1. Overview
This publication develops the findings of four Maths4Life pathfinder projects, which focused on motivating learners and teachers in post-16 numeracy and mathematics. It uses an approach to reflective practice which Maths4Life is developing. The publication guides readers in how to use reflective practice as a tool to examine and develop their work, whatever its focus.

Section 1 gives relevant background information about Maths4Life, the four Maths4Life stage one pathfinders and research on motivation. This section also highlights the relevance of this publication to different user groups and provides guidance on how to use it. Please see section 7 below for further details.

2. Maths4Life
The Maths4Life project started in August 2004 and will finish in March 2007. Maths4Life is led by the National Research and Development Centre for adult literacy and numeracy (NRDC), Institute of Education, University of London. Other partners in Maths4Life are LLU+ at London South Bank University, King’s College London, the Learning and Skills Development Agency (LSDA), the National Institute for Adult Continuing Education (NIACE), Cambridge Training and Development (CTAD) and the University of Nottingham.

Maths4Life aims to develop post-16 numeracy and non-specialist mathematics teaching and learning for everyday life and work in England. Central themes within Maths4Life are:

- Attracting new learners: the motivation, engagement and achievement of new learners.
- Attracting new teachers and developing the existing workforce: capacity building.
- Developing attractive provision in a modern environment.
- The transfer and embedding of good practice.

Maths4Life is located within a broad policy context which emphasises the urgent need to implement far-reaching reforms to the teaching and learning of mathematics, both pre- and post-16. Concerns about numeracy or mathematics are reflected in the following key documents:

To achieve its aims, Maths4Life has initiated an integrated programme of research and development which draws on expertise within and beyond the NRDC consortium.

3. The Maths4Life stage one pathfinders
An important strand of Maths4Life is two stages of pathfinder projects. Pathfinder projects, as the name suggests, aim to discover, try out and collect evidence on new ways of doing things. With the exception of the LLU+ pathfinder, (see section 6), the Maths4Life stage one pathfinders have been primarily developmental. The focus of the projects has been on building an identified area of practice. Each pathfinder has also included some research. Evidence has been systematically collected and analysed on the aspect of practice which each project aimed to develop.

The four Maths4Life stage one pathfinders have explored different aspects of motivation (see section 5) in relation to the teaching and learning of post-16 numeracy or mathematics. The focus of each pathfinder is summarised in the table below.

Please see appendix 1 for methodological information about the four projects.

### The Maths4Life stage one pathfinders

<table>
<thead>
<tr>
<th>Pathfinder</th>
<th>Led by</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talking Up Numeracy</td>
<td>Institute of Education, University of London</td>
<td>Practitioners’ use of speaking and listening in initial assessment and individual learning plan (ILP) sessions, to help motivate offenders to take up numeracy provision.</td>
</tr>
<tr>
<td>ICT</td>
<td>CTAD</td>
<td>The use of mobile technologies to motivate adult numeracy learners.</td>
</tr>
<tr>
<td>Attracting Adult Learners</td>
<td>NIACE</td>
<td>Strategies to promote the take-up of adult numeracy provision.</td>
</tr>
<tr>
<td>Why did they (not) do it?</td>
<td>LLU+</td>
<td>Reported reasons for participation and non-participation in Level 4 adult numeracy teacher education. Practitioners’ views on Level 4 numeracy teacher education at the LLU+.</td>
</tr>
</tbody>
</table>

4. Generalisability
When you reflect on what the Maths4Life pathfinder findings mean in your professional context, it is important to remember that, as outlined above, the projects were principally developmental, with a research strand. The sample sizes and how the samples were selected mean that the pathfinder findings are not generalisable to, for instance, all numeracy practitioners and learners. However, as Silverman (1993) points out, research does not have to be generalisable to be relevant. The aim of this publication is that the work of the four Maths4Life stage one pathfinders should provide helpful starting points for readers to question and develop their practice, using the approach to reflective practice outlined in this publication (see section 2).

5. Motivation
The research evidence relevant to the motivation of teachers and learners of adult numeracy and mathematics is complex and, in places, contested.

Motivation is often considered in terms of intrinsic and extrinsic motivation. Intrinsic motivation refers to motivation which is innate or within, and which stimulates
engagement in activity for its own sake. Extrinsic motivation refers to external factors, usually in the form of rewards or pressures, which prompt an individual to take action in an identified area, such as learning numeracy or mathematics. Extrinsic motivation fosters engagement in activity as a means to an end.

An NRDC study (Swain et al. 2005) explores why numeracy learners in the sample attended numeracy classes. Most learners reported a range of reasons for attending numeracy. Some related to intrinsic motivation. For instance, many of the learners wanted to prove something to themselves about their mathematical capabilities. Nearly all learners in the study wanted to develop their mathematical understanding. Other stated reasons related to extrinsic motivation. Reported reasons included wanting to gain mathematics qualifications, get a job, get on a course, help children with schoolwork, and use mathematics in everyday activities, such as paying bills and doing the shopping.

Coben et al.’s (2003) NRDC review of research into adult numeracy presents a range of findings which are relevant to motivation and numeracy or mathematics. Teaching and learning is one area considered. Evidence at school level underlines that teaching methods influence learners’ views of mathematics. For instance, Ofsted reported that the main teaching method in upper secondary mathematics in the United Kingdom (UK), in the mid 1990s, was that the teacher explained a mathematical concept. The students then worked through exercises. Classes were, on the whole, setted. This approach to mathematics teaching helped shape a range of negative beliefs about mathematics (Becker, 1995; Boaler, 1997; Cobb et al. 1991, cited in Coben et al. 2003) which deterred students from studying mathematics after the age of 16 (Landau, 1994; Quiter and Harper, 1988, cited in Coben et al. 2003). In contrast, evidence indicates that, on the whole, students respond positively to learning mathematics through discussion and exploratory activities, in an environment which, particularly in the case of girls, is not highly competitive (Becker, 1995; Boaler, 1997; Morrow and Morrow, 1995; Thompson, 1995, cited in Coben et al. 2003).

A third NRDC study (Baxter et al. 2005 forthcoming) on the teaching and learning of common measures, particularly at entry level, discusses changes in the meaning of the word motivation. In the 1970s and 1980s, it is stated, motivation referred to circumstances that led to students enrolling on courses. It was considered good practice to negotiate the curriculum around student preferences. Baxter et al. (2003) argue that, in contrast, motivation is now more akin to encouragement. Government, teachers and referral agencies are important in being proactive in fostering learners’ motivation to attend numeracy.

As part of Maths4Life, a forum on motivation and numeracy was conducted in 2005, through the Maths4Life website (http://www.maths4life.org). This forum stimulated many contributions. The Maths4Life project team has summarised responses below:

We asked you what motivates teachers and learners into adult numeracy provision. There was a lot of traffic on the boards and we received a good number of comments.

Many considered that motivation for existing teachers comes from the satisfaction of seeing learners begin to enjoy mathematics and feel that they are succeeding at it. Practitioners see this motivation in the positive facial expressions and body language of their learners. Interestingly, there were no comments which suggested accreditation was a motivating factor, although this is an opinion often quoted by policy makers and practitioners.

We would welcome comments on how we can motivate people to become numeracy teachers.

There was a consensus that what motivates learners is feeling that they are succeeding at numeracy or mathematics. Choice of task is seen as important. Practitioners feel that they must offer experiences which contrast with learners’ school days. Taking this further, there is almost a sense that failure cannot be an option, because learners’ fear of failure could prevent progress. It might be interesting to consider further what success and failure mean.
The previous points indicate that the Maths4Life stage one pathfinders are located within a context of wider research evidence and practitioner debate on motivation and numeracy or mathematics.

6. Audience
The principal audience for this publication will probably be teachers and managers of post-16 numeracy or mathematics. However, this publication is designed to be relevant to a wide-ranging audience, and you will probably find it interesting if you are:

- A post-16 numeracy or mathematics teacher.
- A post-16 numeracy or mathematics manager.
- A post-16 numeracy or mathematics teacher educator.
- A post-16 numeracy or mathematics researcher.
- A policy maker who is interested in post-16 numeracy or mathematics.
- A practitioner or researcher who is interested in speaking and listening.
- A practitioner or researcher who is interested in ICT.
- Interested in reflective practice.

7. How to use this publication
This publication is designed to be used flexibly. The diagram opposite illustrates how the publication is structured.

Sections 3–6 are wide ranging in the aspects of numeracy and motivation covered. Some readers may wish to use the whole publication. Others may find that some sections are more relevant to their practice than others. Those readers may wish to select the sections which are most relevant to their professional context. Readers who are particularly interested in numeracy and ICT, for example, may want to focus on section 4 on the ICT pathfinder, in conjunction with sections 1 and 2 on background information and reflective practice. The publication has therefore been designed both to be used as a whole and to enable readers to dip in and out of it. For those readers who want to use selected sections, a limited amount of key information is repeated across sections 3–6, to help readers interpret and use the section accurately. Individual sections of this publication can be downloaded online at www.maths4life.org/p1report.

Even if your specific area of interest isn’t covered in sections 3–6 of the four Maths4Life pathfinders, you can tailor the generic reflective practice approach covered in section 2 to your own area of interest. So, this publication can also be used by readers who are not numeracy specialists, but who are interested in developing their work, whatever its focus, through a reflective practice approach.

8. Further reading
If you would like to find out more about motivation in relation to post-16 numeracy or mathematics, or about post-16 numeracy in general, you might want to follow up three NRDC reports, available through the NRDC website.

How to use this publication

- **Section 1**: Background
  - Part A. Overview
  - Part B. Pathfinder focus and findings

- **Section 2**: Reflective practice

- **Section 3**: Numeracy and speaking and listening

- **Section 4**: Numeracy and ICT

- **Section 5**: Strategies to increase the take-up of numeracy provision
  - Part C. Reflective practice activities in this area

- **Section 6**: Level 4 numeracy teacher education
  - Part D. Further reading in this area