NCSL National College for School Leadership

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Account of practice

What are we
learning about...?

'Making mathematics count' in school networks

Moving towards a subject learning community...

Leading into Learning NLC

An illustrative example of what effective network practice for improving teaching, learning and leadership in mathematics looks like in action.

Networked Learning Communities

learning from each other | learning with each other | learning on behalf of each other

Moving towards a subject learning community...

The accounts of practice presented within this series are generated from the work of practitioners involved in school networks. They aim to reflect the best of what is known from networked learning in action in order to provide concrete examples of networked learning practice. In particular, they provide a practical illustration of the significant elements we have found to be evident in school learning networks when developing network practice for effective teaching and learning in mathematics.

> ***"Across the country, teachers of mathematics have been teaching, enquiring and learning together. By creating subject-specific learning networks, they are finding ways to solve some of the problems currently facing the profession. More importantly, they are improving the learning experiences of children in classrooms and schools, and in a diverse range of contexts nationwide"***

There are now many schools, both in the UK and internationally, that are benefiting from working together as a network. By drawing upon their experience, and from the range of research that has been undertaken in school networks, it is possible to identify how networks of teachers are helping to address three key issues associated with effective teaching and learning in mathematics.

Three characteristics of network practice for effective teaching and learning in mathematics

1. ***Doing mathematics together in networks to enhance specialist subject knowledge and increase the supply of confident teachers of mathematics.***
2. ***Planning and working together in networks to ensure that the current and developing mathematics curriculum, assessment and qualifications framework meets the needs of all learners.***
3. ***Problem-solving and learning together in networks to provide the infrastructure required to support mathematics teachers effectively, particularly in terms of their continuing professional development.***

The four accounts in this series explore in different ways and with differing emphases the characteristics of effective network practice for improving and developing effective teaching and learning in mathematics. Consideration of these factors when developing learning networks of mathematics teachers and other mathematics practitioners will help ensure that future development is built from the best current thinking and practice. We hope that these accounts of practice will, therefore, be of practical use to you – if you are considering setting up a network, are part of a newly formed or established network, or if you are simply interested in finding out more about making mathematics count in school networks for the benefit of both teachers and children. □

Acknowledgements

We would like to thank all those who contributed to the generation and publication of these accounts of practice: Debbie Adams, Jo Clarke, Jacqui Darrington, Rita Davidson, Karen Gardener, Jenni Gayter, Sian Harrison, Martin Hole, Sylvia Jones, Kim McEwan, Carol Morgan, Melissa Murphy, Philippa Pickering, John Westwell and the mathematics teachers and Local Authority colleagues in Blackburn with Darwen.

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Lead Developers

Moving towards a subject learning community...

The *Leading into Learning* Networked Learning Community is made up of the nine high schools in Blackburn with Darwen working in partnership with the Local Authority. This account of practice describes the development of a mathematics network over the four-year period since 2001.

Beginnings....

Back in 2001, a network for heads of mathematics was already established. The group met once a term and was supported by a Local Authority school improvement officer. There was also an annual mathematics conference for both secondary and primary mathematics teachers.

In the same year, the National Key Stage 3 Strategy was launched. Working on prior experience, we felt that it was important to develop a local response to the national strategy. We did not want to implement rigidly all the national recommendations, but instead find ways of working that were appropriate to the local context.

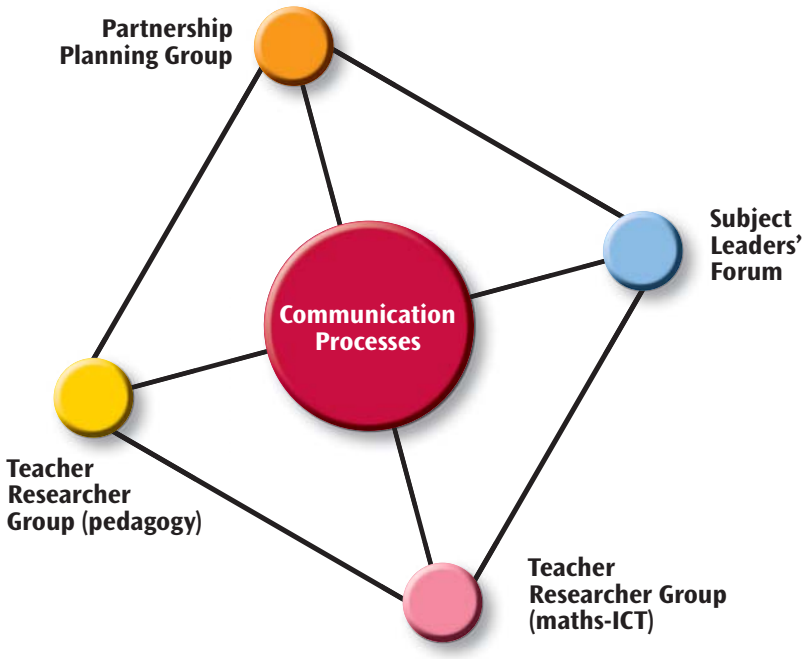
This included an emphasis on building on existing good practice, seeking to collaborate across schools wherever appropriate and using national approaches selectively. One example of this was the decision not to identify leading mathematics teachers, but instead to establish a teacher researcher group with members from each school.

Emerging ways of working...

A variety of approaches to collaborative learning and working have been tried over the four-year period. Most have of these have been refined over time as we have learnt more about what proves to be effective. In this account, five of the main ways of working will be described.

Following details of each of the activities, there are reflections on how well they have worked. Some of the key lessons learnt about effective networks will be offered. Finally, our vision and plans for the formal establishment of a subject learning community will be outlined. □

Figure 1 Five network activities

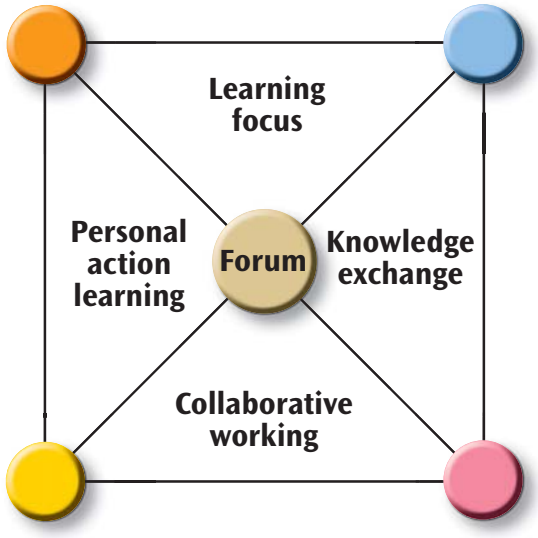


Subject leaders' forums

What do we do?

Heads of mathematics, and sometimes their seconds in department, meet regularly to learn together. In the early days, this was for a whole day, once a term. The current pattern is one whole day, two half days and three twilights in a year, which both increases the regularity and reduces time away from teaching. Each forum may now have four elements. They have been facilitated by the Key Stage 3 consultancy team.

Figure 2 Structure of the forum



When we began the forums the learning focus was often driven by Key Stage 3 Strategy agendas. Gradually, we have recognised how important it is for the subject leaders themselves to set the learning agenda. Recently, Assessment for Learning in mathematics, GCSE changes and working with lower-attaining pupils have all been addressed.

The knowledge exchange process has recently been formalised, although some of the exchange did happen in an unstructured way previously. A standard set of prompts is used.

Knowledge exchange prompts

1. Have you heard that …?...*news relevant to heads of maths*
2. I have used and would recommend…*literature, resources, websites and people*
3. Something we do at our place… *sharing practices that are working*
4. Would you like a copy of …?... *policies, plans, resources produced in the school*
5. Would you like to come to…?...*invitations to visit the school or observe teachers*
6. Can you help me by…? …*with any of the above*

The personal *action learning* element in each forum provides leaders with a supportive context to talk through an issue they are working on back at school. Using a learning set process, leaders present the issue, answer questions and listen to suggestions as to the way forward.

Time is also allocated for discussion of collaborative work whether that be the other professional learning groups or the collaborative planning work.

How well does it work?

Subject leaders very much value the forums for a number of reasons:

- ***Reducing the isolation.*** It is easy to feel alone in a leadership role, so the forums very quickly help to dispel this as you meet with colleagues facing similar challenges.
- ***Useful sounding board.*** Subject leaders appreciate using the forums as a sounding board where they can safely air their thinking and questions.
- ***Sharing ideas and practice.*** There has been a willingness to share practice from early on. Now, with the structure provided by the knowledge exchange process, there is an abundance of knowledge being shared.
- ***Openness about performance.*** As the trust has grown within the group, there is now a willingness to discuss standards achieved in each other's schools and to explore reasons for the differences.

With these positive benefits it is to be hoped that the group will develop further through more informal contacts being made outside the forums. There is also the potential for the subject leaders to become genuinely critical friends as well as supportive colleagues to each other. □

Teacher researcher groups

As was indicated above, the decision was taken early on to establish a teacher researcher group rather than identify leading mathematics teachers. Heads of maths were asked to nominate teachers who wanted to enquire into their own practice and who also wanted to learn and develop together with others.

Group 1 – Pedagogy focus

The first group focused its research on developing teaching and learning. In the first year, teachers mainly explored questions relating to lesson structure. In the next two years, the group's broad research question was 'How do we *engage* pupils in the learning of mathematics?' Most recently, the group has been considering teaching approaches that work with lower-attaining pupils. Within the constraints of the broad research question, individual teacher researchers identified their own research focus.

The group met for regular seminars facilitated by the Key Stage 3 Mathematics Consultants. The timing and length of the seminars changed in the same way as the subject leaders' forums. It was particularly important to increase the regularity in order to sustain momentum in the research. The elements of the seminars evolved over time, but gradually settled on three important aspects.

Structure of the seminar

- stimulus related to research question
- action research methods
- discussion of ongoing personal research

We believed it was important to offer new ideas and approaches to the researchers in each seminar. This might be reading an article or paper, watching a video or having a guest speaker. After the first year, it became clear than an *action research model* was most relevant to the teachers and so seminars addressed different skills required within this approach. Finally, the seminars were a crucial place for the researchers to clarify their plans, discuss progress and present initial findings.

Outside the seminars, teacher researchers received some 'critical friend' support from consultants and were expected to share their work with their head of department and team. Support was also offered in writing up their research.

Group 2 – ICT in maths focus

A second research group was established in 2003. The broad research question for this group was 'How does the use of ICT enhance the learning of mathematics?' It quickly became clear that using the same action research model was too demanding in this area. Most of the teacher researchers were still developing confidence in their use of ICT in maths. Instead, a form of the *research lesson model* is being used. Given the differences in the group, seminars also have a different structure.

Structure of the seminar

- software clinic
- knowledge exchange
- reflection on lessons
- research lesson methods

The software clinic allows teachers to resolve each other's problems with software and interactive whiteboards. The knowledge exchange has a similar structure to the subject leaders' forum, but with the focus on ICT in maths. A key part of the seminar is to reflect critically on a recent lesson, particularly on the impact of ICT.

How well does it work?

The teacher researcher groups have both been effective in encouraging the following:

- ***Enquiring rather than implementing.*** Teachers have valued being able to pose their own questions relevant to their own practice.
- ***Seeking evidence of impact.*** The research process has raised awareness of the need to gather different forms of evidence and to reflect more deeply about practice.
- ***Encouraging experimentation.*** Being part of the research group has given an extra stimulus to teachers to try new approaches.
- ***Renewing enthusiasm.*** Being allowed to direct their own learning, being amongst others who are also enquiring, and being given some time to think have all combined to renew teachers' enthusiasm for their work. □

Collaborative planning

New approaches to planning was one of the key emphases of the Key Stage 3 Strategy for mathematics. In 2001, a number of schools in the network made the decision to develop new plans for KS3. It was therefore seen as an ideal opportunity for real collaborative working.

Partnership planning groups

Four schools decided to work together with the Key Stage 3 Consultant to develop unit plans for Years 7, 8 and 9. Using medium-term plans written by the consultant, the group worked together on producing short-term plans and, where necessary, the associated resources. The whole process took three years.

In the first year, there was just one group of teachers working together. In the second and third years, there were four separate planning groups, each working on a few units. The number of people involved was increased because we believed the process of *collaborative planning* was as important as producing the finished plans. Groups met for two occasions when planning any particular unit. In the first meeting, the objectives of the unit were considered in detail and possible sequencing in the unit addressed. Also, difficulties pupils have with the topic were discussed. In the second meeting, more attention was given to identifying or developing the resources and activities needed to address the planned objectives.

How well does it work?

The collaborative planning process has led to a number of benefits:

- ***Better quality plans.*** By pooling the efforts of several teams and giving more time to the process, better plans have been produced.
- ***Professional dialogue.*** The process encouraged in-depth dialogue about teaching and learning mathematics.
- ***Changed planning culture.*** Participating teachers now view the planning process differently and value collaboration.

Although such a large project would not be attempted again, the process can be applied to much smaller collaborative planning tasks. ☐

Communication processes

Some of the positive benefits of the new ways of working and learning collaboratively have been described above. However, we have faced two significant communication challenges:

- How do we sustain communication amongst group members in the time between forums and seminars?
- How do we ensure that what is being learnt in the groups reaches all of the mathematics teachers in our network?

In response to these questions, we have experimented with a number of communication processes. This is still very much a work in progress, but some of our reflections on issues are outlined below.

Communication processes

- contact details (especially email)
- group blogs
- learning products
- e-newsletters

For every group, we issue contact details including email addresses. Some teachers still do not use email regularly, so any attempt to set up email group discussion was unsuccessful. Also, trying to reach people on the phone in other schools is notoriously difficult. We have also experimented with the use of *blogs*, initially for each group and more recently a single blog for the whole network. This provides a virtual space for the sort of knowledge exchange that goes on in forums and seminars. However, as with any web-based discussion, there needs to be a critical mass of people prepared to participate.

For each of the groups we have attempted to capture the emerging knowledge through various *learning products*. Depending on the group, this may be case studies, action research reports, research lesson reports or unit plans. However, it is difficult to ensure this process is not too onerous, whilst still producing something that is accessible and helpful to other teachers.

Most recently, we have started using *e-newsletters* to report on the work of the different groups. These are sent out to all maths teachers (by email) soon after a group meets. These are proving to be well received. ☐

End note

As we consider how we have developed as a network over the last few years, we can now be confident that the network builds capacity in the maths teams, has an impact on the culture of those teams and so has an indirect impact on levels of attainment and quality of learning. During the first three years of the Key Stage 3 Strategy, Blackburn with Darwen LEA results were in the top five of the most improved nationally for mathematics.

Looking back...

Many lessons have been learnt along the way about what makes for an effective network, sometimes after making mistakes, sometimes after reflecting on accidental successes. Some of what we now understand is outlined below:

Relationships matter: The network only thrives when there are trusting and collaborative relationships established. This takes time. People need time to get to know each other and time to build confidence in each other.

Sustained learning groups: The most significant professional learning happens over time as ideas are tried, reviewed and adapted in school. This is why it is important for teachers to be part of learning groups that are sustained over time.

Professionals setting their own learning agenda: It is vital that teachers take control of the learning agenda based on their understanding of their own local context. As they become more evidence based in their decision-making, priorities for professional learning can be identified more easily.

Time for learning: The network activities only happen if teachers have time to participate in them. The learning that is then stimulated will only become embedded in their practice if teachers have time in school to plan and reflect on their actions.

Dedicated leadership and facilitation: For a network to succeed it needs leadership with a vision of what is possible and determination to make it happen. This then needs to be backed up by facilitators who are able to give dedicated time to supporting the life of the network.

Looking forward...

From network to learning community: Building on the work of the last few years, we are now at the point as a network where we want to move to the next stage in our development. We now believe that it is more appropriate to think of ourselves as a *subject learning community.*

Membership and purpose: The community will be made up of all the mathematics teachers in our NLC and its purpose will be to enhance the learning of mathematics for all pupils across our schools.

Leadership: The community will have a leadership group made up of some subject leaders, the Community Co-ordinator and the Community Lead Professional. They will have shared responsibility for setting the collaborative working and learning agendas for the community, as well as monitoring its effectiveness.

Community activities: The community will use some of the ways of working and learning together described in this paper, as well as new forms that will emerge. Headteachers have agreed to protect six twilight sessions during the year for subject learning communities. For the first time, this will allow all maths teachers to participate in groups and so increase the scope of what is possible.

Facilitation structure: A teacher will be seconded to act as the Community Co-ordinator. This person will facilitate the community activities, research best practice, support communication processes and do one-to-one work with teachers. The Local Authority has agreed to appoint a Lead Professional who will teach in the co-ordinator's school during the year's secondment. Each year a new person will act as Community Co-ordinator. We will also seek to develop partnership relationships with mathematics education staff in Higher Education.

In many ways, we believe that we have only just begun to discover how much can be achieved through working as an effective mathematics learning community. So it is with eager anticipation that we look forward to the next stage in our development. □

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The 'What are we learning about…?' series is designed to make public the learning that has emerged from NLCs in the last two years.

The first nine titles in the series will focus on:
What are we learning about…?

- LEA involvement in school networks
- Establishing a network of schools
- Community leadership in networks
- ***'Making mathematics count'* in school networks**
- The impact of school networks
- Sustaining a network of schools
- Facilitation within school networks
- Professional development in school networks
- Leadership of school networks

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