

LEADING
PRIMARY
MATHEMATICS

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LEADING PRIMARY MATHEMATICS

CATHERINE FOLEY,
JANE McNEILL &
STEPHANIE SUTER

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SAGE Publications Ltd
1 Oliver's Yard
55 City Road
London EC1Y 1SP

SAGE Publications Inc.
2455 Teller Road
Thousand Oaks, California 91320

SAGE Publications India Pvt Ltd
B 1/I 1 Mohan Cooperative Industrial Area
Mathura Road
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SAGE Publications Asia-Pacific Pte Ltd
3 Church Street
#10-04 Samsung Hub
Singapore 049483

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Assistant Editor: Diana Alves
Production editor: Martin Fox
Marketing manager: Dilhara Attygalle
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PART A

LEADING MATHEMATICS LEARNING

The two chapters that form this part provide starting points for leadership. Chapter 1 establishes a model of leadership that takes into account the whole range of subject, pedagogic and affective insight that form the basis of effective leadership. It examines how these insights, together with curricular development and reflective evaluation, can lead to enhanced children's learning. We encounter a range of subject leaders, and meet a recently qualified teacher still building her confidence in her own mathematics teaching. Further case studies provide a window into action planning and implementing change across a range of schools.

Chapter 2 explores the difficult issues surrounding attitudes towards mathematics within and beyond the primary school, beliefs about mathematics as a subject and approaches to developing a mindset conducive to sustaining mathematics learning. Examples from the UK and abroad are presented, and case studies focused upon – using mistakes as part of the learning process, tackling gender differences and gaining insight into particular children and their mathematical experiences as a catalyst for reflection.



1

BECOMING A LEADER OF MATHEMATICAL LEARNING

KEY QUESTIONS TO CONSIDER

- What does mathematics leadership encompass within and beyond the classroom?
- Does leadership really matter?
- Should mathematics in school be led by one person or many?
- What is the link between formal qualifications, training, confidence and competence to lead mathematics? (Do I have what it takes?)
- What else do I need to know about in order to lead mathematics well?
- How do I know where to start?

Mathematics is well established as a core element of the primary curriculum. Often a subject that generates strong feelings amongst children and adults alike, impressions of themselves as someone who either can or cannot 'do' mathematics can become embedded in children's minds before they leave primary school, and become increasingly difficult to shift. Leaders of mathematical learning, both within and beyond their own classroom, therefore need to be able to take account of a wide range of individual, school, local, national and international influences on the mathematical development, competence and confidence not only of the children in their care but also the adults working with them.

This chapter explores the importance and nature of mathematics leadership, including the types of subject, curricular and pedagogic knowledge necessary to lead mathematics learning as a teacher. It looks at different models of subject leadership and considers how the subject leader can identify priorities for leadership and sources of support. Implications for mathematics leadership are explored through the vehicle of case studies.

Overview – setting the context

In establishing what we mean by leading mathematical learning, let's think about the experience of just one child, in one class, in one school, on any particular day. We will call her Sahdia, and place her in Year 3, the middle of her primary-aged schooling in England, in a mathematics lesson. Is she learning from a textbook or exploring practical apparatus, or both? Is she discussing with a talk partner, working in a mixed attainment group, or being taught in a top-ability mathematics set? Does she have choice of the methods she uses, or is she rehearsing a learnt technique? Is she sat at a desk, or learning outdoors? Does she evaluate her own work, believe that she can succeed if she perseveres or despair when marking reveals a page of incorrect answers? The answers to these questions, and many more besides, will come down to the nature of leadership of mathematics in her classroom, school and local area, and how it mediates the national and contemporary context to create conditions that influence her learning.

What does mathematics leadership encompass within and beyond the classroom?

The model presented in Figure 1.1 underpins all discussion around the leadership of mathematics throughout this book. It positions the subject, pedagogic and affective insight of the leader as the starting point, with curricular and reflective evaluation building upon these and leading to enhanced learning, both of the leader and of the children in their school.

Much has been written about the role of subject knowledge including personal mathematics qualifications, pedagogic knowledge and understanding of the detail of

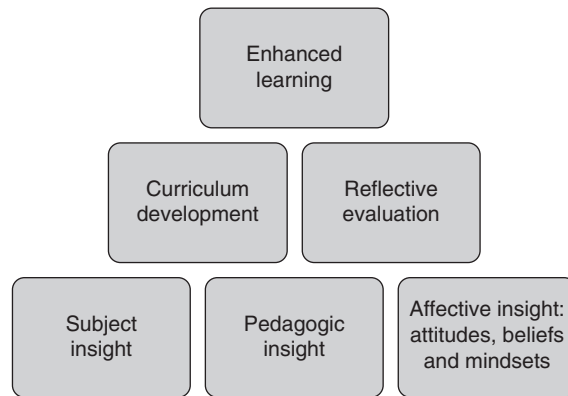


Figure 1.1 Aspects of mathematical leadership

the curriculum, both in effective mathematics teaching itself and leadership of the subject. However, the key element of our model often missing from models of mathematics leadership is the acknowledgement of the contribution of attitudes, beliefs and mindsets in the teaching and learning of mathematics. The current or future leader has little chance of making a difference to the taught curriculum or their own reflective development, and ultimately children's learning, if they rely purely upon subject and pedagogic insight and do not tackle attitudes, beliefs and mindsets around mathematics.

Does leadership really matter?

Whilst leadership takes many forms and is a complex and contested concept (Hammersley-Fletcher and Strain, 2010), its importance is well established: 'School leadership is second only to classroom teaching as an influence on pupil learning' (Leithwood et al., 2006: 4). We will take as our starting point that the approaches of leaders and what they do on a day-to-day basis have the greatest influence on outcomes, rather than the exact model adopted within a school (PricewaterhouseCoopers, 2007). The impact of leadership on individual children and the adults working with them is played out through who is doing the leading, what they do and how they interact with others, and how they are empowered to carry out their role.

There have been various attempts to move forward the leadership of mathematics over recent decades in England. Perhaps the most notable of these was the Mathematics Specialist Teacher Programme (MaST) arising from the Independent Review of Mathematics Teaching led by Sir Peter Williams (Williams, 2008). Amongst other recommendations, this report proposed that each primary school should have at least one mathematics specialist teacher, drawn from the existing workforce to 'in effect "champion" mathematics in the school and act as mentor and coach, as well as being an

outstanding classroom teacher' (Williams, 2008: 4). The role of this specialist teacher included:

- sharing responsibility for improving mathematics teaching within the school
- acting as peer coach and mentor for serving teachers, newly qualified teachers (NQTs), teaching assistants and trainee teachers
- leading collaboration within and between schools
- leading on intervention for children struggling with mathematics and provision for those identified as mathematically gifted and talented.

Although the MaST programme ended in most areas long before the number of mathematics specialists envisioned by Williams was reached, it left a considerable legacy. Its model, with its three-fold foci of subject knowledge, pedagogy and collaborative working with others, was acknowledged as a success (Walker et al., 2013) and is drawn upon to underpin the models of leadership advocated here.

More recently, there has been a two-pronged attack in increasing the proportion of teachers able to take a specialist role in leading mathematical learning in the primary school. The first of these relates to the provision of mathematics specialist routes into initial teacher training, supported by an increased training bursary. The second relates to the initiatives coordinated by the National Centre for Excellence in the Teaching of Mathematics (NCETM), for example those targeted at developing mastery and funded as part of the 'Maths Hubs' programme in the United Kingdom. These latter initiatives focus on those already teaching and leading mathematics. If the new leader of mathematics is feeling daunted, remember that these large-scale models are just one aspect of leadership; actions taken on a day-to-day basis within your own classroom or influencing peers are just as important if not more so.

Should mathematics in school be led by one person or many?

With a growing awareness of the limitations of individual leadership (Harris, 2010), much of the focus of leading mathematics follows a distributed model, in which many people play a part. To a certain extent all teachers are leaders, sometimes purely of learning in their classroom but often more widely as they seek to support and influence the practice of others. In this way leadership of mathematics in the primary school comes in various guises, many of which will be explored in greater detail within the remainder of this book. Leadership may entail, for example:

- leading children through learning a new topic or approach
- developing a new calculation policy to be implemented throughout the school
- working with a cluster group of schools to develop a new assessment approach
- monitoring and evaluating standards and progress for different identified groups of children

- purchasing and developing the use of new resources to support a practical approach to developing number sense
- leading parental workshops targeted at helping parents to play mathematical games with their children
- trying out a new approach to marking before sharing it with colleagues
- identifying, researching and disseminating local best practice in integrating ICT or outdoor learning into teaching.

In other words, mathematical leadership should be embedded throughout every level of interaction in the primary school, from the trainee or NQT leading learning in their own class for the first time, to the head teacher and governing body with ultimate responsibility for standards and progress across their school. These aspects of leadership are influenced in turn by what might be seen as the ‘macrosystem’ (Bronfenbrenner, 2009): the social and cultural influence of national policy making, changing curricular models and assessment systems. As can be seen in our first set of case studies, leaders operate in a wide range of contexts with varying levels of sole or collective responsibility.

CASE STUDY

Five leaders of mathematics

Hayley has had sole responsibility for leading mathematics in her primary school for seven years. She works in a single-form entry primary school, and is a class teacher rather than being a member of the senior management team. She has minimal time to carry out her role in leading mathematics, and works hard to ensure that her role is more than that of maintaining resources and checking data. She sees her main tasks as keeping colleagues up-to-date through staff meetings, signposting resources, supporting teaching and analysing results.

Tahira is not only the subject leader but also the senior teacher of her small primary school. She came to the role with a passion for mathematics, having previously worked in a bank. As part of her leadership role she has a half-day per week out of the classroom, much of which she spends working with her colleagues implementing new approaches to mathematics teaching. It is this aspect of the role that she finds most challenging – having attended mathematics coordinator training, she feels well informed about changes in mathematics teaching but not in the people skills she needs to manage change.

Ryan is one of a team leading mathematics in a large primary school. His main role is in giving things a go in his own classroom before trying to lead change elsewhere. As a new teacher in his second year, he recognises that working as a team has allowed him to learn from more experienced colleagues and temper his enthusiasm with finding good places to start: ‘It’s bringing those ideas together and then producing something that we can use as a school to move them forward.’ Having a degree in mathematics before moving into

teaching, he aims to take on a role in leading mathematics beyond his own school in the future.

Kamila is a trainee teacher nearing the end of her training. Having spent several years in the nursery, one of her biggest fears was leading children through mathematics learning in her placement in a second school with 6- to 7-year-olds. She worked through this experience using a combination of careful observation of experienced colleagues, trial and error with supportive feedback, and sheer hard work in researching and getting to know the curriculum expectations. Growing her experience in this way enabled her not only to embed mathematics in the indoor and outdoor provision for her class, but also to take responsibility for leading medium-term planning and managing the work of other adults in the setting.

Having been identified as an inspiring teacher of mathematics, Deanna's head teacher suggested that she applied to become a mastery specialist teacher. As well as leading mathematics in her own school, she has attended additional training and is developing her understanding and skills of teaching for mastery in her own class before branching out into leading work with her colleagues and local schools.

These examples convey some of the similarities and differences between leading mathematics in different contexts and settings, and at different points in a career. This might be working as part of a well-defined subject leadership team across a primary school, having strategic leadership for all aspects of mathematics teaching and learning within a school, or leading learning within your classroom. Each poses its challenges and requires the kind of knowledge, skills, understanding and attributes explored throughout the rest of this book.

NOW YOU COULD ...

Things to do and further reading

- Identify your own starting point. Are you already a mathematics subject leader, undertaking an element of mathematics specialism as part of your initial teacher training, or interested in taking on this role in the future?
- Ask a head teacher or deputy about how mathematics is led in their school. Is one person responsible for leading mathematics in their school, or many? What time do leaders get to carry out their role, and how do they work with others?
- Find out more about the theory underpinning leadership in primary schools: Hammersley-Fletcher, L. and Strain, M. (2010) Power, agency and middle leadership in English primary schools, *British Educational Research Journal*, 37(5), 871–884 makes a good place to start.

What is the link between formal qualifications, training, confidence and competence to lead mathematics? (Do I have what it takes?)

When training to teach, a key shift many new teachers go through is from assuming that their role is to deliver lessons which result in children paying rapt attention and making instant learning gains, into understanding their role as that of a leader of learning. A key element of this shift is in developing the kind of subject knowledge that allows you to make connections; many of the authors' trainees have been heard to admit, 'I thought I understood this, but it's only when I came to teach it that I researched it properly and really picked it apart.'

The role of mathematical qualifications in teaching and leading mathematics is contested. Suggate et al. (2010) question the value of qualifications in this context; they suggest that primary teachers need to know their mathematics 'differently' as much as they need to know 'more' (2010: 9–10). As Donaldson et al. suggest (2012), the knowledge that $2 + 3 = 5$ would seem straightforward. However, if children are only taught to read this as 'two plus three *makes* five', how will they be able to interpret the number sentence $5 = 2 + \square$ in the future? In this example deep subject knowledge is not about having more mathematics qualifications at a higher level: instead a teacher with deep knowledge might help children gain conceptual understanding by using some of the approaches in Figure 1.2.

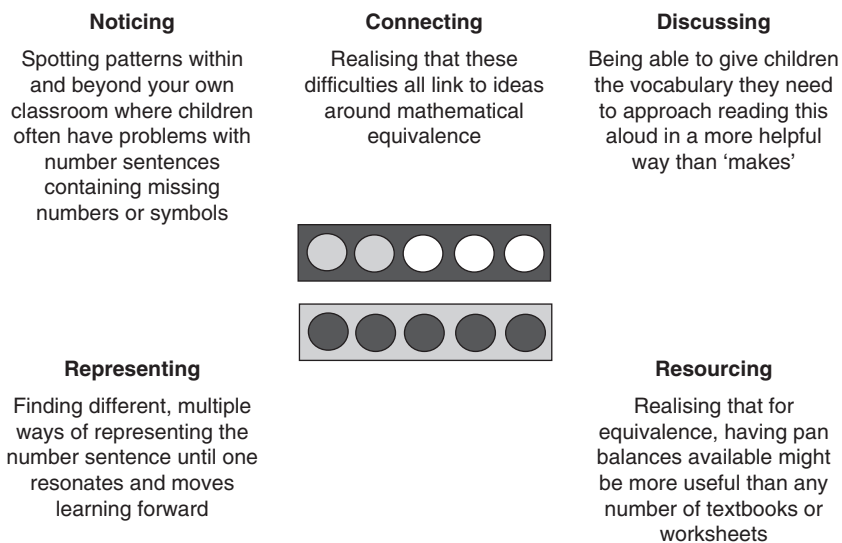


Figure 1.2 Approaches to developing children's understanding of equivalence

One possible framing of the kind of in-depth subject knowledge needed for this kind of leading of learning is that provided by Shulman (1986), that of subject-matter, pedagogical and curricular knowledge. This model is important as it suggests that it is the interaction between these different types of knowledge that has the potential to provide a basis for leading children's learning.

This way of thinking about subject knowledge has been developed further by Rowland et al. in terms of their work on the 'knowledge quartet' (2009: 26). Their research into how different kinds of knowledge of and for mathematics teaching are manifested (during observations of student teachers) has been organised into a framework based on four 'dimensions', which may well resonate with the reader when reflecting on their own experience. These are:

- Foundation – having the knowledge and understanding of mathematics itself, mathematics pedagogy, and beliefs about mathematics as a subject.
- Transformation – being able to represent, analogise, illustrate, explain and demonstrate ideas in a way that makes the necessary learning accessible to children.
- Connection – being able to plan and teach coherently within and across episodes; and sequencing and connectedness of ideas.
- Contingency – the ability to respond to and deal with the unexpected.

More recently, in reviewing and making recommendations regarding *Professional Learning for All Teachers of Mathematics*, the authors of the 2016 Advisory Committee on Mathematics Education (ACME) report acknowledge two types of knowledge: that held by teachers 'about mathematics' (their proficiency, specialist knowledge and understanding of mathematics as a topic); and 'about teaching mathematics', seen as a wide range of knowledge including how to explain mathematical ideas, model and encourage discussion, assess learning and identify errors and misconceptions, and how to structure and sequence mathematics within and beyond the mathematics curriculum.

NOW YOU COULD ...

Things to do and further reading

- Reflect upon and audit your own development and underpinning knowledge of mathematics against the ACME priority areas: ACME (2016) *Professional Learning for All Teachers of Mathematics: Principles for Teachers, Senior Leaders and Those Who Commission and Provide Professional Learning*. This is available to download from www.acme-uk.org/policy-advice/teacher-education-and-development/professional-development/professional-development-learning-journeys.
- Jot down three characteristics that make you a current or potential leader of mathematics. These might be qualifications, prior experience, feedback you have received, an ability to transform mathematical concepts into a format that children can

understand, or simply your passion for mathematics. Looking at the knowledge quartet model introduced above, where do your strengths lie and where might you need to focus?

What else do I need to know about in order to lead mathematics well?

To date, we have focused upon the context for leading mathematics, basic models of leadership and underpinning subject knowledge in all its different guises. Returning to our building-blocks model (Figure 1.1), various elements of knowledge are necessary for you to be confident you can lead mathematics well and reach the desired end-point of enhancing learning in your classroom, school or setting. Each element of the table will need examination in much greater depth, and you can find support for each aspect as you dip into the remaining chapters of this book.

Table 1.1 Aspects of knowledge for leading mathematics learning

Focus	Myself and my class	Within the school community	Beyond the school
Subject insight	<p>What subject knowledge strengths and areas for development do I have in relation to the expectations of the taught curriculum?</p> <p>Do I have an appreciation of the mathematics taught before and beyond my own age range?</p>	<p>What subject knowledge do my colleagues have in relation to the expectations of the taught curriculum?</p> <p>Where are parents and carers well equipped to support their children, and where might they need more support?</p>	<p>What support is available to help me become familiar with new areas of the curriculum?</p>
Pedagogic insight	<p>How is mathematics currently taught in my classroom?</p> <p>What do strategies such as reviewing recordings of my teaching and talking to children tell me about teaching and learning in my classroom?</p>	<p>How is mathematics currently taught in my school and how do I know?</p> <p>Is there consistency of approach based on best practice?</p> <p>Who are the strongest teachers in my school and are they utilised to support others?</p>	<p>What is the current thinking around mathematics pedagogy, including international developments?</p> <p>Does this build on or improve that which has gone before, or is it a step backwards?</p> <p>What local and national support is available to keep abreast of new approaches?</p>

(Continued)

Table 1.1 (Continued)

Focus	Myself and my class	Within the school community	Beyond the school
Affective insight	What attitudes towards and beliefs about mathematics do I hold?	What attitudes and beliefs about mathematics are held by: <ul style="list-style-type: none"> • my peers? • the children in the class/school? • parents, carers and the wider community? 	What is cutting-edge research saying about attitudes and mindsets and their impact on mathematics teaching? How is mathematics portrayed by society?
Curriculum development	How well do I lead children through the current curriculum content? What does assessment tell me about their strengths and weaknesses?	How do our standards relate to the curricular content and expectations? What curriculum do we currently provide beyond the statutory curriculum? Is this fit for purpose?	What does the current statutory curriculum say about mathematics teaching? What can I learn from the curriculum in high-performing countries?
Reflective evaluation	What opportunities/tools do I build into my practice to reflect on the impact of my mathematics teaching, and what is this revealing? What have been my recent priorities for development and how have I taken these forward?	Do teachers currently have time and space to reflect upon, evaluate and improve their teaching? What school systems exist to help teachers to respond to ongoing evaluation?	What models are available to support reflective evaluation? How can I look beyond my classroom to relate my practice to that of others across the country/globe?

NOW YOU COULD ...

Things to do and further reading

- Select one of the cells in Table 1.1 and use this as a starting point for reviewing your knowledge of yourself and your practice, your school community or the wider world of mathematics education.
- Write (on a separate sticky note) different sources of knowledge about mathematics for leadership. Over a sensible timescale, aim to become better informed about one of them at a time, noting implications for yourself or your school.

How can I know where to start?

In reading this far, you may be feeling rather daunted about taking on mathematics leadership in a primary school, developing your role as a subject leader or looking to

Which of these statements reflect the current teaching and learning in your mathematics lessons?

- We use active and hands-on teaching approaches including well-planned models, images and practical resources.
- We actively encourage reflection on learning.
- We use rich questioning and discussion.
- We take time to develop understanding of each new concept.
- We focus on using and applying skills in order to extend mathematical knowledge.
- We identify misconceptions as starting places for concept building.
- We are responsive to the needs of each pupil and allow additional time before moving on when required.
- We ensure that children enjoy challenging mathematics.
- Our learning environment, displays and grouping strategies give the message that mathematics is valued and attainable by all.
- Our pupils use a range of independent learning strategies.

(Adapted from subject leader support materials at www.ncetm.org.uk/resources/25072)

There are many audits available online, whether you want to gain an overview of mathematics in your school or look at something more specific – such as the outdoor learning environment or provision and use of practical resources to support conceptual development.

Start small and with your own practice

All teachers bring with them their own background, knowledge and experiences of mathematics teaching which in turn inform how they approach leading mathematics within and beyond their own classroom. For some, this may entail channelling negative experiences of the past into a determination to make a real difference to future generations of mathematics learners.

CASE STUDY

Ashleigh

When she first dreamed of becoming a qualified teacher, Ashleigh's lack of formal qualifications in mathematics became a significant barrier. Hers had never been an easy relationship with the subject, fuelled by the feeling that every time she was on the cusp of grasping a concept, the teaching moved on and her understanding was lost. She engaged a tutor, resat her mathematics GCSE to meet the entry requirements for initial teacher training, and passed the required professional numeracy skills test at the third attempt.

Much to her surprise, as she progressed through her training year Ashleigh found that many of the most positive observations of her teaching were in mathematics. She speculates that this may be because she paid more attention to detail: 'I think all the time, "How am I going to help them understand, when I never understood what anyone was saying to me?"' She worked hard to hone her key questions, ensuring that she pinpointed and tackled where children were struggling rather than allowing herself not to recognise their difficulties.

Now, Ashleigh is a nursery teacher. As an early years teacher Ashleigh has to lead mathematics provision in her setting, ensuring that her colleagues can also recognise the kind of anxiety amongst the children that was so prevalent in her early experience, and give them the space, time and support they need to play with mathematical ideas and overcome their fears. 'I know that areas of the mathematics curriculum will always be challenging for me', she reports, 'but I never want them to feel like I did.'

Set up a file

Whether you prefer to have everything in hard copy or to work electronically, it can be reassuring to have everything in one place. The Primary Support Team based in Oxfordshire suggest collating the documents in Table 1.2 as a starting point for a subject leader file.

Table 1.2 Suggested contents for a subject leader file

School plans	School Development Plan (SDP) with annotated maths sections Maths action plan
Policies	Mathematics policy Calculation policy Links to other policies (e.g. assessment, marking and feedback, inclusion)
School data with analysis	Comparative data analysis Internal tracking – attainment, progress and consideration around 'narrowing the gap'
Moderation	Work samples, including dated records of when undertaken
Planning	Long-term curriculum plan Medium-term planning Daily planning
Monitoring	Lesson observations/learning walks Planning scrutinies Work scrutinies Pupil voice Learning environment

(Continued)

Table 1.2 (Continued)

CPD record	Subject leader Teachers (including staff meetings, internal/external training) Supporting adults
Resources	Budget and spending Wish list

Work together

Not only can tackling any kind of curriculum change or pedagogical improvement be daunting; also it can be ineffective if one person tries to impose their will or ideas on the rest of the staff. A good way can be to work with one colleague to try something out in your own classrooms before developing it with others. This might be:

- taking mathematics equipment out of cupboards and drawers, and storing it on tables so each child has access to the resources they need at all times
- switching around the lesson structure so children explore problems first before coming together for targeted teaching.

You might start by asking yourself two simple questions: What do I want to change? And who could I work with to learn together?

Develop an action plan

We will consider this by way of a case study.

CASE STUDY

New subject leader prioritising actions towards a mathematics action plan

When Heleena was given the role of mathematics subject leader in a school where raising standards was a key target she realised that there were many potential areas for development so she needed to work strategically, taking an evidence-based approach to development planning:

- She used existing school data and other evidence to clarify mathematics targets. These included: developing effective use of mathematical language and securing mathematical fluency in number facts and calculation.
- Heleena gathered wider evidence around these areas, for example gaining teachers' perspectives through a questionnaire and carrying out learning walks, pupil interviews and book scrutiny.

- She carried out personal research to develop her insight into good practice in identified areas, using research evidence and guidance provided by professional bodies such as the NCETM and NRICH.

Heleena reviewed the evidence she had gathered to clarify an overall goal for the year: To promote inclusive teaching that enables mastery for all. She placed this at the top of a mathematics development-planning pyramid model, similar to that in Figure 1.4, and then worked 'backwards' down the pyramid identifying key elements of practice and actions to build towards this goal.

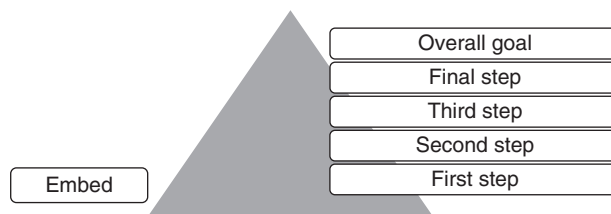


Figure 1.4 Mathematics development-planning pyramid model

By working from the overall goal backwards, Heleena had effectively prioritised development actions, clarifying important first steps and developing a vision for how these would build towards the school's overall goal. Evidence had shown, for example, that limited fluency in selecting and using core number facts and calculation strategies was impeding children's mastery of new learning. She identified that adopting and adapting the 'On the Boil' approach promoted within the Local Authority (Primary Support Team, 2014) would make a good starting point towards addressing this.

Heleena then mapped out the actions she had identified into a mathematics action plan using the school's development plan format, for each action adding in data collection and evaluation activities, which would be used to review its ongoing impact. Each term, this review of the impact of the plan on standards of teaching and learning in maths was used to adapt actions for the subsequent term.

Reflecting on this development planning approach two years later, Heleena identified two key elements which had contributed to the plan having a positive impact on teaching and learning: firstly, throughout the process, strong use was made of data and other evidence to ensure that development was strategically focused; secondly, the 'pyramid' model had provided a useful framework to identify clear steps towards achieving the school's overall goal.

Look beyond the immediate school

With over 17,000 primary schools in England and Wales, a positive development in recent years is that schools are increasingly encouraged to work together, whether in formal Teaching Alliances or Multi-Academy Trusts (MATs) or in more fluid geographical

or context-based clusters. The advantage this gives is that rather than having to choose between either relying on a sole subject leader or looking externally to ‘experts’ delivering a one-off session without knowledge of the local context, the subject leaders can pool their experience and expertise. The following case study provides an example of one such partnership and how they are tackling the recent pace of curriculum change.

CASE STUDY

Whitley Excellence Cluster

The Whitley Excellence Cluster serves a socially and economically deprived area to the south of Reading. Working with children in one of the most deprived wards in the country, the head teachers and staff of the primary, secondary and early years settings have long held the view that (rather than seeing themselves as being in competition) the needs of the children are best met by the schools working together to overcome the challenges facing them. The mathematics subject leaders form a close-knit team, supported at times by staff from the local university teacher-training institute, and more recently by the Whitley Excellence Cluster consultant.

- 1 When the statutory curriculum in England was revised in 2013, the subject leaders worked together to create their own scheme of work. They met regularly to map out what the curriculum might look like term by term for each year group, and to identify elements of mathematics to keep ‘on the boil’ throughout each term, and challenges the new curriculum might pose for colleagues in their school. Of course since its development and implementation the scheme of work has evolved and been adapted for the needs of each school, but working through the process together gave the group the chance to pool their expertise and also gave each subject leader the confidence to lead staff development training in their own school.
- 2 Building on their success with the scheme of work, the group then set about creating their own cluster-wide calculation policy. Much debate was had about the role of different models and images, progression in key ideas (just how do we get from mental to standard written methods of division?), the balance between rapid recall and application of number facts, and whether children should have many methods or one. The outcome was a visual guide that could be used in each classroom and shared with supply teachers, trainees and teaching assistants.
- 3 Working together, the cluster put together guidance to develop fluency as part of their introduction of mastery in mathematics – more of this in Chapter 5.

This case study illustrates the power of working together. Leadership can be distributed not only across individuals within a school but also across a range of schools, increasing the sharing of expertise, knowledge and skills.

NOW YOU COULD ...

Things to do and further reading

- Visit the Maths Hubs website (www.mathshubs.org.uk/) to find out what Hubs operate in your local area.
 - Look for your local branch of a subject association for mathematics such as the Association of Teachers of Mathematics (www.atm.org.uk/) or Mathematical Association (www.m-a.org.uk/) to find out what is happening in your local area.
 - Try out one of the starting points suggested above, whether it be making a small change to your own practice or auditing mathematics provision across the school.
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CHAPTER SUMMARY

In this chapter we have introduced a model of mathematics leadership designed to ensure that not only subject knowledge and pedagogic awareness but also affective insight, curriculum development and reflective evaluation all work together to enhance children's learning. We met Sahdia and considered how the way mathematics is led impacts on her day-to-day experience of mathematics teaching and learning. We have acknowledged that leadership of mathematics comes in many forms, from leading a specific group of children through learning on a new topic, to being a head teacher or subject leader in a large primary school or academy chain. Each of these types of leadership places demands on the individual or group involved, whether these relate to deeper understanding of particular aspects of pedagogy, increased understanding of international models of teaching, enhanced subject or curricular knowledge or a development of the ability to reflectively evaluate teaching and work with others to achieve change.

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