

System leadership: policy implementation in mathematics and science professional development

Analysis of policy implementation in mathematics and science professional development (Strand 2)

Overview: presentation and reflection/discussion

1. The rationale, methods
2. The SLP and Maths Hub programmes
3. Influences on the programmes
Discussion and reflection (1)
4. Professional development leadership roles as implementation mechanisms
5. The interplay of formal and informal leadership across system levels
Discussion and reflection (2)
6. Adaptive leadership and coordination of professional development and learning
Discussion and reflection (3)

Why research the Maths Hubs and Science Learning Partnerships?

- Maths Hubs and Science Learning Partnerships are two government-funded subject hub networks – with varying degrees of balance between national direction and locally ‘school-led’ or Multi-Academy Trust-led delivery
- Hub networks are central to English government’s education policy
- They have some characteristics of other policy-led networks
- SLPs and Maths Hubs were the first two hub networks – representing a development and changed activity of previous professional development provision (Science Learning Centre network and the NCETM) – survived and adapted to policy change and a changing educational and professional development landscape
- Successful implementation over nearly 10 years:

Successful policy implementation

	Features	The programmes
Acceptability	Acceptable to users: User response (Lendrum and Humphrey, 2012) Satisfaction, credibility (Proctor et al., 2011)	Programme activities are widely taken up Networks and organisations are widely respected Programmes have high levels of user satisfaction
Reach	Reaches intended users Uptake, adoption, spread and access (Proctor, 2011)	Both networks have achieved considerable reach – Maths Hub 50% of schools and colleges nationally, SLP with smaller funding also has considerable reach.
Sustainability	Programme is sustainable Continuation and maintenance, (Greenberg, 2005; Proctor et al., 2011) durability, incorporation, integration, level of institutionalisation (Proctor, 2011)	Implementation over a 10-year period during which the composition of area leads, number of Hubs and Partnerships, and the programme offered has changed but the programmes have continued
Replicability	Replicable in different settings and contexts Adjust customize programmes for a time, place, and context (Century and Cassata 2016) Replication, and diffusion the program or programme mechanisms. Geenberg et al., 2005)	The Hub and Partnership models have been spread geographically to different contexts Programme delivery models and mechanisms have been replicated and adapted for different users and content

Professional development leaders' roles in policy implementation

STEM teacher professional development policy analysis

1. Policy analysis of STEM CPD policy: building on Royal Society funded *Landscaping of Mathematics Education policy* <https://royalsociety.org/-/media/policy/projects/maths-futures/landscaping-international-mathematics-education-policy.pdf>

2. Comparative case study of Science Learning Partnerships (SLP) and Maths Hubs:

National level – SLP network and Maths Hub network – interviews with national leads and documentary analysis

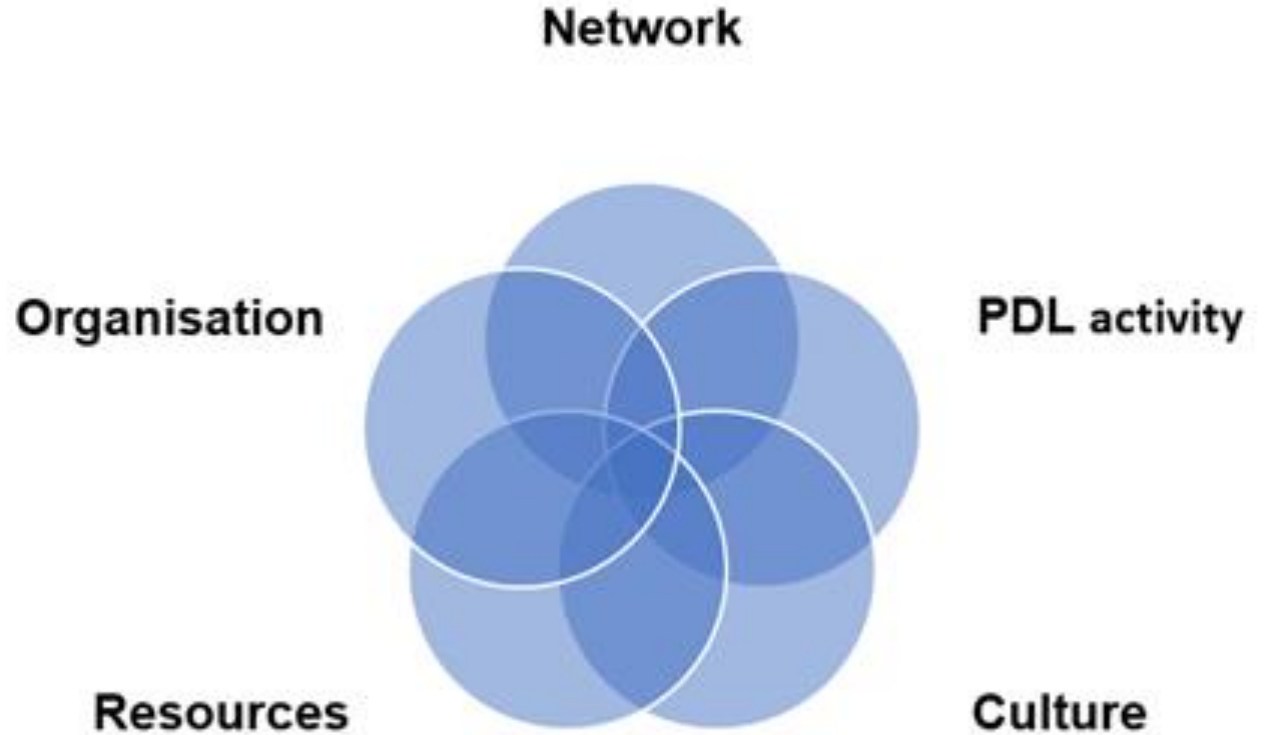
Regional – six SLPs and five Maths Hubs – interviews with SLP/Hub leads and professional development leaders (planned 1 of each SLP/Hub but more complicated in practice)

Methods: further detail

Methodology	<p>Review of policy texts: generic CPD policy and Science and Mathematics specific CPD policy</p> <p>Multiple case study of Science Learning Partnerships and Maths Hubs</p>
Case studies	<p>National Cases: the Maths Hub Network and the Science Learning Partnership Network</p> <p>Area cases: 5 Maths Hubs, 6 SLPs</p> <p>Sampling for a diverse range of locations, length of time organisation has led the SLP/network; overlap of geographical areas – including Hubs and SLPs led by the same organisation</p>
Fieldwork team	<p>Four researchers, working across the SLPs and Maths Hubs</p> <p>Included researchers with different levels of familiarity with SLP or Maths Hub</p>
Data collection	<p>National Cases – Interviews, documents, and correspondence with STEM learning SLP leads and NCETM leads</p> <p>Area cases interviews with:</p> <ul style="list-style-type: none"> • 5 Maths Hub Leads/Assistant Leads and 4 Maths PD facilitators • 6 SLP leads; 3 PD facilitators <p>Interviews by videoconferencing, recorded and transcribed</p>
Analysis	<p>Case analysis using a framework informed by models of CPD implementation and PD leaderships</p> <p>Cross Case analysis across SLPs and Maths Hubs</p>
Ethics	<p>The research was undertaken with institutional ethical approval, following recognised guidelines including that voluntary participation.</p>

- **Systems perspective:** networks and hierarchies, vertical and lateral relationships, complexity
- **Professional development model:** mode, agency, sociality, knowledge, purpose
- **Professional development leadership:** roles, complexity leadership, system leadership

Modelling the PD programmes



The Maths Hub and SLP networks

System level	Maths Hub	Science Learning Partnership
National	NCETM	STEM Learning
Regional	40 Maths Hubs	29 SLPs
Professional development leadership activity systems	Work groups, programmes	Courses (mainly)
Local (schools and teachers)	Potentially hundreds of schools and thousands of teachers engaged with each SLP or Hub	

Maths Hubs and SLPs: what they are, what they do and leadership roles

Knowledge Applied

	Maths Hubs	Science Learning Partnership
Professional development activity (summary, in practice more complicated with crossovers and variation)	<p>Workgroups – collaborative PD, centred on teachers', department or school practice on a specific focus</p> <p>Programmes – like a training course or series of workshops</p> <p>Communities – looser, similar to professional learning networks</p>	<p>Core programme of 80+ courses of varying lengths on specific topics</p> <p>Supplemented by themed subject network meetings, bespoke offers, coaching and mentoring</p> <p>Complements National Centre's on-site programme</p>
Professional development content and participants	All phases, with Mastery central 12 of 25 work groups (policy delivery focus) and more primary than secondary focused	All phases with majority secondary focused Teachers and technicians
Professional development leadership: coordination	National coordination by NCETM and regionally, by Hub Lead and primary, secondary and post-16 leads	National Coordination by STEM Learning, regional activity by SLP – usually one Hub lead with possibly an additional primary lead in larger SLPs
Professional development leadership: design of PD provision	Central NCETM team supported by Hub leads	STEM Learning designers with local leads contracted to produce PD materials for specific courses
Professional development: facilitation	<p>Local Leaders of Mathematics Education (LLMEs) including designated Mastery Specialist leads</p> <p>National programmes by NCETM staff</p>	<p>Hub leads or small number of PD leads contracted to deliver specific courses</p> <p>National programmes by STEM Learning</p>

Looking across system levels

Policy

Government strategy, funding

National

Country-wide organisations

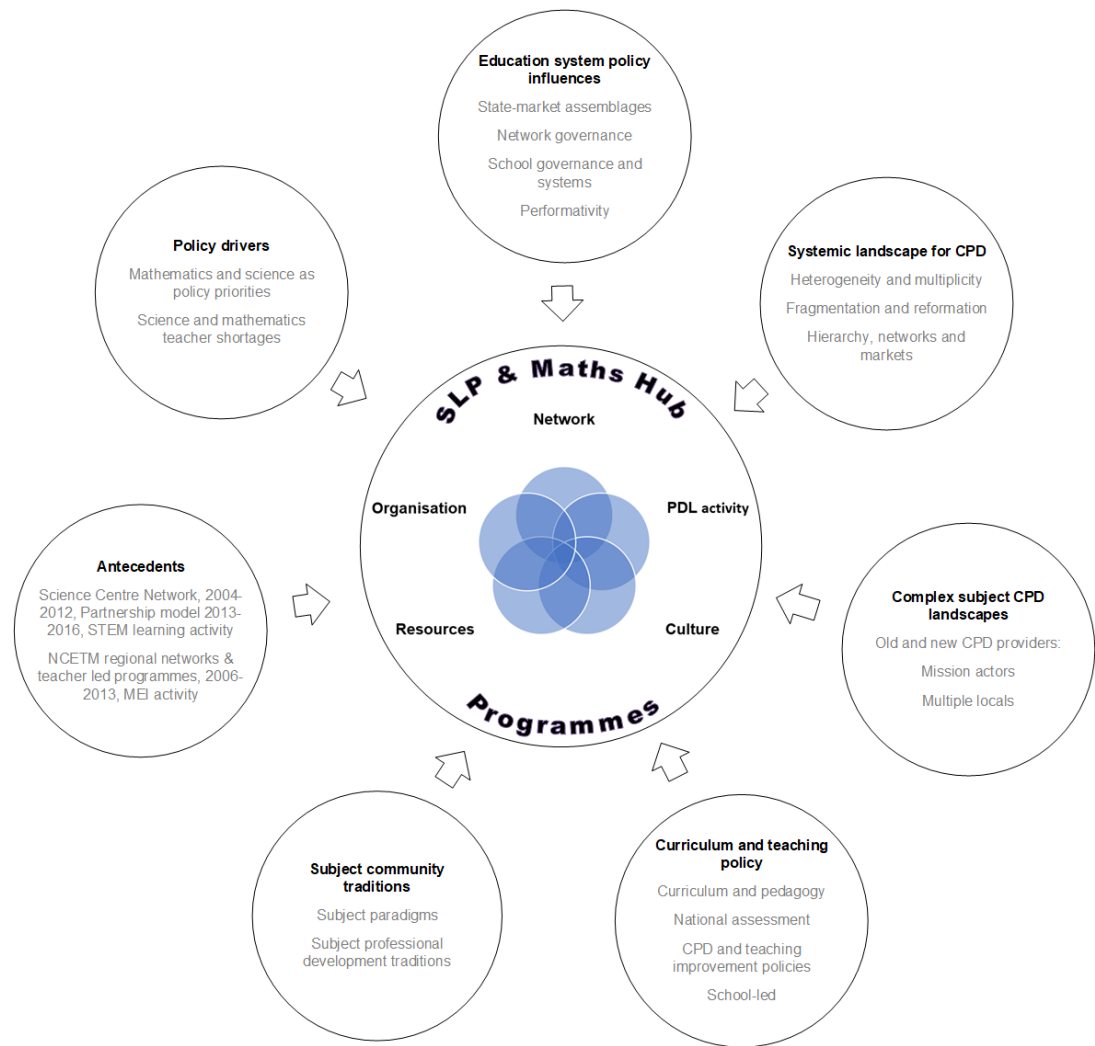
Area

Local, regional, network professional development

Activity

Professional development activity, participants and site

Influences on the programmes



Questions, reflections, discussion (1)

How far is implementation success enabled by adaptation to context and circumstance?

What can we learn from these models for other 'Hub' models of professional development?

Both the SLP and Maths Hub networks have varied and organisationally directed models of PDL. Both have a degree of autonomy. Are there insights for the implementation of other more centrally directed professional development policy (e.g. Early Career Framework, NPQs)?

Considering three professional development leadership roles

- Coordinator** Organising, championing, brokering or planning of professional development activities and programmes
- Facilitator** Delivery of and/or interaction with participants in the professional development activity and programmes
- Designer** Conceptualisation and creation of professional development activities and programmes

Perry, E., & Boylan, M. (2018). Developing the developers: supporting and researching the learning of professional development facilitators. *Professional development in education*, 44(2), 254-271.

Formal and informal

Formal

Administrative, bureaucratic function,
visible, explicit, what is done

Informal

Cultural, relational, less visible/invisible,
tacit, how it is done

**At area level:
PD leads' common implementation mechanisms**

Facilitation of local PD leadership

Brokering access to centrally led programmes for PD facilitators
Identifying and recruiting PD leads
Contributing to PD leadership training activities and events



Enabling pathways for increased responsibility and leadership
Fostering subject teacher leader activist identities
Encouraging identification with network

Local PD provision and delivery

Managing the what, who and how of local activity
Selecting and adapting resources and materials
Providing local delivery infrastructure, including venues, communication e.g. regional newsletters



Providing varied and plentiful provision
Supporting appropriate adaptation and fidelity as a continuum
Supporting school-based and external PD leads

Coordination of the regional system

Managing the regional network including QA, budget and reporting
Staffing of PD activity
Regional promotion
Subject PD championing and brokering
External networking locally



Curating the network of local PD leads and schools
Developing community, affinity and culture
Creating and maintaining feedback loops to shape activity

**Formal - more visible
what is done**

**Informal - less visible
ways of doing**

Coordination across system levels

National	Area	PDL activity
Managing the network including QA	Managing the regional network including QA, budget and reporting	Varies depending on the type of PD activity, might include:
Contracting and providing finance	Staffing of PD activity	<ul style="list-style-type: none"> • promotion and recruitment
National promotion	Regional promotion	<ul style="list-style-type: none"> • logistical organisation
Policy championing and brokering	Subject PD championing and brokering	<ul style="list-style-type: none"> • signposting other activity
External networking nationally	Curating the network of local PD leads and schools	Creating and maintaining participant and school networks
Curating the network, aligning purpose	External networking locally	Championing and brokering the PD activity
Developing community, affinity and culture	Curating the network of local PD leads and schools	Maintaining ongoing contact with participants
Creating and maintaining feedback loops to shape activity	Developing community, affinity and culture	Maintaining ongoing contact with participants
	Creating and maintaining feedback loops to shape activity	Maintaining feedback loops to shape activity

More and less visible PD leadership implementation mechanisms combine to support each other

Network management
AND
Programme curation



Extends reach, improves quality,
increases network affinity

Designing the provision
AND
Ensuring it is varied and plentiful



Enhances choice and agency for
participants with multiple ways to
engage

'Developing the developer' courses
AND
Pathways for increased leadership



Create and maintain a cadre of
professional development leads

Purpose: alignment and navigation

- In both mathematics and science networks, purposes are aligned: central to this is the promotion of subject identity with collaborative professionalism
- Alignment of purpose informs the interplay of formal and informal leadership at national and area level and between national and area and site (PD) level
- Aligned and shared purposes allow the navigation of complex, changing environments

Questions, reflections, discussion (2)

- Coordination, facilitation and design are all important to the successful implementation of professional development initiatives; these roles look different at different system levels
- These roles function through formal and informal actions; some of the knowledge and expertise required for these roles is explicit, such as in operational documents and contracts. A lot of the knowledge and expertise is tacit and unacknowledged
- A sense of shared values and purpose is important in supporting sustainability through change and challenge.

What should we do to best support people working in these roles at each level of the system? How can we ensure their knowledge and expertise is understood and valued?

Complexity leadership

Administrative leadership

Administrative leadership addresses the bureaucratic functions of the organisation and is expressed through formal systems

Enabling leadership

Enabling leadership has two functions. Firstly, it fosters adaptive leadership and, secondly, supports the integration of innovation into the administrative functions of the organisation.

Adaptive leadership

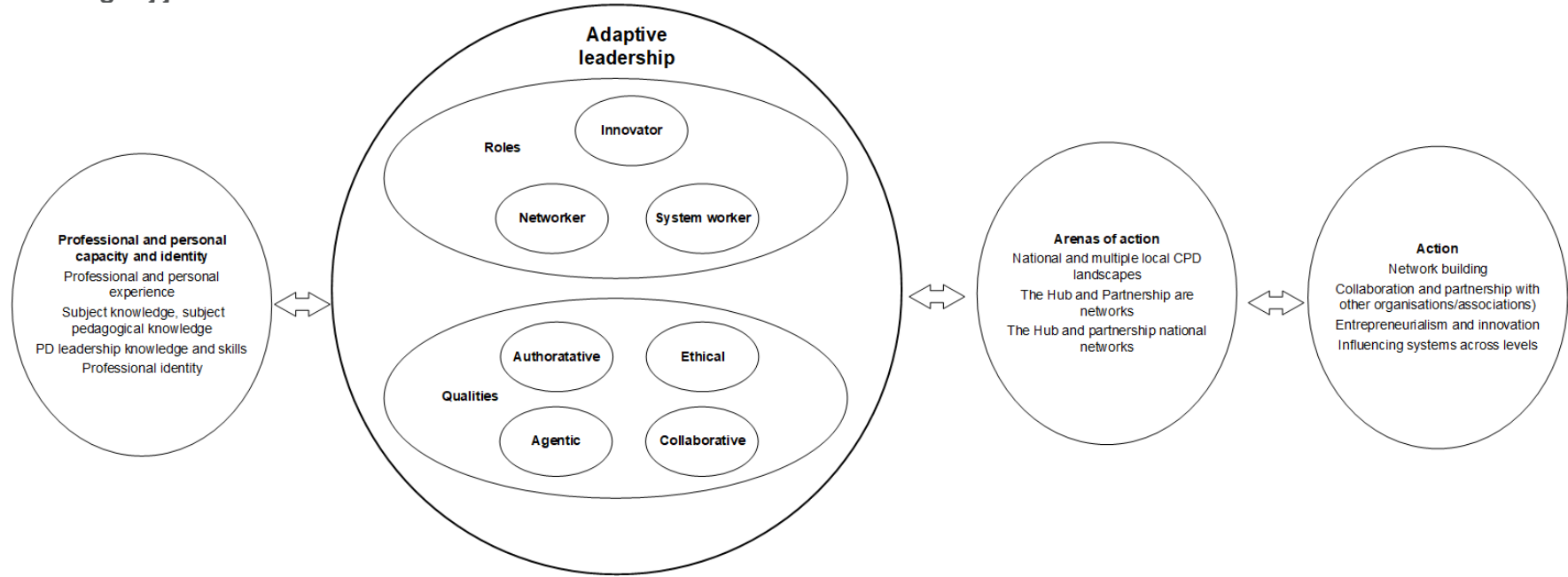
An informal leadership process that occurs in intentional interactions of interdependent human agents (individuals or collectives) as they work to generate and advance novel solutions in the face of adaptive needs of the organization ([Uhl-Bien and Marion, 2009](#): 633).

Formal



Informal

Adaptive leadership of professional development



Adaptive leadership example 1: Networking and innovation

The Hub was established by two primary schools with some local authority involvement. The two schools were both teaching schools with strong links within the local community of schools. The Hub lead formerly worked for the Local Authority. The Hub leader role is shared by two people and there are assistant hub leads for primary, secondary, and post-16. There is a 0.5fte Senior Leadership link role shared by the two headteachers and a group of headteacher advocates who act as a sounding board.

There is a strong sense of community and collaboration within the Hub with clear roles and responsibilities with lines of communication across and between levels. Professional Development leads collaborate to develop workgroup content and delivery and share outcomes and reflections. Communication is facilitated via basecamp groups and PD leads' WhatsApp groups. PD leads value collaboration and manage their role to enable this to happen. For example, they meet together for online training so that they can discuss it together afterwards. They plan sessions together and share responsibility for the creation and development of resources.

Although there is a 'National vision' the Hub leads have collaborated with hub staff to develop their own hub vision: 'that all children are confident, competent, and successful mathematicians and we are aiming to improve pupil participation, confidence and enjoyment, and we are aiming to improve teachers' mathematical knowledge, pedagogical understanding and ...practice with colleagues.'

Adaptive leadership example 2: responsive, purposeful system working

Science Learning Partnership contract is with the Trust.

Small SLP, the lead purposely builds relationships with teachers and senior leaders in the region, and with local school improvement partners. This feeds into a tailored support programme.

Uses some SLP funding to support Head of Science network meetings in order to network and understand needs.

The SLP has a 'portfolio' of roles – currently the SLP lead, leading an Early Career Teacher Programme programme, and in a local School-Centred Initial Teacher Training as a teacher educator, specialist leader of education, with responsibilities across the Trust for science education.

Questions, reflections, discussion (3)

From our data adaptive leadership is important to the coordinator role? How does it relate (if at all) to the designer and facilitator roles?

Does the model of adaptive leadership resonate?

Where else might it be applicable?

What are the implications of the research as a whole for policy, professional development providers, professional development leaders, schools and teachers, and researchers?

Any other reflections on the research?