provision in Canadian universities (McCalla and Day, 2003). Likewise, in the USA, the number of college history departments with an economic historian fell from 54.7% in 1975 to 31.7% in 2005 (Cohen, 2009). These developments are not confined to history, as a recent report on the social sciences has demonstrated (Newman, 2009).

In the UK, the sharp decline in economic history provision occurred in tandem with a rapid increase in the number of undergraduates studying history overall and created acute dilemmas for economic historians. Should they move into management/business/economics departments, where quantitative approaches were the norm, or re-locate to history departments, where an emphasis on quantification was far less likely? Those who chose to move to history departments experienced two problems. Firstly, they faced the marginalisation of economic history within the broad curriculum. This was partly the result of increasing optionality within history programmes, which opened up a much wider range of choice and led both students and teachers to shift away from the economic dimension as quantitative applications became increasingly sophisticated and complex and, for many of them, frankly impenetrable. The reciprocal of this trend has been the advance of social and cultural history (Burke, 2008) which tends not to regard quantitative analysis as integral to historical study. A downward spiral has therefore developed with fewer students being taught the subject, leading to fewer lecturers entering the profession with the necessary background, skills or enthusiasm. The consequence is that history departments are now composed of a majority of staff who prioritise literary, communication and visual skills over the acquisition of numeracy skills and who are often uncomfortable with using, let alone teaching, such skills. Secondly, there have been changes in the content of economic history modules. This is a more subtle set of changes and the evidence is less tangible than for the structural ones. While modules still make reference to the importance of quantification, the tendency is for the numerical material to be pre-packaged and interpretative, with less emphasis placed on direct engagement with quantitative techniques. At the same time, the resort to ICT in many cases has become a substitute for numerical understanding. In short, students may acquire a technical capability and a familiarisation with the 'outcome' of quantification (manipulated elsewhere) but are left with only a superficial understanding of numerical analysis.

What has to be recognised as well is that there is disagreement about the *appropriateness* of particular skills for history students. While the cautious benchmark statement embodied this debate, it was also evident in how the profession responded more generally to the rise of the skills agenda. History, in fact, proved very good at developing most of the skills identified by employers and history lecturers successfully embedded these skills in the curriculum, making learning outcomes much more explicit and encouraging students to be much more reflective about skills and their relevance. The 1990s witnessed a growth in pedagogic initiatives involving the UK's HE historians, led most notably by History 2000, a government-funded project to promote the development of teaching and learning, which inspired numerous conferences, workshops and publications that disseminated new approaches to teaching the discipline (Booth, 2003; Booth and Hyland, 1996, 2000; Timmins, *et al*., 2005) But,

notably, the skill least developed in all this pedagogic activity was numeracy. A report published by the Subject Centre for History, Classics and Archaeology in 2005 showed that history at university was contributing nothing to what limited ability undergraduates had in numeracy (Nicholls, 2005b). Meanwhile, history graduates reported that there was a demand for numeracy skills in the jobs they had taken and that university had improved their ability in every one of the 'employability' skills *except numeracy*. It was evident as well that history graduates had applied for jobs where numeracy was not a main requirement – in other words, the lack of this skill was limiting their employment opportunities and general 'marketability' (Nicholls, 2005b). At the same time, a study by the National Research and Development Centre for Adult Literacy and Numeracy found that 'embedding' mathematics within practical and vocational training was particularly effective (Keating 2007). The appositeness of numeracy to a historical training renders it fit for just such 'embedding' but the profession has yet to embrace the opportunity.

In summary, numeracy is receiving limited attention in the university history curriculum, despite its value in enhancing both employability and historical skills and the availability of publications extolling its usefulness. Indeed, with the decline of economic history and the rise of social and cultural history there has been a retreat from teaching numerical and quantitative approaches. Moreover, the situation in history is by no means atypical. Deficiencies in the teaching of quantification can be found across the social sciences, as evidenced by the recent Macinnes report for the ESRC (summarised in Newman, 2009) which found that, on average, students receive only about 12 hours of teaching in quantitative methods across the whole of a three-year degree. It is hoped, therefore, that the research and findings here will have much wider applicability and provide lessons for cognate disciplines. This is the context for the history dimension of this project, for the reassessment of the importance of numeracy in the study of undergraduate history and for the recommendations that are included at the end of the report.

4. Methodology

National and international audit of History: undergraduate, graduate and tutor perspectives

Overall approach

For the history strand of this project, numerical competence is defined as the capacity to understand and manipulate a range of basic mathematical skills. The term 'numeracy' is therefore not used in an abstract but a pragmatic way to refer to the skills that history undergraduates might reasonably be expected to have acquired as a result of their school education and which would assist them in their interpretation of historical data. The skills so identified include basic arithmetical calculations (addition, subtraction, long division and multiplication); interpreting statistical charts and tables; calculating percentages, ratios and measures of central tendency; being able to compile frequency distributions; and working with ICT applications, such as spreadsheets and databases. The project has sought to gauge student competency in these skills by way of self-evaluation questionnaires and a numeracy test. It is necessary to stress therefore that the terms 'numerical', 'quantitative' and 'mathematical' are used interchangeably to refer to these basic skill-sets and not to the more advanced skill-levels of someone qualified beyond GCSE level. It is also important to note that, while this project is concerned with identifying a minimum level of numerical competence to which all history undergraduates might reasonably be expected to aspire, it recognises that some students will wish to build on these basic skills and, indeed, will be required to do so if they take modules in economic or business history with significant quantitative elements. In such cases, students would be expected to understand new and more advanced statistical skills, such as linear regression and coefficient of variation. Developing the numeracy skills of history undergraduates to this higher level, however, was not the ambition of this project; its concern was with establishing an attainable benchmark for all, rather than seeking to meet the more advanced needs of those working in specialist areas of historical study.

The overall approach involved obtaining data about and insights into the nature and extent of numeracy provision in undergraduate history programmes, both in the UK and overseas. In so doing, the views of both tutors and students, including former students, were sought. Particular attention was given to perceptions about the value of quantitative techniques in historical study and in the world of work and to competency levels with regard to both understanding and applying them. The aim was to secure a range of perspectives that would not only inform understanding of the key concerns relating to the provision being made, but would also suggest ways in which provision might be enhanced.

In part, gathering information depended on the willingness of tutors and students to respond to questionnaires. Convenience sampling had to be employed and so care should be taken in extrapolating results. However, it was possible to exploit personal contacts for some of the surveys, notably the department and tutor surveys, thereby raising the prospect of achieving high response rates. Moreover, availability sampling was still likely to yield considerable amounts of qualitative information that would inform the project's aims and objectives.

Current student surveys

Surveys were undertaken at UCLan, MMU and SHU to determine the perceptions that single-honours history students had of their own numerical competency. A short questionnaire was prepared, which used a five-point scale for self-rating purposes. The questions focused on numeracy skills that students were expected to have acquired during their school years, such as interpreting charts and calculating averages, and on the experience they had using computer applications with numerical data. The students were also asked about the importance they attached to numeracy skills both in studying history at undergraduate level and in enhancing employability. Given the difficulties of making class time available at levels two and three, and hence of maximising the number of returns, first-year undergraduates (i.e. level one students) only were surveyed. One advantage of this approach was that students' recollections of studying mathematics at school were still fairly fresh in their minds.

Follow-up focus group discussions

In order to examine the issues raised in the questionnaire in more detail, three focus group discussions with level one students were organised at the collaborating institutions, as well as one with level three students during the final stages of their course. The latter group was included to gain insights into whether their attitudes towards numeracy had changed during their studies. Two team members were involved in each session, one to chair the discussion and the other to record the key points. The students were encouraged to offer views on various

matters, including the circumstances in which numeracy might be usefully included in undergraduate history courses; whether conceptual understanding of numeracy was important to them; the extent to which the inclusion of numeracy in undergraduate provision would influence their choice of modules; their evaluation of its importance to their future employability; and whether, in undertaking practical work involving numeracy, they preferred to operate within a group rather than as individuals.

Numeracy test

A short test was devised to gauge students' ability in applying basic numerical techniques and to assess the self-evaluation that had formed part of the student questionnaire. Similar questions to those in employers' tests were used, but historical data sets were incorporated so that students might appreciate the relevance and value of quantitative analysis to their discipline. As with the current students' surveys, and for the same reasons, the emphasis was on level one students, but the test drew on volunteer participants from a diverse range of UK history courses.

Questions based on four sets of historical data were included and fourteen responses were required. They involved interpreting charts and tables; calculating percentages, ratios and measures of central tendency; and compiling a frequency distribution. In planning the test, the impact on class teaching time and on the staff involved in administering the test, had to be considered. Accordingly, the figures in the data sets were selected for ease of calculation (students did not require calculators) and the test was designed to be completed within 15 minutes.

Graduate survey

An online questionnaire was devised to establish the mathematical qualifications and numerical and ICT skills of graduates in relation to their educational background and employment experiences. The majority of questions were of the optional 'tick-box' variety but with the opportunity, where appropriate, for additional comment. The main purpose of the survey was to obtain graduates' views on the importance that the application of basic numeracy skills assumed in their work and how far, on reflection, they felt that history courses should help to develop particular types of numeracy skills

Three main criteria were used to identify the target sample. Firstly, graduates from universities in the four constituent parts of the United Kingdom were included in order to produce a wide geographical spread and to represent different national (especially Scottish) educational perspectives and practices. Secondly, both old and new universities were sampled, though with a majority of the former to reflect their sector-wide preponderance. Thirdly, it was decided to concentrate on recent graduates, partly because this would probably maximise the response rate but also because it was recent university experience that was of particular relevance.

The graduates were contacted via the alumni offices of their former universities, which forwarded a letter to them on behalf of the project team directing them to the online questionnaire. The graduates of ten universities were contacted in this way. Some graduates were also contacted directly by the project team.

UK departmental survey

A questionnaire was sent to 91 history departments in the UK which offer single-honours history degrees. The purpose was to produce a snapshot of practice in terms of teaching numeracy skills with a view to arranging follow-up visits to those departments that were the most actively engaged. Departmental contacts were identified from *Teachers of History*, a comprehensive list of history lecturers in UK higher education published annually by the Institute of Historical Research.

The questionnaire was deliberately kept short to maximise the response rate. It consisted of just eight questions. The first was designed to establish if a department was teaching numeracy skills. If not, the respondent was advised to move straight to the last question which invited open-ended comment. Those who answered the first question in the affirmative were asked in the next five questions to flesh out the means by which numeracy skills were being taught and assessed, including the use made of ICT applications. They were then asked to judge whether or not they thought this level of provision sufficient before completing the final, open-ended, question. As a principal aim of the questionnaire was to prepare the way for follow-up visits, the respondents were also asked, as an addendum to the analytical core of the survey, if they were willing to meet with members of the project-team.

Follow-up visits to departments

Departments that claimed in the survey-returns to be active in providing numerical learning for their undergraduate students were selected for follow-up visits. These enabled checks to be made on the questionnaire responses and to secure further details regarding their numeracy provision. Visits were made to 14 departments, seven each in pre-1992 and post-1992 institutions. In terms of geographical distribution, 11 were in England, two in Scotland and one in Wales. Two members of the team were normally present at the interviews and each interview lasted for approximately one hour. Fourteen pre-set questions, copies of which had been sent to the interviewees beforehand, provided the framework for conducting the interviews; one member of the team asked the questions while the other made notes and prepared the preliminary draft report of the meeting. The accuracy of the report was checked and confirmed by both parties. This method provided for a consistent set of reports.

Website survey

History departments in UK higher education frequently mention in their publicity material the cognitive skills that their courses seek to develop, both of a subject-specific and generic nature. A survey was undertaken of those websites publicising single-honours BA history courses to determine how frequently numeracy appeared amongst these skills and thereby obtain a measure of the importance they attached to them. Any course documentation made available on these websites, such as programme specifications and student handbooks, was included in the searches. Module descriptors were also searched, although, since there were a large number, attention was focused on those which appeared to have an economic orientation. Opportunity was also taken to determine whether or not numeracy skills were mentioned in relation to ICT applications and to employability. The website survey was introduced to fill the gaps arising from non-responses to the departmental survey and to check and supplement the information supplied by respondents in the survey and follow-up visits.

Tutor attitude survey

A matter of key concern for the project was to ascertain the attitudes of history tutors to the inclusion of numeracy elements in the courses they design and teach, not least in the wake of the incorporation of economic history in UK mainstream history departments. A further questionnaire was therefore devised to investigate this matter. Given the sensitive nature of the survey and to encourage candid responses, anonymity was guaranteed and fully respected. The questionnaire was also kept short in order to encourage tutors to respond. A paper-based version of the questionnaire was distributed during follow-up visits and at conferences and an online version was also used to permit wider dissemination and ease of analysis.

International departmental survey

Since time and resource constraints did not allow a search to be undertaken of every history department in the world, a selection had to be made. The aims were to assemble as diverse a range of international experience as possible for purposes of comparison with the UK data and to identify examples of good practice. Initially, the focus was on universities in the English-speaking world, especially in North America and Australasia. Subsequently, the survey was extended into mainland Europe, including former USSR countries, as well as into parts of Asia and Africa. The *Universities Worldwide* list was used to find email addresses and each member of the project team took responsibility for different countries.

To gather the information and to facilitate comparison, a questionnaire similar to that used in the UK survey was devised. The majority of responses were completed online in electronic form. However, a hard-copy version was used where personal contact could be made, e.g. at international conferences.

5. Implementation

National and international audit of history: undergraduate, graduate and tutor perspective

At the outset of the project, it was agreed that the history team would hold monthly meetings to plan activities and review progress and that minutes of the meetings would be kept and circulated to other members of the project team. In this way, matters arising could be discussed within a wider framework and linkages made between the different project strands. To assist with the management of the project, each team member assumed responsibility for particular elements of the survey work.

Devising the questionnaires aimed at current students and at UK history departments occupied the early stages of the project. Both had been trialed in an earlier, small-scale survey in which two of the history team had been involved. In the light of this experience and with guidance from other members of the project team, some minor amendments to the questionnaires were made. The 'current student' survey was undertaken in the partner institutions, the aim being to obtain information from undergraduates at an early stage in their university careers. The history department questionnaire was initially sent to one contact in each department, usually the head, and produced returns from around one-third of them. In order to obtain a more comprehensive picture, the questionnaire was re-sent, this time to personal contacts or to an alternative member of staff listed in *Teachers of History*. The Royal Historical Society also kindly agreed to circulate the questionnaire to all its members. As a result, some departments returned more than one questionnaire. For the most part, these were mutually consistent. However, there were a few contradictory responses and these were resolved by follow-up telephone calls, emails, or at subsequent visits.

The results of both surveys raised issues that could be addressed at follow-up discussions. In the case of the student survey, these mainly concerned the attitudes students had to the use of quantitative techniques in the courses they were taking and this was explored in the focus group meetings. With regard to the departmental follow-up visits, no particular problems were encountered and on several occasions more than one member of staff was available to meet the project team members. An added bonus of the visits was that examples of numerical work students were undertaking was demonstrated and copies of course materials were supplied.

Following trials in the lead institution, the numeracy test was undertaken with first-year students in the two partner institutions. The follow-up visits were used to persuade other history departments to administer the test. In the event, however, not all the departments who expressed an interest in participating were able to make the necessary arrangements, so that more testing took place in post-1992 than in pre-1992 institutions. In one case, the test was sent to students to complete out of class time; the potential for collusion meant that these results could not be used.

Data protection meant that much of the survey of former history students had to be conducted indirectly through university alumni offices. They acknowledged that available contact details were sometimes out of date, especially for students who had graduated more than two or three years earlier. Accordingly, the number of universities who were asked to participate in the survey was increased to ensure a viable sample.

The website survey produced valuable information but the amount obtained varied appreciably from one institution to another and a good deal of searching was required to ensure that all available detail was gathered. It proved to be a time-consuming activity in relation to the amount of information realised. That a comparatively small number of institutions were involved made the task manageable.

The last survey to be launched was that to the overseas universities. Computer translation facilities helped with language problems, but difficulties were nonetheless encountered. Not all overseas universities offered undergraduate courses in history; in others, online facilities were not well developed; links to websites, or sections of them, were broken; and contact details at departmental level were lacking. There was also a reliance on potential respondents' adequate command of English.

6. Outputs and findings

Current student survey

Responses to the survey were obtained from 162 students at the three partner institutions. Of these, 92 were at MMU, 50 at SHU and 20 at UCLan. The vast majority (85%) fell into the 18-22 year age range and most (59%) were male.

The students' mathematical qualifications

Nearly all the group (92%) had obtained a GCE O-level or GCSE award as their highest pre-university mathematics qualification. Nearly 80% of them had achieved grade C or above, but only nine per cent had secured an A grade. A small minority had studied mathematics beyond the compulsory education years, with three per cent attaining an A/S level award and a further three per cent an A-level award. It was apparent that all the students sampled had attained qualifications requiring them to demonstrate their understanding of a range of basic numerical techniques.

Ability to undertake basic numerical tasks

In self-assessing their basic numerical tasks, the students were asked to use a five-point scale, with five equating to 'highly competent' and one to 'not at all competent'. The results are shown in Fig. 19.

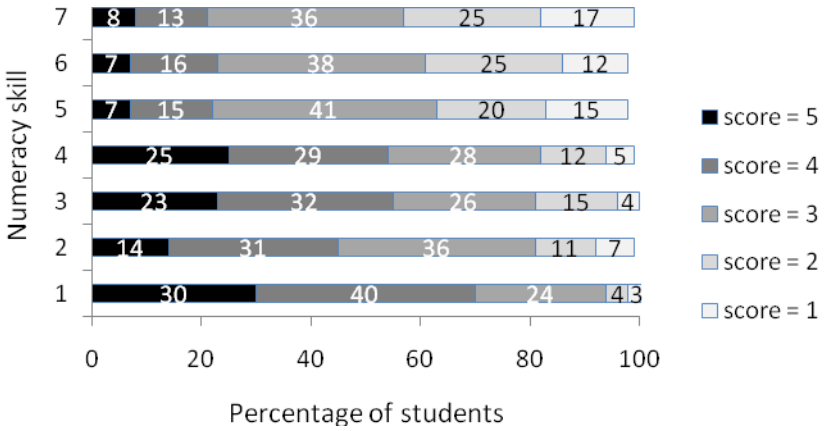


Fig. 19 Perceived ability with particular numerical techniques

Key:

1. Interpret graphs and charts
2. Prepare statistical tables
3. Calculate percentages
4. Calculate averages
5. Calculate ratios
6. Take representative samples
7. Calculate correlations

The following points should be noted:

- Amongst the tasks listed, students expressed greatest confidence in their ability to interpret graphs and charts and least confidence in their ability to calculate correlations. Only seven per cent gave scores as low as one and two with regard to the former, compared with 42% for the latter.
- The pattern of responses in relation to calculating ratios and taking representative samples is very similar to that for calculating correlations. In all three cases, little more than 20% of students recorded scores of four or five.
- The response patterns for calculating percentages, calculating averages and preparing statistical tables are also fairly similar to one another, though with rather lower confidence being registered with regard to preparing statistical tables.
- Even with regard to the skills in which they generally profess relatively high levels of competence, with the exception of interpreting graphs and charts, approaching 20% of students still scored themselves at only one or two.

On the basis of these findings, incorporating opportunity for undergraduate historians to engage with numerical activities would cause little anxiety as far as interpreting graphs and charts are concerned. Nor might it be thought that the majority would have too much difficulty coping with preparing statistical tables and calculating percentages and averages. However, since student self-evaluation may be misleading, it was necessary to test their claims (see section on History student's numeracy test, p. 18).

Other numeracy skills students consider important

Only 35 students (22%) noted other numeracy skills as being important. Two stated that none were. The most frequent response, occurring in seven instances, was counting. The other skills eliciting more than a single response were long division (six), mental arithmetic (five), pie charts (four), multiplication (three) and addition (two).

Reflecting on the responses to this and the preceding question raises the key issue of the advantage that can be derived from giving history students opportunity to apply their existing numeracy skills, which are generally of a basic nature, rather than from trying to enhance these skills. Undertaking aggregative analysis in historical demography and compiling occupational distributions using census schedule or parish register evidence are cases in point. The active learning approaches that are being increasingly applied in undergraduate history teaching, coupled with the wide range of primary evidence that has become readily available to undergraduates, certainly offer the means for improving the teaching of numeracy skills. Consistent with the definition of numeracy given in the over-arching project report, it is necessary to caution against trying to teach *all* history undergraduates additional numeracy skills for, as the findings presented in other sections of this report suggest, such an endeavour may well be counter-productive, meeting with strong resistance from both tutor and student. Developing new numeracy skills might best be reserved for those areas of the history programme such as economic history modules where they are specifically required.

Perceived ability to use numeracy skills in historical study

As Fig. 20 shows, only a little over one in three of the 155 respondents gave themselves a four or five score (using the same five-point scale) when asked to rate their ability to apply numeracy skills in historical study.

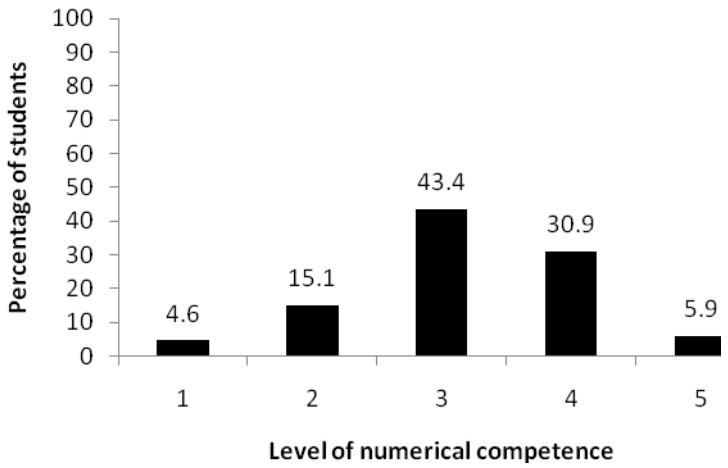


Fig. 20 Perceived ability to apply numeracy skills in historical study (N = 155)

The distribution of grades is somewhat biased towards the upper end of the grading range; a smaller minority of respondents (20%) declared a rating of just one or two. This finding may be seen as giving some grounds for optimism in terms of introducing numerical components into history courses, at least as far as the application of students' existing numeracy skills is concerned. However, it should be borne in mind that not only do the responses relate to student perceptions, which may be misconceived, but also they only relate to an overall assessment of general ability and not to specific mathematical skills regarding which, as Fig. 19 reveals, the responses were more diverse.

Value in developing historical skills

A very high proportion (85%) of students felt that developing numeracy skills would enhance their employment prospects. However, as Fig. 21 reveals, a much lower proportion (44 %) thought that developing numeracy skills would enhance their learning in historical studies.

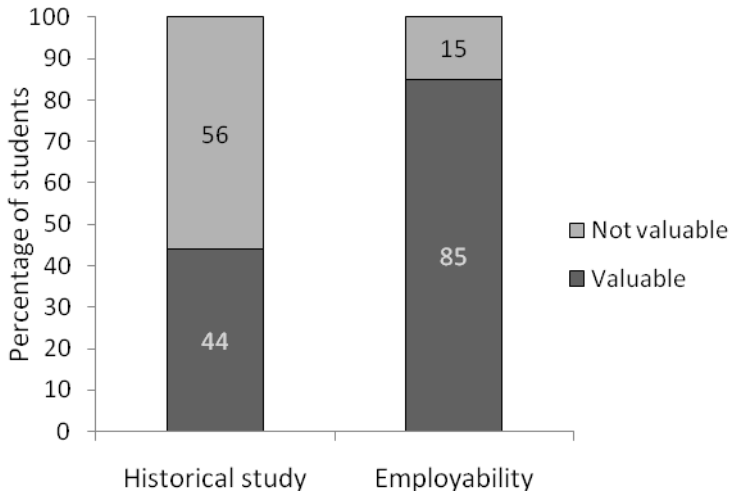


Fig. 21 Value in developing historical skills (N=160)

Given these findings stressing the importance of numeracy skills in employability terms and may be a useful way of encouraging history students to overcome their reluctance to engage with them. However, as the focus group discussions demonstrate, such reasoning would not necessarily weigh heavily with all of them (see section on focus group discussions, below).

Use of computer applications with numerical data

A total of 156 students responded to this question, some noting they had used more than one type of application. Of these, a very high proportion (at least 88%) had used a spreadsheet (almost exclusively Excel) with numerical data. In contrast, only around one-third had used a database programme, and a mere four per cent had used statistical packages. Four students (approximately 3%), noted they had created numerical tables using word-processing software (Microsoft Word).

That the great majority of history students have used a spreadsheet points to a further opportunity to use their existing skills in incorporating numeracy elements into history teaching. An obvious possibility would be to encourage them to prepare original charts and graphs from the data they have derived through investigating primary evidence, as a prelude to interpreting their findings.

Focus group discussions

The respondents

The following four focus group sessions were undertaken within the partner institutions:

Group 1 (UClan): Four first-level students, one of whom was from the USA. The three UK students had achieved grade B in mathematics at GCSE and the US student Algebra 3 at high school.

Group 2 (UClan): Two first-level students, both with GCSE Mathematics.

Group 3 (MMU):Three first-level students, one with a GCSE Grade B in mathematics, one a grade C and the third with Level 2 numeracy through *Learning Direct*.

Group 4 (SHU):Five third-level students, two with grade A, one with grade B, and two with grade C passes in GCSE Mathematics.

Attitudes towards mathematics

Questions dealing with whether or not the students liked mathematics and what considerations influenced their views brought the following responses:

- Most of the first-level students disliked mathematics – one positively hated it – and they were generally relieved to have finished studying it after the compulsory school years. However, one felt that the statistics component of the GCSE course was useful, whilst another stated that he would opt for a module containing numerical elements if the module content appealed to him. Additionally, two third-level

students reported a positive experience in studying the subject. Indeed, one had deliberately chosen economic history modules in order to practise her numeracy skills.

- One first-level student had lost interest as the content of his mathematics course became progressively more abstract and less relevant; another remarked that there would have been more incentive to study mathematics if context had been given. Deficiency in teaching quality was also seen as an issue in the students' dislike of mathematics, the charge being made that some teachers concentrated merely on 'giving the facts' rather than explaining the underlying concepts. However, one third-level student remarked that he had struggled with the subject, but a good teacher had enabled him to recognise its practical use and relevance.

Views on the value of numeracy teaching

Discussion here focused on the value of numeracy in studying history and in relation to employability and as a life skill.

- There was some appreciation of the value that numeracy can have in historical study. For example, one group remarked that they would look at tables of historical data if they felt their understanding would be enhanced by so doing. Otherwise, they would skip over them. The general feeling, however, was that numeracy had limited value in the study of history. The applications mentioned in which it would have value were compiling and interpreting historical statistics, including those given in tabular form, perhaps, say, to show the effects of war. One student remarked: 'Basic sets of numbers related to historical situations are OK and useful.'

- There was a general recognition among the group that numeracy was important in gaining a job. One third-level student had found quantification to be more important than she had anticipated while working part-time in an archive, whilst another commented that it would be difficult to 'imagine a job where you would not be expected to have a grasp of numeracy'. However, one-first-level student thought that teaching numeracy should be the responsibility of the employer not the university, whilst another thought that the option of studying numeracy should be available at university for those wishing to apply for jobs in which numeracy mattered.

Some respondents stated that they would be put off entering a career which required engagement with numerical work, though four out of the five third-level students stated that this would not be the case. Three out of five third-level students were aware that prospective employers might use a numeracy test as part of the job selection process. Four of them asserted that they were not unduly concerned about taking such a test.

- There was an appreciation of the value of numeracy as a general life skill, linked with the notion of making numeracy relevant.

- The third-level students were asked how their perceptions of the value of numeracy had changed over the course of their studies. The responses were divided. One student thought its importance remained about the same; two others believed that it had 'faded-away' somewhat; and two others considered its value had increased.

Inclusion of numeracy in undergraduate history provision

The focus groups were asked about the extent to which numeracy provision should be incorporated into undergraduate history provision and the means of so doing.

- Opinion was divided regarding the extent of numeracy provision. One first-level student observed that it might not be a 'big deal' if only part of a module was involved and one of the first-level groups agreed that the most they would want is for numeracy to figure as an occasional element. This view suggests that students would not be against a 'ticking over' approach.

Another first-level group took a somewhat stricter line, suggesting that it should not be possible in a history degree programme to avoid quantification altogether provided it was introduced in ways with which students would feel comfortable and its relevance to historical study made clear, a view with which the third-year group concurred. Yet a member of the same first-level group expressed a contradictory view, suggesting that the big attraction of studying history was that mathematics was not needed.

- On the question of how quantification might be incorporated into undergraduate history provision, one first-level group felt that either a hidden or an overt approach was acceptable. One of the group observed that 'smuggling in' numeracy – that is, incorporating limited numerical elements into modules that are essentially non-quantitative in nature - might help those who do not like mathematics.

There was no support for including a dedicated 'bolt on' numeracy module in undergraduate history programmes; students preferred the 'smuggling in' (or integrated) approach. There was support for optional economic history modules and for more advanced numeracy provision for those history undergraduates who wished to engage with quantification.

Understanding of mathematics

The students were asked whether they were happy to rely on using calculators rather than have a conceptual understanding of numeracy.

- The first-level students felt that, where necessary, calculators were fine and there was no need for conceptual understanding. One observed that this would be the case with regard to statistical calculations. They were uncertain, however, as to at what point they would turn from understanding to machine, apart from one who stated she would attempt the calculation first.
- The first-level students said they were comfortable with calculating percentages and averages but expressed some uncertainty about the different measures of central tendency and about correlations, although one had done scatter graphs and knew what they meant because context was given to them. As in the case of the current student survey, students' self-assessment of their capabilities did not correspond with their performance in the numeracy test (*cf.* below, section) .
- The third-level group showed awareness of the value of practising numeracy in order to retain understanding. Two of the group also noted they needed to write down mathematical calculations rather than do them mentally.

Use of calculators and ICT applications

The groups were asked about the ways in which they used ICT, particularly in relation to numerical applications.

- They reported that they use ICT mainly for word processing (including, for some of them, creating tables) and internet research. They had also used spreadsheets, in some cases to prepare bar and pie charts.
- They also reported that they use calculators for basic arithmetical calculations frequently but did not feel they could use them, or computers, for more complex calculations. The members of one group noted that they would have a rough idea in their heads of the answers they should obtain when using a calculator.

Opportunity to practise numeracy skills

Asked if the courses they were taking should keep their numeracy skills 'ticking over', do more than this or not address the matter at all, the general view was in favour of a 'ticking over' approach. Asked about how much 'ticking over' should take place, and whether it should be compulsory or optional, the responses from the first-level students were:

- one specific module would be acceptable
- the provision should not be optional
- although compulsory, it should maybe not be made a big part of the grade because the overall grade could be affected.

Rating the value of studying numeracy

The students were asked to rate the value of numeracy in historical study and to employability on a scale of 1-5 (with 5 being the highest value). The mean ratings given for the level 1 and level 3 groups are given in Table 30.

Table 30 The value of numeracy to historical study and employability: student ratings

Year group	Historical study	Employability
Level 1	2.9	4.0
Level 3	2.6	3.2

These results accord with those obtained from the current survey (see p. 13), both samples demonstrating a limited, but by no means insignificant, appreciation of the value numeracy can have in historical study and a stronger awareness of the advantages it can bring in terms of employability. What might not have been anticipated is that students approaching the end of their undergraduate courses would give a rather lower rating to the value of numeracy in future employment than those at the start of their courses.

History students' numeracy test

The students and their mathematics qualifications

Usable test results were obtained from seven HE institutions in England. The number of students taking the test was 365. Sixty-one per cent were male and 82% were aged 18-22. In order to assess the quantitative skills of students at the beginning of their university study, the great majority (86%) of those asked to undertake the test were at level one. However, for comparative purposes and as a measure of progress through their undergraduate programmes, a small proportion of the sample (14%) was at levels two and three. The extremely unequal sample sizes in terms of age and level of study mean that comparisons between groups have to be treated cautiously.

In terms of their highest pre-university mathematics qualifications, 80% had achieved a GCSE pass, eight per cent had gained an A2 award and one per cent an AS-level award. Other types of mathematics awards, including CSE, NVQ, and City and Guilds, were held by three per cent of the students. The remaining eight per cent possessed no formal mathematics or numeracy qualification.

Distribution of test scores

The normality of the data was tested using the Kolmogorov-Smirnov test; scores for individual items and the composite score were all found to be normally distributed (Fig. 22).

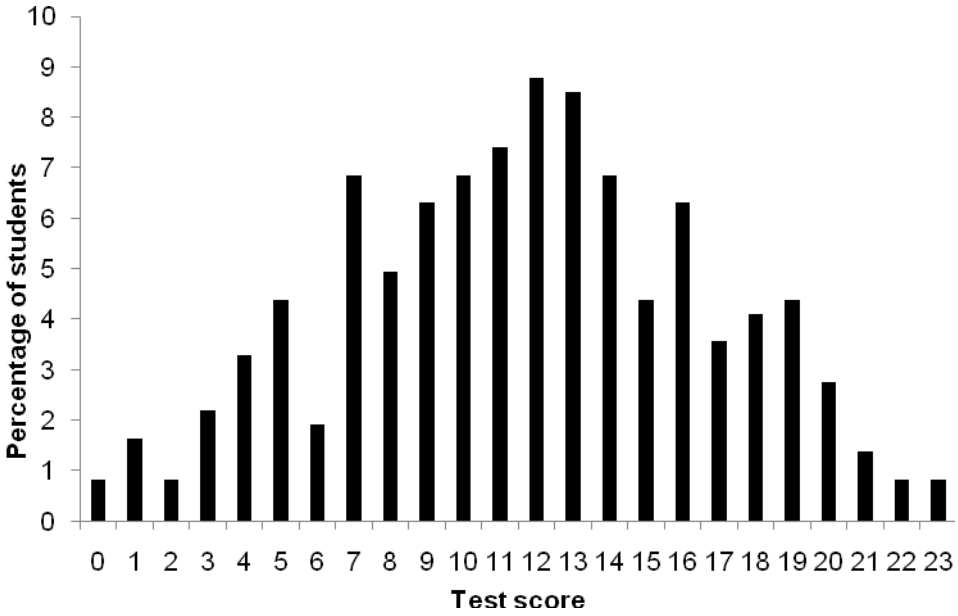


Fig. 22 Frequency distribution for test scores (N= 365)

The mean score for the 14-item test was 11.7 (47%) out of a possible 25 and the standard deviation was 5.0. The lowest score was zero. Forty per cent of the students scored 40% or less; 14% scored between 70 and 90%; and no student scored higher than 23 (92%).

Given that the participating students were asked to apply fairly basic mathematical skills of the type they would have encountered prior to their undergraduate years, the overall results demonstrate quite low levels of ability. Moreover, given that nine per cent of the participants obtained an A2 or an AS award in mathematics, rather more results at the higher end of the range might have been anticipated.

Performance on individual test items

If the 14 quantitative skills are grouped into similar types of numerical task, the following distribution emerges:

- four questions measured the ability to interpret data (1a,1b,1c and 1d);
- four determined the ability to calculate percentages (2b, 2c, 3b and 3c);
- four (3a, 3d, 4ai and 4aii) assessed the ability to calculate measures of central tendency;
- one tested the ability to calculate ratios (2a) and one to prepare a frequency distribution (4b).

The marks attained by the students for each question are given in Fig. 23.

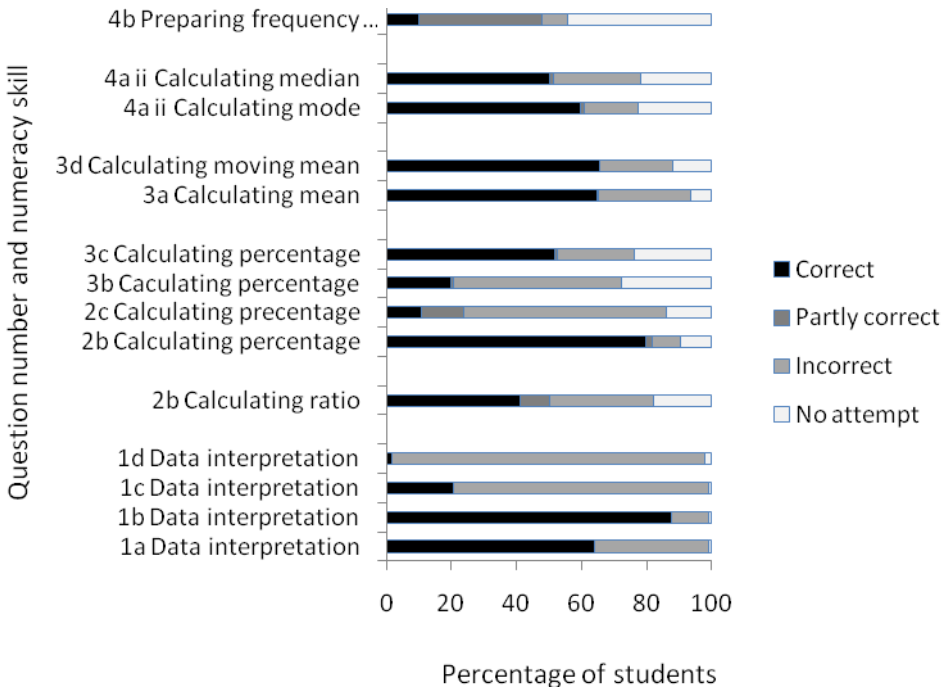


Fig. 23 Scores on individual test questions

Students achieved the second highest average score (44%) on questions pertaining to data interpretation, though with the mean masking a wide variation in performance Questions 1a and 1b were multiple choice and the scores achieved were higher than those for questions 1c and 1d which were open-ended. In fact, question 1b produced the most correct answers in the entire test and 1d the least. Students had considerable difficulty identifying longer time periods (three and four years) on the charts they were given. The overall performance on the data interpretation questions runs contrary to expectations from the current student survey in which the respondents had expressed high levels of confidence about their ability to interpret graphs and charts. These findings demonstrate that history undergraduates can easily be overconfident by failing to recognise their limitations with tasks they see as being relatively straightforward.

The same type of observations can be made with regard to calculating percentages, the success rates again varying markedly. Question 2c introduced a degree of difficulty by requiring students to combine a simple percentage calculation with a subtraction. A small proportion of them gained credit by correctly dealing with the percentage element. As for question 3b, the reason for the difficulty experienced by many students is less easy to discern; having to convert one eighth into a percentage figure without the aid of a calculator may be the explanation.

Students performed best on those parts of the test that gauged the ability to calculate measures of central tendency. On these questions, the average score was 60%. Calculating a median proved the most difficult with 45% of students providing a correct answer. There was comparatively little variation between the students' answers to the central tendency questions.

The number of students who correctly calculated the ratio was 41%. In several cases, a mark was secured by identifying the component numbers of the ratio, without cancelling them down completely. A repeated error was to express the ratio numbers the wrong way around.

Performance was weakest in preparing the frequency distribution with only 10% of students attempting the task correctly. Many demonstrated conceptual understanding but made the mistake of providing overlapping

values in the age groups they distinguished. The fact that 40% of the students did not attempt this question – the highest non-response rate - may reflect their unfamiliarity with frequency distributions, though, since the question was the last on the paper, shortage of time may also have been an issue.

Relationship considerations

Male students (M = 12.6, SD = 4.8, N = 208) scored rather more highly than female students (M = 10.8, SD = 5.0, N = 134), though not to any marked extent. Additionally, younger students, especially males, tended to obtain better scores than those in the older age groups. As would be expected, students possessing higher previous mathematics qualifications and grades performed better than those with lower ones.

Conclusion

Whilst only guarded conclusions can be drawn from the limited amount of testing undertaken, the results obtained support the notion that history students tend to over-estimate their ability in applying basic numeracy skills within historical contexts. They performed inconsistently in the test, even with regard to the numeracy skills in which they professed to be the most confident. Additionally, whilst the test results were normally distributed (Fig. 22), those from the students' self-assessment of their numerical ability are somewhat skewed towards the higher end of the distribution range, reflecting their over-estimation of their mathematical competencies (Fig. 20). Finally, the superior performance of younger students in the test compared with their elder peers may mean they are retaining some of the numeracy skills acquired at school and suggests that there is a better chance of keeping these skills 'warm' if they engage with quantitative study early in their programme.

Graduate survey

Respondents' backgrounds

History graduates were surveyed to ascertain their views on numeracy skills in regard to their education and their subsequent employment. They were contacted via the alumni offices of their former universities and were asked to complete a short online questionnaire. Eleven universities in all were surveyed - nine pre-1992 and two post-1992 – from across the UK; six were English, three Scottish, one Northern Irish and one Welsh. The focus was on graduates of the previous six years (2003-2008) who formed 89% of the sample. The remainder comprised UCLan graduates from earlier years (1994-2002). The universities surveyed were: Bristol, Dundee, Edinburgh, Glasgow, Lampeter Wales, Leeds, Manchester, Queen's Belfast, Sheffield Hallam, UCLan and Warwick.

Responses were received from 96 graduates. All had a first degree in history, though 19 had studied another subject either jointly or 'with' history. After university 68 had pursued, or were pursuing, a further qualification. In terms of their personal backgrounds, 82% were aged 30 or under. Relatively few had been mature students, with 78% of them entering university by the age of 19. There were more female (62%) than male respondents.

Nearly two-thirds of the total (65%) had entered university with a GCSE (or equivalent) as their highest mathematics qualification. No fewer than 19% had gained a full A-level pass in mathematics and another four per cent had achieved AS standard. These figures are higher than the eight per cent of A2 level passes and one per cent of AS level passes achieved by students participating in the numeracy test, and the three per cent A2 level and three per cent AS level passes of the current students surveyed.

Graduates' assessment of their numerical competencies

The graduates were asked to use a five-point scale in assessing their numerical competency, with five equating to 'highly competent' and one to 'not at all competent'. In Table 31, the mean scores and standard deviation are shown for each of the numeracy skills.

The respondents' self-assessment of their competencies is quite positive, with no mean score falling below 2.5. Even so, considerable variation is evident, with notably higher degrees of competency being expressed in some cases than in others, a point which is demonstrated in greater detail in Figure 24 which shows the percentage ratings for each of the numeracy skills. The main points to note are:

- Respondents assessed themselves the most competent in interpreting graphs and charts – 76% giving themselves a rating of four or five - and least competent in calculating correlations – only 21% giving a four or five rating.
- High levels of competence were also claimed with regard to calculating percentages and averages, with 68% of respondents giving a four or five rating for the former and 64% for the latter.

- In contrast, much lower levels of competency were recorded in calculating ratios and taking representative samples. Only 35% of respondents gave a rating of four or five with regard to the former and 29% with regard to the latter.

Table 31 Graduates' assessment of their numerical competencies (N = 96)

Numeracy skill	Mean	Standard deviation
calculating correlations	2.5	1.2
taking representative sampling	2.8	1.2
calculating ratios	3.1	1.2
preparing tables of statistics	3.4	1.1
calculating averages	3.8	1.1
calculating percentages	3.9	1.0
interpreting graphs and charts	4.0	0.9
Total	3.4	1.1

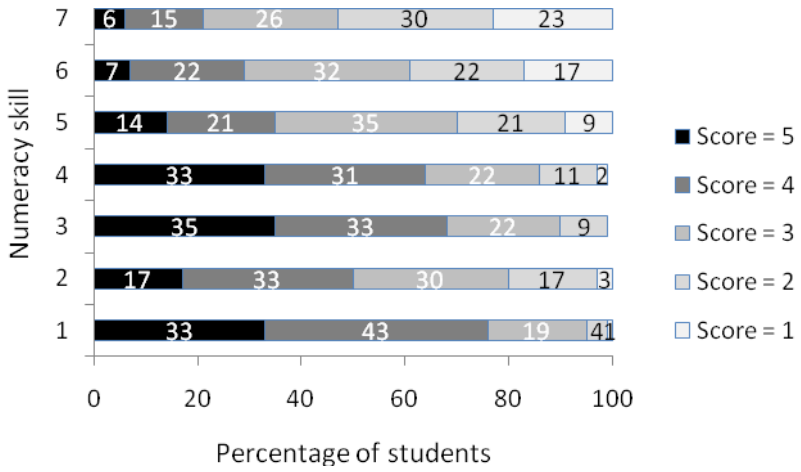


Fig. 24 Graduates' assessment of their numerical competencies

Key:

1. Interpret graphs and charts
2. Prepare statistical tables
3. Calculate percentages
4. Calculate averages
5. Calculate ratios
6. Take representative samples
7. Calculate correlations

In general, these findings are in accord with the self-evaluation ratings given in the current student survey. Both groups expressed varying levels of competence concerning the range of numeracy skills about which they were asked and showed a broadly similar pattern of response in so doing.

Numeracy skills developed in undergraduate courses

The graduates were asked to assess, using a five-point scale with one meaning 'very little' and five 'a great deal', the extent to which their undergraduate history courses had helped them develop particular numeracy skills. The results are set out in Fig. 25 which shows the average rating for each of the numeracy skills.

The numeracy skills graduates thought their undergraduate degree courses had helped them develop the most were interpreting graphs and charts (M = 2.6), and preparing tables of statistics (M = 2.2). At the other end of

the scale were calculating correlations (M = 1.8) and calculating ratios (M = 1.6). Despite this variation in the results, the mean ratings given by the respondents were in general relatively low, indicating that the opportunities to develop their numeracy skills as undergraduates were limited.

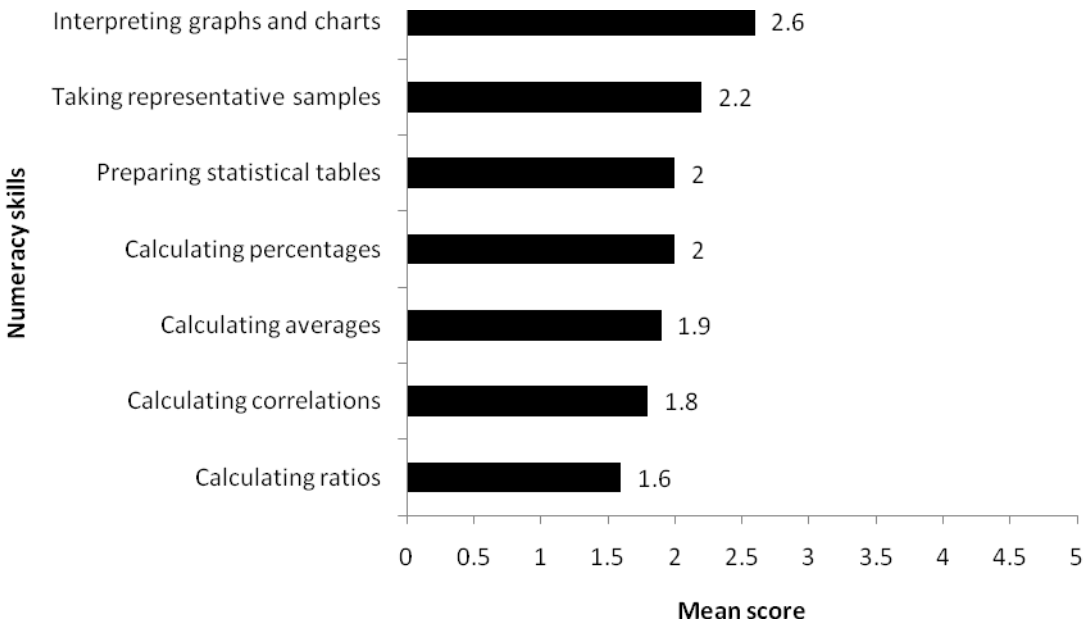


Fig. 25 Numeracy skills developed on undergraduate history programmes (N = 96)

The survey also asked which, if any, numeracy skills the graduates would have liked to have had the opportunity to develop as part of their undergraduate history courses. The results are presented in Fig. 26.

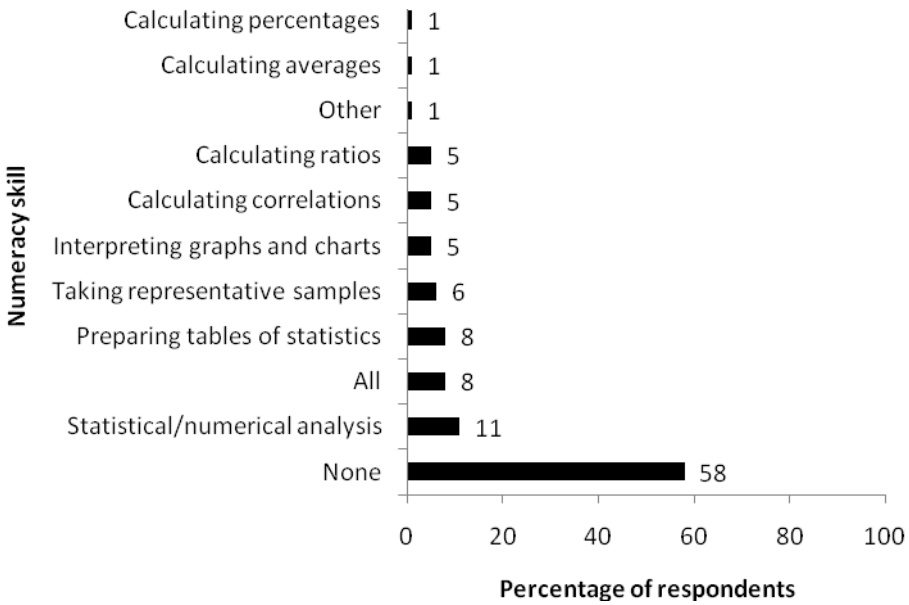


Fig. 26 Numeracy skills graduates would have welcomed as part of their undergraduate programme (N = 79)

The majority of the respondents (58%) did not see any need for further provision of opportunities for numeracy skills development. In fact, only one skill, namely statistical/numerical analysis, was mentioned by more than one in ten respondents. This may be because these skills are not perceived as being of much relevance to historical studies or because they had not been useful in their employment or both.

Underlying these perceptions is a general antipathy towards numeracy, evidenced in some of the comments made by the graduates:

I don't really think numeracy would have been relevant to history.

I don't think an undergraduate history course is necessarily the place to be developing numeracy skills.

I don't think that an historian needs numerical ability above GCSE level.

I went to study history, not maths/numeracy.

None were needed for the degree.

None - I hate sums.

Given such attitudes, it is no surprise to find that, when asked a further question about what degree of emphasis their undergraduate history studies should have placed on developing their numeracy skills, 65% (N = 96) believed the emphasis had been about right. A small proportion (eight per cent) took the view that the emphasis should actually have been less. However, 27% did believe that their degree programme should have placed more emphasis on numeracy.

It might be thought that these differences in opinion could be explained, at least in part, by the different programmes that the graduates had experienced, but this does not appear to be the case. When the data were analysed by university, 60% or more of the graduates from each of them (except for one) thought there had been the right balance of emphasis on numeracy skills in their undergraduate programmes. In the case of the one exception, as many as 62% (8 out of 13) of its graduates were of the view that their undergraduate history degree should have provided them with more opportunities to develop their numeracy skills. That the average figure masks appreciable variation serves as a reminder of the survey's limits and suggests that further research is needed here.

The analysis of the data by gender revealed that 66% of female and 61% of male graduates thought the provision of numeracy skills development in their degree programmes adequate; three per cent of female and 17% of male graduates considered this provision should have received less emphasis; and 31% of female and 22% of male graduates wanted more opportunities for the development of numeracy skills.

The final question about the respondents' experience of numeracy skills development sought to compare the influence that their undergraduate history courses had in this respect compared with school, undergraduate employment and subsequent employment. Again a five-point scale was used, with one equating to 'very little' and five to 'a great deal'. The findings are graphed in Fig. 27, with the respondents' average rating given for each of the variables.

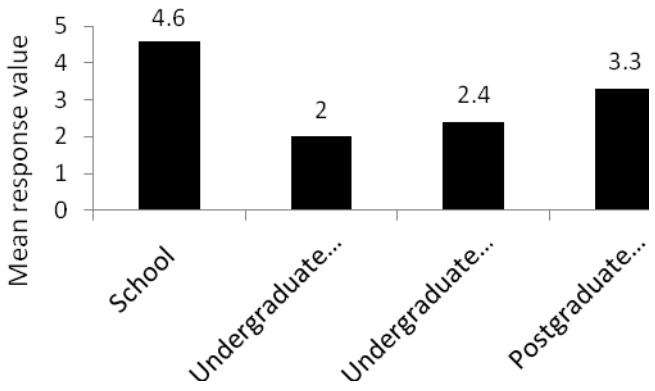


Fig. 27 Educational and employment experiences in graduates' numeracy skills development (N = 96)

Two points stand out from this feedback:

- The perception of the graduates is that school, which was given the very high rating of 4.6, was by far the the most important influence on the development of their numeracy skills. In contrast undergraduate provision scored the lowest mean rating (2.0). The implication is that, during their undergraduate years, respondents were at best 'marking time' and at worst slipping back with regard to their numerical capabilities.

- Quite a high rating (3.3) was given to numerical skill development in the workplace reflecting no doubt the need for specific job-related skills and suggesting that more could be done at undergraduate-level to anticipate this need.

For the great majority of history graduates sampled, it is evident that basic numeracy skills were developed during the compulsory years of education but that these were largely neglected or under-utilised until they entered the world of work.

Graduate employment

The respondents were asked to state their current employment with a view to ascertaining how far they had entered sectors in which numeracy was likely to be important. The breakdown of their occupations is shown in Table 32 using the employment categories found in the survey of first destinations of history graduates compiled by the Higher Education Statistics Agency (HESA). This survey is published as *What do Graduates do?* on the Prospects website at www.prospects.ac.uk. For purposes of comparison, the 2005 HESA data are included alongside the graduate sample data. Because the HESA statistics are based on destinations six months after graduation, they provide only an interim picture of graduate employment. Many graduates are engaged in further study (21.3% in 2005), temporary unskilled jobs or are still unemployed. Accordingly, the HESA percentages in the table below are based on the 52.1% of their sample who were in full employment. For the sake of comparison, the graduates in the current survey who are unemployed (2), retired (3), in part-time employment (3) or studying for a further qualification (6) have been excluded from the analysis.

Table 32 Breakdown of occupations of history graduates

Occupational group	Percentage of history graduates	
	Prospects survey	Current survey (N = 82))
Marketing, Sales & Advertising Professionals	6.1	12.1
Commercial, Industrial & Public Sector Managers	11.6	15.9
Scientific, Research, Analysis & Development Professionals	0.1	1.2
Engineering Professionals	0.3	1.2
Health Professionals & Associate Professionals	0.5	1.2
Education Professionals	4.0	14.6
Business & Financial Professionals & Associate Professionals	8.8	8.5
IT Professionals	0.7	0
Arts, Design, Culture, Media & Sports Professionals	4.2	6.1
Legal Professionals	0.5	3.7
Social & Welfare Professionals	2.3	3.7
Other Professionals, Associate & Technical Occupations	4.4	8.5
Numerical Clerks & Cashiers	3.8	1.2
Other Clerical & Secretarial Occupations	22.9	8.5
Retail, Catering, Waiting & Bar Staff	14.2	2.9
Other Occupations	15.4	4.9
Unknown Occupations	0.2	3.7

That more of the survey graduates than the 'Prospects' graduates are in professional jobs (77.2% against 43.5%) and fewer in unskilled jobs is a reflection of the longer time in the employment market of many of the former and their completion of further qualifications. It confirms the pattern established in other research that the six-month destination statistics are an incomplete and misleading guide to longer term employment. The distribution of occupations three years after graduation provides a more reliable indication of graduate career prospects.

That said, both sets of figures show that history graduates are not, for the most part, taking up positions in the occupational categories that clearly demand numerical and 'strong' IT skills, notably numerical clerks and cashiers and IT professionals. However, a few do go on to take accountancy courses and some are extremely successful in the realms of business, finance, industry, sales and marketing. Whether the low uptake of such jobs reflects an innate aversion among those students who elect to take history degrees or is a product of the general absence of numeracy teaching from history programmes are questions once again posed by the data. It is also not

possible to determine from the raw employment data what degree of numeracy is required by the many 'professional' occupations. This question was explored further in the graduate survey.

Numeracy skills in the workplace

Respondents were requested to state which numeracy skills, if any, they had found particularly useful in the workplace. They reported that some numeracy skills were proving more useful than others, with interpreting graphs and charts (mentioned by 39%) and calculating percentages (mentioned by 38%) leading the field. In third place, some way behind at just 29%, was preparing tables of statistics. Of the rest, only calculating averages received a response in double figures (18%), though 14% thought that all numeracy skills were useful. However, almost as many (13%) had found none of any use. The only others mentioned were calculating ratios (5%) and taking representative samples (4%).

The two numeracy skills that figured highest in the workplace were also those in which the graduates had professed the highest levels of competency. Incorporating these skills within the history curriculum may therefore have particular advantage in career terms and might well meet with little resistance. Overall, though, relatively few respondents identified numeracy skills as being particularly useful to them in the workplace; not one was singled out by a majority of the respondents in this respect. It is possible that they had not been attracted to jobs in which numeracy skills had to be applied to any appreciable extent. If so, their career choices might have been somewhat circumscribed.

Asked if a numeracy test had been required as part of their recruitment and selection process, just under a third (30 per cent) said this was the case. The sectors in which this was required were teacher training, the civil service, financial institutions and retail companies. Whilst, for the most part, history graduates may not be experiencing numeracy tests in the workplace, a significant minority do have to take them. Moreover, numeracy tests are being set in some of the careers that are popular with history graduates.

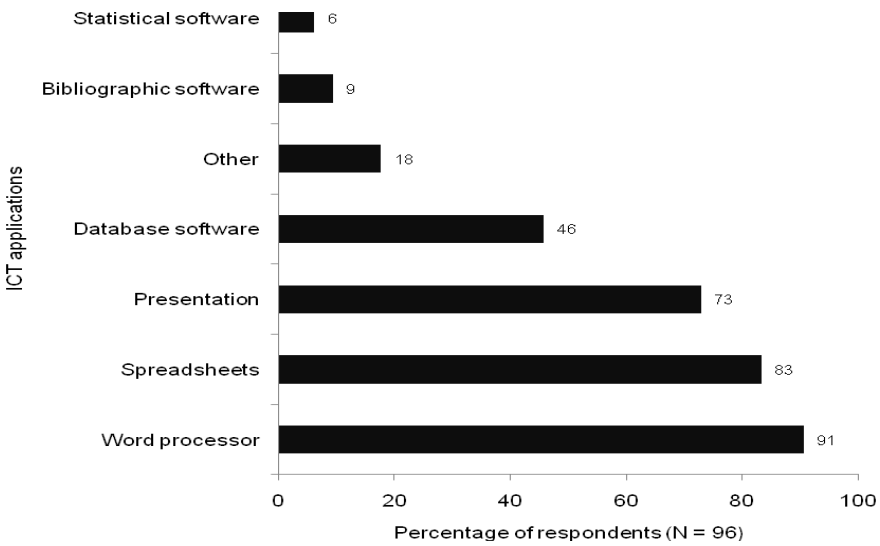
Only 19 of the graduates (20%) had received any numeracy training from their employers. It appears that the graduates were able, on the whole, to cope with the numerical tasks required in their current jobs. However, 31% believed that more numeracy training in their history programme would have increased their career opportunities, though the mean figure once again masks appreciable variation. In the case of one institution, a 70% response in favour of more numeracy training was in inverse proportion to the overall response figure. If this result is discounted, the overall proportion in favour of more training falls to just 22%.

Graduates' use of ICT applications

The vast majority (93%) of the respondents stated that they were using ICT applications in their current jobs. A breakdown of these applications showing the proportion of respondents using each of them is given in Fig. 28.

Fig. 28 Types of ICT applications used by graduates in their work

Nine out of ten were using word processing software and almost three out of four were using presentational software, neither of which would give much scope for dealing with numerical data. However, more than four out of five were working with spreadsheets, and almost half were using databases, suggesting that numeracy featured in their work to some extent. This use of spreadsheets, and to a lesser extent of databases, in the workplace, reinforces the point about the value that teaching these two applications might have in improving the numeracy skills and the employability of history undergraduates.



This notion is given further support once the graduates' response to being asked about the extent to which their history degree courses had helped to develop their ICT skills is examined. Although 65% said their programme had helped, analysis of the responses reveals that the ICT applications most frequently used were word processing, PowerPoint presentations, the internet as a research resource and referencing software, none of which required numerical competence. A few, however, did use databases and Excel for collating and processing information and a small minority were provided with training in these applications outside the history programme.

Survey of UK university history departments

General provision of numeracy teaching

The survey of 91 UK higher education institutions offering single-honours history programmes produced replies from 64, an extremely robust response rate of 70%. Coverage was nationwide and both pre- and post-1992 institutions were well-represented.

In line with the benchmarking recommendation that, where appropriate, provision might be made to incorporate numeracy and quantitative methods into single honours history programmes, 42 (66%) of the respondents stated that their departments did so and a further four (6%) that they did so partially. The remaining 18 (28%) said that they did not incorporate numeracy into their programmes. A sizeable majority of history departments sampled were therefore reporting at least some provision. However, as the data from the questionnaire goes on to show, these raw statistics give an overly optimistic impression of the amount of numeracy teaching that is actually taking place.

Of the 64 respondents, the 42 who said they were teaching numeracy skills together with three of the four who were partly addressing the issue went on to complete the main body of the questionnaire. The following data are based on these 45 responses.

Methods of incorporating numeracy into history programmes

Several of the departments reported that they used more than one method to develop students' numeracy skills (Fig. 29).

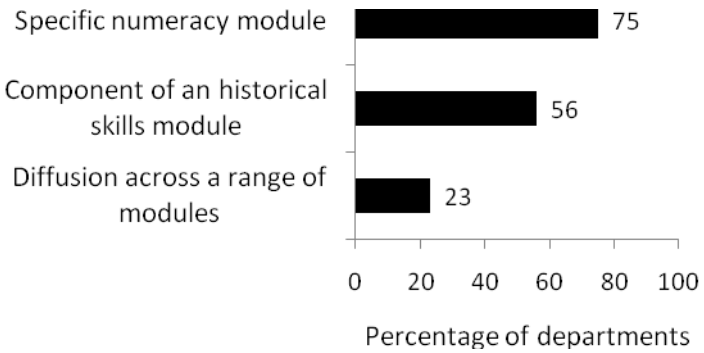


Fig. 29 Methods of incorporating numeracy skills

The most frequently cited method, used in 34 cases (75%) was 'diffusion across a range of modules' – in other words the skills are taught in small doses within any type of module across the whole programme. However, 27 departments (56%) incorporate numeracy skills in modules dealing specifically with historical skills. However, the time allocated to this numerical component using either of these approaches may be quite limited. Nor is it certain whether assessment was used. Both were issues explored in follow-up interviews and via the website survey (see sections on follow-up department interviews and website survey from p. 31). Very few departments (23%) reported having specific *modules* dedicated to numeracy learning, preferring to disperse rather than concentrate it.

Managing the development of numeracy skills

Responsibility for managing the teaching of numeracy skills was most frequently left to committed individuals, occurring in 21 of the 45 departments (47%). The qualitative data, together with evidence collected at the follow-up visits, suggests that these were usually the economic historians in the department. For example, one respondent observed:

> *Individual members of staff, in the area of economic and business history, use statistical evidence in their module deliveries, and engage students in interpreting historical trends. This does not, however, add up to a programme strategy for developing numeracy.*

In nine departments (20%), small teams took on the responsibility. Seven departments (16%) expected all tutors to participate (for example, by teaching compulsory 'introductory skills' or 'methods' courses), while in the remaining eight (18%), responsibility was not assigned to anyone, usually because some numeracy skills were taught but not in any managed or collectively planned way. The implication of these findings (and of the website survey) is that departments in general do not pay as much attention to developing numeracy as they do to other key skills.

Numeracy skills and progression

The absence of collective planning in numeracy teaching is further demonstrated by the small number of survey returns from departments that incorporated numeracy skills into their programmes in a progressive way. Only 11 of the 45 (24%) stated that they did so, and none systematically through all three or, in the case of the Scottish universities, four years of the degree programme. The following comments illustrate this:

> *There is no pathway through the options of our degree programme which will ensure that all students receive training in numeracy and quantitative methods (with consequent and appropriate forms of assessment).*

> *Very few of the dept admit to using spreadsheets any way, even fewer use Access, and probably not more than 1 (myself) or 2 use SPSS. So if taught in the first year it would not in practice be reinforced in years 2 and 3.*

The survey evidence suggests that the majority of UK history undergraduates can pick their way through their programmes of study so as to have little or no need to engage with numerical or quantitative techniques.

Compulsory teaching of numeracy skills

As the data presented in Fig. 30 reveal, numeracy skills are infrequently taught as a part of compulsory modules.

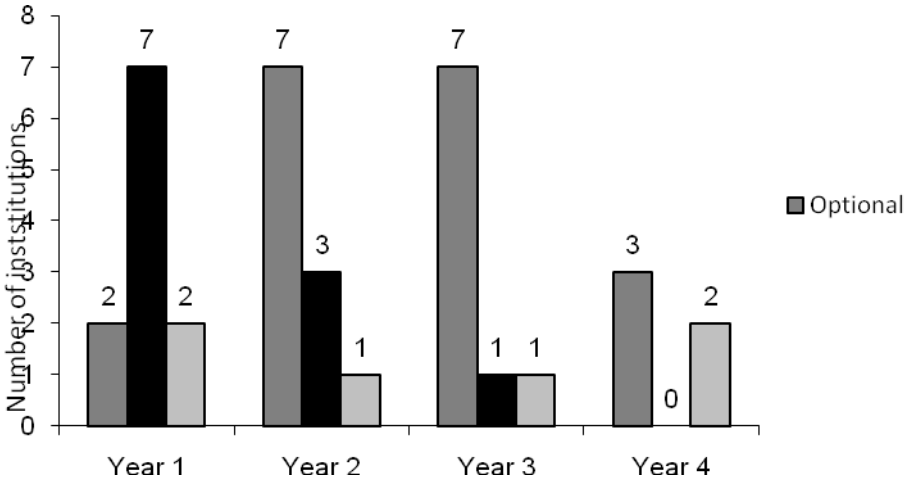


Fig. 30 Location by year of numeracy skills modules

In only eight departments (13%) was such compulsion reported in year one, a figure that fell to four in year two, two in year three and one in year four. After year one, most numeracy teaching was optional and occurred in no more than eight of the responding departments in either years two or three. Not a single UK history department in the sample was found to have a compulsory numeracy skills element in every year. These findings add weight to the point made above that most history students can avoid engaging with numeracy by their choice of modules.

Assessing numeracy skills

Only 17 (38%) of the 45 departments in the sample reported that they used assessment strategies to measure the attainment of numeracy skills. The apparent lack of attention to assessing numeracy skills, a finding supported as well by the paucity of examples uncovered in the website survey (p. 34), is especially significant because of the weight that students place on assessment. The issue of assessment of numeracy skills is therefore one that merits further investigation.

Numeracy teaching through ICT

Most of the 45 departments stated that they provide students with the opportunity to use one or more ICT applications to engage with numeracy. How these are delivered is illustrated in Fig. 31.

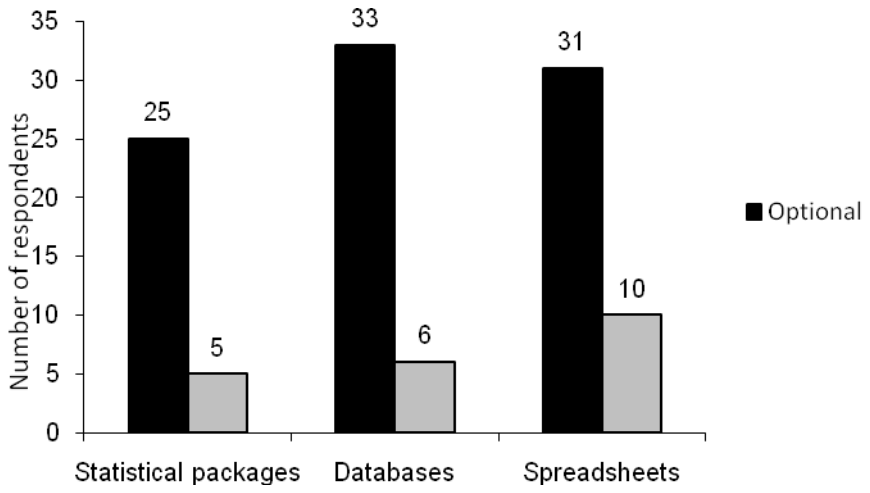


Fig. 31 ICT applications used to teach numeracy

Databases were reported to be the most frequently used of these applications, occurring in no fewer than 33 departments (73%), but only on a compulsory basis in six of them (13%). Spreadsheets were being used in almost as many departments (31 or 71%), though with compulsion being required in just under a third of them. Statistical packages were used less frequently than either spreadsheets or databases, though still in a majority of cases (57%). However, compulsion was infrequent, being reported in only 5 cases (11%).

In the surveyed departments, therefore, the great majority of students can avoid using key ICT applications for numeracy work. This evidence, together with that from the tutor survey (p. 32), suggests that tutors appear to be more confident about requiring their students to engage with spreadsheets than with databases and statistical packages.

Departmental perspectives on numeracy teaching

The survey of UK history departments reveals just how little they are doing in the way of systematic numeracy skills teaching. Of the 64 respondents, over 90% admit that they should be doing more to improve their students' numeracy skills.

The questionnaire sent to them ended by inviting further comments and 48 of the 64 (75%) responded, including all 19 departments that did not complete the main body of the questionnaire. Their responses indicate that many of them are doing much the same (that is, not very much) as others who had said they were addressing the benchmark recommendation positively. While agreeing that more needed to be done, there is a defensiveness about many of the comments. Combative explanations are given to rationalise why more is not being done though some as well confess their own (or their colleagues) inability to teach numeracy skills.

The following represent a small selection of typical comments on various recurring themes:

1. Student resistance

There were many comments centring on the belief that history students are hostile to numeracy teaching. Familiar points were that numeracy skills are 'hard' for students to learn and that, because they don't enjoy quantitative

approaches, they resist the 'imposition' of compulsory numeracy training. The language of 'retreat' was used by several of the respondents:

> *We used to have a compulsory core module at Level 1 that was universally hated by students.*
>
> *There would be massive resistance to compulsory quantitative training from the students.*
>
> *As entrants to a Humanities programme, our students are generally quite hostile to, or frightened of, or inexperienced in, quantitative analysis.*
>
> *We used to do this for all students, but have retreated … because of student hostility to it.*

2. Tutor resistance

The frequent comments about student resistance to numeracy provision were paralleled by those concerning the unwillingness of those who teach them to engage with numeracy. The general thrust of the comments was related to the lack of staff interest and expertise in quantitative approaches but time and resource constraints were also considered obstacles:

> *There are too few staff who are numerate to increase compulsory numeracy training.*
>
> *Inertia and direct opposition from … staff is also a real problem in creating a culture that emphasises the importance of numeracy skills.*
>
> *Nearly all of my colleagues are qualitative rather than quantitative historians.*
>
> *… and [staff] associate quantification with 'white coat history'. They see themselves as cultural historians rather than 'number crunchers'.*
>
> *Neither, it seems, do they [staff] need it for their own research. Those in other Universities, who seem to rate our research quite highly, do not use stats either, beyond percentages and perhaps the odd graph.*
>
> *This is one of the many things that many of us would like to do, but it is - as ever - a matter of resource.*
>
> *It is also incredibly time consuming to teach.*

3. Other priorities than numeracy

Numeracy skills are recognised as one of a range of capabilities of the history undergraduate, but for most staff an increase in its provision would be seen as an unacceptable trade-off, reducing engagement with what they perceive as more important skills:

> *The need to improve students' written and spoken English skills is more pressing than the need to improve their numeracy skills.*
>
> *… staff are not sufficiently motivated in this area. Compulsory training in numeracy skills and ICT would likely be seen as occurring at the expense of training skills regarded as more important to the historian such as palaeography, historical theory, bibliographical skills, source location and interpretation, qualitative methods.*
>
> *Probably staff give a lower priority to numeracy than to literary or communication skills.*

4. The lack of any need to teach numeracy

Some respondents were of the view that the progress of their students did not appear to be hampered by the absence of numeracy teaching; others that, through previous study, their students had acquired a sufficient level of numerical capability to obviate the need for teaching it further:

> *…it does not seem to hinder their degrees or - as far as I can make out - their subsequent employment.*
>
> *We are entitled to expect students, who must after all come with GCSE maths or equivalent, to have basic numeracy. This year's initial skills test, introduced for the first time, showed (to our slight surprise) that all of our intake had a sound enough level of numeracy to be able to work with the sort of tables and figures found in mainstream histories, albeit with one or two borderline cases.*

5. Absence of any external drivers

The point was also made by several respondents that the teaching of numeracy skills was not being advocated or required by any agencies outside their departments. This suggests that more might be done if external drivers did exist:

> *Obviously, this is an issue which needs to be addressed by History schools, but it has never been seriously raised as an issue by Externals or by last year's QA.*

The Benchmarking Statement does not require the teaching of numeracy and quantitative methods, except as one among many desirable skills to be developed.

I am not aware of specific policy statements on numeracy at University level. While the University has pushed the importance of employability there has been as yet no central directive to make it a required element in all programmes.

6. Absence of systematic planning and dependence on committed individuals

Several commentators noted that there was also no internal drive to incorporate numeracy into the history programme beyond the enthusiasm of a few staff:

There is now no specific numeracy skills training in the programme; even the core courses in the first year do not address numeracy or quantification in any systematic way. Some staff may use some quantitative material in individual modules in the second/third years but I think these are actually few and far between and students are so unfamiliar with such data they are very reluctant to engage with it at all.

We used to offer a compulsory History and computing module, but after the retirement of a member of staff we now find ourselves with little numeracy training formally embedded in the degree.

[T]he Department as a whole pays only lip service to numeracy.

There seems to be very little interest in the group for developing a programme for numeracy skills

7. The consequences of optionality

It was noted by some that student choice was a desideratum in terms of curriculum design:

If we put them [students] off too much, in the Scottish system of internal marketplace, they just drop History and do English instead.

[W]e adopt the principle of maximising student choice on modules, which tends at the moment towards text-based modules.

The teaching of numeracy has seen a significant retreat over the last two decades again mirroring trends across the history subject community and reflecting student module choice in programme structures that are far more open than previously was the case.

8. The case for more numeracy

Despite the overwhelmingly negative and defensive nature of these comments, there was nevertheless a recognition that more should be done to teach numeracy skills. Some respondents emphasised the need to anticipate postgraduate study while others made helpful suggestions as to how the current deficit might be addressed:

The decline in the level of numerical provision for undergraduate history students may have a serious impact at the postgraduate level as students enter their studies with little understanding or even acquaintance with quantitative analysis.

Any suggestions should not add to the burden but should make use of existing modules e.g. methods modules and/or the dissertation. It should also be stressed that numeracy skills are part of the historian's craft and are not just being added for the sake of developing transferable skills.

I think this would have to be on an optional basis, but it would be good to have courses available to students, like those currently available for learning/improving foreign languages.

… if quantification was seen as improving employability things might well change.

Only one respondent suggested that numeracy should be made a core component of history programmes:

The main point to this is that I feel that to be taken seriously and not simply shunted into the 'desirable but difficult' sidings of client-led satisfaction surveys, skills/methods modules that focus on numeracy have to be made core/compulsory.

Follow-up interviews with history departments

Key findings

Six key findings emerged from the 14 follow-up visits that project team members undertook:

- A perception frequently expressed by the hosts was that there has been a significant retreat in the extent and level of numeracy taught in undergraduate history programmes over the last two decades.
- The interviews reinforced the findings arising from the general survey of UK history departments that where numeracy skills are taught, this tends to be fragmentary and with little evidence of progression from level one onwards.
- What remains of the teaching of quantitative methods within undergraduate history programmes appears to be largely a legacy of economic and business history provision within undergraduate history programmes.
- There are 'pockets' of good practice which could be used as exemplars to demonstrate the value of numerical analysis to a wider constituency of tutors and students.
- Although this project is concerned with undergraduate programmes, a number of tutors drew attention to the knock-on effect that limited provision of numeracy skills here was having at the postgraduate level where the ability to demonstrate more than a passing acquaintance with quantitative techniques is required by funding bodies.
- The picture that emerges from the visits is one of uneven, but essentially minimum provision, confirming the evidence of the departmental and website surveys. It is possible for an undergraduate history student to complete their studies without any engagement with quantitative methods.

Reasons given for limited provision

Several reasons were advanced for the general lack of attention to the teaching of numeracy skills:

- Departments give priority to perceived deficits in undergraduate literacy, communications and search skills over quantification.
- Over the last two decades, undergraduate history programmes have been re-designed to allow for a far greater degree of student choice. Modules incorporating quantification as part of the content (usually but not exclusively, economic and business history modules) have tended to under-recruit; conversely, modules giving a low priority to numeracy skills (generally cultural history modules) have increased in popularity. The skew in the distribution of student choice in flexible structures has led to an inbuilt bias against the acquisition of quantitative skills.
- There is little institutional or external pressure to consider numeracy provision. Departments reported that undergraduate programme reviews had paid little attention to teaching numeracy skills and there was an absence of any 'steer' from faculty or university or from external agencies such as external examiners.
- It was consistently argued that any attempt to raise the extent or level of numeracy skills for undergraduates would run into a number of constraints: for example, the opportunity costs would be too high in terms of time and resources; students would resist any increase in provision and attempts to do so would reflect unfavourably on recruitment and retention targets.
- Within departments, there is a tendency not to regard quantification as a necessary skill which both contributes to historical understanding and enhances employment/career opportunities. There is an understated assumption that quantitative skills can be acquired on a 'need to know' basis, for example, to support a specific dissertation or project.

Conclusion

In short the evidence from the visits is one of resistance from both staff and students to any significant change in the extent and level of numerical provision. Any change would have to demonstrate the relevance of quantitative approaches to historical study. Bolt-on quantitative modules simply would not work, and numerical understanding must sit alongside a range of other skills as part of the capabilities of the undergraduate history student.

History tutor survey

The online and paper-based responses to the questionnaire seeking information on the attitudes and competency of history tutors in relation to numeracy yielded 100 returns.

History tutors' self-evaluation of numeracy skills

History tutors were asked to rate their ability to apply numeracy skills in their teaching and research on a five-point scale, with five equating to 'highly competent' and one to 'not at all competent'. The responses (N=99) suggest a profession fairly confident in its numerical capabilities (Fig. 32). Four out of five respondents (81%) considered themselves to be average or above average/highly competent in these respects with just over a third placing themselves in the two highest ratings compared with just under two-fifths in the two lower ratings.

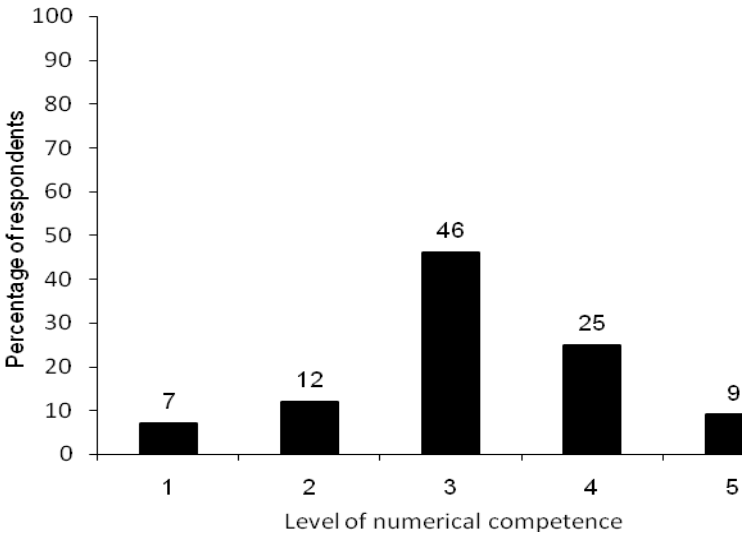


Fig. 32 History tutors' self-evaluation of numeracy skills

There is a conundrum here: history tutors are apparently relatively relaxed about their numerical proficiency and, according to the UK departmental survey, do not believe that enough is being done to teach numeracy. Yet, extant practice, as revealed by the survey and the follow-up interviews, suggests a profession reluctant to engage with numerical work in their undergraduate teaching. Care must be taken, of course, in making generalisations from categories such as 'average competency' (which claimed 47%); it may be that this is a 'catch-all' category towards which respondents inevitably gravitate and consequently it mirrors most measures of central tendency that obscure as much as they enlighten. Perhaps, as well, tutors interested in numeracy matters were more inclined to complete the questionnaire. Nevertheless, the fact that just over one-third of history tutors describe themselves as above average/highly competent does not suggest a profession bereft of numerical understanding.

It would seem reasonable to assume that the indications from these findings are that there is a pool of skill that is being under-utilised and that current numerical provision in undergraduate history programmes cannot be explained simply in terms of a lack of staff competence. It is interesting to note that only half of those tutors who expressed confidence in their numeracy skills are actively engaged in teaching aspects of numeracy and, of these, 38% had no involvement at all in teaching quantification at the undergraduate level. It may be concluded that there is sufficient proficiency within the profession to teach numeracy skills but that other factors are preventing it from being expressed in the classroom.

History staff attitudes towards numeracy

A further question probed tutors' attitudes and confidence levels in the handling and application of numerical techniques and invited them to comment on numeracy skills that concerned them. A number of respondents expressed a lack of confidence in their ability to use statistical techniques such as regression analysis, probability, sampling and so on but were nevertheless involved in teaching aspects of numeracy. For example, a tutor described their knowledge of mathematics as 'rudimentary' but they still taught a module which involved some basic statistical functions. A particularly interesting response was from a tutor who commented: 'My numerical

deficiencies are manifold, but I can honestly say that they have not materially weakened my ability to teach relevant aspects of numeracy.' This is a reflective comment on the 'level' of numeracy skills required to teach history undergraduates and equates with the supposition, expressed elsewhere in the report, that what is relevant to the history student is the ability to use and understand a basic set of quantitative techniques. Hence the assertion of a tutor that 'I have good basic numeracy skills but cliometrics and econometrics have proved to be beyond my ability level' is not a reason for doing nothing. Rather, the reference to 'good basic numeracy skills' is to be welcomed and their employment in the service of curriculum development encouraged.

Tutor views on the importance of numeracy skills for the undergraduate historian

Tutors were asked whether they thought it was important to improve their students' numeracy skills. An overwhelming majority (84%) responded positively. The reasons they gave clustered in three main areas:

- Numeracy skills form part of a set of skills that undergraduate historians require. One tutor commented, 'All historians are quantitative historians; we use quantitative expressions all the time – “few”, “probably”, “most”’. Another added, 'Historians need to count before they can evaluate what they have counted'. History is an evidence-based subject, 'therefore in order to produce an accurate and balanced answer it is most important that students have both good numeracy skills and an understanding of the data/statistics they are dealing with'.
- Numeracy skills are important 'life skills'. One tutor observed that, 'There is absolutely no way of understanding modern politics or society without being able to enumerate, even at the most basic level. How much? Why? Can we trust the numbers?’ Another remarked that numeracy is 'an essential life skill, especially as so much of (the) media is innumerate and misreading of data is rife'.
- Many respondents commented on the importance of numeracy as a transferable skill and its relevance for employability. A typical comment was: 'Amongst the transferable skills we teach our students, numeracy is an important one… Through equipping students with such skills, we are enhancing their employability following graduation.’ Some tutors also made the connection between numeracy as a transferable skill and its relevance both to the subject and broader life skills: ' Enhanced employability is the most important factor; but also because their (student) ability to understand claims based on number(s) is essential to good citizenship as well as good research.’

Other tutor responses

While the comments above are positive, articulating the relevance of developing the numeracy skills of history undergraduates, there were also a few doubts raised by the remaining 16% of the sample:

- A handful of respondents averred that the weak numeracy skills of students were the very reason for *not* integrating quantitative skills in the curriculum. To do so could hinder their academic progress more generally.
- Several others, while acknowledging that numeracy may be important, awarded it a low priority in the undergraduate curriculum. 'It is a transferable skill and also important for certain kinds of history, but would be low down in my list of priorities in relation to, for example, critical reading, writing skills'. Another tutor accepted that the numeracy skills of students should be improved but asserted, 'I am not sure that this is something that can necessarily always be delivered through the history curriculum and it may not be desirable to do so. While some types of historical research do lend themselves to the delivery of this key skill, others do not and to attempt to do so could distract from teaching some of the core skills of the historian.’
- Finally, in any sizeable survey, there is the inevitable 'outlier'; one tutor was firm in their resistance to teaching numeracy: 'I would resign if I was expected to do this!'

The website survey

The survey of websites was conducted partly to check and supplement the information assembled via the questionnaire to UK history departments and partly to explore what was being done in those departments that had not responded to the questionnaire. To facilitate analysis, the results of the survey were recorded on a spreadsheet, with supplementary information recorded separately. Given the variable range of source material and the relatively limited amounts of information that many websites provide, the findings need to be treated with some caution. Even so, since history department websites normally itemise at least some of the transferable skills that history courses seek to develop, whether or not numeracy is included amongst them is an indicator of the degree of importance with which it is regarded.

Numeracy mention in undergraduate provision

Of the 91 websites searched, specific reference to numeracy or quantitative techniques could be found in only 14 cases (15%). Of these, eight related to general statements about the development of these skills within the programmes offered; the other six made mention of their use within specific history modules. In one of the specific cases, it was stated that the sources examined 'may' include statistics.

Such a small number of general references to numeracy provision certainly suggest that very limited attention is being paid to it, even allowing for any fears that website reference to quantification may act as a deterrent to prospective students. This said, it is likely that specific modules are doing more to engage students with numeracy than can be deduced from the summary website data alone, since those dealing with economic and business history and historical demography will include some quantification, as will modules dealing with sources and techniques. Nevertheless, modules of this type form a small proportion of the whole and most are offered as options, enabling students to avoid encountering any quantification if they so wish.

ICT use and numeracy

The survey revealed that while history programmes frequently aim to engage students with ICT applications, only in three instances was unequivocal mention found of the requirement for them to use spreadsheets and databases and, by implication, to deal with quantitative data. In one instance, the applications related to a second-level core module and in another to a second-level option. In the remaining case, the applications were noted in relation to teaching ICT skills in general, but were only included 'where necessary'.

The indications from the survey are that, while undergraduate history programmes encourage students to develop and use 'soft' ICT skills such as word-processing and internet use, they do not usually pay much attention to applications that deal with numerical analysis. It may be that rather more is being done in this respect than the survey findings reveal, but, if so, this seems more likely to be the result of individual initiative than of declared programme objectives.

Numeracy in postgraduate taught courses

The website evidence about numeracy provision in UK history courses is somewhat stronger with regard to postgraduate than to undergraduate provision. In total, 23 history departments incorporated a numerical dimension in their masters' courses. For the most part, reference is made to quantitative techniques and in a few cases to statistical analysis.

The extent and form of the numeracy inputs to MA courses showed considerable variation. They generally comprise elements in core research methods modules and may be linked with ICT inputs. Few instances were found of quantitative elements occurring in the content-orientated modules offered. How far practical work is associated with this provision is unclear from the website evidence.

That numerical components feature more strongly in postgraduate compared with undergraduate history courses may well reflect the requirements of research funding bodies. Additionally, there may be an attempt to achieve progression, with numerical analysis being seen as an advanced form of historical analysis and therefore best located at postgraduate level. That said, current provision at undergraduate level provides very little upon which to progress.

Numeracy and employability

It is commonplace for history department websites to mention that the various skills history students are taught are highly valued in terms of future employment. Additionally, mention is made of how these skills are valued in

the wide range of careers into which history students go. Work placements are frequently offered too. However, only in one case was specific mention made of numeracy being a skill that history students could develop with employability in mind.

International departmental survey

Number and location of responses

Around 500 individuals in overseas history departments were contacted and 91 responses were received. In 13 cases, more than one faculty member replied, giving rise to a few minor discrepancies that had to be resolved through further enquiry. Allowing for the multiple responses, information was obtained from 73 history departments in various parts of the world.

To facilitate the analysis, the returns were grouped into broad geographical areas, namely South America, North America, the Middle East, Western Europe (outside the UK), Eastern Europe, Asia, Australasia and Africa. The number of responses obtained for each of these areas is set out below (Fig. 33). Just over half came from North America and a further 16% from Australasia. The varying rate of response reflects the number of institutions available to survey in each area, as well the ease with which contact could be made, especially because of the language constraints in non-English speaking areas.

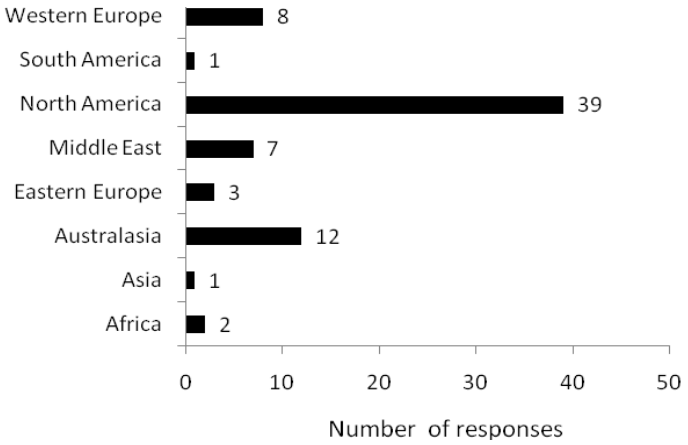


Fig. 33 Geographical distribution of overseas responses

Undergraduate numeracy skills and programme aims

In overall terms, only in 35% of cases (N = 26) did responding institutions offer history programmes that deliberately included the development of undergraduates' numeracy skills, though, as the following section reveals, nine of those which did not have this aim nonetheless reported that some tutors incorporated numerical elements into their teaching.

Marked geographical variation is evident in the results obtained. In both Western and Eastern European universities, high proportions of respondents stated that their programmes developed undergraduates' numeracy skills. The figure for the former was 78% and for the latter 67%. Given the small number of European responses received, this finding must be treated with caution, though it is in line with that from the UK, where two-thirds of history departments reported that they incorporated numeracy into their teaching. Elsewhere, the figures were much lower - in North America, for example, less than one in five. Here, degree programmes are broader, with numeracy skills delivered outside the history programme. Thus, one of the North American respondents observed: 'The college requires such a [numeracy] course; the department does not' and another: 'We assume that numeracy will be ensured by the broad series of requirements for a BA.' Yet whether, as a rule, historians in European universities feel a stronger responsibility to develop their students' numeracy skills than their American and Australasian counterparts is by no means certain.

The extent of numeracy teaching

With regard to the nine departments which did not aim to teach numeracy but where some of their tutors did incorporate numerical elements into their teaching, there was some variation in how this was done as the North American responses noted below reveal:

We don't emphasize numeracy skills as a specific goal - we don't teach cliometrics in any of our courses. However, all of us place heavy emphasis on the ability to use numerical data as part of historical analysis. This latter component is a feature of virtually all of our classes.

Again, individual instructors may introduce some numeracy component, although this can be quite limited. When I taught second year students last year I included no numeracy (other than a brief discussion on pre-decimal currency). At the third year level I use some numerical examples but no assignments. At the fourth year and graduate levels I spend some time with statistical evidence and statistical argument, discussing how to read and present numerical evidence.

Clearly, individual tutors are taking the opportunity to incorporate numerical elements into their teaching and they may do so to a considerable degree, even without the stimulus of a programme aim. In this context, it is worth remembering that tutors in the USA have a greater degree of autonomy over the content of their courses than their counterparts in the UK. Yet the point should not be overstated. Tutors willing to include numerical aspects may comprise only a small minority of the teaching team, whilst, as the second respondent notes, the numerical inputs they deliver may be quite limited. These observations might equally apply in departments with the stated aim of teaching numeracy. Again, the impression is of limited and fragmentary provision with little evidence of progression through students' programmes of study.

Means of developing students' numeracy skills

Several of the 25 respondents to this question noted that they used more than one means of developing students' numeracy skills. As Figure 34 reveals, the most popular method used for doing so, which occurred in 60% of cases, was as part of a broader course/module on historical skills.

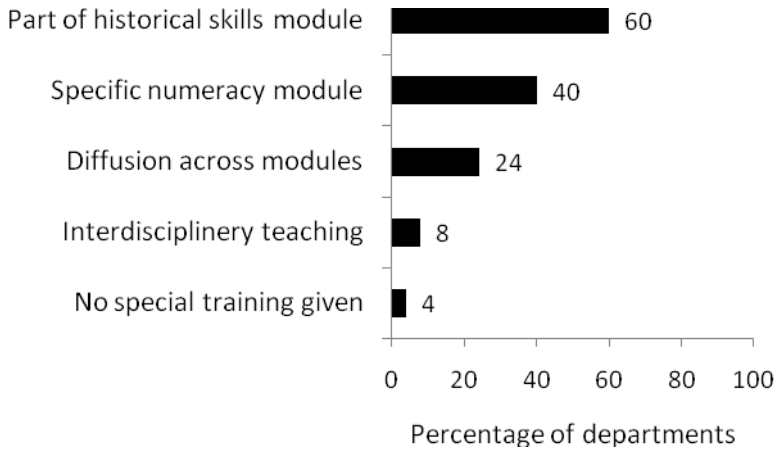


Fig. 34 Means of developing students' numeracy skills

Only in 24% of cases were numeracy elements being diffused across a range of modules. Rather more frequent, occurring in 40% of cases, was the use of specific courses or modules dedicated to numeracy learning. Compared with the UK approach, therefore, far less reliance was being placed on the diffusion approach, but rather more on the use of specific numeracy modules.

Responsibility for managing the development of numeracy skills

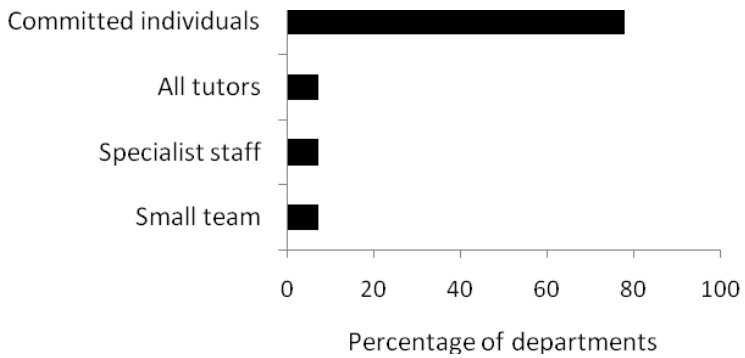


Fig.35 Responsibility for managing the development of numeracy skills

An overwhelming majority of the respondents (78%; N = 27) stated that the development of numeracy skills within their history course/programme is managed by committed individuals (Fig .35), even in those that included numeracy as a programme objective.

The pattern shown by these data is similar to that of the UK, though with an even more marked reliance on the contributions of committed individuals. The notion of teaching teams as a whole having responsibility for incorporating quantification into history degree programmes does not appear to be widespread.

Location of numeracy in programmes

Respondents were asked to say at which level or levels numeracy skills were located in their programmes and whether these inputs were compulsory, optional or both. The results are shown in Fig.36. At level one compulsion (54% of cases) outweighed optionality (38%), though not to a very marked degree. At each level thereafter, the proportion of compulsory numerical elements diminished steadily, and were absent entirely at level four. Very few departments reported the provision of both compulsory and optional numeracy inputs at any level.

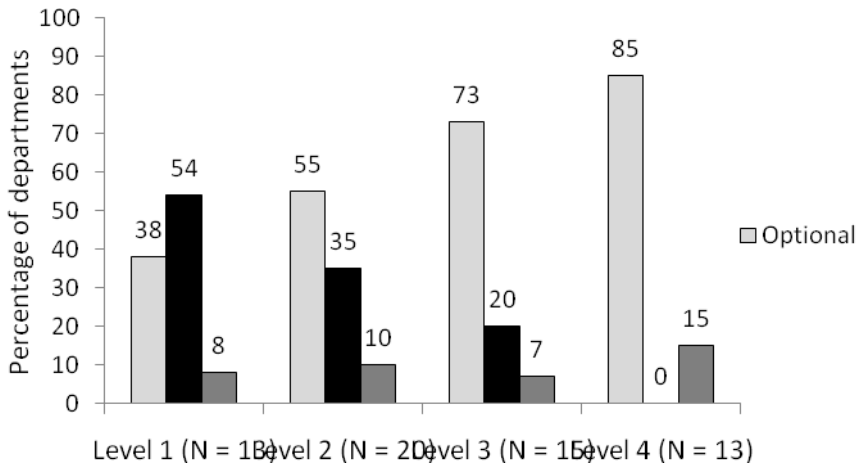


Fig. 36 Year-wise distribution of numeracy skills learning

In some overseas programmes, numerical methods are seen more as a feature of postgraduate than undergraduate teaching, as the following observations from North American respondents reveal:

> *Several faculty use such methods in their own research, but teach them mainly to graduate students.*
>
> *Not all fields have the evidentiary base that supports the use of statistical skills. There's more attention to this at the graduate level, but undergraduate majors focus on writing and analytical skills.*

These observations accord with those obtained from the website survey of UK history departments, which found that numerical inputs were reported to occur rather more frequently at the postgraduate level.

Progressive development of numeracy skills

Only 34% of 29 respondents claimed to develop numeracy skills in a progressive way through their undergraduate history programmes. The figure for Western Europe (excluding the UK) was 29% and for Australasia 25%. The corresponding return for the UK was 17%. Overall, therefore, the indications are that, in the countries surveyed, relatively small proportions of history departments are concerned to develop undergraduate skills in a progressive way.

Individual tutors may well adopt a progressive approach to incorporating numerical aspects into their teaching, as shown by the North American respondent quoted earlier, even if this is not a part of overall programme aims. Indeed, it seems that individually-managed, rather than programme-planned, progression in numeracy teaching is the more likely to prevail.

Numeracy skills assessment strategies

When asked about their assessment strategies for measuring the attainment of undergraduates' numeracy skills, less than one third of the 32 who responded indicated that they used any. For North America, the figure was just eight per cent. In some cases, as the following examples reveal, students do undertake practical numerical exercises as part of their assessed coursework:

> *Students are shown how to create tables in SPSS, and then asked substantive historical questions that require construction of similar tables, and interpretation of those tables.*
>
> *The answer to this question is rather "maybe" than "yes", in the sense that we do assess the attainment of numeracy skills but perhaps not in the framework of an overarching *strategy* but rather through a few well-proven group and individual exercises measuring the degree to which the students have mastered the basic numeracy skills included in our training in "theory and methods" of historical research.*

Other respondents mentioned the use of occasional class tests and one the setting of a stage two exam that required students to answer one question with a numeracy skills element.

Using computers to develop numeracy skills

As Fig. 37 reveals, only in a minority of cases was it reported that students were required to use computer applications, especially statistical packages and spreadsheets. The use of databases was reported as being used more commonly than spreadsheets and statistical packages and was also the most likely to be compulsory. Thirty-two departments were using databases to develop numeracy skills, compared with 29 using spreadsheets and 22 using statistical packages. It must be remembered that these constitute only a minority of the 73 departments surveyed. Given, too, that the use of these packages is largely optional, the indications are that overseas history departments are making relatively little use of computer applications to develop their students' numeracy skills.

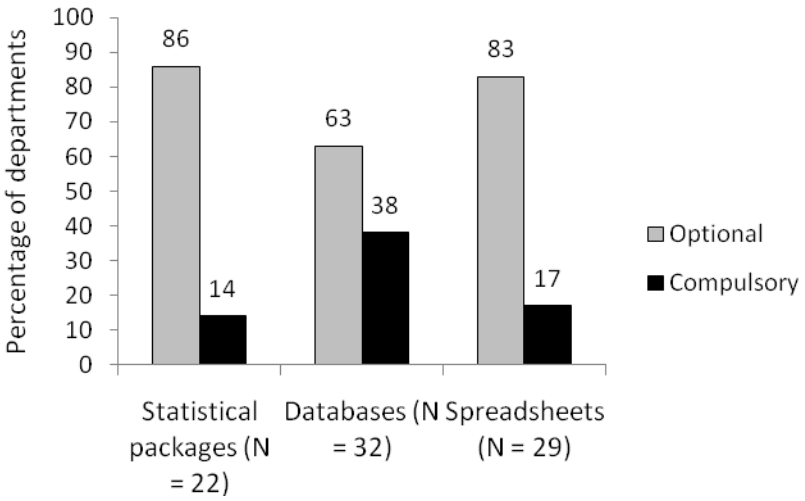


Fig. 37 Use of computers to help develop students' numeracy skills

Doing more to improve students' numeracy skills

Asked if their history programmes should be doing more to improve their students' numeracy skills, 68% of the 91 respondents stated that they should. The figure is appreciably lower than the 90% of UK respondents who took this

view, though geographical variations arise. The Western European figure of 89% (N = 11) is on a par with the UK figure. Others, however, were lower: for the Middle East 75% (N = 6); for Australasia 68% (N = 13); and for North America 63% (N = 30). The comparatively low figures for Australasia and the United States may reflect the broader provision at undergraduate level, with students having opportunity to deploy their numeracy skills in other subject areas.

Reasons for the limited numerical inputs in history courses

Insights into why overseas history tutors may be reluctant to incorporate numeracy into their course provision were obtained both from a question asking why numeracy was not a programme aim and from general comments respondents were invited to make. In the former case, 29 responses were received and in the latter 49. Many of these comments parallel those made by tutors in UK history departments (see section on the survey of UK university history departments, p. 26), sometimes even to the extent of using the same language.

In a few cases, respondents were unable to explain why numeracy was not included in programme aims or the possibility of doing so considered. A particularly revealing response in this context came from a history department in a North American university in which defining teaching objectives was a matter of concern:

> *In our department numeracy is handled as an elective choice for individual professors. I suspect all of us would point to exercises, mini lectures, exam questions, etc. that connect to numeracy. But it is not a defined outcome for any of our levels. Why not? Because it never occurred to us. All 8 of us are social or cultural historians, so that may have something to do with it. But it is also true that in the larger conversations going on about departmental outcomes, numeracy is not on the table. So you're the first to poke at us*

Reference to the prevalence of social and cultural history carries with it the implication that numeracy teaching is best left to those who have both the interest and expertise to deal with quantitative matters, including economic historians. In the absence of such historians, numeracy teaching may not enter the collective consciousness of teaching teams, at least to the extent that it should feature as a key programme aim.

Aside from the absence of interest and expertise amongst tutors, other reasons suggested for the absence or limited presence of numeracy teaching in undergraduate history courses were:

1. Leaving numeracy teaching to non-historians

Where broadly-based arts degree courses are offered, as in Australia and the United States, the argument is made that expertise outside history departments can be relied on to deal with quantification. The following observations from two North American respondents illustrate the point:

> *As part of the normal General Education Requirements at a liberal arts college, all students, whether or not they are history majors, have to take two courses in social science, which would include training in quantitative methods. Departments such as Sociology, Political Science and Psychology handle this aspect of undergraduate education.*
>
> *We do encourage students to work across disciplines and many get statistical training through their courses in political science, sociology and economics.*

2. Resistance from students

Several respondents expressed concern about the reluctance of students to engage with quantification. The following - two from Australasia and one from North America - are typical:

> *We have found that very few of our undergraduates are comfortable learning quantitative methods and the best students are invariably double-majors from the Social Sciences.*
>
> *However I have tried to teach students how to read balance sheets and economic data sheets - but it's clear that by-and-large Art students have difficulties with numeracy. The best I can do at times is to get them to understand numeracy by understanding their own finances. It is a problem.*
>
> *I am loathe to spend too much time on any kind of number, including dates, in the courses I teach. It turns the students off and this aspect is not what I want to stress in my courses.*

3. More pressing concerns

Several respondents mentioned that they had priorities in their teaching other than dealing with numeracy. For example, one from Australasia remarked in some detail on his main objectives, pointing out that these kept him fully occupied:

> *I teach courses about parts of the world unfamiliar to the students, and place a lot of emphasis on teaching geography. I also teach several courses about countries where English is not the dominant language, notably*

German- and Russian-speaking parts of the world, and see my primary objective as spreading cultural literacy about these areas. I want students to develop empathy for non-Anglophones, to see the world through foreign eyes. I see this as particularly important when teaching the history of countries that have previously been at war with the student's country, and often portrayed as "bad guys" in secondary education and popular media. Finally, I see the main analytical skills that students ostensibly gain from a degree in the humanities in terms of writing skills and public speaking. These objectives keep me plenty busy! My own research is not highly quantitative, and other colleagues at my institution work intensively with numerical methods. While accepting that numeracy is important, I don't feel bad that I concentrate on other things in my own classes.

The issue of grappling with students' literary skills as a priority was also mentioned by others. Another comment from Australasia was that, 'Quantification is important for some kinds of historical analysis, but we are still struggling getting students past the more basic forms of historical learning'. A Western European respondent observed that: 'The students are not really tested on numeracy skills. It's bad enough having to correct them at every turn with their basic literacy!' The impression left from such comments is not one of hostility as such to the idea of teaching numeracy to history undergraduates, but rather that other objectives are deemed to be far more important.

4. The lack of a need to teach numeracy

It was argued by some that history students already have sufficient skills to cope with any numerical demands that the undergraduate curriculum makes on them. The respondent from Africa observed that the basic numeracy skills students required for university entry were 'usually sufficient for the elementary quantitative tasks set for our general undergraduates'. Likewise, an Australian respondent remarked: 'We assume that students have the basic skills in this area when they arrive.'

Aside from the point about numeracy teaching occurring outside history courses, several of the 29 responses received about why numeracy teaching was not taking place mentioned staffing constraints. In part, they centred on a lack of interest amongst history tutors in teaching numerical/quantitative methods, at least as far as undergraduate provision is concerned. Thus, amongst the North American responses were the following:

Most faculty think it's not important to studying history.

Little interest among faculty – all the 'numeracy' folks went cultural.

Commenting from the student perspective, one Australasian respondent maintained that most students in his department tried to avoid courses that involved numeracy skills and another, also from Australasia, that it was assumed undergraduates already possessed these skills when they arrived on campus.

Employability Issues

The survey of current students reveals that they enter university with a reasonable range of basic numeracy skills from having studied mathematics to GCSE-level. However, the numeracy test issued to level one undergraduates indicates that, for many of them these skills are already beginning to fade. The issue arises, therefore, of the advantage that can be derived from giving history students opportunity to revive and apply their existing numeracy skills rather than trying to enhance them. The potential benefit of this course of action in terms of the students' future employability is reinforced by the finding that, for the most part, the level of numerical capability demanded of graduates by employers is fairly basic. History is well-equipped to perform this task of 'keeping warm' a range of numeracy skills:

- they are important to historical inquiry – as evidenced by quantitative history – and should not therefore be neglected;
- there is ample historical data that is susceptible to quantitative investigation and which can thereby help with the honing of these skills;
- the receptiveness of the history profession to active learning approaches should encourage the adoption of methodologies that assist student engagement with numeracy skills.

Moreover, there is a widespread recognition across the history profession of the need to do something. An overwhelming majority (84%) of tutors in our survey thought it was important to improve their students' numeracy skills. Many of them also remarked on the importance of numeracy as a transferable skill and its relevance for employability. These positive findings, however, are offset by more troubling evidence. Hence, for example, departments trumpet on their websites their commitment to teaching transferable skills that will assist history graduates in finding employment and in their future careers. It is telling, however, that only one department made specific mention of numeracy in connection with student employability. Moreover, while there is

a general recognition that more needs to be done and that most history staff have reasonable confidence in their own numerical competence, there is a reluctance to act. The ambivalent attitude of history staff to numeracy is therefore a critical issue. The question naturally arises, do they have a duty to prepare their students for employment – especially where mathematical skills can be shown to be apposite for history?

Undergraduates also recognise the value of numeracy to their future employability. Eighty-five per cent of the current students who responded to the questions on this issue felt that developing numeracy skills would enhance their employment prospects. Once again though the position is not as straightforward as the survey data suggest. The focus groups provided a rather more ambiguous picture. While they rated highly the value of numeracy to employability, some students still did not think it should be included as part of a history degree programme. That said, the key point to emerge from the various surveys of student opinion is that there is a general willingness on their part to engage with numeracy skills if it is made clear to them why they are necessary and that their value in terms of employability can be a selling point – indeed, more so than their value in terms of historical inquiry.

A student in one of the focus groups remarked that he would not apply for a job that required too much in the way of numeracy skills. As the review of history graduate employment shows, this perspective is not untypical of history students generally. For the most part, they do not apply for jobs that demand numeracy skills. Those that become numerical clerks and cashiers and IT professionals or enter business, finance, industry, sales and marketing are the exception to the rule. The focus group comment cited above suggests that the low uptake of such jobs reflects an innate aversion among students who elect to take history degrees. Even so, the general absence of numeracy skills in history programmes can only mean a narrowing of horizons for students – their career opportunities would surely be advanced if their skills were augmented. Thirty-one per cent of the respondents to the graduate survey believed that more numeracy training on their history programme would have increased their career opportunities. Nearly two-thirds (63%) of the same respondents also said that they thought their history programme should have given more emphasis to numeracy. However, the fact that almost seven in ten graduates did not see any need for further provision of opportunities for numeracy skills development suggests they are not perceived as being of much relevance to historical studies or in employment or both.

The numeracy skills that graduates are finding most useful in their jobs are ones that are routine at GCSE level, reinforcing the point about the value of a history degree in keeping these skills 'warm'. This is being done to some extent; the numeracy skills graduates thought their undergraduate degree had helped them develop the most included the three skills they also were finding the most useful in their work, namely 'interpreting graphs and charts', 'calculating percentages' and 'presenting tables of statistics'. Also, almost two-thirds thought that their history degree programme had helped them to develop their ICT skills. However, these apparently positive findings require qualifying. The ICT skills acquired were mostly the 'soft' ones that require no numerical competence. This is confirmed by the website survey which found little evidence that undergraduate history programmes pay much attention to involving students in ICT applications that deal with numerical analysis.

Moreover, in terms of their overall experience, from school to employment, the graduates reported that their undergraduate history programme had played the least part in developing their numerical competence. University is not only contributing little to the numeracy skills of history undergraduates, but evidence elsewhere in the report also shows that it is not helping to keep their existing skills active. This has implications for its students in terms of their ability to study history not just at undergraduate level but as preparation for postgraduate study of the discipline and for their employability in general.

In his analysis of first employment destinations, Nicholls (2005a, 2005b) concluded that the proportional distribution of history graduates by employment has been more or less constant over time with three sectors accounting for, on average, over 55% of jobs – namely, the clerical, retail and managerial sectors – while aggregating the several types of 'professional' employment produced a fourth, accounting for a further 20%. There are some differences in the destinations of the graduates surveyed by the project but the overall pattern is broadly similar. History graduates therefore enter the type of careers where employer numeracy tests are most frequently used, namely managerial, professional, associate professional and administrative occupations. Thirty per cent of the graduates in the graduate survey said that they were required to take a numeracy test as part of their recruitment and selection process. Failure in these tests, or reluctance to apply for jobs that make use of them because of perceived weakness or 'number fear', limits the career opportunities of history graduates. This is unlikely to diminish as the resort to tests spreads and it is a cause for concern that university history departments seemingly do little to prepare their students for them.

The question of *which* mathematical skills students need to enhance their employability is a complex one – complicated by the differential needs of employers, degree-subjects, the prior experiences of students and so forth.

Indeed, because of these complexities, employer demands for 'oven-ready' graduates who (pardon the mixed metaphor) can 'hit the ground running' are unrealisable. (Atkins, 1999) Nevertheless, when employers specify the numeracy skills they expect graduates to have, these are usually fairly modest ones. The type of mathematical skills that many say they regard as important, and which figure in their numeracy tests, are integral as well to mainstream quantitative history, namely, understanding the concept of number, handling fractions and decimals, working with ratios and proportions, calculating percentages and rates, numerical problem-solving, data interpretation and using spreadsheet software. For example, Richard Wainer at the CBI defined numeracy as the ability to 'do simple mental arithmetic, not having to rely on calculators or tills, interpret data, extract relevant information from graphs and so on. It's pretty simple stuff.' (Keating, 2007)

This section of the report must conclude with one serious matter that militates against its findings and recommendations on enhancing the numeracy skills of history graduates in order to improve their employability. The subject of a degree in the case of non-vocational occupations is relatively unimportant. Approximately 60% of job advertisements are non-specific as to degree qualification. Employers place more emphasis on class of degree and still more on the graduate's university (reinforcing the advantages of social class and educational background). The irony of this can be seen in the fact that, while new universities have been more pro-active than the old in embracing the employability skills agenda, it is the latter which employers invariably tend still to favour. The task of persuading employers that any particular degree programme is addressing their demands for skilled graduates is not at all straightforward and poses serious obstacles to delivering the sort of changes recommended by projects like this one.

In conclusion, the employability agenda is fraught with problems stemming in large part from the contradictory positions taken up by the key players. Students see the value of numeracy skills to their future employment but don't want to practise them; tutors recognise the need to incorporate them in their programmes but find all sorts of reasons for not doing so; employers trumpet the need for better graduate numeracy but their inclination in their recruitment policies to favour some sectors of HE over others is a disincentive to those in the latter willing to meet this need.

Good practice website

In a discipline such as history, quantitative analysis is a means to an end, but it is a means worth investing in, equipping students with a set of skills that apply to historical study, to career development, and to a more critical understanding of contemporary society. It is also the case that demonstrating the value of quantification is crucial if history undergraduates are to engage with it as an accepted part of their programme of study. The investigation identified a small minority of departments that had successfully inserted numerical work in their single-honours degree programmes. Examples were received from 13 departments (eight pre-1992 and five post-1992) and they varied in detail, content and approaches. In addition, a number of text-based and online sources and guides to quantitative techniques are available that include exercises using historical source materials and which are aimed at helping history undergraduates develop their numeracy skills. The project team are in the process of creating a website that will direct tutors and students to these materials (subject to permission) and which will offer some advice on how they might be incorporated into the undergraduate curriculum. The website will also invite contributions from across the sector in the hope that it will quickly become populated with examples of good practice that will serve as a readily available resource for history teachers. The Higher Education Academy History Subject Centre has kindly agreed to host it. This section of the report is therefore provisional as work on the website is still in its infancy but below we describe the principles that a course team might apply in re-designing their programmes and include examples of the models of good practice that will be included on the website.

Guiding Principles

- Students should engage with numerical work in their first year of undergraduate study and it should be recognised as a skill which is on a par with other historical skills, for example, as in Model A below.
- Numeracy must have more than a token presence in the curriculum.
- To enable a progressive engagement with quantification, serious consideration should be given to providing a compulsory element at level two and to the possibility of extending numerical work in a student's final year of study, perhaps by way of the dissertation or project. The 'hybrid' model D suggests one way in which progression of this sort might be achieved.
- Numerical exercises should be contextualised within the historical literature and demonstrate the value of quantification to the student's understanding of the topic. The exemplars in the texts identified in Model E illustrate how this can be done.

- Numerical components should be summatively assessed. Assessment is a key aspect of student learning and an assessed exercise should enable students to demonstrate both their understanding and application of a basic set of quantitative techniques.

Models of Good Practice

Below are examples of models that will form the basis for more detailed case studies posted on the website. As work continues on this part of the project, it is likely that more will be added.

Model A: curricula designed to enable the progression of a quantitative component from level 1 to level 2. A numerical component is inserted into a core 'skill' module in the first year of study and is then extended into the second year. The numerical component typically forms part of a range of approaches centred on a broad historical theme.

***Model B*:** numerical work forms an integrated part of an optional module which can be offered at any level as a specialism of a member of staff or a small team. The content tends to focus on economic themes but other aspects of history are sometimes explored, for example, demography or voting patterns. The model does not guarantee progression.

***Model C*:** an ICT module (core or optional and at any level) which uses practice-based work to analyse, interpret, and present a range of historical evidence using numerical techniques. Applications typically involve spreadsheets, databases and statistical packages. The issues for course teams is whether to offer such modules as core or optional, whether or not to make them part of an essentially 'self-directed' programme of study, and whether or not to include such ICT modules at every level of the programme in order to develop numeracy skills progressively.

Model D: a 'hybrid' of Models A, B, C and E which uses elements from each to ensure progression through all levels of the undergraduate programme.

Model E: a selection of textual or online sources, ranging from the relatively undemanding to the more advanced, that history tutors can draw upon at all levels of the programme to give their students experience of applying quantitative techniques to historical sources. This might be described as a 'distributive' model that will enable tutors who are uncertain about their and their students' numerical competence to begin by incorporating some small scale provision into their modules while allowing the confident ones to be more adventurous.

7. Conclusions

The history strand of the project revealed that history students over-estimate and are over-confident about their mathematical capabilities and are generally resistant to their incorporation into history degree programmes. Their deficiencies are nevertheless fairly minimal although the mathematical skills they have learnt at GCSE have 'cooled' somewhat by the time they enter university. Keeping warm and ticking over mathematical skills acquired at school would meet the requirements of most employers and widen opportunities for history graduates. The team found that there are tutors across the HE history sector capable of delivering these basic skills. Moreover, the abilities to quantify, calculate and measure are not inimical to the discipline but are an integral part of historical investigation and reporting. A plethora of historical data is susceptible to quantitative analysis. The means whereby the situation may be remedied are therefore present. What is lacking is the will to do so. It is the team's belief that the modest and incremental approach recommended for history is practical and attainable in the prevailing context.

8. Implications

The history strand of the project revealed that history students over-estimate and are over-confident about their mathematical capabilities and are generally resistant to their incorporation into history degree programmes. Their deficiencies are nevertheless fairly minimal although the mathematical skills they have learnt at GCSE have 'cooled' somewhat by the time they enter university. Keeping warm and ticking over mathematical skills acquired at school would meet the requirements of most employers and widen opportunities for history graduates. The team found that there are tutors across the HE history sector capable of delivering these basic skills. Moreover, the abilities to quantify, calculate and measure are not inimical to the discipline but are an integral part of historical investigation and reporting. A plethora of historical data is susceptible to quantitative analysis. The means whereby the situation may be remedied are therefore present. What is lacking is the will to do so. It is the team's belief that the modest and incremental approach recommended for history is practical and attainable in the prevailing context.

9. Recommendations

History discipline

RECOMMENDATION 1: Numeracy skills should be incorporated in history courses and not 'bolted on' to them

The best methods for teaching numeracy skills to history undergraduates require careful consideration. The students themselves, though not entirely uniformly, were inclined towards the incorporation of limited numerical elements into courses. Some thought that such provision could be made by way of optional economic history modules for those who wished to engage with quantification. There was no support for 'bolt on' modules provided by either the degree programme or the institution as part of a wider generic skills course. This sentiment was echoed by tutors during the follow-up visits. 'Bolt on' provision might be used to provide remedial or additional support but, if compulsory would be resented, if optional would probably not be effective.

RECOMMENDATION 2: History programmes should incorporate basic numeracy skills that revive and keep 'ticking over' the skills that students bring with them from school

Most history students have a mathematics qualification at GCSE level or above. This level of pre-university knowledge forms the basis for our 'ticking over' recommendation. Moreover, competence levels had declined in the interim period between school and university. Given that the students who participated in the numeracy test were asked to apply fairly basic mathematical skills of the type they would have encountered at school, the overall results revealed quite low levels of mathematical ability. The graduate survey uncovered a related issue – the likely effect of neglecting numeracy at university. The perception of respondents was that school, which was given the very high rating of 4.6 out of 5 on a competency scale, was by far the most important influence on the development of their numeracy skills. In contrast, undergraduate provision scored the lowest mean rating (2.0). The implication is that, during their undergraduate years, respondents were at best 'marking time' and at worst slipping back with regard to developing their numeracy skills. Asked if the courses they were taking should keep their numeracy skills 'ticking over', do more than this or not address the matter at all, the general view expressed by the focus groups was in favour of a 'ticking over' approach. Moreover, to embark on a more ambitious programme of teaching new or more advanced mathematical skills would most certainly be met with resistance from both tutors and students and would therefore be counterproductive. In any case, such 'upskilling' is unnecessary. In terms of historical study, higher level skills could safely be left to the postgraduate level provided there is a sound base upon which to build, while in terms of general employability, the concern of the vast majority of history students, incorporating modest changes in the curriculum to keep basic numeracy skills 'ticking over' would help meet the demands of most employers of history graduates. The type of mathematical skills that many employers say they regard as important, and which figure in their numeracy tests, are integral as well to mainstream quantitative history. The responses to the tutor survey suggest that history teachers are eminently capable of delivering such a modest programme and that they believe, as well, that improving the numeracy skills of students is important – though their own commitment to doing so is open to question. History is well-equipped to perform this task of 'keeping warm' a range of numeracy skills by virtue of the primary source materials available for interrogation, the willingness of many of its practitioners to espouse active learning approaches and its tradition of economic and quantitative analysis. With regard to the last of these, despite the decline in the teaching of economic history and in the number of economic historians, many departments still have a reservoir of staff skilled in quantitative approaches and whose talents could be usefully deployed in the realisation of this recommendation. A starting point for implementing it is our good practice website.

RECOMMENDATION 3: History programmes should make better use of ICT to cultivate students' pre-existing skills

The survey of current undergraduates revealed that the great majority have used spreadsheets. This extant knowledge can be drawn upon to keep warm some of their existing numeracy skills, for example the ability to prepare original charts and graphs from the data they have derived through investigating primary evidence. The students also reported a general facility in preparing statistical tables and calculating percentages and averages. A similar confident self-evaluation featured in the graduate survey which indicated as well that these applications were useful to their later employment. That history undergraduates can generally be expected to be familiar with using spreadsheets and that they are highly likely to use spreadsheets in the workplace, reinforces the point about the value spreadsheets can have in developing numeracy skills. Use of ICT in teaching numeracy could easily be done in a more systematic, planned and progressive way (see Recommendation 4). At present this is not the case; while most UK history departments provide students with the opportunity to use one or more ICT applications, the majority of students can avoid doing so if they wish, apart from the 'soft', non-numerical applications. This evidence from the survey of departments is confirmed by the website survey which revealed that, whilst history programmes frequently aim to involve students with ICT applications, only in three instances was the requirement to use spreadsheets and databases and, by implication, to deal with quantitative data unambiguously specified. Nevertheless, there is an opportunity to use ICT as one conduit for delivering numeracy; students recognise its contemporary importance, they have engaged with it in some form in school or home, it can readily be identified as a 'life skill' and consequently its 'relevance' can act as a form of gravity pulling in numerical activities.

RECOMMENDATION 4: Numeracy skills should be incorporated in history programmes to ensure student progression

The survey of UK history departments revealed that only a very small number of programmes incorporate numeracy skills in a progressive way. Less than a quarter of respondents (or 12% of the 91 HEIs surveyed) said they were doing this and none were doing so in a systematic way through all three or, in the case of the Scottish universities, four years of the degree-programme. Not a single department was found to have a compulsory numeracy skills element in every year. This, and other evidence, suggests that the majority of history undergraduates can pick their way through their programme in such a way as to have little or no need for numeracy skills. This finding was supported by evidence from the follow-up visits. Even in departments that, the general survey had suggested, were teaching more in the way of numeracy skills than most, it was nevertheless being done in a spasmodic way with little evidence of progression from level one through to levels two and three. Progression also needs to be considered in regard to students who go on to postgraduate study. The departments visited were keenly aware that the lack of provision of numeracy skills was especially critical at the postgraduate level where the ability to demonstrate more than a passing acquaintance with quantitative techniques is required by funding bodies. It may be that many departments regard leaving numeracy skills to the postgraduate level as appropriate in terms of progression. The authors of this report believe that this is leaving things too late and that the inclusion of basic numeracy skills developed progressively through the undergraduate programme would provide a much sounder platform for postgraduate study, not to mention future employment.

RECOMMENDATION 5: The teaching of basic numeracy skills to history undergraduates must be reinforced through assessment. Funding of pedagogic research on this vital issue and on approaches to teaching numeracy in general is urgently needed

The survey of UK history departments uncovered only 17 that claimed to be using assessment strategies to measure the attainment of numeracy skills. The website survey and the international survey found very little evidence of extant good practice that might usefully be disseminated across the sector. The question of how best to assess, both formatively and summatively, the progressive acquisition and demonstration of numeracy skills by history undergraduates is one that is crying out for pedagogic research, though there are practical examples both in UK and overseas history departments that could be used as a starting-point. We would recommend that departments, the History Subject Centre and the Higher Education Academy consider funding pedagogic research on this critical subject that would lead to the development of teaching packages and aids, including online IT materials and courses. The Subject Centre has made an excellent start here with its publication of the guides by Rodger and Freeman alluded to earlier but much more needs to be done.

RECOMMENDATION 6: For numeracy skills to be successfully incorporated into the history programme, it is essential that students are convinced of their importance

The general feeling expressed in the student focus groups was that numeracy had limited value in the study of history. The message of the value of quantification in historical study is either not being conveyed or not getting across. The students also said that they would look at tables of historical data if they felt their understanding would be enhanced by so doing, otherwise they would skip over them. The point was made that the relevance or practical application of mathematics had not been made clear to them and that there would be more incentive to engage with quantitative skills if the reason for doing so was made clear. The focus groups and the current undergraduates surveyed also recognised the advantages that numeracy can bring in terms of their future employability. Emphasising the importance of developing numeracy skills in employability terms would therefore persuade some, though not all, students of their value. Currently, history tutors are doing very little to proselytise the usefulness of numeracy skills either to the understanding of history or as a transferable skill. The survey of departmental websites revealed that only 15% made any specific reference to numeracy or quantitative techniques. The history profession's inability to 'remember' numeracy when listing valuable employability skills speaks volumes in a Freudian way about its 'number-phobia'. Departments therefore might usefully revisit the information they provide on their websites and in their programme brochures regarding core skills, transferable skills and employability.

RECOMMENDATION 7: External agencies should provide both leverage and assistance to ensure the wide adoption of numeracy skills

The history benchmark statement includes a permissive recommendation with regard to teaching numeracy skills but it has not greatly influenced the content of undergraduate programmes in relation to these skills. The survey of UK history departments reveals just how little they are doing in the way of systematic numeracy skills teaching. Of the respondents, over 90% admitted that they should be doing more to improve their students' numeracy skills but there is a big gap between tutor sentiment and a willingness to act. This report can exhort and, within its limited remit and authority, make modest proposals that would be effective *if they were adopted*. However, it is most unlikely that exhortation will be enough if the profession is left to its own devices. At the moment, it can continue with impunity to bury its collective head in the sand. Comments in the UK department survey and the follow-up interviews provided evidence that departments face little institutional or external pressure to consider numeracy provision. Undergraduate programme reviews have paid little attention to the acquisition of student numeracy skills, there has been an absence of any 'steer' from faculty or university or from external agencies such as external examiners. There seems to be an irrational fear among many history tutors about 'compelling' the inclusion of numeracy in the undergraduate history students' skills-set. It is our contention that the basic skills we have identified are within easy grasp of the great majority of tutors and students and that such skills should be accepted as part of *the normal range appropriate to the understanding of the discipline* and of the transferable skills related to a graduate's career opportunities and life-skills.

In the meantime, it is encouraging to report that the Higher Education Academy's History Subject Centre has agreed to host the 'Good Practice' website, which will include examples of ways to incorporate a range of numerical skills into history undergraduate programmes and a guide for teachers and students on how best to make use of the materials. The Subject Centre has also invited the three historians on the project team to take forward their recommendations during 2010/11 as part of a major project on *History Graduates with Impact*. For details visit: http://www.historysubjectcentre.ac.uk/research/gwi