

## Building evidence into practice: teaching adult numeracy

Numeracy tutors often use a ‘telling’ style of approach that follows a common format. They:

- show learners procedures
- break down concepts into smaller parts
- demonstrate examples, and
- expect learners to work individually through worksheets.

A recent project called Maths4Life set out to explore how a group of tutors changed from the ‘telling approach’ to one which proved more effective and resulted in transferable learning. Transferable learning is learning that lasts and which can be used in non-routine, non-classroom situations. The aim was to help learners to use more active approaches – especially pertinent in adult numeracy lessons, where learners often view maths learning as something that’s ‘done to them’. The new approach, which was underpinned by eight research-based principles (see box), helped learners to:

- discuss and explain ideas
- challenge and teach one another
- create and solve each others’ questions, and
- work collaboratively to share methods and results.

The 24 teachers involved in the research took part in a nine-month professional development programme, with regular meetings to:

- discuss the outcomes of classroom trials of various mathematical activities
- reflect on the underlying principles, and
- create new activities.

During the programme, the tutors modified their teaching approach and the resources they used in the light of emerging issues and findings. They also created a substantial collection of discussion-based activities that included:

- cards showing alternative representations of the same mathematical idea designed for the learners to match up, working collaboratively with others
- true/false statements for learners to discuss in groups, such as ‘Max gets a 10% pay rise, Mary gets a 5% pay rise, so Max gets the bigger pay rise?’ and
- comparing different problem-solving methods and/or diagnosing the causes of errors in solutions.

Three quarters of the tutors changed their general practice and became more learner-centred. Over a quarter introduced changes of a more profound nature. The tasks they created successfully helped them to facilitate collaborative small group work. They enhanced the quality of their questioning too, with activities leading naturally to tutors asking, for example, ‘Is that true? Why?’, ‘Can you find a counterexample?’, ‘What is the same and what is different?’, ‘How do you know that this means the same as this?’, and ‘How could we write this in a different way?’

### The research based principles underpinning the new approach

Teaching is more effective when it:	This means:
builds on the knowledge learners already have	developing formative assessment techniques to accommodate individual learning needs
exposes and discusses common misconceptions	learning activities should expose current thinking by confronting learners with inconsistencies and allow opportunities to resolve them through discussion
uses higher-order questions	asking question that promote explanation rather than recall
uses co-operative small group work	providing activities that encourage critical, constructive discussion and where group accountability is important
encourages reasoning rather than ‘answer getting’	aiming for depth rather than superficial ‘coverage’
uses rich collaborative tasks	creating tasks that encourage decision making, promote discussion, encourage creativity and ‘what if’ / ‘what if not’ questions
creates connections between topics	helping learners to generalise and transfer learning to other topics and contexts
uses technology	using computers and IWBs in ways that allow concepts to be presented in visual, dynamic and exciting ways to motivate learners

### Take action

#### Could you:

- create and refine tasks with the help of colleagues that involve learners in group discussion of concepts and explanations, or
- experiment with the strategies described here with help from colleagues to help you to review and develop your own practice?

#### Evidence source

Swain, J. & Swan, M. (2009) Teachers’ attempts to integrate research-based principles into the teaching of numeracy with post-16 learners. *Research in Post-Compulsory Education*, 14 (1), pp.75-92.

*The researchers created 29 discussion-based mathematical activities in collaboration with 24 tutors from 12 organisations in England as part of a 9-month CPD programme. They used an iterative cycle of design, trial, reflect and modify.*