

National Centre for Excellence in the Teaching of Mathematics

Evaluation

GHK Consulting



Research Report No
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*National Centre for Excellence in the
Teaching of Mathematics
Evaluation*

The views expressed in this report are the authors' and do not necessarily reflect those of the Department for Children, Schools and Families.

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EXECUTIVE SUMMARY

1 Introduction

GHK Consulting in collaboration, with Edcon Educational Consultants, People Science and Policy Ltd and TNS Social Research, were commissioned by the Department for Children, Schools and Families (DCSF) to undertake the evaluation of the National Centre for Excellence in the Teaching of Mathematics (NCETM). Launched in June 2006, the NCETM is a key component of the government's Science, Technology, Engineering and Mathematics (STEM) programme, and aims to improve the teaching of mathematics by facilitating the provision of appropriate, accessible and effective professional development activities.

The NCETM follows a model which seeks to address many of the barriers to participation in professional development activities, and includes an online resource (the NCETM Portal) and a network of Regional Coordinators. The Centre also works collaboratively with its regional and national partners, providing events and funding to support regional projects and networks.

2 Study Aims and Methodology

The study took place during the NCETM's second year of operation, and provided an evaluation of the Centre in terms of process and impact. Focusing on its work with schools under their DCSF contract, the study explored the extent to which the model underpinning the Centre had the potential to be effective, exploring five specific areas:

- The impact of the Centre on mathematics educators in schools and colleges, and on pupils and students;
- The impact of the Centre on the culture, expectation and uptake of continuing professional development (CPD);
- The use of networks and the role of the Centre's Regional Coordinators to facilitate knowledge and good practice exchange between teachers; and
- The impact of the NCETM portal on mathematics professional development.

The evaluation methodology comprised four stages, namely:

- An initial scoping stage – featuring a document and data review and interviews with Regional Coordinators and senior Centre staff.
- The first fieldwork stage – featuring an email survey of 6,453 individuals registered with the portal, with 1,034 responses being received (a 16% response rate); a review of a sample of discussion groups on the portal;

and case study visits to a sample of 12 NCETM-supported regional networks.

- A second fieldwork stage – featuring interviews with Regional Coordinators, partners and stakeholders, and educators using NCETM services; interviews with 12 national stakeholder organisations; second contacts with the network case studies; and interviews with senior NCETM staff.
- Reporting – the production of scoping, interim and final evaluation reports.

3 The NCETM Model

The NCETM model offers a ‘blended learning’ approach via two main components.

The NCETM Portal

The portal is an online resource providing materials for professional development and classroom use, and a means of communication between educators. It comprises:

- **Resources and case studies** – including materials to support the teaching of mathematics, and learning points from NCETM grant funded projects.
- **The Mathemopedia** – an online tool for sharing knowledge about mathematics.
- **Professional Development Directory (PDD)** – a directory of courses related to mathematics-CPD, at the national and local levels.
- **Communities and forums** – on-line fora (accessible to all), communities (restricted to members) and hidden communities (restricted to invited users only), allowing users to share ideas and discuss issues with others
- **Blogs** – an online blogging facility for people to write and contribute to blogs about teaching mathematics.
- **Self-evaluation tool** – allowing teachers to evaluate their own performance and subject knowledge, to identify training and development needs.

A new self-evaluation tool and the Personal Learning Space (PLS), where materials can be stored to return to in future, were introduced during the study.

Individuals can register with the portal to access its full range of services (although they do not need to log in each time they visit), with the numbers registering rising steadily to 13,149 by May 2008. Monitoring data shows that:

- The portal had received 101,253 logins from registered users since June 2006, rising with new registrations to 70,643 logins in 2007/8. Of these

- The portal content received 962,782 hits in 2007/8, a 200% rise on the previous year. The Resources received most hits (40% of all hits) followed by News (14%), with the Research area being the least popular with 2% of hits.

More detailed analysis introduced in 2007 showed that the portal received 274,009 visits between July 2007 and May 2008, 75% from unique visitors and suggesting just 25% were from repeat visitors. The average time spent on the portal was 3 minutes and 30 seconds - although 59% viewed it for less than 10 seconds and 11% for between three and 10 minutes. Almost two thirds of visitors used the portal on one occasion only, with 21% visiting between two and eight times and 4% 200 times or more.

Regional Coordinators

The Regional Coordinators provide a physical presence for the Centre in each region, raising awareness, establishing links with the regional professional development infrastructure and facilitating activities including regional grants for collaborative projects.

Each region is intended to have one full-time equivalent Regional Coordinator (RC) post for schools, as well as a pool of associates to draw upon to support their activities. The RCs are all experienced teachers of mathematics, with many having a wider involvement in mathematics teaching at the regional and national levels including Local Authority Mathematics Advisors and National Strategy consultants. Most had experience of working in their regions, with those having previous local authority or regional experience finding establishing regional links easier. Each of the RCs were viewed positively by the regional stakeholders interviewed.

Although less able to quantify the proportion of teachers and schools who were aware of the Centre, the RCs had made much progress in raising awareness amongst schools and the wider mathematics education infrastructure. This had been, and remains, a considerable challenge, with progress being made through a combination of attending local and regional meetings with local authority networks and groups of teachers, distributing newsletters and other materials, and through NCETM events and presenting at those organised by others. The RC's considered profile raising with regional influencers to be amongst their greatest achievements, although it was acknowledged that much remained to be done.

The second area of success cited by the RC's was the establishment of partnership and collaborative activities within their regions. These included activities with a range of mathematics or CPD-focused organisations, and included joint events and conferences with STEM partners and National

Strategy consultants, the delivery of professional development activities with Science Learning Centres and participation in advisory and high level regional groups to share experience and materials.

The RCs are also responsible for regional grant funded projects, and the networks that spring from them. Although working with small numbers, these projects proved to be an effective means of engaging individual and groups of teachers.

4 Educator Experiences

The study explored the experience of educators engaging with the NCETM through a survey of individuals registered with the portal, qualitative interviews with a small sample of teachers and case studies of a sample of NCETM supported networks.

The **educator survey** targeted 6,453 individuals registered with the portal in October 2007, with 1,034 responses being received, three quarters of which were from practicing teachers. While the respondents may have been atypical of the wider mathematics educator population, they reported a range of involvement with, and benefits from, their interactions with the NCETM.

The **portal** was most commonly used between once and three times each month, with the Resources being the most popular section followed by fora and communities and the Mathemapedia. While use patterns by educators in different sectors varied, the portal functions were rated positively by between three quarters and 90% of respondents and examples of the use of materials downloaded in the classroom were reported.

Fewer respondents (38%) reported attending NCETM-supported **events or meetings**. Those attending reported finding them useful, most commonly by identifying new ideas for use in the classroom, and the vast majority indicated they would attend such events in future.

The educators participating in the **qualitative interviews** described their interactions with the Centre and their RC positively. Many reported already knowing their RC well, although awareness of the centre amongst educators was not felt to be uniformly high, and many of those engaged with the Centre had different views on its remit and activities. Use of the portal by this group reflected that reported in the survey, although others reported limited knowledge and use to date.

The majority of the educators consulted had engaged with the Centre through direct contact with their RC, by attendance at regional events or meetings or their involvement in an NCETM grant funded project. In the latter case, portal use was linked to involvement in communities, and suggested that exposure through this route could lead to increased use in future.

Benefits and Impacts

Educators consulted in each element of the evaluation reported a range of benefits and impacts resulting, or expected to result, from their involvement with the Centre. The **survey** respondents reported benefits such as helping them keep up to date with teaching methods, providing new teaching ideas and encouraging creativity in mathematics teaching – with the opportunity to share information on teaching practice and experiences with colleagues also being cited. They also reported a series of impacts for themselves, their pupils, colleagues and their schools/colleges, including:

- **'Personal' impacts** – on their knowledge of teaching methods (46%, with 32% expecting in future), motivation (41% with 24% in future), confidence (32% with 25% in future) and mathematics content knowledge (26% with 28% in future);
- Impacts on **pupils and students** – with 41% reporting impacts on their pupils and students, and 32% expecting impacts in the future;
- Impacts on **colleagues** – with 31% reporting impacts on their teaching colleagues and 35% expecting impacts in the future; and
- Impacts on **school/college** – although reported less frequently impacts were reported and expected in future by over half the respondents, in terms of supporting schools objectives and plans and the culture of CPD for mathematics teachers.

Impacts were most commonly described as 'some' rather than 'a great deal' of impact, with the share expecting impact in future suggesting a continuing role for the Centre to ensure the expected benefits are achieved.

The **qualitative interviews** also identified **educator impacts**, most commonly including improved knowledge of teaching methods and impacts on their motivation and confidence. In addition, collaborative approaches, where teachers had the opportunity to learn from other teachers' practice, had led to changed views about effective professional development models.

Impacts for **pupils and students** were also reported through classroom change, and although evidence for this was limited the educators considered that presenting topics in a more engaging manner would translate into improved pupil performance. Again these effects were felt to result from participation in grant funded projects, through the funding and support offered by the Centre and their RC.

5 Network Case Studies

The Network Case Studies explored the activities and impact of a sample of 12 networks supported by NCETM funding, through a combination of local visits and where possible observations of network events and classroom teaching. The focus of the networks and the projects they were involved in varied,

including mathematics pedagogy, raising achievement, mentoring mathematics teachers and leading and supporting primary mathematics.

The networks had benefited to different extents from NCETM funding, with 10 being established directly as a result and two being pre-existing, with each receiving an average of £8,000. In 10 of the 12 networks studies, the networks were already judged to have had an impact on participants' practice, with impacts being considered likely for the remaining two.

The RC's were in most cases crucial to the establishment of the case study networks, each of which were considered to be appropriate for NCETM funding. Once implementation began the role of the RC was variable in terms of ongoing support, with the level of contact being variable and in some cases restricted to emails and occasional informal contacts. Although an increased requirement for progress reporting was described in some cases, the majority of the case study networks were able to function effectively without RC support – often when local authority mathematics advisors or consultants were involved – although others could require more support.

6 Conclusions

The study concluded that much has been achieved to illustrate the potential of the Centre to deliver its mission and raise standards in mathematics teaching, and that the Centre is having positive impacts on the teachers engaging with it. However there remains work to be done to extend these impacts to have a greater and more visible effect on educators, pupils and students, and promote linkage between the virtual and face to face elements of provision. In this context, the study team consider that the timing is appropriate for the Centre to review its objectives and clarify how they will be taken forward, building on achievements and lessons to date as attention focuses on extending reach and achieving impact across the mathematics workforce.

Impacts on Pupils and Students

The quantitative and qualitative elements of the study identified a range of impacts resulting from educators' interactions with the NCETM, including:

- **On educators** – successfully impacting on the professional expertise of mathematics educators by helping them keep up to date with teaching methods, providing new ideas and identifying the need for, and sources of, professional development provision. These had led to improved knowledge of teaching methods, motivation and confidence and mathematics content knowledge. However, not all educators considered that the Centre had supported their day to day teaching of mathematics, suggesting that more could be done to help embed new learning, ideas and approaches into classroom practice.
- **On pupils and students** - positive impacts were also reported on pupils' and students' learning and interest, which were considered by the

While positive impacts were identified, the study also found that:

- The impacts reported were often 'expected' rather than achieved – showing the importance of ensuring educator impacts are converted into classroom change;
- Substantial impact may be restricted to those accessing the portal or directly participating in NCETM activities – stressing the need to extend reach to maximise impact; and
- Extending reach will be challenging with a limited regional fieldforce - emphasising the importance of working collaboratively with regional partners such as Local Authority staff, National Strategy consultants and other local influencers.

Both elements of the NCETM were considered by the evaluators to have an important role to play in achieving the Centre's mission. Use of portal resources were considered to have the potential to offer immediate benefits and classroom change, while longer term, deep rooted and sustainable impacts were considered more likely to result from participation in the Centre's project and network-based activities.

Impact on Professional Development Culture

The Centre has encountered many of the traditional barriers to participation in professional development amongst mathematics educators, with influencing the culture of subject specific CPD representing a considerable and long term challenge.

While there is little evidence that the Centre has had a measurable impact on professional development culture to date, we consider that the approaches employed have the potential to deliver positive benefits. In addition to extending its reach overall, the Centre must engage with schools that have low participation rates in external professional development activities if it is to successfully influence CPD culture. The self-evaluation tool has the potential to play an important role in stimulating demand, as has the Professional Development Directory (PDD), although questions were raised over the comprehensiveness of the latter's coverage and the way in which it is maintained.

The NCETM Portal and the Use of Networks - Is the Model Working?

While it was widely considered that a national centre of excellence for mathematics teaching was a much needed resource, the individuals consulted

for the study held different views on the effectiveness of the NCETM model, largely influenced by their degree of involvement or reports of involvement from others. Most educators viewed the model positively, although few had made comprehensive use of the range of services available. Stakeholder views varied between those operating at regional and national levels, with those closest to delivery being the most positive, while others were often unclear on the services available and the Centre's objectives and priorities.

On the basis of the evidence collected during the evaluation, we consider that the current model shows promise for the future, and that its components are capable of achieving positive impacts for the community it serves. The task facing the Centre, notably in terms of achieving visible and sustained change in teaching standards and the wider professional development culture, is considerable, and while much promise has been illustrated areas for revision have also been identified.

- **The portal** – while the number of registrations with, and hits on, the portal have grown considerably, portal monitoring data suggests low overall penetration of use across schools and college educators and that the depth of use may be limited in terms of the duration of visit and pages viewed. While educators and others confirmed while the portal can deliver benefits, awareness and use is highly variable, even amongst individuals involved in other NCETM activities.
- **Grant funded projects** – were found to play several roles, including raising awareness and engagement, allowing new approaches to professional development to be tried, and delivering positive impacts with the potential for sustained change. The Network Case Studies focussed on grant funded activities, and reported positively on the nature of networks supported and their impact. The direct impact of the Centre on the networks varied between providing funding to more direct support, with the level of support offered not always matching the level of need.

7 Recommendations

A series of recommendations were produced, including:

- **Reviewing and formalising NCETM objectives** - to articulate a clear sense of purpose to staff, partners, stakeholders and educators; reflect a sharpening of focus overall and stressing the Centre's unique role as an impartial facilitator of professional development; and setting a clear set of priorities and the activities by which these will be achieved. The Centre should emphasise its role as an 'honest and informed' broker in its work with schools and partners – while also considering the staffing structure and resources required to deliver this role.
- **Revising key performance indicators (KPIs)** – the Centre's KPIs should be reviewed alongside its objectives, to emphasise the focus on impacts, capture the different elements of the Centre (including the less tangible effects of partnership working), and provide a clear measure of

progress. Potential KPIs could include penetration rates and new users; impacts on educators and pupils; the nature and take-up of service delivery; and the level, nature and impact of partnership activity. Recommendations were also provided for data collection to support the new KPIs, including a 'benchmark' survey of participation in professional development activities against which change can be measured.

- **Improving communication** – the Centre must clarify its communication with the different areas of the wider mathematics community, including tailoring its presentation of the core vision and strategic objectives for different audiences. This evaluation has shown that there is confusion about what NCETM does, for whom and how, and this must be addressed as the initiative enters its third year of operation. The effective communication of the Centre's successes and impacts is also required.
- **Extending reach and achieving impact** – a series of recommendations were provided regarding:
 - **Regional Coordinators** – including ensuring regional resourcing considers the size of the region and the nature of its professional development infrastructure, exploring opportunities for regional 'bases', and considering the professional development needs of existing staff.
 - **The Portal** – including recommendations relating to portal structure and content, including the re-design of initial pages and merging fora and communities.
 - **The Professional Development Directory (PDD)** – including improving PDD coverage to provide a comprehensive directory, introducing a common approach to information collection implemented centrally, and following a common quality assurance process.
 - **Increasing the number of NCETM regional events** – in partnership with regional influencers, and focusing on 'workshop' sessions for small groups of educators.
 - **Grant Funded Projects** - including increasing the resources for grant funded regional projects involving teachers, and suggestions for improving effectiveness such as moving towards a strategic commissioning model, encouraging joint work with Local Authority colleagues to identify opportunities and projects, and requiring applicants to consider how they will evaluate, disseminate their findings and promote sustainability.
 - **The Self-Evaluation Tool** – to exploit the potential of the tool, recommendations included promoting it as a means of initial engagement and needs identification, encouraging and facilitating its use across school and college departments on a demonstration basis,

and making explicit links between the outcome of tool use and potential NCETM and partner services.

Finally recommendations were made for the **Department for Children, Schools and Families** regarding how best it can influence others within the mathematics infrastructure to support the NCETM. These included continuing to support progress towards Chartered Mathematics Teacher designation, and exploring opportunities for establishing a 'CPD entitlement' for mathematics teachers.

1 INTRODUCTION

GHK Consulting, in collaboration with People Science and Policy Ltd, TNS Social Research and Edcon Educational Consultants Ltd were commissioned by the Department for Children, Schools and Families (DCSF) to undertake the evaluation of the National Centre for Excellence in the Teaching of Mathematics (NCETM).

The NCETM is a key component of the government's Science, Technology, Engineering and Mathematics (STEM) programme, and aims to improve the teaching of mathematics by facilitating the provision of appropriate, effective and accessible professional development activities. Both the NCETM and the STEM programme have their roots in the 'SET for Success: The Supply of People with Science, Technology, Engineering and Mathematical Skills' (known as the Roberts Review) of 2002, which identified concerns over the shortage of specialist mathematics teachers, failures in the curriculum and qualifications framework to meet learner and employer needs, and recognised the need to support mathematics teachers through continuing professional development (CPD) and other teaching resources. This is the final report of the evaluation of the Centre at the end of its second year of operation, and draws together the findings from the different study elements and the previous scoping and interim reports.

1.1 Study Aims and Objectives

The overall aim of the study was to provide an evaluation of the NCETM in terms of the processes it follows and the impacts resulting, with five specific areas being highlighted for attention. These were:

- The impact of the Centre on mathematics educators in schools and colleges;
- The impact of the Centre on pupils and students;
- The use of networks to facilitate knowledge and good practice exchange between teachers, and the role of the Centre's regional co-ordinators in developing and supporting such networks;
- The impact of the programme on the culture, expectation and uptake of continuing professional development (CPD); and
- The impact of the NCETM web portal on mathematics professional development.

In addition, the study sought to explore the extent to which the model underpinning the Centre has shown itself to be effective, accessible and transparent, or has the potential to do so in the future. In doing so it is recognised that the study took place in only the Centre's second year of

operation, which followed a series of initial challenges including a significant change in the composition of the senior management team.

The evaluation has focussed on the Centre's work with schools under the current DCSF contract. However it is recognised that interactions between school focussed activities and those with FE establishments under the Centre's contract with the QIA can interact and can be mutually supportive, at both national and regional levels.

1.2 Study Methodology

The evaluation approach comprises of four stages, as summarised below:

- **Stage 1: Scoping Stage** (September to October 2007) – featuring an initial document and data review, visits to the Regional Coordinators and interviews with senior Centre staff, and the production of a Scoping report.
- **Stage 2: First Fieldwork Stage** (October 2007 to February 2008) – featuring:
 - **The Early Experience survey** – an email survey of 6,453 individuals registering with the NCETM portal between June 2006 and October 2007, to explore their involvement with the Centre, use of and perceptions of the services it provides, and benefits and impacts resulting. Following two email reminders 1,034 responses were received, a response rate of 16%.
 - **The review of the NCETM portal** – exploring a sample of 23 discussion groups (fora, communities and hidden communities) and the resources section, to explore factors including usage, numbers of members and posts, the nature of discussions taking place and the role of the administrator.
 - **The NCETM Network Case Studies** – the first contacts with a sample of 12 NCETM-supported networks to identify their characteristics, explore the role of the Centre and identify benefits and emerging impacts. The Networks were visited again during the second fieldwork round.

This stage concluded with the production of an Interim report.

- **Stage 3: Second Fieldwork Stage** (25 February to 2 June 2008) – featuring:
 - **Visits to the Regional Coordinators** – each of the Regional Coordinators were visited again to explore their experiences, achievements and challenges and the benefits and impacts resulting.
 - **Consultations with regional stakeholders and participating teachers** – a sample of 25 regional stakeholders (including local

authority staff, Strategy consultants and others) and 30 teachers using NCETM services were interviewed by telephone, to explore their experiences of working with the Centre and the Regional Coordinators.

- **National stakeholder interviews** – representatives of a sample of 10 national stakeholder organisations with an interest in the Centre were interviewed face to face or by telephone interviews, to explore their perceptions of the Centre and experiences of working with it.
- **Network case studies** - a second round of contacts with the 12 network case studies, including interviews with network representatives and the exploration (and observation where possible) of their activities and impacts resulting.
- **Interviews with Senior NCETM staff** – a series of interviews took place with the Centre's senior management team to explore views on progress to date and future strategic direction and priorities.
- **Stage 4: Final Reporting** (W/c 9 June to 28 July 2008) – featuring the production of draft and final evaluation reports.

1.3 Report Structure

The remainder of this report is structured as follows:

- Chapter 2 describes the origin, mission and key features of the NCETM, and explores the portal and roles and activities of the regional Coordinators
- Chapter 3 explores the experiences of users of the NCETM, drawing on the findings from the Early Experience survey and interviews with participating teachers;
- Chapter 4 provides the findings from the fieldwork with a sample of 12 Network Case Studies, and the review of a sample of fora, communities and resources hosted on the NCETM portal;
- Chapter 5 reports the experiences of interactions with, and perceptions of, the Centre amongst a sample of national stakeholders; and
- Chapter 6 provides the conclusions of the study and the recommendations resulting.

The report also contains five annexes, as follows:

- Annex I – lists the national stakeholder organisations interviewed;
- Annexes II to V – lists the fora, communities, hidden communities and resources reviewed respectively.

2 THE NCETM – ORIGINS AND KEY COMPONENTS

2.1 Introduction

This Chapter provides an overview of the NCETM, describing its origins, rationale and operational model, and explores the NCETM portal and the roles and activities of the Regional Coordinators.

2.2 Origin and Rationale

The concept of a national centre to support the teaching of mathematics has its roots in the ‘SET for Success: The Supply of People with Science, Technology, Engineering and Mathematical Skills’ (known as the Roberts Review) of 2002, which identified concerns regarding the shortage of specialist mathematics teachers, failures in the curriculum and qualifications framework to meet learner and employer needs, and recognised the need to support mathematics teachers through CPD and other teaching resources.

Subsequently the Advisory Committee on Mathematics Education (ACME), which had been established to advise Government on issues such as the curriculum, assessment and the supply and training of mathematics teachers, produced its first report ‘Continuing Professional Development for Teachers of Mathematics’ in December 2002. Amongst the report’s eight recommendations were the following:

We recommend that a network of Local Mathematics Centres (LMCs) should be developed to encourage the growth of a community of teachers of mathematics across all phases and to provide a source of expert advice, resources and information. The Government should commission a feasibility study of how LMCs might function and then set up a pilot centre involving teachers, Local Education Authority staff and academics from mathematics and education departments.

We recommend that a National Academy for Teachers of Mathematics should be established to have a strategic overview of CPD at a national level and to coordinate its operation locally. The Government should commission a feasibility study to set out a range of options with costings and then seek private sponsors for funding.

This report was perhaps the genesis of the idea that was to become the NCETM.

Whilst the ACME report was being prepared, the Government announced the intention to set up an independent inquiry into Post-14 mathematics education. This inquiry was announced by the Chief Secretary to the Treasury on 23 July 2002 and was intended to provide a mathematically focused follow-up to the Roberts Review.

The inquiry was chaired by Professor Adrian Smith, with its terms of reference being to make recommendations on changes to the curriculum, qualifications and pedagogy for pupils and students aged 14 and over in schools, colleges and higher education institutions to enable them to acquire the mathematical knowledge and skills necessary to meet the requirements of employers and of Further and Higher Education.

The report of the inquiry was published in February 2004 and titled 'Making Mathematics Count'. Amongst its wide-ranging recommendations the issue of CPD for teachers of mathematics was again brought to the fore. Of particular relevance were recommendations 5.3 and 5.4, namely:

- 5.3 *The Inquiry recommends that there be long-term investment in a national infrastructure to oversee the provision of subject specific CPD and other forms of support for teachers of mathematics, tailored to the needs of teachers of mathematics, both specialist and non-specialist, including leaders in mathematics teaching.*
- 5.4 *The Inquiry recommends that the national support infrastructure for the teaching and learning of mathematics take the form of a national centre providing strategy and coordination, together with regional centres providing local support and networking.*

The Government's response to 'Making Mathematics Count' included a chapter on supporting CPD, in which the intention to establish a National Centre for Excellence in the Teaching of Mathematics was announced. In December 2004, the then Secretary of State for Education and Skills, Charles Clarke, formally announced a tendering process for the establishment of the NCETM, with funding of £15 million earmarked for the first three years of the Centre's life. On 6 October 2005, it was announced that Tribal Group plc had been the successful bidder, working in partnership the Centre for Innovation in Mathematics Teaching at the University of Plymouth. The NCETM was formally launched on 27 June 2006.

The partnership did not start smoothly and the original Director of NCETM, Professor David Burghes, and two Assistant Directors resigned in November 2006. The appointment of the current Director of NCETM, Professor Celia Hoyles, was announced on 6 June 2007. Development work continued throughout NCETM's first year, but it is important to recognise that the loss of senior managers and the time taken to replace them did affect the speed with which NCETM could start to fulfil its anticipated role. The 2007-8 Annual report describes the year 2006-7 as being used to "*build up a strong internal structure and initiate productive relationships with national and regional stakeholders across the mathematics community*". 2007-8 was identified as the year when the "*focus*" was on teachers.

The subject of this evaluation is the contract awarded by DfES (now DCSF, the Department for Children, Schools and Families). However, there are other funding streams that go through the NCETM, in particular Quality Improvement

Agency (QIA) support for post-16 Further Education. The multiple roles of NCETM and its staff are a factor in the perceptions of some stakeholders. The views of national stakeholders are reported in Chapter 5 of this report.

2.3 NCETM Mission and Key Priorities

The mission of the NCETM is “to “develop a sustainable national infrastructure for subject-specific professional development of teachers of mathematics that will enable the mathematics potential of learners to be fully realised and raise the status of the profession¹”.

The early change of leadership did not affect the overall mission of the NCETM, but inevitably new leadership will bring changes of tactics, so in considering the priorities of NCETM we have used those set out in the planning summary for 2007-8. The key priorities were set out as:

- Ensuring greater ‘reach’ of the NCETM among teachers/lecturers nationally and by region.
- Taking the lead in communicating with teachers of mathematics, subject leaders and senior managers about the range of continuing professional development opportunities that together can support teachers in putting into practice the effective teaching and learning of mathematics.
- Engaging with head teachers, principals and senior managers to promote mathematics as part of their institutional planning for improvement and influence their strategies with regard to professional development in mathematics.
- Target subject leaders and heads of department to ensure they understand the professional needs of their teams.
- Provide a direct service for teachers and senior managers through the portal which clearly sets out a framework for CPD for mathematics and brings together the existing aspects within this framework and provides further resources to support practice.
- Deliver the messages learned about gaps in professional development to key partners, and work with them to develop and disseminate programmes and professional development resources, communities etc. to fill the gaps.

It is clear from these priorities that it is not a function of NCETM to deliver CPD for teachers of mathematics. Rather it is working to stimulate demand for CPD and to ensure that other organisations have the products in place to meet this demand. The NCETM’s role can include funding the development of CPD offerings to meet specific gaps that are identified – as well as influencing professional development provision through the establishment of the ‘NCETM Standard’ proposed for the 2008/9 year.

¹ NCETM Annual Report 2007/08

The Centre also works with a range of partners and key influencers with an interest in teaching and the teaching of mathematics in particular, as well as policy makers and other bodies with an interest across the STEM agenda. Key national partners include:

- Advisory Committee on Mathematics Education;
- Association of Mathematics Education Teachers;
- Association of Teachers of Mathematics;
- General Teaching Council for England;
- Joint Mathematical Council;
- Mathematical Association;
- National Association of Mathematics Advisers;
- The National Strategies;
- Qualifications and Curriculum Authority; and the
- Training and Development Agency for Schools

2.4 Key Performance Indicators and 2007/8 Performance

The NCETM's priorities are reflected in its Key Performance Indicators (KPIs), which are listed in Table 2.1 below with definitions for each. The table also provides a summary of performance in the 2007/8 year (April 2007 to March 2008), which shows:

- The Centre achieved and exceeded the vast majority of its KPIs in 2007/8.
- Performance was below target for KPI 1 (portal availability) in Quarter 4, and increases in teachers engaging with the Centre (KPI 2) in Quarters 1 and 2 – although in both cases variation was minor (within 1% of target).
- Performance was particularly strong in terms of portal visits, and with teachers engaging with the Centre in Quarters 3 and 4 – notably as these variables best encapsulate participation and the potential for impact of all the current KPIs.

While the current KPIs have been fit for purpose during the Centre's development stages, they are less effective in capturing the benefits and impacts of the services it provides. The nature of the NCETM model, however, means that capturing its performance is difficult, as it combines an on-line presence, physical interactions and the strategic facilitation of professional development activities by the Regional Coordinators.

Other aspects of the performance to date are explored under the different components of the Centre described below.

2.5 The NCETM Model

The NCETM model has two main components, which offer a 'blended learning' approach through:

- **The NCETM Portal** – which provides a virtual presence including a repository for materials for professional development and classroom use, a means of communications between educators and others, and a source of tools to identify professional development needs and development opportunities to address them.
- **A network of Regional Coordinators** – who provide a physical presence in each English region, and whose main role is to establish links with the regional mathematics professional development infrastructure and facilitate professional development for mathematics teachers.

The Centre is an innovative approach and seeks to address many long standing barriers to educator participation in continuous professional development in mathematics. The model is underpinned by a series of principles, including:

- Not delivering 'traditional' or course based CPD, but working *with* teachers rather than doing things *to* them;
- Enabling and encouraging teachers to exchange experience and good practice on a group basis;
- Facilitating an increased involvement in professional development activities across the mathematics educator workforce; and
- Changing the culture of mathematics-specific CPD.

Table 2.1: NCETM Key Performance Indicators (KPIs)

KPI	NCETM Definition	Performance Summary 2007/2008*
KPI A - Portal availability at 97% or greater in every month excluding scheduled downtime.	A monthly figure on portal uptime derived from statistics from the IP Monitor tool.	Benchmark 97%. Exceeded each quarter with exception of Q4 (96.31%)
KPI B - A quarterly increase in the number of teachers (and trainee teachers) who have engaged in NCETM activities.	Derived from monthly portal usage and attendance at NCETM events.	Benchmarked at end of year one at 15,281. Performance Q1 99.6%, Q2 99.6%, Q3 174% and Q4 162%
KPI C - The number of schools in contact with NCETM.	Regional Coordinator reports on number of schools represented at their regional events.	No benchmark. Recorded from September 2007 only – 153 in September, Q3 587 and Q4 469
KPI D - NCETM portal viewed as key location for the identification of CPD opportunities.	Number of visits to the portal's CPD Directory, together with posts to communities and new blogs.	Benchmark 7,768 visits. Exceeded in each quarter - Q1 11,199, Q2 13,749, Q3 53,436 and Q4 29,953.
KPI E - The number of PD resources and CPD programmes developed/developing to fill 'gaps,' and disseminated with or on behalf of partners.	The cumulative number of grants operating under the NCETM small grants scheme and the number of relevant regional grants	Benchmark 49. Exceeded in each quarter – Q1 72, Q2 80, Q3 104 and Q4 124.
KPI F - Positive feedback from stakeholders - a quarterly increase in the ratio of positive to negative feedback received through the portal; evaluations of events; qualitative feedback from sample of portal and events.	From feedback at NCETM events, using a scale of Very Useful (0.75), Useful (1.5), Not Very Useful (2.25), and Not At All Useful (3).	Benchmark 1.16. Exceeded in each quarter - Q1 1.13, Q2 1.09, Q3 1.1 and Q4 1.06.
KPI G - Number of representatives from key stakeholders (eg. LAs and HEIs) actively working or partnering with NCETM in CPD development and delivery.	The cumulative number of LA and HEI stakeholders participating in grants projects	Benchmark 18. Exceeded in each quarter – Q1 24, Q2 24, Q3 29 and Q4 37.

* April 2007 to March 2008

The Centre also works with its national partners and stakeholders to raise awareness, establish collaborative relationships and provide networking opportunities. As the 2007/8 Annual Report describes, the Centre organises and participates in a range of national conferences and events around the subject of mathematics, including two NCETM national conferences attended by over 500 delegates. The Centre has developed strategies for both internal and external communications, with external communications including an annual conference, periodic national stakeholder and partner meetings, and targeted events and newsletters.

The Centre, both nationally and at the regional level, provides funding to stimulate project and networking activity through its national and regional grant programmes. These offer opportunities to bid for small amounts of funding to support projects and associated networks, which as well as involving teachers in development activities also provide case study materials to be shared via the portal. As later Chapters of this report will describe, these grants have shown themselves to be particularly effective as a means of engaging teachers and stimulating or sustaining network activities in the regions.

The remainder of this chapter explores the two main components of the NCETM in more detail, starting with the portal before describing the structure, roles and experiences of the Regional Coordinators.

2.6 The NCETM Portal

The NCETM portal is best described as ‘an online resource to support the teaching of mathematics’. Although other mathematics websites exist none offer such comprehensive coverage in terms of resources for teachers, diagnostic and communications tools, and directories of national and regional CPD provision.

The virtual presence is intended at least in part to mitigate against several common barriers to participation in mathematics professional development – including limitations on teacher time away from the classroom, the cost of professional development services in the context of limited school budgets, and variable awareness of the products and providers available. However the portal is also itself subject to a number of well recognised barriers to use – which can include limited access to IT facilities during school time, and the aversion amongst some potential users to IT-based development opportunities.

The portal has been a development priority in the early stages of the Centre, to ensure that products were available for promotion and to offer educators engaging initially. This development has continued throughout the evaluation period, and offered the following main functions at the outset:

- **Resources and case studies** – an online collection of materials for teachers to inform them about and help them with their own teaching of mathematics. The case study section provides key learning points from

the NCETM grant funded projects, disseminating practical examples for educators more widely.

- **The Mathemopedia** – an online tool which functions in a similar way to Wikipedia, and designed for sharing knowledge about mathematics.
- **Professional Development Directory (PDD)** – a directory of courses related to mathematics-CPD, at the national and more local levels.
- **Communities and forums** – on-line discussion groups which allowing users to share and discussion ideas and issues with other teachers of mathematics. Three types of group exist:
 - Fora – accessible to all portal users and split into different discussion topics upon which anyone can comment;
 - Communities – similar to the fora, but more closely focused and restricted to members only, although anyone can become a member; and
 - Hidden communities – restricted to users invited to join, not visible to anyone else, and generally narrowly focused around specific areas.
- **Blogs** – an online blogging facility for people to write and contribute to blogs about teaching mathematics.
- **Self-evaluation** – an online tool allowing teachers to evaluate their own performance and subject knowledge and help identify training and development needs.

Further development of the portal took place during the study, including the introduction of a new self-evaluation tool and the development of the Personal Learning Space (PLS), where portal users can store materials or references to return to in future.

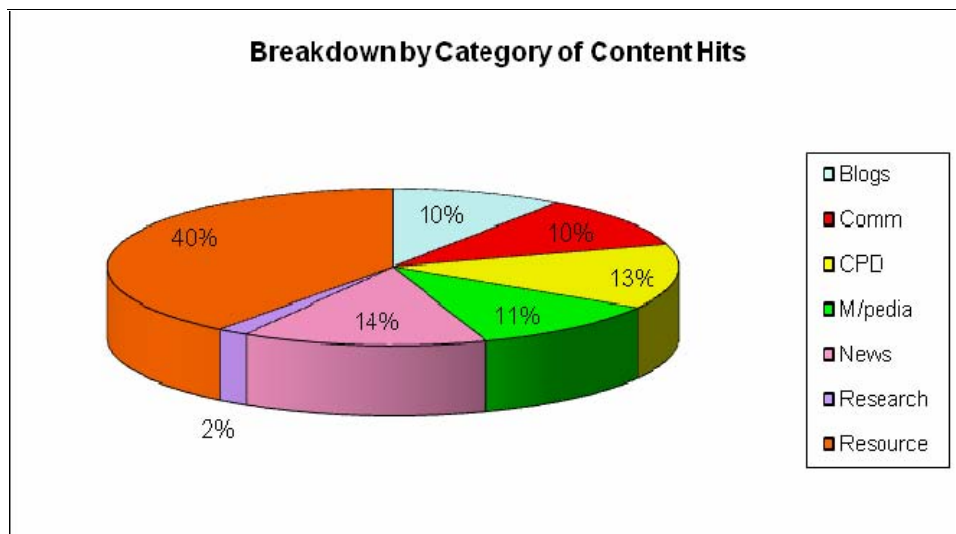
Individual educators, and others with an interest in mathematics, can register with the portal, which is strongly encouraged to allow two way communication as well as contributing to the achievement of milestones for the Centre. The number of portal registrations has grown steadily – with 13,149 individuals registering between June 2006 and May 2008, 9085 in the 2007/8 financial year – against a target of 25,000 by March 2009.

Monitoring data is produced on the number of new registrations and portal access on a monthly basis. Much of the portal can be accessed without the requirement to register with it or to log on if registered, which while allowing maximum access makes assessing the frequency, depth and breadth of portal use difficult. Consequently while the number of logins and hits can be identified, the lack of information on other user characteristics and use patterns limit the degree to which portal 'performance' can be analysed. Available data for the 2007/8 year shows that:

- The portal has received a total of 101,253 logins since June 2006.
- The number of registered users logging on to the portal has grown in parallel with new registrations – with 70,643 logins in 2007/8, an increase of 131% on the previous year, representing 7.8 logins per registered user.
- Some 1,033, or 11%, of registered users have made a contribution to the portal through posting comments, blogs etc. since June 2006 – with an average of 89 making a contribution each month.

The portal content elements received a total of 962,782 hits from users (logged in and otherwise) in 2007/8, an increase of over 200% on the previous year. The figure below shows the distribution of these hits by area, and shows that:

- The Resources section was most commonly visited, accounting for 40% of hits;
- The News area received 14% of content hits; and
- The Research area emerged as the least popular, receiving just 2% of all hits.



Source: NCETM Portal Statistics Report

Since July 2007 the use of Google Analytical has allowed usage patterns to be explored in more detail. The data produced showed that:

- The portal received a total of 274,009 visits since July 2007, 75% of which were from unique visitors – suggesting just 25% of visits to the portal are repeat visits;
- Over 1.2 million pages were viewed over this period, an average of 4.5 pages viewed per visit;
- Over half of visitors (57%) viewed just one page, while almost one in four (23%) viewed between two and five pages per visit;

- The average time spent on the portal per visit was 3 minutes and 30 seconds, with 59% viewing the portal for between 0 and 10 seconds and 11% viewing for between three and 10 minutes; and
- Of those visiting the site almost two thirds (65%) did so on one occasion only, with 21% visiting between two and eight times and 4% visiting 200 times or more.

The use of, and benefits resulting from, the portal were explored as part of the evaluation, and a review of a sample of fora and communities undertaken which features in Chapter 4.

2.7 The NCETM Regional Coordinators

2.7.1 *Staffing and Characteristics*

Each region is intended to have one full time equivalent RC post for schools funded under the DCSF contract, although they can also call upon a pool of 'NCETM associates', some of whom have provided valuable support in times of transition as well as assisting with local implementation.

The RCs for schools are engaged under a variety of contractual arrangements. The majority are employed by Tribal, although other arrangements including secondments from local authorities and individuals employed by existing regional mathematics centres, which have contracts with Tribal. The current RCs include individuals recruited by the former Director at the start of the Centre and others recruited subsequently, with the full complement of RCs being in place by January 2007.

Inevitably changes in the make-up of the RC workforce took place during the evaluation period, with three RCs working on the DCSF contract leaving their posts. These had been, or were in the process of being, replaced at the time of the second regional consultations. Recruitment experiences suggest that finding individuals with the appropriate mix of skills, experience and existing regional contacts can be challenging. The change in RCs also emphasised the importance of retaining 'organisational memory', and in particular maintaining relationships with regional influencers, to ensure progress made is not lost.

Each of the previous and current DCSF RCs have considerable experience of teaching mathematics, many to Head of Subject level and above, including former advanced skills teachers. Many had also being involved in a range of mathematics initiatives and strategy development, including being Local Authority Maths Advisors and National Strategy consultants, a former Honorary Secretary of ATM, and a QCA employee.

Most, but not all, have specific experience of working in their regions – at least one had to familiarise themselves with their region on appointment. Those with previous local authority or wider regional experience found establishing relationships with stakeholders, partners and schools easier. Well recognised,

and respected, individuals with previous long term involvements in mathematics education in their regions understandably appeared able to make regional and local links more easily. However, even here individuals still faced challenges in applying their regional experience at the local authority level, to enable engagement with schools on a direct as well as an indirect basis.

2.7.2 *The Role of the Regional Coordinators*

The RCs represent the ‘face’ of the Centre and provide a physical presence for the NCETM in the regions. As such they must fulfil a range of roles – initially working to raise awareness of the Centre and its services and engaging with teachers, schools and representatives of the mathematics education infrastructure. This infrastructure is a broad church including local authority staff, individual and regional National Strategy lead consultants, existing networks and other groups. As the RCs have become better known, and following direction from the NCETM management team, they have sought to target individuals and organisations with the greatest potential to ‘influence’ – to maximise awareness and promote wider engagement. This has emphasised the importance of working with local authority staff and consultants but also with ‘influential’ teachers – including Headteachers, subject leads, and representatives of local and regional teacher networks.

Raising Awareness and Initial Engagement

The awareness and initial engagement function has proved to be a considerable task, and continues to occupy much RC time and effort to extend the reach of the Centre. The RCs reported starting to achieve successes in this area – even between the visits at the start and towards the end of the evaluation. Most reported successes in raising awareness of themselves with their respective regional infrastructures and at the local authority level – with the smaller number of contacts in comparison to the numbers of schools and teachers making this task more manageable.

The RCs were less able to quantify the proportion of teachers and schools who were aware of them and the Centre, outside of those with whom they had worked directly. While they considered that levels of awareness amongst teachers were rising, several considered that they still remained low and there was much work still to be done. As well as variable awareness, several RCs described how teachers were not always clear on the Centre’s aims, activities and target groups. Several described initial perceptions that the Centre was a provider of traditional ‘CPD courses’, focused solely on the post-16 sector, or as working mainly with secondary schools with less of an offer for the primary sector. This perception was considered to be changing through more effective communications - and the development of products for primary schools and teachers. In other cases teachers reportedly described the NCETM as a website, and could struggle to understand the role of the RCs as their perceptions of professional development were based on traditional ‘course’ models.

The RCs described following a range of approaches to introduce themselves and facilitate constructive engagement. Different combinations of approaches to raise awareness were described, including:

- **Attending regional and more local meetings** – with the RCs describing regularly attending local authority and local network meetings, as well as specific groups such as new teachers and those undergoing teacher training. Many described initially having to “*fight tooth and nail*” to secure a place at more strategic meetings, but that over time they had secured a permanent place and were now invited on a regular basis. Others found engagement easier – as mentioned previously those who has previously held strategic roles within their regions experienced greatest initial success.
- **Information sharing meetings with teachers** – attendance and presentations at existing or ad hoc teacher groups to explain the NCETM and its opportunities and benefits had been found to be effective, including twilight events to enable attendance. Meetings also commonly featured an introduction to the portal, and an opportunity to register with it or leave details for later registration by the RCs. In some cases the RCs would lead short mathematical exercises as part of their meetings, to set a practical context and emphasise their focus. Associates were in some cases used to lead these meetings to extend regional coverage. Although the numbers attending such events were often small, they were considered an effective means of communicating the role of the Centre and establishing personal relationships.
- **Producing regional newsletters** – these were produced on a termly or half termly basis to provide updates on activities and events in the regions. They were considered to have mixed results, with several coordinators describing planning more frequent or monthly bulletins to capture activities over a shorter time period as “*things happen on a more frequent basis than termly*”. However, all recognised the danger of overloading teachers with information, and the risk that materials distributed (in either hard copy or electronic format) would not be read.
- **Visits to Higher Education Institutions** – more recently, many RCs described visiting their regional Higher Education Institutions with a teacher training or wider educational remit to meet with tutors and students to directly promote the Centre. Newly qualified or teachers in training were widely considered to be a key target market for the Centre, where early awareness raising could lead to sustained engagement throughout their careers.
- **Direct mailshots to, and other ‘cold contacts’ with, schools** – finally, many of the RCs described undertaking mailshots or large scale telephone contact exercises with schools. While the mailshots allowed information on the Centre to be provided, their effectiveness was not clear – although many of the respondents to the educator survey (see Chapter 3) described first hearing of the Centre by this route. The RCs

considered that mass contact approaches had limited effects in terms of return contacts or awareness levels, unless they were paralleled by direct teacher contact.

An important point, raised in regions where there had been a change in RCs over the evaluation period, was the importance of maintaining momentum once contacts were established and of retaining corporate memory. In at least one case links and working relationships had been set back by a change of staff, and efforts were ongoing to re-establish the position reached previously. The development of a more formalised approach to recording regional contacts has recently been introduced, which was considered to be helpful. Nevertheless, there was felt to be no substitute for more direct handover procedures and face to face introductions to key partners.

NCETM Events

The NCETM supports a range of events at the national and regional levels to raise awareness of, and promote engagement with, their products and services. Monitoring data shows that over 4,000 individuals attended regional events organised by the NCETM under the DCSF and QIA contracts between June 2007 and May 2008, with positive feedback from attendees being reported through NCETM monitoring and comments received during the evaluation study. These ranged from regional conferences to smaller group meetings, and were attended by representatives of 1,643 schools. Over the same period over 8,100 individuals attended regional events organised by other organisations, where the RCs were considered to have made 'significant contributions'.

Regional events are a useful way of spreading the influence of the NCETM and promoting subsequent engagement. As the steps to raise awareness suggest, they have taken a variety of forms – from regional conferences delivered jointly with partners to more informal sessions with small groups of teachers.

Regional Grants, Networks and Projects

The RCs are also responsible for regional grant funded projects, facilitating their delivery as appropriate and supporting associated network activities between participating schools and colleges. The regional grant funded projects, and the networks springing from them, have proved to be an effective means of engaging individual, and groups of, teachers, although as Chapter 4 describes their direct influence has in some cases been limited to small numbers of teachers.

2.7.3 *Regional Coordinator Achievements*

It is clear that the breadth of the RC role is considerable, and that much effort has been expended in establishing a regional presence for the centre, raising awareness and communicating the nature and range of the NCETM offer. The RCs considered that their increasing recognition as important partners with

much to offer local authority staff and other regional influencers was amongst their key achievements to date.

The development of a valued presence was confirmed through consultations with regional stakeholders as part of the evaluation. Although based on a small sample of 25 local authority and national strategy staff, STEMNET representatives, Universities and existing mathematics education networks across the nine regions, the RCs were regarded positively. They were often described as “*enthusiastic*”, “*helpful*” and “*committed*”, with their roles (and the role of the NCETM) being considered to complement other regional provision well. While some gaps in individuals’ knowledge were described, these were considered to be inevitable given the breadth of their task and the range of local knowledge required. The regional stakeholders also considered that the RCs and the Centre needed to continue its profiling raising efforts, particularly amongst teachers (where efforts should now be concentrated) and ‘intermediaries’, with face to face contacts being the most effective means of doing so.

Regional Partnerships and Collaborative Working

The conversion of initial awareness raising and engagement efforts into active partnership and collaborative activities in the regions was a second area of success reported by the RCs. A range of such activities were described, building on shared understandings and continuing communication, and included:

- Collaborative events and conferences – for example with local authorities, STEM partners, National Strategy consultants and regional mathematics centres.
- The development and delivery of joint professional development activities – such as working with Science Learning Centre staff to develop and deliver combined ‘maths and science’ professional development for teachers, including model approaches to use in the classroom.
- Sharing approaches and materials produced by the Centre with other providers and influencers – for example in two regions where National Strategy teams had been introduced to NCETM resources and now used and referred to them in their own work.
- Participation in advisory groups at both regional and local levels – although the RC’s own attempts to develop advisory groups had met with limited success.

Other examples included preparing and delivering collaborative funding bids, and contributing to the delivery of other partners’ programmes and services. Joint bidding successes included working with the TDA in one region to secure Regional Development Agency funding, to help teacher training providers to identify and support individuals to become mathematics champions.

Impacts

Currently there is no systematic approach to identifying and collecting data on the impacts of the NCETM on schools and teachers. However, each RC was able to provide at least anecdotal examples of the impacts of their activity, and the Centre more widely, on teachers in their regions. For the most part, these related to activities supported under the regional grant programmes, where the requirement to provide progress and final reports to populate the portal meant that at least qualitative self-assessments of impact and effect were available. The RCs were able to provide additional anecdotal examples of their impact on pupils and schools they continued to liaise with, but these were restricted due mainly to limited follow-up and the time that could be needed for such impacts to be realised. The RCs recognised that, to date, the Centre had been less effective at identifying its impacts, concentrating correctly in their view on establishing the structure and services by which impact could be achieved. As work with teachers, either directly or through influencing the activities of third parties, becomes more of a priority they recognised that more needed to be done in this regard. The RCs unanimously considered that there was “*a good story to tell which remained untold*”, and that being able to evidence their positive effects would be a key element in extending engagement.

The regional stakeholders considered that the impacts of the RCs and the Centre had been limited to date, due to a combination of limited information and the small numbers of teachers reached. Face to face interactions, alongside NCETM grant funded projects and continued support for networks, were felt to be the most likely means by which reach could be extended and further and more visible impact achieved.

2.7.4 *Future Direction*

RCs held a common view of the immediate priorities for their work within the regions, namely continuing to establish links with influencers and increasingly focusing on establishing links and working more directly with schools. While each described increasing their knowledge of schools within their region, supported by the new contact recording process, the majority felt that they were not yet able to undertake targeted activities beyond the schools they already knew well.

Given their numbers, the RCs recognised that continuing to work through others would be key – although this posed challenges. Potential partners with a delivery role were not always obvious – National Strategy colleagues while well placed to work with schools were following their organisational agenda, and while the Centre’s services could support their objectives the remit of the strategies was broader. Concerns were raised by several RCs that in many authorities mathematics advisor posts were becoming vacant and not being replaced, reducing the range of potential ‘delivery partners’ available to them.

Views on whether the RCs, and the Centre itself, should have a more direct role in delivery were mixed. Some RCs felt that, through their work with

projects and networks, and joint activities with other partners, they were already having a delivery role – albeit to a limited extent. The majority considered that including direct delivery in remit of the RCs would not be possible within the Centre’s resources – but more importantly could risk changing the perceived ‘neutral broker’ position of the Centre, potentially lead to concerns over competition, and risk changing the nature of the regional relationships which had been developed.

3 EDUCATOR EXPERIENCES

3.1 Introduction

This Chapter explores the educators' experiences of interactions with the NCETM through use of the portal and participation in regional activities, such as events and other activities.

Educator experiences were captured in the evaluation in three ways:

- Through the Early Experience Survey – which provided a quantitative view of interactions based on a survey of over 6,000 individuals registered with the NCETM portal at the time of survey;
- Through qualitative interviews with teachers – a sample of 30 teachers were interviewed either by recommendation from the RC, or follow-up contacts with individuals responding to the survey; and
- Through the Network case studies – featuring the review of a sample of 12 networks supported by the NCETM, the results of which are provided as Chapter 4.

3.2 The Early Experience Survey

The Early Experience Survey provided a quantitative assessment of user interactions with the NCETM in its virtual and physical forms, and the benefits resulting from them. The survey targeted 6,453 individuals registering with the portal between June 2006 and October 2007, and comprised an online survey which explored their:

- Involvement with, and participation in, NCETM activities to date;
- Awareness and usage of NCETM functions;
- Strengths and weaknesses of the web-portal; and
- Perceived impacts of NCETM.

A total of 1,034 responses were received to the survey, representing a response rate of 16%. These included responses from individual teachers/tutors in pre-school and primary, secondary, FE, HE and 'other'² locations (75%, or 776 responses), as well as others with non-teaching roles such as Local Authority staff and other interest groups (25%, or 258 responses). The majority of responses from teaching staff were from the secondary (39.7%) and FE (19.1%) sectors, with staff from pre-school/primary, HE and 'other' settings staff accounting for 8.1%, 3.8% and 4.4% of responses respectively. The distribution of responses meant that in some cases base

² Including Pupil Referral Units, independent schools, etc

sizes were too small to provide reliable data, which are highlighted as appropriate.

Both teaching and non-teaching staff described first hearing of the NCETM through a variety of routes, including direct marketing and the NCETM website, Local Authority staff and National Strategy Consultants and from other colleagues/contacts.

Responses from the teaching staff were analysed in detail, and are presented in the full report of the survey presented as a separate document. It is important to recognise that the respondents, by virtue of their registration with the portal, may be atypical of the wider educator population in terms of their interest in and commitment to their continuing professional development. This was reflected in the time reportedly spent on CPD activities, which although no baseline for mathematics educators currently exists exceeded that recorded for science educators in a similar recent study³.

The remainder of this section summarises the key findings of the survey report, exploring: respondents' use of the NCETM portal; participation in NCETM events; perceptions of the benefits and impacts resulting for them and their schools; and their perceptions of the strengths and weaknesses of the Centre.

3.2.1 Use of the NCETM Portal

The survey respondents provided useful information on the frequency, focus and experience of using the NCETM portal, and the benefits and impacts resulting from it. Table 3.1 shows the **frequency of portal use** amongst respondents in different settings, with the most common pattern of use (reported by 46% of respondents) being between one and three times a month. While 11% reported using the portal only once, it is not clear whether these were individuals recently registering and so having less time to use the facilities the portal offers.

³ Baseline Survey for the Evaluation of the National Network of Science Learning Centres, TNS/GHK Consortium, December 2006

	All	Pre-school/Primary	Secondary	FE	HE	Other
Base: all teachers and tutors	776	84*	410	198	39*	45*
Weekly or more	8%	5%	9%	4%	21%	11%
2 or 3 times a month	24%	17%	23%	27%	26%	33%
Once a month	22%	25%	21%	26%	21%	7%
Every 2 or 3 months	18%	17%	16%	22%	15%	29%
2 or 3 times a year	8%	6%	10%	7%	8%	7%
Less often	8%	11%	9%	6%	10%	4%
Used only once	11%	20%	12%	9%	-	9%

* Indicates that the base size is too small to provide reliable data

Variations in the frequency of portal use were apparent between educators in different settings, with those in HE appearing to use the portal most frequently and those in pre-school and primary settings least (although in both cases the small numbers of respondents should be considered).

Respondents most frequently described using the portal to support their own personal development and teaching needs. Others referred to using the portal primarily to collect materials and information to disseminate to their colleagues – where respondents tended to be more senior teachers with staff development remits in the pre-school/primary and secondary settings, the target market for the Centre.

Table 3.2 shows the **use of different portal functions** by the educators responding to the survey, with the resources and case studies being most commonly reported followed by the fora and communities and the mathemapedia. Use of the blogs and self-evaluation functions were least commonly reported, although it is important to note that at the time of survey the self-evaluation element was in the process of being upgraded.

	Resources/Case Studies	Fora and Comms	Mathemapedia	PDD	Blogs	Self-Evaluation
Yes – ever used	66%	34%	34%	31%	19%	13%
No – never used	34%	66%	66%	69%	81%	88%

Base: All teachers, trainers and tutors (n=776)

Differences also emerged to the use of different portal functions by educator setting and other variables, including:

- The **resources and case studies** were most commonly used by FE respondents, with use appearing to be linked to attendance at NCETM events.
- The **communities and fora** were most likely to be used by teachers in the secondary sector - although over half used them to read content rather than contribute, with the likelihood of contribution being related to the frequency of portal use.
- Use of the **mathemapedia** was most commonly reported amongst the HE and 'other' teacher settings, with access being linked to the frequency of portal use and use by educators using the portal to disseminate learning to others.
- The **Professional Development Directory (PDD)** was also most commonly used by the HE and 'other' teacher groups.
- Secondary teachers were the most likely to use the **blogs**, where length of teaching experience and previous attendance at an NCETM event appeared to increase the likelihood of use.

The vast majority of educators accessing the different portal functions **rated them positively**, with between 80 and 90% rating them as useful with the exception of the PDD, where just over three quarters (77%) rated it as useful. Indeed half of those accessing materials from the resources and case studies section reported making use of them in the classroom, with 14% claiming that they had changed their teaching practice as a result. In addition, a quarter of those using the PDD described either booking or participating in professional development activities sourced from it.

Finally, almost two thirds (64%) of the educators considered that the portal was easy to use, although this was also cited as an area for potential improvement with specific reference being made to providing additional guidance and improving search capabilities.

3.2.2 NCETM Events

As well as accessing the NCETM portal, over one in three (38%) of the educators had also attended an NCETM event or meeting. As Table 3.3 shows, FE, HE and 'other' teachers were most likely to have attended, with pre-school/primary and secondary educators being the least likely.

	All	Pre-school/Prim	Secondary	FE	HE	Other
Base: All teachers, trainers and tutors	776	84*	410	198	39*	45*
Yes	38%	15%	33%	56%	51%	38%
No	56%	82%	62%	33%	46%	60%
Don't know	6%	2%	5%	11%	3%	2%

* Indicates that the base size is too small to provide reliable data

For the most part, those attending NCETM events did so to exchange ideas and to learn from other mathematics teachers, with fewer doing so as part of programmed CPD activities agreed with their line managers. Attendance at events was linked to length of teaching experience but also to school size – with teachers from the larger schools being more likely to attend.

The majority of individuals attending NCETM events considered that they had benefited from them, either by identifying and using new ideas or classroom techniques (76%), or whose teaching methods had changed as a result of attendance (58%). In both cases educators in the FE sector were more likely to experience these benefits, and those in pre-primary settings least. Irrespective of the benefits received, the vast majority of respondents (93%) stated they would attend other events in future.

3.2.3 Benefits and Impacts

The NCETM was considered by the majority of educators to offer a range of positive benefits to the educators engaging with it, including helping keep up to date with teaching methods, providing new teaching ideas and encouraging creativity in mathematics teaching. Fewer considered that the Centre had helped them identify training and professional development provision (45%), or to evaluate their performance (31%) - although as described earlier the survey took place prior to the introduction of the current self-evaluation tool - and just under one third (31%) felt that the Centre had supported them in the day-to-day teaching of mathematics.

The opportunity to share information on teaching practice and experiences with colleagues through meetings, events and online, alongside the support offered, were cited as particular benefits, with comments including:

“[The NCETM] offers a community whereby ideas/opinions can be shared, and also a potential support network” - primary teacher

“[The Centre] provides a focus for people from primary, secondary, GCSE, Key Skills, Basic Skills numeracy, FE, prisons, work-based learning backgrounds to talk freely and collaborate” - teacher in FE

‘Support and motivation are two things that the NCETM provide, both with their representatives and through their material’ - secondary teacher

‘NCETM seems to have been set up to provide a good level of support. Due to time constraints and a changing role, I haven't yet made as much use of it as I think I will. It certainly offers information that can support CPD for those teachers who have time to access it’ – secondary teacher

The majority of educators considered that their interactions with the Centre had already, or were expected to, result in impacts for themselves, their schools and their pupils they teach. Table 3.4 shows the extent to which **‘personal’ impacts** had been realised on their knowledge of teaching methods, motivation, confidence and mathematics content knowledge.

Table 3.4: NCETM Impacts on Educators				
	A great deal of impact	Some impact	No impact yet, but some expected	No impact
Knowledge of teaching methods	7%	39%	32%	21%
Educator motivation	10%	31%	24%	35%
Confidence in teaching mathematics	4%	28%	25%	43%
Mathematics content knowledge	2%	24%	28%	46%

Base: All teachers, trainers and tutors using any portal function or attended an event (686)

While the majority across each area either reported or expected impacts to be realised, impact on knowledge of teaching methods was the most frequently reported, followed by motivation in their role. Teachers in the FE setting were the most likely to report personal impacts – for example 65% reported the NCETM had had at ‘great deal’ or ‘some’ impact on their knowledge of teaching methods, compared to 46% of all educators. Across all settings educators were most likely to report ‘some’ rather than ‘a great deal’ of impact – and fewer (but still more than half) reported or expected impacts on their teaching confidence and mathematics content knowledge.

The educators most commonly referred to the provision of materials and resources for use in the classroom as the main route to impact, for example:

“[NCETM has] given me access to a wealth of ideas and resources to improve maths learning and teaching” - secondary teacher

“Lots of resources and ideas that I have been able to share – some of them with people outside the maths department. Also the chance to discuss ideas with others” - teacher in FE

“Access to a wide range of resources [...] whilst still teaching full time” - secondary teacher.

“[The Centre] provided some excellent resource materials and allowed a different approach to the teaching of maths” - teacher in FE.

Impacts were also reported on **pupils and students, and on other colleagues** at school or college. As Table 3.5 illustrates, these were reported slightly less frequently than for the ‘personal’ impacts, and appeared more positive for students than for educators’ colleagues.

	A great deal of impact	Some impact	No impact yet but some expected	No impact
Pupils' / students' learning and interest	4%	37%	32%	27%
Colleagues in school / college	3%	28%	35%	34%

Base: All teachers, trainers and tutors using any function of the portal or attended an event (686)

Educators in FE were again the most likely to report impacts on pupils learning and interest (56% compared to 41% in all settings) and on other school/college staff (42% compared to 31% in all settings).

Impacts on **whole school activities and CPD cultures** were mentioned less frequently than those on individuals, with few reporting a ‘great deal’ of impact and many expecting no impact to result, as Table 3.6 illustrates.

	A great deal of impact	Some impact	No impact yet but some expected	No impact
Supporting whole school / college objectives	2%	21%	34%	43%
The culture of CPD for mathematics teachers	3%	19%	36%	42%
Supporting school / college development plans	2%	19%	35%	44%

Base: All teachers, trainers and tutors using any function of the portal or attended an event (686)

As would be expected, educators who reported collecting portal materials to disseminate to others, rather than solely personal use, were more likely to report 'establishment' impacts as well as on their colleagues. As one described:

'From my point of view it has improved my teaching, and as a Department we have worked together to incorporate new approaches in our classroom and reflected on how everything went' - secondary teacher.

Overall the nature and frequency of impacts achieved and expected is encouraging, particularly given the relative youth of the NCETM, the fact that 'establishment' impacts take time to be realised, and that the respondents were potentially atypical in terms of exposure to professional development activities and so represented a 'sophisticated' client group.

3.2.4 Areas for Improvement

The educators were overwhelmingly positive about the involvement with the Centre, with the vast majority stating that they would, or had, recommended the NCETM to other colleagues. A small number suggested potential areas for improvement, referring in particular to:

- **The portal** – in terms of improving usability, providing guidance for users and making searching for information easier:

'Portal is extremely slow in operation, content is often not what is expected. A virtual tour for new users; splitting content according to the level being taught could help' - teacher in FE

'I think the portal could be more user friendly. It is difficult to find things' - secondary teacher

'This portal is a user's nightmare with too many windows. Teachers do not have enough time to spend dilly dallying through your website' - secondary teacher

- **Events** – with more local or regional events being called for, and for existing events to be publicised more widely:

'A circulated list of CPD events circulated in the summer term in preparation for Autumn would help to identify time out of school in plenty of time to be able to arrange cover [...] get permission to attend and to plan personal CPD' - secondary teacher

'A short email with events listed which would be quick to read and pass on' - teacher in FE, using portal two or three times a year

'Events should be made more local' - primary teacher

'Have more regional events that are in an immediate locality and at twilight times so a whole day of teaching is not lost. I have noticed that the East of England Region does this but it does not happen in other regions. There must be large towns or cities which would benefit from twilight or after school maths specific training, but not at Key Stage 3 or 4, but for those working with Key stage 5 and in colleges' - teacher in FE.

3.3 User Experiences – Qualitative Interviews

To provide a more qualitative insight into user experiences of the NCETM, and the resultant benefits and impacts, a sample of educators was developed based on recommendations from the Regional Coordinators and participants from the Early Experience survey (in a ratio of two to three respectively). A total of 30 educators were interviewed on a qualitative basis, spread across the nine regions and distributed between different settings and roles as follows:

- Pre-school/primary – two Headteachers, five Deputy Headteachers (with lead responsibilities for mathematics) and three teachers (incl. subject leads)
- Secondary – eight Heads of Mathematics and six teachers (incl. ASTs)
- FE – one Head of Mathematics and four tutors, all in sixth form college settings

Although the size of the sample and its means of development meant that any findings were not representative of the wider educator population, they provided useful illustrations of the different interactions and accompanying perceptions. The sample was also directed towards individuals whose involvement with the Centre was considered to have been 'substantial', and as such focused where possible on more senior staff and those with (formal and informal) responsibilities for mathematics professional development within their organisations. Further investigation also identified that two individuals were 'associates' of the Centre – one of whom had acted in this capacity and the other who was 'signed up' but had not yet undertaken any commissioned activity.

While the educators came from a variety of settings and regions, few differences were identified in their experiences beyond what would be expected from the context of their setting. Many reported being involved in project-based activities, presumably funded through the NCETM's national or regional grant programmes - although for some this appeared to be where their involvement had ended, and not all were equally aware of the wider range of activities and aspects of the NCETM.

3.3.1 Awareness and Engagement

As with the survey respondents, the educators described first becoming aware of the NCETM through a variety of routes. Some described being aware of the Centre from its inception, although most described becoming aware of it through different routes. These included direct contacts with their Regional Coordinator (who in many cases was known to them previously), via colleagues and others at the local and regional level, via conferences and other events, through the internet and through direct and more broadly targeted mailshots.

The Regional Coordinators were generally well known to the educators interviewed, well thought of and considered to be proactive in approach. Descriptions included being:

“very easy to get on with and relaxed very positive and supportive” – secondary teacher

“[The RC] is brilliant, {he} is inspiring. As soon as I met him I wanted to work with him as he is so enthusiastic” – primary deputy head

In many cases the Coordinators had been known to the educators for many years – either through local links but more often when the Coordinators had held Local Authority or region-wide remits in their previous posts. Not all considered their Coordinators knowledge of the region to be encyclopaedic, particularly in terms of local providers and key players, but the challenges faced in terms of breadth of coverage were widely acknowledged.

However, awareness of the NCETM was considered to be limited amongst educators not having direct contact with their Coordinators, and several described how the Centre was yet to become a “*common currency*” amongst mathematics teachers.

In some cases the participating educators themselves were not uniformly clear on the range of activities and remit of the NCETM. Some felt that the Centre “*is about providing CPD for teachers of maths*”, others to provide funding for regional projects and other activities. These views were expressed mainly where individuals’ engagement with the Regional Coordinators had been limited, and were often accompanied by limited knowledge of other NCETM services, notably the portal. For the most part, however, those engaging directly with the Regional Coordinators understood the Centre’s facilitative role and position, and were aware of the portal even if their use of it was variable.

3.3.2 Use of NCETM Services

Involvement with NCETM services for the majority of the educators interviewed was initiated by direct contact with their Regional Coordinator, attendance at a local or regional event, or leading or participating in an NCETM grant funded project.

The NCETM Portal

While the majority (but not all) of the educators were aware of the portal, use varied and followed the pattern reported in the quantitative survey – namely the resources section being used most, with use of fora and communities being mentioned by some of those involved in funded projects.

The resources section was widely considered “*a helpful first place to go for resources or questions*”, although use was often described as “*occasional*” and commonly just once or twice a term. Others described being “*vaguely aware*” of the portal, had perhaps visited once to register or after being registered, and not returned. One individual spoke for many when asked how often he visited the portal “*Probably not very often, but that is me and websites it was useful at the start of our project to look at others*”. Available time also emerged as a barrier to use, although access to IT equipment during school time was also raised, alongside the perception that “*using the internet during the day means people think you are skiving*”.

Use of the portal during the implementation of grant funded projects was often reported, although this did not always lead to continued use and further activity commonly focussed on viewing communities rather than contributing to discussions and exchanges. One educator described how “*the only schools I know that use the portal are those involved in our project and community*” – and emphasised that more effort was needed to encourage use once project activities end.

A minority of educators did, however, describe using the portal more frequently or on an increasing basis. Most commonly, but not exclusively, this followed an introduction as part of a funded project, which had led to wider and more frequent use. As one educator explained after engaging with a portal community for a teacher collaboration project “*I am using it more and more. You need to evolve into it, it takes a while to see how it fits. It is not just resources but it is thinking about what you do.*” This individual accessed the portal between two and three times a week, with ‘favourite’ areas including resources, the mathemapedia, fora and communities and ‘regional news’ areas.

The most frequent user was the deputy head of a primary school, who described using the portal on a daily basis. Most commonly accessing the forum and communities of which he is a member, he identifies and disseminates useful information for his colleagues – “*I use it to post and to read what others have said. I lurk around the open forums, I have posted questions and the responses have been useful – although I haven’t had many back, the answers have been useful*”. He makes use of all the portal features with the exception of the PDD, and accesses each on an “*at least monthly*” basis, and has acted as an ambassador for the portal in his school. This resulted in further registrations and the use of the new self-evaluation tool, which was found to be very useful at looking at staff confidence issues.

NCETM Events

Most of the educators interviewed described attending one or more NCETM events, ranging from twilight introductory sessions to attending and presenting at regional or national conferences. Those giving presentations at events commonly reported being invited to present on project activities they were involved in, although one described being the primary representative on the regional advisory group.

Events emerged as being an effective way of being introduced to the NCETM and establishing links with the Regional Coordinators. While attendance at national events had been enjoyable for the six educators attending, the overall view was that local events were preferred as they were more targeted and so represented a better use of their time.

3.3.3 NCETM Impacts

The vast majority of the educators considered that their interactions with the NCETM had led, or would lead to, benefits and positive impacts for themselves, their students or their organisations more broadly – although in most cases these effects had not been quantified and were reported on an anecdotal basis.

In terms of impacts on the **educators themselves**, improved knowledge of teaching methods was most commonly reported, followed by improved confidence and motivation. Involvement in NCETM-funded projects and associated network activities, and the use of portal resources, were the most common sources of personal impacts – the former being seen as having longer term impacts on the way teachers taught while the former could be helpful more immediately. More specific vehicles for impact included experience of collaborative working and the exchange of practice, and opportunities to participate in observational approaches to professional development – which in some cases were considered to have changed internal “*cultures and beliefs*” about effective professional development models.

Positive views and expectations were also expressed regarding the impact of the NCETM on **pupils and students**, through change in classroom practice. While several educators reported waiting for results to identify any change in expected learning and attainment trajectories, no hard evidence was presented to confirm impacts in this area. However providing students with “*more ways to think about maths*” and presenting topics in what was considered a more exciting and engaging manner was hoped to translate into improved performance.

Often the main NCETM impact was through the provision of funding to allow project activities to take place – in others the effect was broader, where the Regional Coordinators both instigated and provided support to the project implementation process. Different levels of support were provided by the Coordinators, although in all cases the level of contact was considered

appropriate, often being more intensive at the start but becoming more 'hands off' during implementation. Importantly, the majority felt they could call on their RC for support if this was necessary.

Illustrative examples of the impact reported by the educators interviewed are provided below.

Examples of NCETM Impact

Example 1

One Head of Department in a secondary school described how his involvement in a grant funded project had had a range of impacts. The project was based around observational approach, where a group of teachers came together to observe and comment upon each other's practice. For a very small sum of money the project was considered to have had wide ranging impacts and led to a change of culture around professional development, which would taken time to achieve otherwise.

Changes in teaching practice were reported as a result of the observational work, and the individual's leadership capability through insights into the needs of new teachers as a result of the process. The collaborative nature of the intervention had led to other teachers in the school reporting "*I used to teach this way, now I do it better*" – and while actual changes may have been limited, teachers are more prepared to consider new things and this change of ethos makes them well placed for further positive effects over time.

Example 2

A Head of Department in a secondary school described how his involvement in a local network had had clear impacts. A group of teachers worked together with the support of their local authority to develop "*standards unit type materials*" for aspects of mathematics. Involvement with the network has made this teacher "*think about*" the way he teaches the topic. "*It makes you unpick it and make it meaningful for students*". He believes that this has added to pupils experiences.

CPD is important within this school, which performs well in mathematics, as well as internal work, most members of staff also "*get out*" within the year. Despite this and the positive network experiences, the portal has not become a major factor in this school, indeed the teacher said that he did not really use it himself. This teacher said that access to the internet is not a problem in this school, and should not be in others and that teachers should use their time to save time in the long run, but are often driven by short-term pressures. "*I should be using it but ...*"

Example 3

A Head Teacher in a nursery school described how the school had been able to work with their Regional Co-ordinator to develop new ways to introduce mathematical ideas to very young children, including bringing in an artist to build an installation that could provide an interactive medium for numerical work. In this type of school, the Head Teacher Maths believed that "*maths is core; you don't necessarily take it out and teach it, it happens all the time*".

Watching the artist work with children had helped teachers to reflect on their own practice and the way that they worked. The understanding that the children develop of different concepts is assessed by observation, which has proved to be a powerful way of understanding the impact of different ways of working. Impact is critical "*there is no point in doing anything if it doesn't impact on practices*".

The Head Teacher is a maths co-ordinator so is “*in and out of the portal*” quite a bit, but suggested that others use it more occasionally. All the staff have done the early years self-assessment module. The tool is easy to use but it is easy to “*cheat*”, so the participation of the school’s maths co-ordinator was required to spot individual weaknesses so that plans could be developed to help individuals.

3.3.4 Future Role for NCETM

The educators interviewed all considered that there was a strong case for, and potential for significant future benefits and impacts from, the continuation and expansion of the Centre’s activities. For these potential benefits to be realised, they considered that:

- Increased interactions were needed ‘on the ground’, with RCs increasingly interacting with teachers around topics and agendas where they could add most value. A more visibly proactive approach was felt to be required.
- These interactions should be on a face-to-face basis, rather than being reliant on the portal – which although useful was not the same as direct contact, and was widely expected to be less effective in engaging schools with limited track records of external professional development.
- Small group working on professional development, although new for some, was felt to have worked effectively amongst those participating such activities. Other events could also play a role, although large scale ‘conferences’ were considered less effective, and less likely to be attended than smaller ‘workshop’ sessions.

4 NCETM NETWORKS AND PORTAL FORA AND COMMUNITIES

4.1 Introduction

The previous Chapter described the experiences of teachers' interactions with the NCETM. Here attentions focus on two specific areas of NCETM activity – local/regional networks supported by the NCETM, and the fora, communities and hidden communities hosted on the NCETM portal.

As key, and inter-linked, components of the NCETM model, the nature, use and effectiveness of a sample of NCETM-supported regional networks and fora and communities were investigated, through the Network Case Studies and Review of Fora and Communities respectively.

4.2 NCETM Network Case Studies

Much of the NCETM's activity at the local and regional levels comprises local initiatives or 'research projects' funded by NCETM regional or central grants and involving teachers, Local Authority staff and other providers. These vary considerably in composition and character, but all should have professional development and the sharing of effective practice at their core and are generically referred to as 'networks'.

To explore the operation and impact of the NCETM networks, a sample of 12 'case study' networks were selected with the aim of evaluating:

- The effectiveness of the various network models in moving forward the professional development and practice of educators in schools and colleges;
- The contribution made by NCETM staff and resource to the establishment, running and effective working of networks;
- The progress made by networks in the period covered by the study; and
- The likely impact of the networks on teachers of mathematics and their students.

The networks was selected based on suggestions made by Regional Coordinators, with further selection by the study team to cover as wide a range of different initiatives as possible. Each network was visited in the Autumn term of 2007 to identify their aims, how they had been set up and operated, what teaching and learning outcomes had been achieved and the contribution made by the NCETM to their work. Ten of these networks were visited again in the Spring term of 2008 to evaluate progress, follow up issues raised in the first visits and review the support provided by the NCETM.

Of the remaining two networks one (John Flamstead in the East Midlands) was no longer operating, and the West Midlands Mathematics Advisers network

functions as a communications group and was not visited a second time. The time released was used following up the impact of the other ten networks; including interviews and observations in schools where possible. The twelve case study networks are listed below.

Regional Case Study Networks

- Portsmouth (South East) - a matched small grant collaboration with a Local Authority in an underachieving area, to establish a teacher coaching scheme for schools with potential for improvement.
- Bedfordshire Upper Schools network (East) - an established network continuing with NCETM support. The network has the theme of 'Making Maths Count', with a focus on pedagogy and how teachers from similar contexts can pool resources to raise the profile of mathematics and improve the classroom experience.
- Network for 'Influential' teachers (Yorkshire and Humberside) – a network established to support advanced skills teachers, leading teachers and others with potential opportunities to influence practice.
- All Saints School (Yorkshire and Humberside) – a mature network supported by the NCETM, focused on establishing a 'professional learning community' in a cluster of schools.
- Peer learning (London - Bromley) - a 14-19 network in an inner city context, where specialist teachers are few and intensive support is required.
- Stratford (London) - a primary network looking at how teaching assistants and teachers can work together to enhance the teaching of mathematics.
- Increasing levels of confidence in teachers of primary mathematics (East Midlands) – a primary network aimed at supporting teachers, particularly those with a modest mathematics background, in their teaching of relatively high attaining pupils.
- John Flamstead (East Midlands) - a 'collaborative learning' network based in a Derbyshire Specialist School, focusing on post-16 provision and the development of materials for teaching A Level mathematics.
- Cornwall Mathematics Advisers Group (South West) - using NCETM support to influence teaching and learning across a wide rural area.
- Raising Achievement in A Level Mathematics (Newcastle – North East) - a small grant funded post-16 project in an area of high national priority.
- Teaching Algebra in the classroom (Oldham – North West) - this network works in collaboration with the Open University, and is one of a few focussed on specific curriculum areas.
- Mathematics Advisers network (West Midlands) - an established network, selected to ascertain how the NCETM can add value to networks already in place.

As the list above shows, the case study networks offered a combination of primary, secondary and post-16 coverage, and were dealing with areas such as:

- Mathematics pedagogy (NW, SW);
- Raising achievement in mathematics (NE);
- Mentoring mathematics teachers (SE, Lond.);
- Dissemination of effective practice (Y&H);
- Increasing take-up post-16 (EM); and
- Leading and supporting primary mathematics (EM, Lond.)

Although each network had its own local characteristics, some generalised features were also identified, with the above groupings being used to explore the case study findings.

The case study fieldwork also sought to evaluate the networks against the overall aims of the NCETM, in particular against the guiding principles that:

- The Centre should work *with* teachers rather than doing things *to* them;
- The learning needs and aspirations of all learners should be at the heart of any support provided;
- The core of the work should be professional development; and
- Schools and colleges should learn through their own good practice and that of other local teachers.

4.2.1 The NCETM Role in Establishing and Maintaining Networks

The 12 case study networks had benefited to different extents from the involvement of the NCETM in their initial establishment and maintenance, with:

- Five owing their existence directly to the NCETM, which was instrumental in setting them up; and
- Five benefiting directly from NCETM support in terms of their development or continued existence.

All the networks in these above categories were judged to have benefited significantly from the financial support provided by the NCETM - indeed most would not exist without it.

The remaining two networks were established by other organisations and operated independently of the Centre, although with some contact and publicity being provided by it. One of these was a Mathematics Advisers Group which has been existence since the 1980's, but which provides the Regional Coordinator with a means of networking. The other, Bromley Peer Mentoring, was established by London Mathematics Challenge and supported by the National Strategy, but continues to receive some NCETM support.

Nine of the networks visited received either establishment or maintenance funding, in a few cases both, through NCETM small grants or central resources. The grants awarded to the case study networks ranged from £1,000 to £25,000, with the mean being around £8,000. Most of this funding was used to offset the costs of events and the production of materials; in only two networks were any significant staffing costs paid for. In a few cases funding was matched by other organisations such as the Mathematics Challenge in Bromley, or Local Authority in Portsmouth:

“This project forms part of an overall Local Authority strategy to raise achievement in mathematics. The lead adviser contacted the NCETM via the Regional Coordinator and obtained funding for a teacher coaching scheme targeted on schools and teachers who 'had clear potential for improvement'. Following the commitment of the NCETM the Authority matched the funding so extending the scope of the project”.

Follow-up visits revealed that no additional NCETM funding had been given to the existing networks although in a few cases, such as in Cornwall, new grants had been awarded to related projects. Some of the initiatives that also received support from Local Authorities were scheduled to continue, but overall networks were destined to be short lived. Whilst the role of NCETM might be seen as pump-priming rather than sustaining local activity, a longer term strategic view could result in some cases in sustained activity and more durable impact.

Yorkshire and Humberside Influence Network

One example of a network strongly influenced in conception and sustained by the NCETM is the Yorkshire and Humberside 'Influence Network'. This is intended for Advanced Skills Teachers, leading Teachers, Consultants and others who support the professional development of their colleagues in mathematics. The network was initiated by the Regional Coordinator who:

- Identified the need for the network and secured funding for it;
- Invited a significant proportion of its membership (almost exclusively);
- Acts as catalyst for the activities of the network – organising network meetings, planning network programmes and contributing to their delivery; and
- Locates speakers for network meetings and communicates with members.

Overall the influence network was considered to be working well, being adopted elsewhere and is making a difference to those that attend. The reasons quoted by participants included *“it is enabling and supportive”* and *“the network reaffirms me as a teacher”*.

This level of Regional Coordinator involvement was exceptional across the case studies, and could not be reproduced across the wider range of networks. However, direct involvement of this kind does ensure that NCETM objectives are kept to the fore. This example also achieved a high level of penetration of

educators, by targeting those best placed to influence the professional development of others.

In most cases the role of the Regional Coordinators was crucial in establishing new groups and building on existing networks. In many cases potential network organisers had direct contact with the relevant Regional Coordinator, either through their own initiative or as part of networking. All the networks supported in this way were judged to be appropriate for NCETM funding; with decisions to provide support appearing to be sound.

Currently the process of setting up networks is strongly bid-led, with local groups bidding for funding being considered by the NCETM. This has led to a varied and worthwhile range of networks which is intended to reflect regional needs. Phase 4 of the grants programme envisages a 40:60 split between non-specified and declared priority areas, namely projects that explore:

- How the NCETM portal tools are used to support school or college based collaborative professional development leading to mathematics improvements;
- How best to translate 'research into practice'; and
- How the NCETM can best extend its reach to support teachers of mathematics who, for whatever reason, are not able to access or choose not to engage in current offers or models of professional development in their schools.

However, since the outcomes are made available to all via the portal there is a case for an even more strategic national view. Some Regional Coordinators are pro-active and approach possible network leaders with a particular CPD theme in mind, but in most cases the networks derive from local initiatives rather than a central view of particular aspects of mathematics teaching that needs to be supported. The most well received and successful case study networks were those that led to the joint development and sharing of practical approaches to address specific issues in mathematics teaching and learning. As one network participant described: *"The NCETM project was valued because it focussed on mathematics teaching; valued maths teachers and considered mathematics directly, cutting through what is viewed (by teachers) as peripheral"*.

4.2.2 The On-going Role of the NCETM and Communication

The role of the NCETM and the Regional Coordinators in providing on-going support to the case study networks emerged less clearly than their role in network establishment. The degree of on-going contact between the networks and the Centre staff varied considerably, but were generally considered to be *"informal but supportive"*.

Much depended on positive professional relationships between network organisers and the Regional Coordinators, who were often viewed as the

embodiment of the NCETM. However, although informal contacts were often helpful, there was no uniform expectation of support or demand from the Centre. While in some cases contact was maintained through Regional Coordinators attending network meetings, several networks reported that communications after grants had been awarded amounted to email requests for progress updates, rather than personal contacts. Some of the most successful case studies were driven by Local Authority staff, who made good use of grants to access local resource and communications networks without which the case study networks could not have functioned efficiently.

Several network coordinators expressed the view that monitoring had been light but was now becoming more demanding. In the period between the evaluation visits network coordinators had been asked to produce a report or details of activities to be placed on the portal. Most had also been asked to produce a monthly progress report for the Regional Coordinators, which was seen as onerous by many network coordinators. No guidance for these reports appeared to be available, and the lack of feedback once submitted led to some network coordinators being uncertain as to whether they were achieving what was expected of them by the NCETM. Less frequent reporting, guidance on what is required and brief feedback on their reports would both make expectations more uniform and be a step towards quality assurance. It may also be appropriate to adjust reporting requirements to the size of grant and the duration of the project involved.

Many of the networks were relatively free-standing, and could function well without on-going support by the NCETM. These were usually projects supported strongly by Local Authority mathematics advisers and consultants or other partners. In these instances network participants often had a low level of awareness of the NCETM or its part, other than financial, in supporting the project. Nevertheless such collaborative projects were often highly successful as they were driven forward by a well-known local individual seen to be attuned to the local context and needs. One such network involved nine schools in Oldham and was managed by the Local Authority mathematics coordinator.

The Oldham Teaching Algebra in the Classroom Project

The 'Teaching Algebra in the Classroom' project aimed to support the development of collaborative practice amongst mathematics teachers, using a peer coaching approach to:

- Develop teachers' coaching/mentoring skills;
- Develop collaborative practices within and between schools;
- Develop the Year 10 and Year 11 curriculum beginning with algebra, based on a common pedagogy; and
- Make greater use of the learning conversation in the assessment for learning programme.

To overcome the practical difficulties of getting teachers together during school time three residential sessions were run, with additional optional twilight sessions. The sessions were well received, were considered to have had a direct impact on classroom practice, and offered the possibility of wider dissemination of practice.

Overall the network was judged to be an excellent example of mutual sharing and learning. While the NCETM funding has helped, much of its success is due to the local personnel, especially the Local Authority Mathematics Coordinator.

Whilst NCETM resources for personal support are obviously limited, it is important that these are directed where they are most needed and according to a shared rationale. Experienced Local Authority staff may need less support in organising a large project, but a high profile and more directly involved Regional Coordinator will make links with the Centre more apparent. Smaller scale action research projects, such as four primary schools working together to increase confidence in mathematics teaching, would benefit from more specific support and guidance. In all cases there should be clear and mutual expectations of what is expected in the way of monitoring and support.

4.2.3 The Penetration of Networks and Dissemination

Some of the networks supported were small in terms of the number of teachers and schools directly involved, while others were open to all relevant staff in a Local Authority area. Altogether about 180 teachers and 140 schools were directly involved in the twelve case study networks – with the smallest involving four teachers and the largest potentially 60 teachers across an urban Local Authority. Clearly overall impact depends on the number of teachers directly involved, combined with the potential for dissemination either locally or through the NCETM portal. Potential impact via the portal will depend on the nature of the project, and the extent to which resulting materials or approaches are transferable.

A few networks, whilst very valuable for those involved, had small initial penetration and relatively little transferable benefit. In particular projects supporting teachers through coaching in a small number of schools, or raising

the confidence of a small group of primary teachers, may have no wider impact unless there is a novel element to the approaches used which can be usefully and effectively shared with others.

A successful approach to maximising penetration of a network was found to be to 'start small grow big'. Teachers welcomed the opportunity of working with a relatively small number of colleagues, meeting together to share ideas and then introducing materials and approaches to others. Unfortunately this organic model can be slow to grow, and some networks would have benefited from longer term financial support to maximise their penetration.

One of the principal ways in which the networks are expected to disseminate their activities is via the NCETM web portal. Evidence from the network case studies suggested that web communities were developing slowly, and that participants tended to use established local methods such as school and Local Authority intranets to share their work. Network participants using the NCETM portal reported similar issues to NCETM users more broadly, including difficulties locating other network case studies and resources. Many 'casual users' were initially simply looking for relevant resources to meet an immediate need. Although the portal is not intended principally as a resource directory it is likely that ready access to teaching materials and outcomes from networks is the means to establish its use.

Although much interesting and useful material produced by the NCETM projects and networks can be found on the portal, it is not clear what quality assurance procedures are applied. Network leaders received little guidance as to what was required in their reports, and most reported that they had simply been asked to provide "*something for the portal*". Uploads of video and other materials also appeared to lag behind the intention declared in some of the case study network bids.

The successful Cornwall post-16 illustrates some of these findings. The model used was organic, means of dissemination were included and the NCETM portal was generally well used.

The Cornwall Post-16 Network

The Cornwall Post-16 network initially involved eight participating schools and one FE College, with two teachers from each institution, and was led by the Local Authority mathematics consultant. Teachers in participating schools worked on materials to support students' active engagement in studying A Level mathematics topics. Although the principal outcomes were a series of specific resources, the impact on the teaching of post-16 and Key Stage 4 mathematics was “*transforming*” according to teachers involved.

Evidence from visits to schools as part of the case studies showed that ideas and materials from network activity had already been shared within participating mathematics departments. A dissemination conference was held where teachers could share their ideas and enthusiasm with other colleagues. However, no additional finance is available to ensure that others can benefit, other than on-line, across this large rural county.

Reports and resources have been lodged on the NCETM portal and a successful on-line community launched. There is also evidence that some teachers outside the county have found the materials produced very useful.

Overall the judgment was that the project had immediate, clear and demonstrable impact on practice in the participating schools. However, it was not clear how the project will grow over time, as it is time limited by the funding period.

4.2.4 Overall Impact

A key aim of the case studies was to assess the extent to which the networks had, or were likely to, impact on classroom practice; and the impact of the NCETM on the networks themselves. One of the key questions addressed concerned the extent to which the Centre had added value to the on-going work of networks beyond funding.

The first and second case study visits explored the progress made by networks and their likely impact, confirmed where possible by direct observation or discussion with participants in their schools. Both visits provided positive findings in terms of the **networks' actual and potential impact on classroom practice**, with:

- Ten networks being judged as already having an impact on participants' practice; and
- The remaining two as working in such a way that they are likely to have an impact on participants' practice.

In each case, the networks' strong emphases on pedagogy, dissemination of good practice and professional development were crucial in determining these favourable judgements.

The **impact of the NCETM on the networks** ranged from 'small or indirect' to 'substantial'. The second visits showed an increase in the impact made by the

Centre, but in several cases there was no change as there was little or no intervention or direct contact following the award of the grant. Typically the impact of the Centre was described as 'moderate or developing'. This often represented a resolution of two factors - the reality that the network would not exist without NCETM support with the continuing uncertainties about its on-going influence.

Clearly the nature of the impact on classroom practice varied depending on the aims of the project. A few projects included their own evaluation of impact, although this was exceptional. For example Longbenton College incorporated a student voice survey which confirmed a broadly very positive response by students to the changes in practice brought about by the network:

The Longbenton College Network

The Longbenton college network was set up to 'investigate the potential of raising students' achievement in A Level mathematics by incorporating a wider range of teaching styles, materials and experiences'. As part of this students and teachers were interviewed before and after the development programme. They also took part in two residentials to trial new resources and approaches.

During the second visit to the college the evaluation team observed three lessons taught by participating teachers. These observations confirmed the teachers' view that the project had led to greater confidence in the use of a wide range of teaching styles. The residential sessions had also led to long term improvement in relationships between staff and students, and students' attitudes towards study.

Comments from the students included:

- *"They (now) let us talk and solve problems first before helping us as we are tightly knit, so this is good".*
- *"Before starting a new topic the teacher will outline a question to us and ask us to think about different ways of going about answering it".*
- *"For revision there are lots more game-based activities".*
- *"Teachers explain work clearly with examples, then individual work is done".*
- *"I can (now) adapt to different learning styles for more variation".*
- *"They help us when asked, but let us puzzle ourselves as this is most beneficial for us".*

The overall judgment was that teaching and learning improved markedly, and that observed was good or better and contained a variety of styles appropriate for the work in question. The self- evaluation of impact was positive, however some attempt to disseminate more widely should be built into bids for future projects.

This illustration highlights the need for and value of networks engaging in the evaluation of their own impact. Very few of the case study networks had reflected on impact in a systematic way as part of the programme. Although impact on practice was favourably judged on the basis of the case study visits, realistic self-evaluation of projects should be incorporated into bids to ensure reflection in what are described as research projects.

Finally, there was also evidence that participating teachers had also benefited as professionals from involvement in NCETM networks, with many not previously being involved in 'action research' projects and being enthused and re-engaged by doing so. The direct 'hands-on' involvement with developing teaching and practice along with the sharing of ideas appealed strongly to teachers.

4.2.5 Legacy and Sustainability

Given the positive findings from the networks in terms of actual and potential impacts on classroom practice, the case studies also considered potential legacy (assuming no further funding) and sustainability (in the event that funding continues). Previous sections have emphasised the desirability of the 'organic growth' of networks and the extension of their impact; a phenomenon which can take time to manifest itself.

The ten networks judged to already have had an impact on classroom practice represents a notable achievement for all those involved, with the majority being directly focussed on the collaborative development of teaching and learning. Clearly there is potential for legacy effects if teachers continue to develop their practice and share their experience with others. This is likely to be greatest where networks have received support from Local Authorities or other local agencies, and where relationships between schools have developed to the point where they are not dependent on individuals. Once such project might be the 'Making Maths Count' network in Bedfordshire:

The Making Maths Count Network

The central aim of the Bedfordshire Making Maths Count project was to find a way for teachers to use assessment for learning and student involvement to develop a 'needs driven' curriculum for D/C borderline students in Y11, thereby personalising learning and enabling the students to take more responsibility for their own progress.

This network has been strongly supported by the Bedfordshire Mathematics Team and the NCETM Regional Coordinator. The group includes all 17 Bedfordshire upper schools and two special schools, and has been convened five times during the year for a full day of joint working. It built upon an established heads of department network, but has been able to meet more often and have more ambitious outcome goals as a result of NCETM support.

The Making Maths Count home web page makes all the ideas and materials that have been produced available to a wider audience via the portal. The project is focused explicitly on raising achievement, has evidence of impact from previous results and has transferable outcomes. The group itself is "*encouraged by their success and will continue to work in the hope of pushing results still higher*"

There is a clear legacy from this network - the local activity is likely to continue making an impact, and the network has the potential to influence practice more widely via the portal.

Other networks leave a legacy but have the potential for sustainability which may not be realised without further NCETM or other support. This is often the case when they draw on a particular support structure that has or will be superseded, or when relationships between the partners whilst productive are dependent on individuals rather than integral to schools. Without the incentive to continue and the means of doing so some networks with the powerful capability for impact in mathematics will be lost. The future of the following network is not known, although it has the potential for sustained impact.

East Midlands Primary Mathematics Network

The primary mathematics project in the East Midlands involved seven Leading Mathematics Teachers (LMTs), and aimed to increase their skill at supporting pupils with critically low scores in mathematics. The designation of LMT was maintained by the Local Authority in spite of a lack of central funding. The NCETM small grant enabled potential LMTs to be observed, selected and trained to support teachers less confident in supporting the mathematically weakest Year 6 pupils in their schools.

This network builds on existing effective practice, is supported by the Local Authority and makes specialist training available. However only seven teachers were involved, and the model is capable of further expansion that would bring further benefit if sustained.

The project was judged to have had a very positive effect on the teachers involved. It was noted that all who took part were keen to continue, but that survival and sustainability depended on funding and finding a consultant to lead the project. The project was considered a good piece of action research that needs more time if it is to have a lasting impact.

As far as could be judged from the case study 'snapshots' of networks at work most were capable of being sustained to good effect. The reality of short term interventions is that they all too rapidly lose their impact once those involved move on to other tasks and responsibilities. Although grants are awarded for action research projects and so are of limited duration, those bidding should be asked to consider short term impact and sustainability when making their bids. Similarly the NCETM should take account of the prospect of sustainability when considering or seeking bids.

4.3 Review of Portal Fora and Communities

The NCETM web portal has the potential to play a key role in disseminating and extending the influence of grant funded projects and networks, as well as facilitating information exchange and discussion groups between mathematics educators more widely. This potential was investigated through the review of a sample of 23 discussion groups (fora, communities and hidden communities) and the resources section of the portal, which took place in November 2007. The discussion group sample included:

- **Seven fora** – accessible to all portal users and split into different discussion topics upon which anyone can comment.

- **Nine communities** – similar to the fora, but more closely focused and restricted to members only, although anyone can become a member.
- **Seven hidden communities** – restricted to users invited to join and not visible to anyone else, and are generally narrowly focused around specific areas.

Stratified random sampling was used to develop the fora and communities sample, with the more frequently used groups being over-sampled with two less frequently used fora and communities also being included. For the hidden communities consent was sought for their inclusion in the review, with the more frequently used communities and two less used being selected. Use of the groups was then explored in terms of:

- The number of topics and number of posts received;
- The number of members, and who was posting;
- Duration of use;
- The types of discussion taking place; and
- The role of the administrator

The fora, communities and hidden communities reviewed, and the number of topics and postings at the time of review, are shown in Table 5.1 below. Descriptions and additional information on the individual groups reviewed feature as Annex II, III and IV respectively. For brevity fora, communities and hidden communities are considered as a whole, with any significant differences being highlighted as appropriate.

Table 5.1: Fora, Communities and Hidden Communities Reviewed		
Forum Name	No. of Topics	No. of Posts
The Maths Café	99	738
Primary Forum	26	165
NCETM is launched	8	73
National Maths4Life 'Thinking Through Mathematics' Launch (26 February 2007)	9	47
Using Gattegno's work in the teaching of mathematics	2	25
Access to London Mathematics Challenge	3	8
ESOL, EAL and Mathematics	2	4
Community Name	No. of Topics	No. of Posts
ICT in Mathematics	12	57
Statistics Teacher Network	13	47
West Midlands Teachers' Community	13	43
Influence Network	12	26
Creative Maths in Newcastle	12	18
London Subject Coach Network	7	12
South West Teachers' Community	3	11
Bringing Maths & Science Together	1	3
Watch and Learn	1	3
Hidden Community Name	No. of Topics	No. of Posts
London Maths Challenge – Bromley Cluster	22	62
NMTSS Community	12	37
The SW Collaborative Professional Development Research Project	7	19
Devon Action Research Community	5	18
Vision without leadership is a dream. Leadership without vision is a nightmare.	3	10
The Oldham Project	4	5
NCETM Grant Holders	2	6

4.3.1 *Number of Topics*

The review first considered the number of topics within each group before looking at the number of posts, to identify how focused or dispersed the discussions are. The review found that the number of posts per topic is actually fairly small, with many groups having almost as many topics as posts. For example, the Statistics Teacher Network was amongst the more active communities reviewed with 47 posts, but had 13 topics, meaning that an average of fewer than four people were commenting per topic.

4.3.2 *The Number of Posts*

The number of posts varied greatly between the groups reviewed, although it is important to note that the sampling approach over-represented groups where more posts had been received. Consequently the average number of posts for all groups on the NCETM portal is likely to be significantly lower than those featuring in the review. The groups reviewed tended to have between one and fifty posts, however a few fora have reached over one hundred posts. Table 5.2 shows the number of topics for all the fora, communities and hidden communities reviewed.

The Maths Café, for example, is a forum promoted by NCETM as a good place for new members to start posting. The forum had the largest number of both posts (738) and topics (99) of all the groups reviewed. Here posting activity appeared to be concentrated in a small number of topic areas, with five of the 99 topics receiving 20 or more posts and seven receiving between 15 and 20. Conversely 82 topics received fewer than ten posts, and 27 had no more than one post. In the more popular topics some discussion threads have developed, and within these the discussion appears detailed with individuals sharing ideas.

Number of Topics	Fora	Community	Hidden Community	Total
1	0	2	1	3
2	2	0	1	3
3	1	1	1	3
4	0	0	1	1
5	0	0	1	1
7	0	1	0	1
8	1	0	0	1
9	1	0	0	1
12	0	3	1	4
13	0	2	0	2
22	0	0	1	1
26	1	0	0	1
99	1	0	0	1

There was little clear indication as to why some groups had received many more posts than others, although it appeared that the most active groups were all fora, and focused on general topics relevant to all teachers of mathematics. That said, not all general topics generate high levels of usage.

4.3.3 Number of Members Registered and Posting

Unlike the fora, registration is required to join communities and hidden communities, which allowed the number of members of each to be explored. Looking at the number of members signed up to communities and hidden communities, significantly more members appeared to be joining the communities than actually posting on them. Indeed, some groups have as many as ten times as many members as there are members posting – a feature also identified in both the educator survey and individual interviews. In many groups a few people appeared to be dominating contributions to posting, moreover, these same people are often posting in a variety of different groups.

The larger numbers of members joining groups suggests that a significant numbers are actively looking at the portal, and who may be accessing resources and reading conversations between other community members. However data was not available from NCETM on the frequency of individual visits to the communities. The educator survey and interviews suggested that in some cases this was taking place, with initial community membership through project activity leading to the wider portal exploration.

Table 5.3 shows the number of individuals posting to the groups reviewed.

Table 5.3: Number of Unique Members Posting for Fora, Communities and Hidden Communities				
No. of Unique Members Posting	Fora	Community	Hidden Community	Total
3	1	2	1	4
4	0	1	2	3
5	0	1	0	1
6	1	0	2	3
9	0	0	1	1
10	1	0	0	1
11	0	1	0	1
12	0	1	0	1
14	0	0	1	1
19	0	1	0	1
21	0	1	0	1
23	0	1	0	1
36	1	0	0	1
41	1	0	0	1
152	1	0	0	1

(The 'National Maths4Life' forum was removed from the portal part way through this review, so the number of individual members posting to that forum is not known)

In general the numbers of individuals posting to the different groups are between zero and twenty, with the numbers posting being particularly low for the hidden communities.

4.3.4 Role of the Administrator

The role of the administrator varied greatly across the groups reviewed, in some groups having little or no input whereas in others their input is extensive. Administrators were Regional Coordinators, NCETM staff or members of the portal administration team. In a number of the groups the administrator appears to be posting a great deal more than other members, which suggests that conversations would not continue without their input. In addition to answering questions posted by members, some administrators have started up conversation topics themselves as well as starting new groups to give members information and a topic to discuss.

The study fieldwork confirmed that in many cases the Regional Coordinators played an 'animation' role, particularly with new groups, in starting discussions or maintaining their momentum. One individual described also using an online alias to hide their animation role, and allow 'unofficial' contributions to stimulate discussions.

4.3.5 Length of Use

The period over which the groups have been active also varies. Groups that appear to be about specific issues or events tended to have more short-term conversation threads, while general issues often have more longevity. Some groups explored during sample development (but not included in the final sample) had not received any comments for over six months, but still appeared on the NCETM website, prompting the thought that it may be unnecessary to keep them as 'live' groups. The removal of the 'National Maths4Life' forum suggests that such a process may exist, although there is no evidence that there had been widespread removal of inactive groups.

4.3.6 Degree of Discussion

The success of different groups appears to be dependent on a number of factors, including:

- The number of topics;
- The role of the administrator; and
- The longevity of the issues.

However, there was no clearly visible relationship between the type of discussion topic and the popularity of the group. Groups with both more general and more specific topics have varied success, and although the groups with very large numbers of posts are all fora, the fora still vary in use as much as the communities and hidden communities.

It would appear that when a group 'takes off', multi-way conversations take place and members actively share ideas with each other. However, many groups have attracted little input, and the questions posed by members have gone unanswered – a potential disincentive for future engagement. In some of the groups conversation appears fairly superficial, particularly in some of the hidden communities where respondents appear more familiar with each other. Some of the groups, again in particular the hidden communities, appear to be set up for an organiser to post details of forthcoming events. In some of these cases a conversation may start after the event in order to discuss it, but dies down again soon after the event.

One example of a group where ideas are being shared is 'Using Gattengo's work in the teaching of mathematics'. Although this group had only 25 posts it also had just two topics, which means that conversations are more focussed. The members appear to be sharing ideas and resources, and one post suggested that the site could be used as an online book club.

4.3.7 Layout

The layout of the NCETM website was considered as part of the portal review. While the portal provides a variety of options for users and a number of different routes to finding things, it can, however, appear complex. The

distinction between the location of a forum and a community is often not clear, and the different routes into parts of the portal make it difficult to navigate. The large numbers of different fora and communities, while providing choice to members, can be overwhelming as it is difficult to identify interesting or relevant groups from such a large range of options.

In addition to this portal review, the comments from users on the site were also considered. User comments posted included:

- Blogs and news are not in chronological order so are hard to see;
- There are too many communities;
- Resources are muddled;
- The website doesn't work properly and is not that easy to use;
- There should be one big forum;
- There are not enough members for so many sections; and
- Technical aspects are "*always breaking*".

These user observations are important when considering recommendations for the future development of the portal.

4.4 Review of Resources

As well as looking at the fora, communities and hidden communities, the resources pages were also briefly considered. A sample of 10 resources, listed as Annex V, were reviewed, randomly selected from the resources section and the "explore by..." sections. The review focussed on user comments on resources, in order to ascertain whether this section of the portal was triggering input from users.

Very few comments were found, although some of the most popular resources had stimulated a few responses. The majority of the resources had no comments at all, a few had basic comments describing how the resource was used and thanking the NCETM. It must be noted, however, that although very few members were posting we are unable to tell from this analysis whether members are using the resources and finding them useful – although indications from other elements of the study suggest the that they are. Members can explore resources using different routes, for example by featured resources, most popular resources, latest resources, sector, resource and mathematical topic. This may be designed to allow users to navigate by their own personal preference, but in our view it makes the page appear daunting and potentially confusing.

5 NATIONAL STAKEHOLDER PERCEPTIONS

5.1 Introduction

The experiences and views of the representatives of a sample of national organisations with an interest in mathematics CPD, or the professional development of the educator workforce more broadly, were sought through a programme of face to face and telephone interviews. The interviews aimed to establish stakeholders' perceptions of and engagement with the initiative, key success factors for it and views on the early impacts of the Centre on mathematics CPD. Twelve stakeholders were interviewed⁴, with interviews lasting between 30 and 90 minutes. .

The interviews took place in May 2008 to enable stakeholders to give a considered view of the initiative towards the end of its second year of operation. They focused on national stakeholders who have, or would have been expected to have, been closely involved in the initiative, notably those likely to be involved in the development of the Mathematics Continuing Professional Development Framework.

The interviews covered issues such as the degree of awareness of the NCETM's work, the nature of any joint working relationships, perceptions of the NCETM and its work including the portal, mathematics CPD more generally and the future priorities for the NCETM.

The attitudes towards, and perceptions, of the NCETM should be considered against perceptions of CPD for mathematics teachers more broadly, as well as perceptions of the wider mathematics education community.

5.1.1 *CPD for Teachers of Mathematics*

Many stakeholders felt that although CPD is available to mathematics teachers, it is not always taken up to the extent that it could be. There was a fairly widespread view that an entitlement to, or even requirement for, mathematics CPD would improve uptake.

Some of the stakeholders suggested that mathematics teachers are harder to engage in CPD than teachers from other disciplines; although there was a widespread view that many teachers, regardless of subject, will claim that they do not have the time for CPD. This was felt to be due to mathematics teachers considering that they knew their subject, and therefore did not require additional training and development.

A number of stakeholders mentioned that local authorities are becoming less likely to have senior level specialist mathematics advisors, and that this is

⁴ A complete list of stakeholders interviewed is available at Annex I

leaving a gap in the infrastructure promoting and delivering mathematics CPD. It was also suggested that the use of mathematics departments' training days for mathematics CPD has diminished in favour of general administration and departmental management.

It was suggested that in recent years the "*mantra*" regarding CPD was "*learning from each other*" and that this had helped to foster a belief that "*outsiders*" were not necessary for CPD, supporting a culture that is unwilling to look for support.

The general impression from stakeholders was that while subject specific CPD was regarded as an important issue at a policy level, it was not such a high priority either within schools or for individual teachers. This means that NCETM is not necessarily working with receptive audiences when trying to promote the uptake of CPD in mathematics.

5.1.2 The Mathematics Education Community

Reactions to NCETM should also be considered in the context of the broader mathematics education community, which was considered by respondents to be quite fragmented with different learned societies and different subject associations for teachers having different foci and emphases for their work.

At the national level efforts have been made to promote greater coherence amongst the organisations supporting the teaching of mathematics. Nonetheless one finding of this evaluation is that developing and maintaining stakeholder relations needs to be a priority for NCETM, given that the Centre is not itself a deliverer of CPD.

The interviews provided an insight into stakeholder perceptions, with the commonality of some of the messages in the following sections highlighting some of the major issues. However, it was also clear that a far wider set of stakeholders exist and that NCETM needs to review how it engages with them, and ensure that adequate effort is directed towards building partnerships with those able to multiply the Centre's efforts.

5.2 Awareness of NCETM and Knowledge of its Work

All of the stakeholders interviewed were familiar with NCETM and the roots of its development. Many referred to "*the ACME report*" and "*the Smith report*", and virtually all were aware that the development of NCETM had been delayed by changes within the centre's senior management. The current director is highly regarded within the stakeholder community, and is perceived to be one of the Centre's strengths.

It is also important to note that all of the stakeholders were supportive of the concept of the NCETM, and wanted to see a successful organisation emerge to promote CPD for teachers of mathematics. While some raised criticisms over the way that the project has been delivered to date, all wanted to see the

Centre continue and only a small minority wanted to see a re-tendering exercise. Most stakeholders wanted to see Tribal build on the investment so far although, as detailed below, there were universal calls for a more focused approach.

Detailed knowledge of NCETM's work was more variable. All knew of the portal, and most knew of the Regional Co-ordinators although few had had any direct contact with them. A small number knew that NCETM provided funding for research projects or small grants to support the development of local CPD networks and activities, indeed some had approached the NCETM for support for specific activities. In some cases any lack of familiarity with all that NCETM does was accepted as the stakeholder's fault, for example because CPD was a relatively minor part of the stakeholder's interest in mathematics. However, some stakeholders felt that there was a lack of clarity about NCETM and its roles. One talked about the "huge" size of NCETM's brief, suggesting that "people only get to know about bits of the iceberg" and that NCETM is "an amorphous object and difficult to get to grips with".

5.2.1 Level of Government Investment

A number of stakeholders were also aware of the network of science learning centres (SLCs) and compared the investment in the NCETM project to the investment in SLCs. There was some concern that the investment in mathematics was far smaller, but recognition that when viewed in isolation the NCETM investment was still a significant sum of money. However, a number questioned whether the investment was sufficient to support the ambitious hopes that existed for NCETM.

One respondent noted that expectations for NCETM may have been "artificially high" and a number suggested that NCETM had to focus its efforts to make best use of its budget.

5.3 The NCETM Model

The NCETM model is based on a combination of virtual and physical products, with no physical manifestation of the Centre as such. The national stakeholders were most familiar with the web portal, and a largely online model was not considered to be the best fit for the needs of teachers, or for the purpose of the centre. As one national stakeholder described:

"A virtual model is of limited benefit. Teachers don't have access to IT all the time and it is really no good for primary teachers. This creates a real issue for anyone interested in CPD who needs to connect with teachers."

There was also a general consensus among the national stakeholders that a web portal has limitations as an engagement mechanism, and that the NCETM needed to engage in face-to-face interactions with teachers in the field. One stakeholder considered that:

“Web portals are like libraries, they are only there for the people that go to them.” and a second that

“Live events and interchanges between teachers and others matter.”

However, one stakeholder pointed out that the early focus on the portal means it could be argued that the NCETM has made an investment in infrastructure, which now needs to be maintained and built upon through more *“on the ground”* and *“face-to-face”* activity.

5.3.1 Physical Centres

There were some suggestions that a physical base, if not necessarily a centre, could help to build an identity for NCETM and, particularly, the Regional Co-ordinators. It was recognised that an independent base for every Regional Co-ordinator would be expensive, but a variety of co-location options appeared to be available such as HEIs, SLCs and STEM centres and their respective regional satellite centres.

5.3.2 The Portal

Regardless of the appropriateness of a virtual component at the centre of the NCETM model, the stakeholders had mixed views on the portal itself.

Some respondents spoke favourably of it, with one expressing the opinion that the self-assessment tools, personal learning space and capacity for teachers to build a portfolio had been done well. A couple of others considered the portal to be a good resource generally, with *“tons of stuff”*, and one reported that it was becoming a genuine and valued resource having heard *“good things”* about it.

Criticisms of the portal fell into two categories; those who were critical of the functionality and those who focused on content.

In terms of functionality, some respondents found the portal hard to navigate; with a particular issue being finding something on subsequent visits after initially spotting it. This is of course one result of having a website that contains a lot of material. This makes the search facility important, and a couple of people were concerned that the search engine did not seem to be producing accurate results (for example, events that the respondents knew were on the portal) and that questions posted by teachers seemed to take months to answer.

The NCETM team has commissioned a usability study of the portal and this should help to identify specific improvements that can be made. In addition the introduction of the Personal Learning Space should also make accessing previous materials more straightforward.

Issues raised around content focused on quality control. Although some stakeholders considered the self-assessment tools to be good, others spoke more negatively about the self-development tools, with one not finding them sufficiently mathematics specific and another suggesting they do not always highlight current good practice. Similarly the variable quality of some of the resources, including the Mathemapedia, seemed to be problematic for some.

“Who looks after quality control?” - National stakeholder

Several stakeholders cited the difficulty, experienced by other websites with similar objectives, in encouraging teachers to interact online via chat rooms or other applications. The portal review undertaken within this evaluation suggests that this continues to be an issue for the Centre.

Perceptions of quality and levels of interactive use could discourage teachers from using NCETM as a resource, which would, in turn, lead to reduced impact. Indeed, one respondent noted that many members had not logged in for months, suggesting to them that the portal was not perceived as being particularly useful.

5.4 Collaboration with NCETM

Most of the stakeholders had either worked with or attempted to work with the NCETM, and a number described their experiences of collaboration in the interviews. On the whole these experiences appear to have been challenging, with several respondents finding that the NCETM was not responsive to queries but often demanding *“instant responses”* when it needed something.

There was a widespread interest in collaborating with NCETM, reflecting the earlier comment that stakeholders want to see a successful organisation develop, but also a sense that NCETM's relationships with other organisations could be improved. Some described being unclear about the specific activities the Centre was undertaking or planning, and consequently how they could become involved and contribute most effectively.

“Everything they do is in partnership with others, but partnerships have to be managed.” - National stakeholder

It was widely considered that the Centre needed to plan more in advance, on a collaborative basis, to enable more effective engagement and allow partner organisations sufficient time to respond.

A few people spoke more positively about their organisation's relationship, and communications, with the NCETM. Although these comments were less common, they suggest that when the Centre makes appropriate approaches to potential partners considerable potential exists for relationships to be developed with other organisations.

5.5 Impact of NCETM

Few of the respondents were able to identify much impact from the work of NCETM, suggesting that its impact may as yet be limited. To some degree the lack of impact was ascribed to the Centre's potentially limited profile amongst teachers. The stakeholders were aware of the NCETM, but were not confident that awareness amongst mathematics teachers would be as high. Some stakeholders commented that the numbers of registrations on the portal were quite low compared to the national mathematics teacher population, suggesting a combination of limited awareness and limited interest.

This limited awareness or lack of visibility in the community is likely to present a significant barrier to potential impact. Nevertheless, it was felt that the potential for impact certainly exists. Some respondents described a possible role for the NCETM in contributing to a greater sense of cohesion or community among mathematics educators. There were also calls for the NCETM to focus on fulfilling a brokerage role to encourage uptake of CPD by teachers of mathematics.

One area where impact on teachers was felt to have been achieved was through successfully bids for NCETM project funding, or where they had been involved in funded projects at the regional or national level. It was suggested that the impact on these teachers could have been quite high, although one stakeholder was "*angry*" about the small numbers of teachers that had been actively engaged. A couple of stakeholders expressed concern that a relatively large amount of money had enabled relatively few teachers to be reached.

5.6 The Future

There was a general consensus that the NCETM is not, and should not be, a provider of CPD, but rather should promote and support the delivery of CPD more generally. Put differently, respondents felt that the NCETM should "*be a signpost and drive [encourage] sharing*", but should not be creating content.

Respondents felt strongly that in order to be effective, the NCETM needs to clarify its goals and focus its priorities. Some respondents expressed a belief that NCETM was not sufficiently clear about its mission and was trying to do too much, including taking on tasks that it was ill-suited to complete.

"It is not clear what the NCETM are actually doing. They are trying to do too much." National stakeholder

"NCETM is guilty of being sucked into 'initiative frenzy', and does not always have the skills to deliver." National stakeholder

Having a clearer focus was considered important to make the most of the Centre's limited resources and to avoid duplicating existing efforts. This focus had to be driven by a simple objective, and the over-riding message was that the NCETM must be about reaching teachers of mathematics. Thus the clear

objective of NCETM should be: “to increase the uptake of subject specific CPD by teachers of mathematics”.

5.6.1 NCETM Priorities

Respondents spoke extensively about what they felt the NCETM's priorities should be to achieve this objective. In summary these key priorities should be to:

- Engage teachers of mathematics in CPD (but not as a provider); by
 - helping teachers understand and appreciate what CPD means – that it is more than just training;
 - persuading school leaders of the value of CPD;
- Raise awareness amongst teachers, school leaders and CPD providers of the need to address subject knowledge of mathematics teachers;
- Ensure CPD is available, appropriate for the system and individual teachers, and of high quality; and
- Build relationships with the mathematics community whose members can either multiply the NCETM's message or provide CPD.

5.6.2 NCETM Strategy

Linked to the need for a more focused approach, respondents also emphasised the importance of developing a more clearly articulated strategy. This was considered key in making the most of the Centre's limited resources, and in building on what it may be uniquely placed to contribute.

Considering the priorities listed above, the NCETM needs to address a set of questions for each priority, including:

- What means are available to achieve this priority?
- What skills are required to deliver the means?
- Do we have these skills, and if so in whom are they vested?
- If we don't have the skills, who does or where can we find them?
- How will we know when we have achieved this priority?
- What evidence do we need to collect to show that we have achieved this priority?

A more strategic approach could also support relationship building with other organisations and associations, by clarifying the need for, and role of, complementary organisations and skills. More than one respondent thought that their organisation and the NCETM could complement each other, but that thus far they have not worked together in a coherent or strategic fashion. As an organisation whose focus is signposting and facilitation rather than delivery,

it seems incumbent upon the NCETM to be the partner working to build relationships.

5.6.3 Advisory Group

A number of the stakeholders were members of NCETM's advisory group. This group was described as “*well run*” and supported by the regular attendance of a core group of members. The widespread feedback highlighting the need for greater focus and clarity suggests that the advisory group could play a strong role in helping to set priorities and scrutinising progress towards delivery of the strategy.

5.6.4 NCETM Staff

A more strategic approach to activity will need to be supported by a strategic approach to staffing. The stakeholders who had had more extensive contact with the NCETM suggested that the quality of staff, both centrally and in the regions, is variable.

While the director was considered to have a “*good vision*” for the organisation, it was suggested that she does not seem to have fully “*put her stamp*” on the organisation as yet. There was concern that the roles of members of staff are not sufficiently clearly defined, and some respondents voiced concerns that the organisation needs more firm management. Some stakeholders suggested that some members of NCETM staff had, perhaps, had too much freedom and that the organisation would be well served if there were clear job descriptions and performance management targets to help keep individual members of staff focused.

5.6.5 Opportunities for NCETM

Within any revised strategy the stakeholders suggested that the Centre needed to identify key opportunities to promote CPD. Generally it was felt that changes in the policy and teaching environments provide opportunities to promote CPD, as change brings the potential to move teachers out of comfort zones and encourages the sourcing of additional expertise.

Several respondents highlighted specific opportunities for NCETM, these included:

- Curriculum changes;
- The ‘Williams’ review; and
- The new Masters of Teaching and Learning (MTL).

5.7 Concluding Comments

The national stakeholders interviewed uniformly recognised the need for, and supported the establishment of, a national centre to support CPD for teachers of mathematics. Similarly, they were keen to work with the Centre on a collaborative basis, and contribute where their expertise was needed and could

have the best effect. They recognised that it was still early days for the Centre, and that it had faced a series of challenges in its early evolution.

The stakeholders did, however, raise concerns about their ability to effectively engage with the Centre to date, and exploit the potential for joint working identified. In their view a shift of emphasis towards direct rather than virtual interactions with teachers was necessary if impact was to be achieved and reach extended, based on focused objectives with the clear articulation of how these objectives will be achieved.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This Chapter presents the conclusions and recommendations of the evaluation, drawing on the findings of the different study tasks, including consultations with NCETM staff, national and regional stakeholders and others with an interest in mathematics education, and mathematics educators in the pre-school/primary, secondary and post-16 settings.

The conclusions address the aim of the study, namely to evaluate the NCETM in terms of process and impact, with a particular focus on:

- The impact of the Centre on mathematics educators in schools and colleges;
- Its impact on pupils and students;
- Its impact on the culture, expectation and uptake of CPD;
- The impact of the NCETM web portal on mathematics professional development; and
- The use of networks to facilitate knowledge and good practice exchange between teachers, and the role of the Centre's regional co-ordinators in developing and supporting such networks.

6.2 Conclusions

Our conclusions recognise that the study took place during the Centre's second year of operation, and the context set by the contractor's five year implementation plan which has focused on developing the NCETM offer and engaging with stakeholders. We also recognise that the Centre faced a series of initial challenges, including significant changes in the senior management team, in addition to those facing any new organisation seeking to establish itself in the professional development marketplace.

In this context, we conclude that much has been achieved to illustrate the potential of the Centre to deliver its mission to raise standards in mathematics teaching and improve institutional performance. The study identified that the Centre is having positive impacts on the teachers engaging with the variety of approaches it offers to professional development. However there remains work to be done to extend these impacts to have a greater and more visible effect on educators, pupils and students, and promote linkage between the virtual and face to face elements of provision.

We consider that the time is right for the Centre to review its objectives and clarify how they will be taken forward. Such a review should seek to build on achievements to date, and the lessons from delivery experience to allocate

resources appropriately, as attention focuses on extending reach and achieving impact across the mathematics workforce.

6.2.1 Impact on Educators, Pupils and Students

The quantitative and qualitative elements of the study identified a range of impacts resulting from educators' interactions with the NCETM, as summarised below.

Impacts on Educators

The NCETM has successfully had an impact on the professional expertise of mathematics educators. This impact has resulted from a combination of the use of resources and materials held on the portal, and participation in project activities and networks supported by national and regional grant funding.

The nature and 'depth' of the impacts identified is, as would be expected, variable. Respondents to the **educator survey** identified a range of benefits from engagement with the Centre, including helping them ensure that they are up to date with teaching methods, providing new ideas and identifying the need for professional development provision. Educators indicated that engagement with the Centre had the following common benefits:

- Improved knowledge of teaching methods – cited by 46% of respondents, and expected in the future by a further 32%;
- Improved motivation and confidence – by 41% and 32% of respondents respectively, and expected in the future by a further 24% and 25%; and
- Improved mathematics content knowledge – by 26% of respondents, and expected in the future by a further 28%.

Although widely reporting positive benefits and impacts, fewer respondents (just under one third) considered that the Centre had supported them in their day to day teaching of mathematics. This suggests that more could be done to help embed new learning, ideas and approaches gained into classroom practice.

The more qualitative elements of the study also identified, and through observation evidenced, impacts for participating educators. The Network Case Studies, for example, identified positive impacts on classroom provision in 10 of the 12 cases evaluated, with impact being expected in the remaining two cases.

Impact on Pupils and Students

Despite variable views on the extent to which they considered the Centre had supported their day to day classroom teaching, the survey respondents also reported positive impacts on their students' learning and interest (by 41%, and expected in future by an additional 32%). The qualitative investigations with individual educators involved with the NCETM found considerable optimism

that change in classroom practices would lead to positive impacts for their pupils. Although little hard evidence was available as yet in terms of increased performance, benefits such as providing more engaging and exciting lessons were considered by the educators to be likely to translate into improved pupil performance.

The Network Case Studies allowed the potential for impact to be explored in more detail, and identified a range of positive influences on the classroom. The case studies also suggested that such impacts were most likely to be identified (and potentially change reinforced) when review and self-evaluation processes were undertaken.

Conclusions

While many examples were identified of positive impacts for educators and students, two key considerations were also identified:

- Many of the impacts reported were 'expected' rather than achieved – which while a positive indicator does not necessarily mean they will be realised; and
- Substantial impact may be restricted to those accessing the portal or directly participating in NCETM-facilitated activities, and not disseminated to a wider audience.

This presents two key challenges – the first being how best to maximise the conversion of expected impacts into classroom change. The second relates to the need to extend reach to maximise the potential for impact on a greater number of educators and their pupils and students. While the educator survey and the qualitative studies identified examples of dissemination within educators' establishments, and between them in the case of project/network activities, they also found that most portal use was for the educators' own purpose. It was also clear that not all educators were equally likely to use an on-line support facility, for a variety of reasons including limited access to IT facilities at school and a preference for more direct methods.

On the basis of the evidence to date, we consider that the portal has an important role to play in achieving the NCETM's mission, with its strengths including the provision of resources which can lead to immediate benefits and classroom impacts. However, we consider that longer term, deep rooted and sustainable impacts are more likely to result from contact-based activities, and participation in project and network-based activities facilitated by the Centre. This also suggests challenges including how to extend reach with a limited regional fieldforce, and emphasises the importance of generating 'multiplier effects' through collaborations with regional partners such as Local Authority staff, National Strategy consultants and other local influencers.

6.2.2 *Impact on Professional Development Culture*

Many aspects of the professional development culture within schools and colleges presents challenges to extending reach and impact. The barriers to participation in professional development activities are well researched and include issues of both supply (such as the availability of suitable provision and awareness of it) and demand (such as cost, time away from school and perceptions of limited benefit). Influencing the culture of subject specific CPD represents a considerable challenge, and represents a long term mission where any observable change at the national level is unlikely to be achieved in the short or medium term.

At this time, there is little evidence that the Centre has had a measurable impact on CPD culture, for example through increasing the take-up of professional development activities overall or amongst schools where participation has previously been limited. While this is not surprising given the scale of the task and the short life of the NCETM, the evaluation findings suggest that engagement with the Centre may be concentrated in individual educators already convinced of the merits of, and participation in, professional development activities. In addition to extending reach overall, the Centre must engage with schools that have low participation rates in external CPD if it is to make a significant difference.

While the scale of the challenge is recognised, we consider that the approaches employed by the NCETM have the potential to have a positive influence on CPD participation. The NCETM model has been designed to mitigate against some of the key barriers to participation by promoting access to on-line resources and learning materials, collating information on regional provision and demonstrating the effectiveness of alternative approaches to traditional 'course based' provision.

The NCETM also has the opportunity to stimulate the demand side through the introduction of the self-evaluation tool, which allows teachers to assess their current capabilities and identify any development needs. The most recent version of the tool was introduced during the study, so its use and potential for impact was not explored in any depth. While the use of the tool will depend on portal use more widely, examples of its use were identified in consultations with educators, in one example across a mathematics department to explore issues of teacher confidence.

If interest generated by the self-evaluation tool is to convert into the take-up of professional development services, educators must be able to identify suitable and accessible provision. Here the Professional Development Directory (PDD) has a potentially important role to play, not least for schools with limited experience of sourcing mathematics specific provision in the past. However, consultations with Regional Coordinators, and subsequent exploration of the Directory on the portal, have raised questions over the comprehensiveness of its coverage and the way in which it is populated at the regional level. If

current levels of use are to increase, it will be essential that the Directory provides comprehensive and up to date coverage of training and professional development opportunities which can be accessed by educators at the local level and beyond. This will require considerable effort and time input to both populate and maintain – with providers needing to be convinced of the benefits for them of providing up to date information on a regular basis.

6.2.3 *The NCETM Portal and the Use of Networks – is the Model Working?*

As previous sections indicated, the NCETM has shown that it can have impacts on the educators engaging with it through both the portal and more direct activities. Views on the effectiveness of the model amongst individuals consulted were influenced by their degree of involvement with it, or reports of involvement received from others:

- The majority of educators using NCETM services considered them to be appropriate, beneficial and in the majority of cases resulting in positive impacts – however few could be described as making ‘comprehensive’ use of the different NCETM ‘products’ available.
- The views of the stakeholders consulted varied between those operating at the regional and national levels – with those closest to delivery being the most positive, while others were often unclear on the breadth of services available, and the Centre’s objectives and priorities, particularly at the national level.

Consequently few were able to offer evidence based views on the effectiveness or appropriateness of the NCETM model, although there was a uniform belief that a national ‘centre of excellence’ for mathematics teaching was a much needed resource.

On the basis of the evidence collected during the evaluation, we consider that the current model shows promise for the future, and that its components are capable of achieving positive impacts for the community it serves. The task facing the Centre, notably in terms of achieving visible and sustained change in both teaching standards and the wider professional development culture, is considerable, and while much promise has been illustrated areas for revision have also been identified.

The NCETM Portal

The use of the portal has been shown to be capable of delivering positive benefits for teachers that can be realised in the short term, through the provision of materials for direct use in the classroom. While both registrations and activity in terms of the number of hits have grown in the 2007/8 year, the levels of registration and repeat use described in Chapter 2 suggest low overall penetration across the school and college educator population – and that ‘depth’ of use may be limited in terms of the duration of visit and pages viewed.

Usage data and consultations with users suggest that the portal is yet to become a widespread and effective means of engagement - although not every user would be expected to access every element of it. As an example, the finding that some teachers involved in grant funded projects showed little awareness of the wider range of NCETM products is a concern. While the Regional Coordinators described making considerable effort to introduce the portal to potential users and setting it within the context of the NCETM mission, levels of subsequent use during project activity was less clear.

More broadly, the educator survey, review of the on-line fora and communities and comments from educators and regional stakeholders also suggest that portal use is variable in terms of frequency and depth, and portal data confirms the view that the resources section is the most commonly accessed.

While a preference for face-to-face rather than virtual professional development and other on-line activities was identified amongst some educators, others suggested areas where change in the portal could be beneficial. The survey reported that most respondents found the portal straightforward to use, although improvements were suggested, the more qualitative consultations collected more negative views around functionality and clarity. Whether these perceptions had deterred engagement amongst potential users was not clear.

Grant Funded Projects

The evaluation found that grant funded projects can play several important roles, including: raising awareness and engaging educators and other regional stakeholders; allowing new/'non-traditional' approaches to professional development to be experienced; delivering positive impacts with the potential for sustained change; and developing or refreshing networking between participants. They also provide content for the portal and other materials, although their placement under the 'Research' element of the portal (which received the lowest number of content hits in 2007/8) may restrict access to their findings.

The Network Case Studies, which focussed on grant funded activities, reported positively and showed that:

- A wide variety of 'networks' were supported – including existing and previous networks, with all having objectives consistent with the aim of the NCETM;
- The networks had impacted, or were expected to impact, on classroom practice – with in some cases teachers also being reinvigorated in their teaching;
- Collaborative working between the Regional Coordinators and Local Authorities was often highly productive, through drawing on existing local resources and lines of communication; and

- Networks including individuals in a position to influence others could be highly effective, particularly when strongly supported by the Regional Coordinators.

The direct impact of the Centre on the networks varied, from providing funding to implementation support through the Regional Coordinators. In some cases contact was more limited, informal or by email alone. The extent to which direct contact is needed varies with the nature of the network and local expertise available. However, in some cases Centre support was considered insufficient and NCETM impact was reduced accordingly.

The dissemination of learning outcomes from network activities is key to both extending impact and providing value for money, and the networks included some involving small numbers of teachers (where impacts could be considerable) and others with larger membership and a focus on transferable outcomes. The quality and relevance of the information submitted to the portal was variable, however, and self-evaluation amongst the case study networks was limited.

6.3 Recommendations

On the basis of our conclusions we propose the following recommendations.

6.3.1 *NCETM Objectives*

As the NCETM enters its third year of operation, and directs its activities towards working more closely with teachers, we recommend that the Centre reviews and formalises its strategic objectives. This will enable the Centre to articulate a clear sense of purpose, and communicate this to its staff, partners, stakeholders and educators at the national and regional levels. The revised strategic objectives should reflect a sharpening of focus overall, but particularly on the NCETM's unique role within the wider mathematics education community as an impartial facilitator of professional development. Consequently the increased uptake of the services of others should be an indicator of success for the NCETM.

The objective review process should involve the Centre's national partners and stakeholders, to allow common understandings and a sense of commitment to be established. The Centre should establish a clear set of priorities for the short and longer terms, to help identify where they and their partners can contribute to the achievement of common goals, and the Centre contribute to the goals of others. These priorities could also form a strategic agenda for grant and other programme activity on an annual basis.

The Centre must also consider, and detail, the specific mechanisms and activities by which their objectives will be achieved. We consider that the Centre and the Regional Coordinators' greatest potential lies in supporting professional development by: playing a facilitating role with groups of teachers; acting as 'honest and informed' brokers to direct teachers to appropriate

sources of support; and working with local partners to increase the level of engagement in development activities. Recommendations on the role the self-evaluation tool can play in stimulating demand are provided under 6.3.2.

Once formalised, the new objectives and priorities should be communicated more widely to other actual and potential partners, stakeholders and educators nationally. Here the emphasis should be on the practical, setting out the overall objectives of the Centre but with a strong focus on activities and ‘what the NCETM can do for you.’ This level of clarity should help address the variation in perception amongst many of the stakeholders and educators interviewed about both the aims and direction of the Centre and the products and services it provides. The provision of a clearly articulated facilitation offer to educators will also help the Centre’s efforts to penetrate the market and extend their reach in the regions.

While the revision of objectives, setting of priorities and articulation of activities will offer immediate benefits, the process will also provide a framework and foster a collaborative environment for planning in the future. Later recommendations relate to monitoring progress towards the Centre’s objectives and identifying its impact, which would also allow a process of annual review and target setting to respond to change in a rapidly moving policy environment.

Finally, the review of objectives and clarity of activity should also include the consideration of the suitability of the Centre’s current staffing structure to deliver the revised objectives. In addition to providing clear leadership and an enhanced sense of focus, the scale of the challenge facing the Regional Coordinators should also be considered. Later recommendations relate to the regional staff resources, but here we recommend that the professional development needs of existing and new staff are also considered to allow them to deliver their roles effectively.

Key Performance Indicators (KPIs)

Any revision in objectives must be accompanied by a review of the Centre’s KPIs –particular given the future focus on impacts. The revised KPIs should capture the use of the different elements of the Centre, the degree of penetration and impact resulting, and provide a clear measure of the progress made towards achieving its strategic objectives. They must also capture the less tangible, but nonetheless important, impacts of the Centre in terms of working with regional and national partners to stimulate activity and identify and fill gaps in professional development requirements.

Potential KPIs could include:

- Penetration rates – for example the number of teachers, schools and partners directly involved, estimates of the numbers having access to and using materials from the portal, and the numbers using NCETM services for the first time.

- The nature and extent of support provided – mapping use by service provided.
- Involvement with other partners and stakeholders – such as the number and extent of collaborative activities involving the NCETM, and the perceptions of partners and wider stakeholders of the added value the Centre offers.
- The impacts of NCETM activities on its stakeholders in the widest sense – including on educators, their pupils and students, and the wider mathematics infrastructure.
- The contribution of NCETM activities to the achievement of their strategic objectives plus distribution across regions.

We also recommend the introduction of a rating system to provide broad quantitative indicators for relationships with key stakeholders at the regional level, following a similar approach to that introduced by the SLCs. This would require relationships with, for example, all local authorities in a region to be rated by the Regional Coordinator on a 0 to 5 scale (with 0 meaning no contact, to 5 signifying close working relationships). This data would support the planning and targeting of Regional Coordinator activities, and reporting changes in relationships as part of wider performance monitoring.

Communication

Having clarified its objectives and the KPIs by which success will be measured, the NCETM needs to clarify its communication with the different areas of its wider community. This will mean tailoring presentation of the core vision and strategic objectives for different audiences. The evaluation has shown that there is confusion about what NCETM does, for whom and how, and this must be addressed as the initiative enters its third year of operation.

A clear communication strategy setting out how NCETM will get its core message out to potential partners and users will be required.

Community Engagement

NCETM's unique offering is as an impartial facilitator, which means that it needs to be working closely with all potential partners, essentially driving business to the suppliers of professional development and associated support. This requires the NCETM to proactively 'court' partners at both the national and regional level, with a starting position of how can the Centre help partners to deliver their goals?

We believe that there is scope for the current advisory group to be given a stronger role in helping to set the direction of NCETM. It could be re-configured as 'steering group', that 'has teeth' and a formal role in approving work programmes and strategies, thereby helping to position NCETM as the servant of a wider community.

Data Collection

Any revised KPIs will also require the introduction of appropriate data collection approaches. We recommend that:

- The Centre should set a 2008 benchmark for participation in CPD by mathematics educators, based on a representative survey of educators in different settings, funded by DCSF and undertaken on an independent basis.
- The Centre should commission follow-up surveys to track change in volume and nature of CPD received over time. These surveys could also provide information on the impact of educator interactions with the Centre.
- Additional data on impacts be sought from follow-up contact with participants in grant funded activities, and others receiving 'significant' NCETM inputs.
- Regional stakeholder surveys be undertaken, to capture more qualitative variables such as the value of NCETM collaboration, strategic added value and other variables. Undertaken on an annual basis, the survey would collect the views of a sample of stakeholders in each region and at different points on the relationship scale.
- A survey of national stakeholders be undertaken, on an annual basis, to explore engagement, benefits and strategic added value resulting from NCETM activities.

Data Utilisation and Communicating Success

In addition to meeting the requirements of the revised performance management regime, the Centre must also consider how it can make best use of the information it collects to inform future development based on evidenced good practice.

Similarly, the Centre should communicate its successes, particularly in terms of impact on educators and pupils, to its stakeholders at the regional and national stakeholders. This will help cement the NCETM as a partner of choice, as well as providing persuasive marketing materials to support efforts to engage teachers.

6.3.2 *Practical Steps to Extend Reach and Achieve Impact*

The NCETM must extend its reach if it is to achieve its mission of improving standards of mathematics teaching, and achieve significant and visible impacts on educators and their pupils and students. The following recommendations are proposed for the different elements of the NCETM model.

Regional Coordinators

We recommend that the NCETM considers the resourcing of the regional fieldforce on the basis of the task at hand, considering variables such as the

size of the region (in terms of numbers of schools/local authorities) and the nature of the regional professional development infrastructure. For example, local collaboration and support can be well developed in some regions through the auspices of local authority staff or other organisations, and less well developed in others. The emphasis should be on providing appropriate additional capacity where it is needed.

In recruiting additional staff, we suggest that experience of working in more strategic roles at the local authority or region-wide levels be considered a pre-requisite, in addition to mathematics teaching experience.

We also recommend that:

- Succession plans and handover strategies are put in place for the Regional Coordinators – to parallel the new contact database and ensure organisational memory is not lost.
- Opportunities to establish regional ‘bases’ are explored – to provide a physical location for the Regional Coordinators, for example by co-locating with other STEM partners, while recognising that no single site will be accessible for all parts of the region.
- The Regional Coordinators are informed of decisions on future funding as soon as possible, to help ensure the retention of staff and the relationships they have developed.

Finally, as an earlier recommendation described, the provision of professional development support for NCETM staff should also be considered, to enable them to fulfil their roles to the best of their capabilities. For example some Regional Coordinators have prior experience of national or regional roles, but others do not and would benefit from learning from the networking skills of others.

The Portal

Our main recommendations in regard to the portal relate to its structure and appearance, to facilitate enhanced use and clarity for users. We recommend that:

- The ‘front end’/first screen of the portal be reconfigured to direct progression by user ‘sector’ – i.e. pre-school/primary, secondary or FE, before offering different options and regional specificity.
- Any re-design ensures that the initial pages also provide clear descriptions of the portal options available, avoid over-complication and are as welcoming as possible to users across all levels of IT familiarity.
- A ‘new user’ option be included on the first screen, which provides a detailed explanation of each portal component to ease navigation and a short ‘virtual tour’ to highlight the key features.

- Key portal content be made available in 'hard copy' format – as a share of educators exist who are less likely to access NCETM materials and services if they are only available on-line.

The interim report also proposed a series of recommendations for the portal, which are reproduced below:

- Merging 'forms' and 'communities' into a single entity – and allow open access whether registered with the NCETM or not, to help raise use levels and avoid confusion over terminology. 'Hidden' communities could still be used for more sensitive/confidential discussions – such as between NCETM staff, groups developing bids, etc.
- Instigating an approach to closing inactive fora/communities – to improve site management and ease of use, with fora or communities not receiving posts for a period of three months being identified in the monthly portal statistics and considered for closure.
- Introducing a 'topic review' process – given the large number of topics with limited activity, redundant topics should be removed to focus attentions on those that are active.
- Establishing a process for opening new communities – to avoid unnecessary duplication and provide clarity to users. This process should include: requiring proposed communities to specify their purpose, topic coverage and proposed duration; checking whether similar communities already exist; and including new communities in the activity review process.
- Identify a way of recording unique URLs visiting the forums/communities, and identifying who is downloading resources, to establish a more detailed picture of portal use and allow follow-up contact to explore usefulness and exploit cross-selling opportunities.

The Professional Development Directory (PDD)

With regard to the PDD, we recommend that:

- Steps are taken to improve the coverage of the PDD at regional and sub-regional levels, to provide a comprehensive directory of mathematics professional development provision.
- A common approach is introduced to the collection of information from providers – with a common quality assurance process, and implemented centrally rather than use limited Regional Coordinator resources.
- Any information on provision is updated regularly – again through a centrally managed process.
- Access to the PDD, and the takeup of provision resulting, is monitored – to inform performance monitoring for the Centre, and provide evidence of benefits of inclusion for providers.

NCETM Events

We recommend that the number of NCETM 'events' targeting regional mathematics educators is increased, and delivered in partnership with local and regional influencers.

The nature of these events should be considered carefully, with smaller group 'workshop' sessions around specific themes being preferred by educators, rather than more formal conferences.

Grant Funded Projects

Given their success in engaging educators, stimulating activity and achieving learning and other impacts, we recommend that the Centre continues to offer, and increases resources for, grant funded regional projects involving teachers. Any shift in resource allocation from portal development towards activity with schools should be considered to support this recommendation.

To improve the effectiveness and impact of the grant funded projects, we recommend that the Centre considers:

- Moving towards a strategic commissioning model for allocating funding – developing a typology of projects that it wishes to fund, and promoting this through the Regional Coordinators and via the portal.
- Encouraging Regional Coordinators to work with Local Authority colleagues to identify opportunities and projects for teachers to work together.
- Encouraging opportunities for collaborative activity as part of projects to extend impact – notably with key local influencers and influential school staff.
- Requiring applicants for grant funding to consider how they will disseminate the findings of and materials produced by their projects, and how their activities might be sustained if they are found to be effective.
- Strengthening the weighting given to the likely penetration and impact of projects and their networks when considering bids – in the context of balancing depth and breadth of impact and value for money.
- Considering extending the duration of funding periods on a case by case basis to allow effective dissemination to take place.
- Ensuring that clear expectations of ongoing support are established between projects and NCETM staff, as appropriate to the needs of the project and those participating in it.
- Requiring all grant funded projects to undertake self-evaluation exercises – to ensure a process of reflection to identify impacts and key learning points, commensurate with the level of funding received.

- Introducing follow-up contacts with funded projects after completion - to identify impacts to populate KPIs, support further dissemination and identify additional support opportunities for embedding and impact.

The Self-Evaluation Tool

The self-evaluation tool has considerable potential to promote individual and collective review, and stimulate demand for professional development services amongst those who make use of it. To exploit this potential, we recommend that:

- The self-evaluation tool should be subjected to ‘peer review’ in the mathematics education community, so that it is widely accepted as an industry standard.
- The self-evaluation tool be promoted widely by the Centre as a means of initial engagement and needs identification – including encouraging and facilitating its use across school and college departments on a demonstration basis.
- Continued efforts are made to promote the use of the tool by other national and regional organisations, to stimulate self-review, identify professional development needs and establish as the tool the ‘standard’ for mathematics educators.
- Explicit links are enhanced between the outcome of the use of the tool and potential NCETM and partner services – extending the current options to include provision in the PDD, active regional projects and more region-specific examples.
- NCETM could consider developing an incentive scheme to subsidise implementation of school or department-wide CPD plans that are developed as the result of using the self-evaluation tool.

6.3.3 Recommendations for DCSF

We recommend that the Department considers how it can best influence other partners and the mathematics infrastructure to support the NCETM in achieving its mission. Supportive measures could include:

- Funding a benchmark study of educator participation in CPD activities in 2008, against which change in provision can be assessed in future years.
- Continuing to supporting progression towards the establishment of a Chartered Mathematics Teacher designation – to act as a lever to stimulate enhanced take-up of CPD.
- Explore opportunities for establishing a ‘CPD entitlement’ for mathematics teachers – to further stimulate participation in professional development activities.

ANNEX I – NATIONAL STAKEHOLDERS

Stakeholders from the following organisations took part in interviews to support this evaluation:

- Advisory Committee for Mathematics Education
- Association of Teachers of Mathematics
- London Mathematical Society (LMS)
- Ofsted
- Qualifications and Curriculum Authority (QCA)
- Royal Institution
- Secondary National Strategy
- Specialist Schools and Academies Trust
- STEMNET – central perspective
- Training and Development Agency for Schools
- National STEM co-ordinator
- Review of Mathematics Teaching in Primary Schools and Early Years Settings

ANNEX II – FORA REVIEWED

Forum name: ESOL (English for speakers of other languages), EAL (English as an additional language) and Mathematics

Description: This is a place for teachers to discuss issues and resources for developing EAL/ESOL learners' understanding of mathematics. It has been set up in response to requests from teachers for a forum in which to share ideas and strategies for teaching mathematics and numeracy to EAL/ESOL learners.

Number of topics: 2

Number of posts: 4

Number of posters: 3 (One is a regional co-ordinator who posted once)

Start date: 13/09/07

Last used: 14/10/07

Frequency of use: All September-October

NCETM input: Medium (1 of the posts) however did start the forum

One visitor wrote in about needing help to assess non-English speaking pupils' Maths levels, another responded with the same problem but no solutions or resolutions were provided.

Forum name: Access to London Mathematics Challenge

Description: An open forum for teachers involved in London Mathematics Challenge to share their Collaborative Practice Project work with the wider mathematics community through the NCETM.

Number of topics: 3

Number of posts: 8

Number of posters: 6 (One visitor has posted five times, all others have only posted once)

Start date: 15/06/07

Last used: 29/09/07

Frequency of use: All June, July, September

NCETM input: None

Most of the posts are from the person that set up the group describing the London Maths Challenge. In one discussion visitors posted items relating to the topic but did not appear to be reacting to each other or posting in response to what others have posted.

Forum name: Using Gattegno's Work in the Teaching of Mathematics

Description: Caleb Gattegno founded the Association of Teachers of Mathematics (ATM). He believed in using resources (eg Cuisenaire rods, geoboards and number charts) and images (eg rotating arm to introduce trigonometry, www.mathsfilms.co.uk) to make mathematics visible and tangible to students who would then use their powers of discrimination and description to develop concepts.

Number of topics: 2

Number of posts: 25

Number of posters: 10 (The visitors who set the two topics up have posted seven and five times (one of these is a regional co-ordinator), all others have posted between one and three times)

Start date: 07/10/06

Last used: 18/10/07

Frequency of use: Consistently to October

NCETM input: Medium

Visitors are sharing ideas about Gattengo, they are discussing and suggesting resources. Visitors are learning new things from this site as they are reading the books suggested to them by other visitors. The possibility of using the forum as an online book club about Gattengo where visitors comment on particular abstracts of writing was suggested, this was welcomed by other visitors. Information on meetings about Gattengos work was also posted. The group seems open to new visitors, inviting anyone to comment.

Forum name: National Maths4Life 'Thinking Through Mathematics' Launch (26 February 2007)

Description: A discussion forum to share ideas and thoughts about the Maths4Life 'Thinking Through Mathematics' resource pack and launch.

Number of topics: 9

Number of posts: 47

Number of posters: Forum was removed from NCETM site before the number of posters was counted

Start date: 26/02/07

Last used: 03/09/07

Frequency of use: All June and July 07 apart from one comment in September

NCETM input: Low

One visitor asked for information on where to find the thinking through mathematics resource pack and was helped by admin and a regional co-ordinator. Another visitor wants to post something but is unable to work out how to upload. A further visitor asked a question and got a selection of responses. Much of the conversation is commenting on the resources pack and launch. Discussion topics with questions or issues about the launch seem to be attracting a number of posts.

Forum name: NCETM is Launched

Description: A discussion forum to share ideas and thoughts about the launch of the new centre.

Number of topics: 8

Number of posts: 73

Number of posters: 36 (Eight are regional co-ordinators or admin, together they posted 20 times. One visitor posted nine times and a few posted three or four times but the majority posted only once or twice)

Start date: 26/06/06

Last used: 24/09/07

Frequency of use: Dispersed June 06-September 07

NCETM input: Medium

People are posting in their comments and criticisms of the portal. There are critical comments about the portal structure. For example:

- blogs and news are not in chronological order so are hard to see;
- there are too many communities;
- resources are muddled;
- there should be one big forum;
- there are not enough visitors for so many different sections; and
- technical aspects are always breaking.

Much of the conversation appears to be between regional co-ordinators and a visitor of the community debating the portal. There is also criticism that the NCETM do not give information about what they are doing but provide links to other websites. One discussion topic was placed in this area because the visitor did not know how to put it anywhere else.

Forum name: Primary Forum

Description: This is described as an open community, which for many people will be the preferred point of contact with the portal. Discussions cover curriculum, pedagogical and change issues related to primary mathematics. An aim is to collect 'Bright Ideas' - innovative classroom activities that have been successful. There is a promise to regularly update links to other sites of interest.

Number of topics: 26

Number of posts: 165

Number of posters: 41

Start date: 05/03/07

Last used: 01/11/07

Frequency of use: Frequent throughout

NCETM input: Low

The most popular topics are:

- Written Calculations subtraction: 29 posts
- Learning times tables: 19 posts
- Mean Modes: 14 posts

- Mental Arithmetic: 11 posts

The least popular topics are:

- New Framework changes: 0 posts
- Wanted Pop music times tables: 0 posts
- Creative ideas for addition or subtraction (yr 3): 1 post
- Great Date Today: 1 post
- Using Assessment in Mathematics: 1 post
- Successful revision for Year 6: 1 post

Although regional co-ordinators have posted a few items, they are not starting topics or keeping topics going. This is an example of a good forum, where visitors are posting their own questions and often getting responses, and sharing ideas for teaching techniques. Topics are fairly general, e.g. how to teach times tables and written calculation and subtraction. As well as sharing resources visitors are discussing the issues in-depth.

Forum name: The Maths Cafe

Description: *“A place to share ideas about teaching mathematics and discuss topical issues. Grab a coffee, pull up a chair and make new friends.”*

Number of topics: 99

Number of posts: 738

Number of posters: 152

Start date: 04/07/07

Last used: 07/11/07

Frequency of use: Frequent throughout

NCETM input: Low- Medium (generally commenting but not starting)

Different topics stimulate different levels of involvement, as shown below:

- 0 to 1 posts – 27 topics
- 2-5 posts – 33 topics
- 6-9 posts – 22 topics
- 10-15 posts – 5 topics
- 16-20 posts – 7 topics
- Over 20 posts – 5 topics

Topics that stimulate the greatest level on involvement include:

- Maths jokes – 53 posts
- Memory tricks in mathematics – 33 posts
- What is understanding – 29 posts
- What is understanding – 29 posts

- Perimeter assignment - Primary Maths – 27 posts
- Maths songs – 24 posts

When the discussion threads are picked up, the conversation is detailed and people are sharing ideas. People are often asking questions and others are writing in to provide suggestions and useful links. Many of the discussion lead to resolutions, with the creators of the group thanking others at the end. A lot of the topics have been started by different visitors.

ANNEX III – COMMUNITIES REVIEWED

Community name: Influence Network

Description: The network is open to those who support the professional development of teachers of Mathematics in Yorkshire & the Humber. It brings together AST's (Advanced skills teachers), Leading Teachers and consultants who work in Primary and Secondary schools. It offers the opportunity to share practice and update knowledge through regular meetings and the online community.

Number of topics: 12

Number of posts: 26

Number of members: 38 **Number of members who have posted:** 11 (The regional co-ordinator has posted seven times, all other members that have posted have done so between one and three times)

Start date: 17th May 07

Last used: 09/10/07

Number of resources: 2

Frequency of use: All between 3 and 9 October 07

NCETM input: Medium

Very few comments, most being posts with no replies, or posts with one response to/from the NCETM representative. Topics tend to be general mathematical discussions, as opposed to local specific.

Community name: West Midlands Teacher's Community

Description: A forum for teachers across the WM to work together in a supportive and developmental atmosphere. The idea is to stimulate debate about the learning and teaching of mathematics. It is a 'members only' community. However, applying to be a member is described as very simple the instructions are: *"just click 'Join' and be prepared to share your practice with others"*.

Number of topics: 13

Number of posts: 43

Number of members: 76

Number of members who have posted: 23 (The main poster was a Regional Co-ordinator with 13 posts, a few had posted three or four times, but the majority of posters (17) only posted once)

Start date: 30/01/07

Last used: 06/11/07

Number of resources: 5

Frequency of use: After meetings new topics are set up, comments are posted for a few days and then the conversation stops

NCETM input: Medium

Discussions tend to centre round meetings, comments are posted for a few days after a topic is started but there is little sustained conversation. Questions are asked and are most often answered by the Regional Co-ordinator and/or other members. Of the 13 topics only three have five or more posts, and seven have no or only one posts. Questions are generally about teaching methods, and the Regional Co-ordinator provides quick links to other relevant sites throughout conversations.

Community name: Watch and Learn

Description: This community is focused on using video to improve Professional Development.

Number of topics: 1

Number of posts: 3

Number of members: 24

Number of members who have posted: 3(two of which were regional co-ordinators)

Start date: 01/05/07

Last used: 17/06/07

Number of resources: 1

Frequency of use: May-June 07

NCETM input: High (2 comments from co-ordinators and only one from another member)

This community consists of one co-ordinator posting a video clip, another adding a similar video clip and one other person commenting. Although there are very few comments 24 people have joined this community, so it may have created some initial interest. The member that responded found the resource useful and asked for comments on 'wrong' maths but no responses were received.

Community name: Bringing Maths and Science Together

Description: January saw the first meeting of the Y&H STEM Collaborative Project Group. The meeting allowed Maths and Science Teachers to talk to each other about common themes. The community is intended to foster discussion about working together and experience of interesting work with Science Teachers.

Number of topics: 1

Number of posts: 3

Number of members: 30

Number of members who have posted: 3 (one of which is a regional co-ordinator)

Start date: 02/02/07

Last used: 22/06/07

Number of resources: 0

Frequency of use: February, March, June (1 post in each month)

NCETM input: Medium

The topic was created by the regional co-ordinator and two members responded. Discussion was about people's experiences of collaboration between maths and science, some ideas are presented, but it is mainly just personal opinion about the issue. No sustained conversation is taking place it is simply a thought and a response.

Community name: South West Teachers' Community

Description: This is a forum for teachers across the SW to share stories about their teaching in a supportive and developmental atmosphere. The idea is to stimulate debate about the learning and teaching of mathematics. It is a 'members only' community. However, applying to be a member is described as very simple: "just click 'Join' and be prepared to share your practice with others".

Number of topics: 3

Number of posts: 11

Number of members: 70

Number of members who have posted: 5 (a regional co-ordinator posted 5 times, the other members all posted once or twice)

Start date: 25/01/07

Last used: 12/07/07

Number of resources: 1

Frequency of use: Dispersed- spread over 7 months

NCETM input: Medium

Two of the three discussions were started by regional co-ordinator.

On one topic with 5 posts although only a few people are posting, they are sharing an idea and that idea is being developed and improved as it is tested.

Community name: London Subject Coach Network

Description: This is a community for members of the London Subject Coaching Network and is intended as a way in which members can keep in touch between network meetings.

Number of topics: 7

Number of posts: 12

Number of members: 30

Number of members who have posted: 4 (One is a regional co-ordinator posting 8 times, one is admin, one member has posted once and one member has posted twice)

Start date: 14/09/06

Last used: 03/07/07

Number of resources: 7

Frequency of use: Dispersed

NCETM input: High

This community has nearly as many posts as it has topics. Of the 12 posts only three are from members, all the rest are from the Regional Co-ordinator. The Co-ordinator is adding posts to inform people of new resources, however they receive very few responses.

Community name: Creative Maths in Newcastle

Description: A community for anyone interested in exploring teaching for creativity in maths. A number of Newcastle schools are collaborating with Creative Partnerships North & South Tyneside and this community is intended to provide a space where they can share experiences.

Number of topics: 12

Number of posts: 18

Number of members: 43

Number of members who have posted: 12 (one person has posted three times, three people have posted twice and eight people have posted once (one of which is a regional co-ordinator))

Start date: 05/02/07

Last used: 19/09/07

Number of resources: 4

Frequency of use: Mainly April 07- July 07 with one in September 07

NCETM input: Low

Of the 12 topics, nine have no posts, one had one post, one had two posts and one had three posts. One conversation between two people involves the sharing of an idea, but apart from that there is virtually no discussion taking place.

Community name: Statistics Teacher Network

Description: A support and professional development network for new and experienced teachers of statistics.

Number of topics: 13

Number of posts: 47

Number of members: 106

Number of members who have posted: 19 (One member posted 12 times, one posted seven times, one posted six times and one posted three times, the other 15

members posted once or twice (one of which was admin and one was a regional co-ordinator)

Start date: 11/08/06

Last used: 05/11/07

Number of resources: 2

Frequency of use: Fairly evenly spread throughout the life of the community

NCETM input: Low

Of all the topics only five have more than one post, the one with the most posts has 16, however nine of those have come from one member. Within that conversation, genuine discussion is taking place and people are sharing their views.

Community name: ICT in Mathematics

Description: This is a community for sharing good practice in the use of ICT in teaching and learning mathematics. Members are advised to “*use this community to share resources and lesson plans*”. A commentary on research findings and how they can be implemented in the classroom may also be shared through the community.

Number of topics: 12

Number of posts: 57

Number of members: 166

Number of members who have posted: 21 (There is a roughly even spread of members posting between one and five times, one poster is a regional co-ordinator who posted twice)

Start date: 13/07/07

Last used: 06/11/07

Number of resources: 15

Frequency of use: Fairly Frequent

NCETM input: Low

There is a mixed level of discussion, some discussion have received little reaction, whereas in others people are sharing ideas and thoughts. Some topics are promoting debate and there are examples of members helping each other find resources.

ANNEX IV – HIDDEN COMMUNITIES

Community name: London Maths Challenge Bromley Cluster

Description: A community for teachers from schools and FE colleges in Bromley involved in the London Mathematics Challenge.

Number of topics: 22

Number of posts: 62

Number of members: 17

Number of members who have posted: 9 (One member has posted over 40 times, all other members have contributed five times or fewer. Only two posts came from admin)

Start date: 30/06/06

Last used: 01/11/07

Number of resources: 18

Frequency of use: Random spread, many topics started in July 06 and then spread from January 07- November 07

NCETM input: Little

Many of the posts are the dates and details for meetings. Most of the discussion topics only have one or two comments. One member of the group is dominating the posts (and statistics). Members appear to be posting resources for each other to share. Some discussions are simple one word chats, whereas others are more detailed discussions of between 3 and 8 posts.

Community name: NMTSS Community

Description: This 'hidden' community is for all those involved in the National Mathematics Teachers' Summer School (NMTSS) run from 27 August to 2 September 2007 at Robinson College, Cambridge.

Number of topics: 12

Number of posts: 37

Number of members: 78

Number of members who have posted: 14 (15 of the posts come from one of the regional co-ordinators. Of the other 13 people who have posted, one has posted five times, three have posted three times, two have posted twice and seven have posted once)

Start date: 17/07/07

Last used: 03/11/07

Number of resources: 6

Frequency of use: Consistent posts over last three months

NCETM input: Medium

In the topic with the most posts (12) there is little discussion or debate going on, people are generally commenting that they found an article. In general it appears that people are adding resources or comments and others are thanking them for their contribution, there is little discussion of the issues or debate. About half of the discussions were started by the regional co-ordinator. Topics raised are generally about different techniques to use in classrooms.

Community name: The SW Collaborative Professional Development Research Project

Description: A 'hidden' community for those involved in the SW Collaborative Professional Development Research Project

Number of topics: 7

Number of posts: 19

Number of members: 23

Number of members who have posted: 6 (Of the six people who posted, two are regional co-ordinators, one posting 11 times and the other posting once. One member posted 5 times, 2 posted twice and one posted once)

Start date: 26/03/07

Last used: 28/09/07

Number of resources: 7

Frequency of use: A couple of comments a month from April- September

NCETM input: High

One topic has nine comments, whereas the others all only have one or none. In the topic with nine comments discussions are backwards and forwards between the regional co-ordinator and other members. Resources are posted and comments are made about them, discussion is not really in-depth about issues but requests for resources or brief responses to resources.

Community name: Devon Action Research Community

Description: This community is for those Maths teachers who are involved in the Devon Action Research Project and is intended as a way to keep in touch and share ideas.

Number of topics: 5

Number of posts: 18

Number of members: 13

Number of members who have posted: 6 (One member has posted eight times, another has posted four times, another has posted three times and three have posted once, one of which is admin)

Start date: 26/09/06

Last used: 18/10/07

Number of resources: 8

Frequency of use: Several in October 06 and then some in June 07

NCETM input: Very low - only 1 comment.

One member asked that a file be set up for older resources to make way for new ones, admin did not respond. A discussion took place about the need for more people to upload resources to be shared. There are eight resources on the site but no discussion of them. Little conversation about issues is taking place, many posts simply thank people for attending meetings.

Community name: Vision without leadership is a dream. Leadership without vision is a nightmare. Managing change in mathematics teaching and learning in Slough primary schools.

Description: The purpose of the forum is to share and discuss what successful management of mathematics is in primary schools using the renewed primary framework as a mechanism for change. Participants are all mathematics subject leaders or local authority consultants.

Number of topics: 3

Number of posts: 10

Number of members: 10

Number of members who have posted: 4 (One member has posted five times, one has posted three times and the others have posted once)

Start date: 02/03/07

Last used: 03/06/07

Number of resources: 2

Frequency of use: March- June a couple of posts in each month

NCETM input: None

Very little discussion, two of the topics are merely about joining the group. The other topic contains a conversation about local schools, with few posts. Group appears to be specific to a few people.

Community name: The Oldham Project

Description: This is a 'hidden' community for those involved on the (NCETM grant-funded) project, to facilitate communication with each other and to share our findings.

Number of topics: 4

Number of posts: 5

Number of members: 15

Number of members who have posted: 3 (Two members have posted twice and one has posted once)

Start date: 15/06/07

Last used: 02/10/07

Number of resources: 4

Frequency of use: 5 posts over 4 months

NCETM input: Low

Four topics have been created and only one has a response which is a one sentence comment. One member and a regional co-ordinator both added a topic to ask a question about the usefulness of the portal, with no responses being received.

Community name: NCETM Grant holders

Description: A 'hidden' community for all NCETM grant holders to share views, support each other and access resources

Number of topics: 2

Number of posts: 6

Number of members: 33

Number of members who have posted: 4 (One member posted three times and three posted once, one of whom was a regional co-ordinator)

Start date: 19/09/07

Last used: 07/10/07

Number of resources: 2

Frequency of use: All end of September beginning of October

NCETM input: Low

The group was set up to provide a place to discuss issues affecting grant holders. Two posts were added that welcome the community as a good place to share ideas, but apart from this one person asked a question which has not been answered, and another having trouble downloading a resource and was told how to do it. No other discussion has taken place in this community.

ANNEX V – RESOURCES REVIEWED

Resource	What is it about?
Case Study: St Day & Carharrack Community School	St Day & Carharrack Community School is one of the NCETM Pathfinders - read about their experiences.
Coxhoe Primary School's Mathematics Pages	A huge collection of resources and links for teachers and learners of mathematics at Primary Level put together by the teachers of Coxhoe Primary School in Durham.
BBC SkillsWise Maths	A collection of activities including fact sheets, games and quizzes to support the adult numeracy curriculum. Topics are also related to the national curriculum. The links to current TV programmes are a bit forced. This is a popular site - would be useful to have feedback on how it is used by teachers.
Catcode on Trigonometry	Catcode provides lesson ideas in a whole variety of topics using java applets. Of particular interest is the section on using java to teach trigonometry.
The Simpsons and Maths	The Simpsons has established itself as an award-winning international pop culture phenomenon. It is the longest-running sitcom of all time and one of the most literate television programmes on the air, containing many references to subject matter and scholars from various academic fields, including mathematics. Al Jean, Executive Producer and head writer, has a bachelor's degree in mathematics from Harvard University. Several episodes of The Simpsons contain significant mathematics that relates to material normally covered in classes. For these reasons, this programme is an ideal source of fun ways to introduce important concepts to students, reduce maths anxiety and motivate students.
MathsNet	MathsNet is maintained by a maths teacher and offers a wealth of resources to support teaching and learning which can be used in the classroom or by individuals. Sketches webpage offers excellent java based applets which seek to demonstrate mathematical applications. Very user friendly, simply select a mathematical model and watch an interactive model drawn.
1000 Problems	Structured around the Framework for KS3, but suitable for KS4 as well, this site extends the exemplar materials to "showcase the beauty and unexpected nature of Mathematics, as opposed to the utility of Numeracy alone."
Stats4Schools	Managed by the independent Office for National Statistics, this website as data banks that pupils can use in projects or coursework and lesson plans and ideas for teachers. Topics covered include population, household chores, tourism in London and travel to school.
The Association of Teachers of Mathematics	The ATM website offers information and resources on supporting mathematics in all phases of education. Resources include activities for teaching and learning, publications, papers, research theories and conferences.
Teacher Resource Exchange	The Teacher Resource Exchange is designed to help teachers of all subjects to share and develop teaching resources and activities. Teachers have submitted more than 2,000 contributions containing over 4,000 attachments.

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