



National Research and Development Centre
for adult literacy and numeracy

RESEARCH SUMMARY **SKILLS FOR LIFE TEACHERS' QUALIFICATIONS AND THEIR LEARNERS' PROGRESS IN ADULT NUMERACY**

ANALYSIS OF DATA FROM THE SKILLS FOR LIFE TEACHER AND LEARNER STUDIES

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INTRODUCTION

In this report we look in detail at the relationship between teacher qualifications and learner progress in adult numeracy. Since the Skills for Life strategy was introduced in 2001, most research has focused on learners and their progress. Few studies have paid attention to the teachers, tutors and trainers.

However, a core aim of the Skills for Life strategy is to improve the quality of teaching (and hence of learning) through a new infrastructure of teaching qualifications. In the period from 2002 to 2007 new Skills for Life teachers were expected to have a generic teaching qualification such as a Postgraduate Certificate in Education (PGCE) or Certificate in Education (CertEd) and a subject-specialist teaching qualification in the subject they were teaching. Existing teachers were also encouraged to take these qualifications with the aim that, by 2010, almost all existing teachers in the post-16 sector should be qualified.

The assumption behind these reforms, and those that followed in 2007, is that better qualified teachers will deliver higher quality teaching. But what is the evidence for this assumption? What do we know about the impact on learning of teachers' other qualifications? And is it necessary for a numeracy teacher to have qualifications in numeracy? If so, what level of numeracy qualification appears to have the most positive effect on learner progress? And what about learners' attitude to and confidence in maths – is that also related to the qualifications that their teachers hold?

By combining data on the characteristics of teachers and tests scores of learners we can assess the extent to which teacher qualifications are related to the progress learners make between a first assessment, prior to their course, and a second, conducted once the course has finished. We can also look at whether the relationship differs according to the type of qualifications held.

THE POLICY BACKGROUND

The Skills for Life strategy initially set out to improve the literacy, language and numeracy skills of 2.25 million adult learners by 2010; a target which was met two years early. The strategy aims to 'make sure that England has one of the best adult literacy and numeracy rates in the world', and, its long-term vision is 'ultimately to eliminate the problem' of poor levels of adult literacy and numeracy (National Audit Office 2004, p.20). Skills for Life emphasises the needs of priority groups at risk of exclusion, including unemployed people and benefit claimants; prisoners and those supervised in the community; public sector employees; low-skilled people in employment; and younger adult learners aged 16–19.

A core component of the Skills for Life strategy has been a new national learning, teaching and assessment infrastructure. New national literacy, numeracy and ESOL core curricula for adults have been introduced based on national standards at each of five levels (Entry 1, Entry 2, Entry 3, Level 1, Level 2), as well as assessments, both diagnostic and summative.

From 2002 onwards the Government began developing mandatory teaching qualifications for new teachers, using a framework which recognised that adult literacy, numeracy and ESOL were specialist subjects. New Skills for Life teachers were required to have a generic teaching qualification such as a Postgraduate Certificate in Education (PGCE) or Certificate in Education (CertEd) and a subject-specific teaching qualification in the subject they were teaching. For numeracy this included numeracy pedagogy at Level 4 and a large element of subject knowledge at Level 3. In the 2007 teacher education reforms, new standards and qualifications were introduced. The content of the previous numeracy subject-specific teaching qualification was effectively split into two parts, with the numeracy pedagogy being added to the main teaching qualification and the addition of an entry requirement of personal maths skills at Level 3. Thus, while Level 3 maths subject knowledge is required, it is no longer taught within the teaching qualification.

THE NUMERACY WORKFORCE

Information on the number of Skills for Life teachers and their profile is provided by a recent NRDC report commissioned by Lifelong Learning UK (Cara et al. forthcoming). It estimated that 18,800 individuals were teaching Skills for Life subjects in 2004/05, the most recent year for which full Learning and Skills Council data are available. Approximately 37% of these were involved in the provision of literacy, 35% ESOL and 28% in numeracy. Those who taught two or more subjects were represented more than once in these figures, thus the total number of teachers in the three subjects adds up to more than the number of Skills for Life teachers in the workforce as a whole.

A report by the inspectorate in 2003 found that there was a need for greater expertise in teaching numeracy, which was too often taught by rote rather than by understanding numerical concepts (ALI/OFSTED 2003). The Smith Report acknowledges that the adult numeracy strategy is challenging and demanding for teachers and learners alike (Smith 2004).

Data on the teaching qualifications of adult numeracy teachers in the NRDC report (Cara et al. forthcoming) suggest that in 2005/06 29% of numeracy teachers were fully qualified, while almost one-fifth (18%) of numeracy teachers did not have any teaching qualifications.

In this report we focus on the teaching qualifications of numeracy teachers, their personal skill levels in maths and English, and how these qualifications are related to the progress of their learners.

EVIDENCE FROM PREVIOUS STUDIES

Few would dispute that teacher quality is a vital element in student achievement and progression. However, the contribution that teacher qualifications make to this is open to question. Studies that have looked at this are inconclusive or find no significant effect when looking at general teaching qualifications or certification status (Croninger et al. 2007). However, others that have looked specifically at the subject area of teacher qualifications find that gains in student achievement in high school for mathematics and science are associated with teachers holding a mathematics or science undergraduate or masters degree (Goldhaber and Brewer 1997, 1998, 2000; Rowan et al. 1997). Other research seems to suggest that over-qualified teachers sometimes appear to be less effective. Thus, teachers holding a masters degree can have a negative effect on elementary school student achievement (Rowan et al. 2002, Croninger et al. 2007).

While existing research provides some guidance on the potential importance of teacher qualifications, most of the literature comes from the compulsory sector, with the vast majority of the published studies coming from the US. There remains a lack of evidence in the UK, particularly for the learning and skills sector.

Some research based in the UK has suggested a significant association between teacher qualifications and learner achievement both in the further and compulsory education sectors. For example, Brooks et al. (2001) found that one of the factors associated with better progress in reading for adult learners was that all tutors in an FE provider area had qualified teacher status. Askew et al. (2003) argued that highly effective numeracy teachers in primary schools in England were much more likely than other teachers to have undertaken mathematics-specific continuing professional development over an extended period.

METHODOLOGY

We draw on data from two related longitudinal studies: the NRDC Skills for Life Teacher and Learner Studies. The former is a study of approximately 1000 teachers, interviewed three times between 2004 and 2007. A wide range of questions were asked concerning the teachers' socio-economics characteristics (age, gender, ethnicity, etc.), and also with regards to their qualifications. (See Cara et al. (2008) for a detailed account.)

From this full sample of teachers a sub-sample of 270 teachers were randomly selected and asked to test some of their learners. Overall, it was possible to use assessments for 763 learners (teachers tested on average three of their learners). The learners were tested twice, first early on in their Skills for Life courses and then at a later stage towards the end of their courses.

Within this data set we controlled for a number of key variables describing the characteristics of the learners and teachers and also for the type of institutions in which the courses took place. This enabled us to focus on the difference between students taught by different teachers and to put aside variation in students' achievement and progress due to factors other than teacher qualifications.

This report focuses on 84 numeracy teachers and 237 of their learners.

LEARNERS AND TEACHERS

THE LEARNERS

In this study we were looking at a group of 237 numeracy learners who were tested for their numerical skills before and after their course of study. Just over 55% of the learners were female, over 80% were White British and for nearly 90% English was their first language. Only 6% had any qualifications above Level 2 with 35% holding no qualifications at all.

LEARNERS' TESTS SCORES

From the results of the tests in numeracy that the learners took before and after their courses we can see that progress was made. The tests were scored on a scale of 0–60. The mean score pre-course was 22.9 out of 60; post-course this became 26.1, an increase of 3.2 or just over 5%.

However, this only provides descriptions on the means scores. It could be that some people progress while others regress, therefore cancelling each other out. To control for this we need to look at the distribution of the pre- and post-tests. In Figure 1 the blue dotted line shows pre-course test results and the red line post-course test results. As can be observed the red line is to the right of the blue dotted line for lower scores. This means that more learners got low scores before the course than after. The opposite is observed for high scores. This move to the right is quite clear, indicating the positive effect of the courses.

THE TEACHERS

We worked with data from 84 numeracy teachers; of these the vast majority were White British and

only one in four was male. They had an average age of 45 and had been teaching for seven years. Seventy per cent had a degree-level qualification. However, this was not necessarily a maths degree; only 28% held a degree-level qualification in maths and for 44% the highest qualification they had in maths was at Level 2.

The picture of teaching qualifications is equally interesting. We used three main categories to describe the qualification status of teachers:

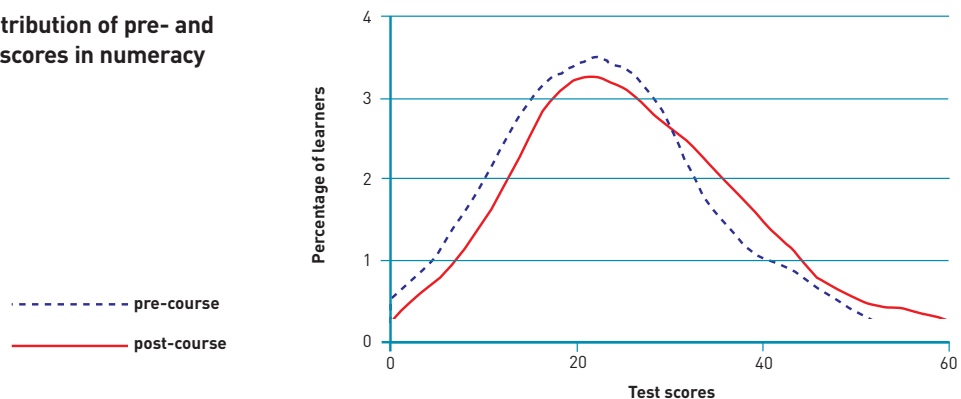
- **Fully-qualified** teachers had gained a full generic teaching qualification (a Certificate in Education/PGCE or Certificate in Further Education Teaching Stage 3) and a subject-specialist qualification in numeracy.
- **Part-qualified** teachers had one or the other of the two qualifications required at the time for teaching their subject.
- **Unqualified** teachers had neither of these qualifications though some may have had introductory teaching qualifications.

Using this classification we discovered that only 15% of our numeracy teachers were fully qualified, 52% were part qualified and 33% were unqualified according to the regulations at the time.

LEARNER PROGRESS

We looked at the variance in learners' numeracy test scores after taking into account their skills measured before or at the beginning of their course. We were therefore looking solely at learners' progress in relation to their teacher's

Figure 1: Distribution of pre- and post-course scores in numeracy



qualifications. To do this we started with one type of qualification and tested its effect on the learners' performance. We then introduced other qualifications on their own or in different combinations. All of the models included numerous controls for learner characteristics (gender, age, first language, learning or health difficulties) and teacher characteristics (age, gender, ethnicity).

1. HIGHEST QUALIFICATION

First we asked the level of teachers' highest qualification in general. The result implied a positive, but not statistically significant effect on learners' progress in numeracy.

2. HIGHEST QUALIFICATION IN MATHS

Then, while keeping this information, we introduced whether the teacher had a Level 3 or above qualification in maths. Both appeared to have a positive and strongly statistically significant effect on learners' progress. This means that learners make more progress when their teachers are qualified to at least Level 3, i.e. A-level or equivalent in maths.

3 AND 4. TEACHING QUALIFICATIONS

Next we asked whether the teacher held a subject-specialist teaching qualification in numeracy and whether the teacher had a generic teaching qualification. These questions, of course, relate to the pre-2007 teaching qualifications. While both generic and subject-specific teaching qualifications had a positive effect, there wasn't evidence of a statistically significant effect on learners' progress.

5. QUALIFIED STATUS

Here we wanted to know about the highest qualification in maths together with the qualified status of teachers. Rather than testing these two variables separately we introduced three sub-categories of how far teachers were qualified to teach adult numeracy – fully qualified, part qualified and not qualified. When we did this, the teachers' qualified status did not appear to have much effect, but the maths qualification remained significant. In other words a teacher being A-level maths qualified had a positive effect on learners, whether the teacher was qualified to teach adult numeracy or not.

6. EXPERIENCE

From previous research we knew that it is very hard to measure teaching quality. It cannot be assumed that teaching quality can be fully accounted for by teaching qualifications alone. Therefore, we introduced teaching experience as an additional factor that may be closely related to teaching quality. Again this had a positive but not statistically significant effect and again when we added in the highest qualification in maths, Level 3 maths qualifications remained significant.

ATTITUDE TO MATHS

Improvements in test scores was not the only outcome we were able to look at; questions were included in the learner questionnaires to enable us to investigate the impact of teacher qualifications on learner confidence; attitude towards their numeracy skills; and how they used them in everyday life.

Analysis of their teachers' qualifications showed that learners had a more positive attitude towards their daily use of maths when their teachers had a Level 6 or above qualification in maths (degree or postgraduate degree). Learners also appeared to enjoy maths more if their teachers held maths qualifications at Level 6 or above.

However, although this group of learners appeared to show increased enjoyment of maths and have a positive attitude to it, they also appeared to be less self-confident about their ability in maths once their course had finished.

CONCLUSIONS AND IMPLICATIONS

Making use of comprehensive and unusually rich data sets we are able to make a number of distinctive and new claims with regards to how teacher qualifications affect learners' progress in adult numeracy.

- Experience matters. Number of years' experience teaching numeracy was found to positively affect learners' progress in and attitude to numeracy.
- Subject knowledge is also of prime importance. There was dissent in the field at the introduction of the entry requirement of personal maths skills at Level 3 for courses leading to numeracy teaching qualifications. It was argued that Level 3 was too high and that it would

discourage people from applying. However, this research strongly endorses the requirement. Learners' improvements in numeracy were mostly due to teachers who held qualifications in maths at Level 3 and above. No effects on improvements were detected for numeracy teachers holding qualifications at Level 2 compared to those teachers who did not hold this qualification.

- There was also a positive effect where teachers held numeracy qualifications at Level 6 or above. What's more these teachers also impacted positively on the attitude of their learners to maths use in their everyday life. However, they also appeared to impact negatively on the confidence of their learners in their numeracy skills after their course had finished.

REFERENCES

ALI/OFSTED (2003) *Literacy, Numeracy and English for Speakers of Other Languages: A review of current practice in post-16 and adult provision*. Coventry: Adult Learning Inspectorate, OFSTED and Her Majesty's Inspectorate.

Askew, M., Brown, M., Rhodes, V., Johnson, D. and Wiliam, D. (2003) *Effective Teachers of Numeracy*. London: King's College London.

Brooks, G., Davies, R., Duckett, L., Hutchison, D., Kendall, S. and Wilkin, A. (2001) *Progress in Adult Literacy. Do Learners Learn?* London: The Basic Skills

Cara, O., Carpentieri, J.D. and Casey, H. (forthcoming). *The Skills for Life workforce in England: The full picture*. London: NRDC/LLUK.

Cara, O., Litster J., Swain, J. and Vorhaus, J. (2008) *The Teacher Study: The impact of the Skills for Life strategy on teachers*. London: NRDC.

Croninger, R.G., Rice, J., Rathbun, A. and Nishio, M. (2007) 'Teacher qualifications and early learning: Effects of certification, degree, and experience on first-grade student achievement'. *Economics of Education Review*, 26, pp. 312–324.

Goldhaber, D. D. and Brewer, D. J. (1997) 'Why don't schools and teachers seem to matter? Assessing the impact of unobservables on educational productivity'. *The Journal of Human Resources*, 32(3), pp. 505–523.

Goldhaber, D. D. and Brewer, D. J. (1998) 'When should we reward degrees for teachers?'. *Phi Delta Kappan*, 80(2), pp.134–138.

Goldhaber, D. D. and Brewer, D. J. (2000) 'Does teacher certification matter? High school teacher certification status and student achievement'. *Educational Evaluation and Policy Analysis*, 22(2), pp. 129–146.

National Audit Office (2004) *Skills for Life: Improving Adult Literacy and Numeracy*. London: The Stationery Office. www.nao.org.uk/publications/nao_reports/04-05/040520.pdf.

Rowan, B., Chiang, F. and Miller, R. J. (1997) 'Using research on employees' performance to study the effects of teachers on students' achievement'. *Sociology of Education*, 70 (October), pp. 256–284.

Rowan, B., Correnti, R. and Miller, R.J. (2002) 'What large-scale, survey research tells us about teacher effects on student achievement: Insights from the Prospects study of elementary schools'. *The Teachers College Record*, vol. 104, no. 8, December, pp. 1525–1567 (43).

Smith, A. (2004) *Making Mathematics Count: The report of Professor Adrian Smith's Inquiry into Post-14 Mathematics Education*. London: Stationery Office.

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