OPINION ARTICLE

REVISED Exploring the current context for Professional Learning Networks, the conditions for their success, and research needs moving forwards [version 2; peer review: 5 approved]

Chris Brown [iD]

School of Education and Sociology, University of Portsmouth, Portsmouth, Hampshire, PO1 2HY, United Kingdom

Abstract

The emergence of networks within education has been driven by a number of factors, including: the complex nature of the issues facing education, which are typically too great for single schools to tackle by themselves; changes to educational governance structures, which involve the hollowing out of the middle tier and the introduction of new approaches with an individualized focus; in addition is the increased emphasis on education systems that are 'self-improving and school-led'. Within this context, the realization of teacher and school improvement actively emerges from establishing cultures of enquiry and learning, both within and across schools. Since not every teacher in a school can collaboratively learn with every other teacher in a network, the most efficient formation of networks will comprise small numbers of teachers learning on behalf of others.

Within this context, Professional Learning Networks (PLNs) are defined as any group who engage in collaborative learning with others outside of their everyday community of practice; with the ultimate aim of PLN activity being to improve outcomes for children. Research suggests that the use of PLNs can be effective in supporting school improvement. In addition, PLNs are an effective way to enable schools to collaborate to improve educational provision in disadvantaged areas. Nonetheless harnessing the benefits of PLNs is not without challenge. In response, this paper explores the notion of PLNs in detail; it also sheds light on the key factors and conditions that need to be present if PLNs are to lead to sustained improvements in teaching and learning. In particular, the paper explores the role of school leaders in creating meaningful two-way links between PLNs and their schools, in order to ensure that both teachers and students benefit from the collaborative learning activity that PLNs foster. The paper concludes by suggesting possible future research in this area.

Keywords
Professional Learning Networks, School Leadership, sustainability

Open Peer Review

Approval Status ✓ ✓ ✓ ✓ ✓

	1	2	3	4	5
version 2 (revision) 05 Apr 2019	✓	✓			
	↑	↑			
version 1 28 Jan 2019	?	?	✓	✓	✓

1. **Paul Wilfred Armstrong** [iD], University of Manchester, Manchester, United Kingdom

2. **Sølvi Lillejord** [iD], Research Council of Norway, Lysaker, Norway

3. **Sue Brindley**, University of Cambridge, Cambridge, United Kingdom

4. **Jo-Ann Baird**, University of Oxford, Oxford, United Kingdom

5. **Leyton Schnellert**, University of British Columbia, Vancouver, Canada

Any reports and responses or comments on the article can be found at the end of the article.
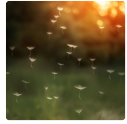
This article is included in the Quality Education

for All gateway.

Corresponding author: Chris Brown (chris.brown@port.ac.uk)

Author roles: Brown C: Conceptualization

How to cite this article: Brown C. **Exploring the current context for Professional Learning Networks, the conditions for their success, and research needs moving forwards [version 2; peer review: 5 approved]** Emerald Open Research 2019, **1**:1 https://doi.org/10.12688/emeraldopenres.12904.2

First published: 28 Jan 2019, **1**:1 https://doi.org/10.12688/emeraldopenres.12904.1

Introduction

The emergence of networks within education has been driven by a number of key factors. These include: the complex nature of the issues facing education, which are typically too great for single schools to tackle by themselves; changes to educational governance structures, which involve the dismantling of old ways of working and the introduction of new approaches with an individualized focus; in addition is the increased emphasis on education systems that are 'self-improving and school-led'. Within this context, the realization of teacher and school improvement actively emerges from establishing cultures of enquiry and learning, both within and across schools. Since not every teacher in a school can collaboratively learn with every other teacher in a network, the most efficient formation of networks will comprise small numbers of teachers learning on behalf of others.

Within this context, Professional Learning Networks (PLNs) are defined as any group who engage in collaborative learning with others outside of their everyday community of practice; with the ultimate aim of improving outcomes for children (Brown & Poortman, 2018). Research suggests that the use of PLNs can be effective in supporting school improvement. In addition, PLNs are an effective way to enable schools to collaborate to improve educational provision in disadvantaged areas. Nonetheless harnessing the benefits of PLNs is not without challenge. In particular, participation in learning networks does not automatically improve teaching practice or student outcomes. In response, this paper explores the notion of PLNs in detail; it also sheds light on the key factors and conditions that need to be present if PLNs are to lead to sustained improvements in teaching and learning. In particular, the paper explores the role of school leaders in creating meaningful two-way links between PLNs and their schools in order to ensure that both teachers and students benefit from the collaborative learning activity that PLNs foster. The paper concludes by indicating possible future research foci in this area. It is suggested that the outcomes of such work would enable researchers and school leaders to readily secure the benefits of PLN activity for teachers and students in a more consistent and sustained manner.

The rise of networks

In his seminal book *Liquid Modernity*, Zygmunt Bauman argues that the challenges of the modern age, both in terms of their sources and their impacts, are global in nature. This means the institutions and governments of individual countries are inadequate: alone they cannot hope to make meaningful or productive inroads into the complex and often *wicked* problems we currently face (Rittel & Webber, 1973). Problems such as human led climate change, the general degradation of the environment and the depletion of the Earth's natural resources, poverty and the huge disparities apparent in the distribution of wealth, or the rising volume of uprooted people - those such as migrants, asylum seekers and refugees, who are seeking a new life (Bauman, 2012).

At the same time Bauman notes that being 'modern' means being subject to constant change and the continuous replacement of the old with the new: 'change is *the only* permanence, and uncertainty *the only* certainty' (2012: viii: italics in original). The aim and expectation of this change is the continual pursuit of improvement. To achieve it, structures and systems are regularly dismantled and replaced with new ways of working in order to secure better results. Particular casualties of this process in recent years, notes Bauman, have been the social institutions which have typically provided social cohesion: specific layers of government, the trade unions, the church, as well as the provision of universal services such as health. In their place stand deregulation, privatisation and the onus on individual agency over collective approaches; albeit with the expectation that individuals should use their agency to learn from the best practices of others (Bauman, 2012).

It is clear, however that what is and what can be learned by individuals is enabled or constrained by the networks in which we are immersed (Castells, 2010). Strong networks between individuals therefore lead to more potent opportunities to learn. Networks also provide an avenue through which collaborative coordinated action can be pursued. Shifting power from institutions and layers of government able to coordinate conditions favourable to the formation of networks is thus seemingly

self-efeating. This is because individuals - those currently the beneficiaries of this power shift - lack, when acting alone, the ability to affect changes at meso and macro levels (Helsper & Hummrich, 2006). Correspondingly individuals are not singly able to ensure the existence of that which will enable their agency to flourish: the potential for creating strong networks. Thus, such shifts in power make it even less likely that the wicked problems of the world will be adequately addressed.

Networks in education

Education - here broadly defined[i] as the collection of institutions (ministries of education, local educational authorities, teacher training institutions, schools, colleges, universities, etc.) whose primary role is to provide education to children and young people - has also been affected by these more general societal trends (Hargreaves & Shirley, 2009), leading to the aforementioned focus on networks. A network in 'education' is generally considered to represent a 'group or system of interconnected people and organizations whose aims and purposes include the improvement of learning and aspects of well-being known to affect learning' (Hadfield et al., 2006: 5). The emergence of networks within education has, on one hand, been driven by the interconnected and pervasive nature of issues facing education (Dı´az-Gibson et al., 2017). Examples here include: providing effective schooling in an age of austerity, which puts pressures on the staff, resource and infrastructure that can be afforded (Brown et al., 2017); ensuring all children realise their potential and are effectively supported to enter society as competent, responsible citizens, irrespective of background and situation (Arkhipenka et al., 2018; Howland, 2015); preparing students of today to be the workforce of tomorrow, when the nature of the work and the skills required to do it are uncertain (Bauman, 2012; Castells, 2010); likewise is the need to ensure teachers have the skills and knowledge to adapt to fast changing social and economic related educational imperatives (de Vries & Prenger, 2018). The main focus of this article is networks as centred around schools. With this in mind - as with Bauman's notion of the *liquid* modern age - the nature of these issues means that tackling them effectively is often too great a challenge for individual schools to undertake by themselves (Stoll, 2010). Schools therefore need to be working smarter together - and with others - rather than harder alone, to both learn with and support one another (Jackson & Temperley, 2006).

In this light, the noted aims and purposes of extant education networks in a general sense, include:

- Facilitating a more willing distribution of professional knowledge (Hargreaves, 2010; Hargreaves, 2012; Muijs, 2015). In other words, networks can be used to foster knowledge sharing, collaboration and practice development across schools. This can be especially useful in plugging 'structural holes' through the access to expertise that is not available in individual schools (Huxham & Vangen, 2005; Muijs, 2015).

- The development of context specific strategies for improvement (Hargreaves, 2010; Hargreaves, 2012; Howland, 2015). For instance, networks might have a focus on addressing challenging circumstances and/or persistent issues of inequity and underperformance (i.e. ensuring all students, irrespective of background, gain the minimum skills necessary to function in today's society (Arkhipenka et al., 2018; Armstrong, 2015; Muijs et al., 2010)). Other focus areas can include students' transition from school to work, or pervasive problems such as childhood obesity (Dı´az-Gibson et al., 2017).

- Facilitating schools and others to share resources more efficiently than they might previously have done, or to achieve economies of scale or reductions in risk from resource pooling (Azorín, 2018; Ehren & Godfrey, 2017; Gilbert, 2017; Hargreaves, 2010; Hargreaves, 2012; Howland, 2015; Muijs, 2015). An example here is provided by Dı´az-Gibson et al. (2017) who note that austerity driven funding cuts are now frequently resulting in schools and community agencies collaborating in order to meet common educational challenges more efficiently and effectively. In Dı´az-Gibson et al.'s (2017) example, the provision of extended educational and social services in low-income communities is seen to represent an approach for addressing complex educational challenges through a strategic use of limited set of educational resource such as money and time.

Simultaneously, changes to educational structures have seen the dismantling of old ways of working and the introduction of new approaches with an individualized focus. Although this is occurring in education systems worldwide (e.g. see Hargreaves & Shirley, 2009; Helsper & Hummrich, 2006), England, which has experienced a recent and sharp decline in the support role offered to schools from both the top and the middle tier of government (Local Authorities), provides an exemplar case of such trends (Armstrong, 2015; Greany, 2017; Handscomb, 2018). In particular, central government policy makers in England, having lost faith in the postwar 'trust and altruism' model of public service delivery in which Local Authorities ran schools with minimal central oversight, have now devolved multiple decision making powers and resources to schools. Included in this process of devolution is the responsibility for teacher professional development, in the belief that this will improve quality and increase innovation (Greany & Earley, 2018; Howland, 2015). To support schools in making best use of their newly found autonomy, the Education White Paper *The Importance of Teaching* espoused a newly found faith in inter-school collaborative networks. For instance, within the white paper it is stated that: 'along with our best schools, we will encourage strong and experienced sponsors to play a leadership role in driving the improvement of the whole school system, including through leading more formal federations and chains' (Department for Education, 2010: 60).

The commitment established in *The Importance of Teaching* has been described elsewhere as the move towards a

---

[i] See https://en.wikipedia.org/wiki/Education

'self-improving school system' (Dowling, 2016; Greany, 2017). The characteristics of 'self-improvement' include that individual schools now have greater responsibility for their own improvement; that teachers and schools are expected to learn from each other so that effective practice spreads; and that schools and school leaders should extend their reach to support other schools in improving (Greany, 2014). With the liquid modern hollowing out of the middle tier, successful self-improvement thus depends on the existence of strong networks which foster learning and the sharing of effective practice. Other policy commitments and levers that have accompanied and support the process of self-improvement in England (e.g. the introduction of *academies* and competitive quasi market pressures within the education system) as well as those which impact on the potential for networks formation and sustainability (for instance approaches to formalized collaboration such as Multi Academy Trusts and the notion of *system leadership*) can be found in papers by colleagues such as Armstrong (2015); Armstrong & Ainscow (2018); Greany (2017) and Greany & Earley (2018). Of particular note for England is the tension between the appetite that exists in schools to collaborate and the context of competition driven by parental choice and the use of league tables to publically rank school performance. The nature of such collaboration has been referred to as 'coopetition' (Muijs & Rumyantseva, 2014); and this idea again reflects the notion that the potential for creating strong networks can be affected by factors outside of the control of individuals (leaders or schools). The notion of self-improvement stretches far beyond England, of course, and the recognition that networks and networking might represent an effective approach to educational improvement is evident in a tranche of countries including the US, Canada, Finland, Singapore, Scotland, Germany, Belgium, Spain, India, Northern Ireland and Malta (Armstrong, 2015; Boylan, 2018).

At the same time, it has been suggested that the realization of self-improvement will emerge from establishing a 'culture of professional reflection, enquiry and learning within and across schools, [centred] on teaching and student learning' (Gilbert, 2017: 6). In light of this, it is worth reflecting that networks are also viewed as instrumental to how teachers can and should develop professionally. More than ever, it is recognized that teachers must be 'active agents of their own growth' (Schleicher, 2012: 73). To actualise professional growth, teachers need to learn: teachers developing is not enough, rather teachers must be knowledgeable, possess practical expertise, and have the wherewithal to change their behaviours in order to get different results - they must become professional learners (Easton, 2008). Learning results from effective collaboration with others (ibid). But since the school as a unit has become too small in scale and too isolated in nature to provide rich professional learning environment for teachers (Jackson & Temperley, 2006), successful professional learning activities will typically involve three key principals: teachers collaborating between schools; teachers collaborating over time; and teachers collaborating with external partners (Stoll *et al.*, 2012). Thus, achieving the learning culture required by the notion of self-improvement requires networks of teachers who come together (with other key partners) to learn and to share this learning with others. Since not every teacher in a school can collaboratively learn with every other teacher in a network of other schools, the most efficient formation of networks will comprise small numbers of teachers who learn on behalf of others. Therefore, while described as the self-improving *school* system, the process of improvement leading to system level change must necessarily come from small numbers of networked teachers (along with other stakeholders) engaged with addressing key issues of teaching and learning and able to lead processes of knowledge mobilization and change within their school.

Professional Learning Networks

It is this recognition that networks and networking operates most effectively at the level of the teacher that has seen a growing number of school leaders and policy-makers in various jurisdictions world-wide, turn their attention to Professional Learning Networks (PLNs) as a way of improving education in schools and across school systems (Armstrong, 2015). PLNs now exist in many countries and for many reasons. This requires a broad 'catch-all' definition, such as that provided by Brown & Poortman (2018), who describe PLNs 'any group who engage in collaborative learning with others outside of their everyday community of practice, in order to improve teaching and learning in their school(s) and/or the school system more widely', a graphical conceptualisation of PLNs is set out in Figure 1 below. Here each black dot or white star represents an individual (e.g. a teacher academic researcher, or other stakeholder). The arrows, meanwhile, represent connections and so flows of information or other forms of social capital that occur between individuals. As can be seen, there are two types of groupings of individuals represented in Figure 1. The first, demarcated by the dotted circles, are everyday communities of practice (e.g. a whole school, a subject department, a university department, etc.: see, Wenger, 1998). The second type of grouping – the mass of black dots in the centre of the diagram – represents a PLN. In the three communities of practice presented in Figure 1, the members of the PLN are those individuals who are represented by white stars. Thus, it can be seen that PLNs are comprised of individuals with connections that stretch beyond the dotted circles and into the network of individuals at the centre of the diagram. At the same time, as the number of white stars indicates, PLNs typically comprise a small number of individuals from each community of practice rather than a whole school approach.

Brown & Poortman's (2018) definition illustrates that PLNs are focused on driving improvements to teaching and learning, which is the core stuff of education. In reality therefore, this means the aims of any given PLN could range from exploring and seeking to improve specific teaching practices and their outcomes, to engaging in a critical examination of the purpose and the aims of the curriculum (as well as a combination of these things). Both the definition and Figure 1 also highlight that PLNs can vary in composition, nature and focus: PLNs can exist as data use teams, curricula improvement teams, Research Learning Networks and so on. Similarly, PLNs may consist of teachers and school leaders from different schools, educators and local or national policymakers, educators and
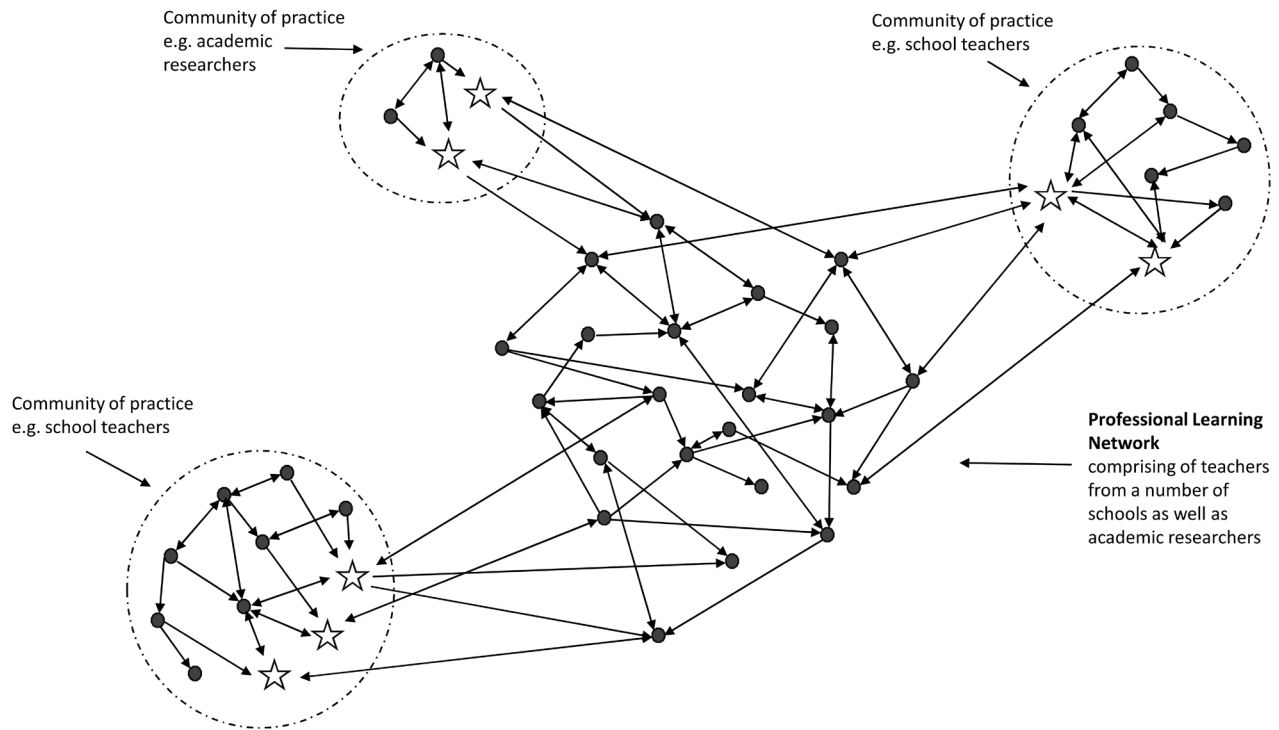
Figure 1. A graphical depiction of PLNs.

other stakeholders as well as many other potential combinations. Often networks will also form in partnership or involve joint work with academic researchers. Ultimately, however, irrespective of composition or focus, the aim of PLNs is to build capacity, which is defined as 'the power to engage in and sustain learning of all people at all levels of the educational system' (Stoll, 2010: 470). Capacity is built first by helping PLN participants to create and share knowledge about specific educational problems as well as innovate (i.e. develop novel responses to these problem). An example might be a PLN focused on how to improve reading outcomes for specific groups of children which engages in both knowledge and practice innovation in relation to this subject. Capacity is also built as PLN participants broker new knowledge and/or innovations to colleagues within their home schools (Hubers, 2016).

Benefits to this approach
Evidence suggests that PLNs can positively impact on:

- The professional learning of teachers participating within the PLN (e.g. Berkemeyer *et al.*, 2011; Bremm & Drucks, 2018);

- Reflection and inquiry mindedness of teachers within schools connected to PLNs (Bremm & Drucks, 2018). In particular reflection/inquiry mindedness is evidenced through increased motivation to engage in professional discourse and dialogue with colleagues and to share knowledge in effective ways. Alongside this is a more

general shift towards a more learning-oriented or enquiry-based culture in schools that have engaged in sustained collaboration (Armstrong, 2015);

- Related to the above is the impact on the innovation potential of participating schools (e.g. Berkemeyer *et al.*, 2008; Bremm & Drucks, 2018; Howland, 2015). In other words, the culture and capacity required to effectively create and spread new knowledge and practice within schools that have connections to networks;

- Improved teaching practice (Armstrong, 2015; Bremm & Drucks, 2018; Darling-Hammond, 2010; Muijs, 2015);

- Student outcomes (e.g. Bremm & Drucks, 2018; Chapman & Muijs, 2014; Hutchings *et al.*, 2012; Muijs, 2015; van Holt *et al.*, 2015); and

- Improving educational provision in disadvantaged areas (Bremm & Drucks, 2018)

PLNs also provide the opportunity to achieve cost effective educational change at scale (Hargreaves, 2010): this is because they only require small numbers of teachers to leave their communities of practice to innovate.

Conditions for success for PLNs
But the benefits outlined above are not guaranteed and is important that this is recognized by those potentially turning to

PLNs as a means to improve teaching and learning. A touch of realism is therefore required in order to temper the 'uncritical enthusiasm' for collaborative network type approaches as a means to solve a wide range of problems (Baum, 2000). Thus in order to prevent this paper (or its readers) falling into the trap of exaggerating the potential of PLNs, glossing over the substantive requirements to make them work, and ignoring evidence that PLN development is often disjointed and tenuous (Baum, 2000), it is worth noting the following: first, there are a number of studies suggesting the evidence of networked learning activity on student outcomes is mixed (Armstrong, 2015; Armstrong & Ainscow, 2018); with some studies reporting no association between school engagement in PLN-type activity and outcomes for students (e.g. Sammons *et al.*, 2007; Woods *et al.*, 2006). Furthermore, while there is a drive towards networked forms of learning, it should also be recognised that there is nothing inherently positive or negative about a network: '[networks] can be flexible and organic, or rigid and bureaucratic; [they can be] liberating and empowering, or stifling and inhibiting; [networks] can be democratic, but [they] may also be dominated by particular interests' (Lima, 2010: 2). Moreover, the impact of engaging in a PLN can only be considered sustainable when it results in lasting school wide changes in school policy and practice (Hubers, 2016); with these changes resulting in measurably positive outcomes (Hubers & Poortman, 2018). What's more, all educators with links to a network should also display 'agency'. This means that teachers in schools engaged in PLN activity do more than just make lasting changes in their behavior; they should actively try to innovate their practices in an ongoing way (Hubers & Poortman, 2018). Thus, to ensure PLNs are effective, i.e. result in sustained and positive changes in teaching, learning and student outcomes, a number of conditions relating to their nature and functioning need to be met. These conditions are set out below: Effective collaboration - The notion of teacher-to-teacher exchange is typically referred to under the broad terms of collegiality or collaboration. As Warren-Little argues, however, such concepts remain 'conceptually amorphous and ideologically sanguine' (1990: 509). Warren-little also highlights the widely-held belief that any interaction that reduces the isolation of teachers will contribute: 'in some fashion to the knowledge, skill, judgment, or commitment that individuals bring to their work, and will enhance the collective capacity of groups or institutions'. At the same time: 'what passes for collegiality [typically] does not add up to much', with collaborations often appearing 'contrived, inauthentic, grafted on, perched precariously (and often temporarily) on the margins of real work.' (1990: 509-510).

PLNs function through establishing networks of formal relationships (e.g., between schools, hospitals, agencies, etc.) and informal relationships (e.g. one-to-one social interactions), thereby creating an interconnected approach to tackling important and persistent educational issues (Dı́az-Gibson *et al.*, 2017). The diversity of knowledge, skills, and capacities that each network participant provides represents an 'important organizational asset', that can be made available to others (Dı́az-Gibson *et al.*, 2017: 1043). It is effective collaboration however that enables the social capital available with networks to be harnessed.

At the same time, there are many ways to collaborate and not all of them are always effective. This means there is a lot yet to be learned about professional collaboration and the conditions under which it provides benefits for professional practice and student achievement. (Hargreaves, 2018). What is known, however, is that effective collaboration is that which induces mutual obligation, fosters interdependence, exposes the practice of teachers to the scrutiny of others, and encourages initiative in terms of developing approaches to teaching and learning (Warren-Little, 1990). For instance, Warren-Little posits four ideal types of collaboration which differ according to the extent to which they induce these key factors: storytelling and scanning; aid and assistance; sharing; and joint work. The first, *storytelling* represents the occasional and opportunistic forays undertaken teachers as they seek out specific ideas, information, solutions, or reassurances. At the same time teachers remain autonomous and free to choose which of these stories they engage with or act upon. Within this mode of collaboration, independent trial and error acts as the principal route to developing competence. (Warren-Little, 1990: 514). The second ideal type, *aid and assistance*, reflects the idea that teachers offer help and support when asked, but only when asked. This is because in schools where this mode of collaboration is prevalent, discussions about teaching practice become associated with judgments on the competence of teachers: both judgments of those seeking support and judgments on the competency of those supplying such support (Warren-Little, 1990: 516). Warren-Little's third type of collegiality – *sharing* - spotlights the routine sharing of materials and methods as well as the open exchange of ideas and opinions (1990: 518). Acting in this way provides teachers with an opportunity to learn about others' practices and to compare this to their own. Even so, sharing can be variable in nature: different teachers may engage with more or fewer teachers, their engagement may be fully or only partially reciprocated and teachers may reveal much or little of their thinking, ideas, practice or materials or ideas (Warren-Little, 1990: 518). Warren-Little uses the term *joint work* to represent encounters among teachers that are grounded in 'shared responsibility for the work of teaching (interdependence), collective conceptions of autonomy, support for teachers' initiative and leadership with regard to professional practice, and group affiliations grounded in professional work' (Warren-Little, 1990: 519). Teachers are more motivated to collaborate with one another when the success of their efforts depends on it, and as a result of this interdependence, a norm based on the thoughtful, explicit examination of practices and their consequences is likely to emerge (Warren-Little, 1990: 522).

Trust - Effective collaboration is also grounded in trust existing between participants (Bremm & Drucks, 2018; Howland, 2015): where trust relates to our beliefs regarding the competence, benevolence and the integrity of another (Ehren, 2018). In particular, high levels of trust are associated with a variety of reciprocal efforts, including where learning, complex information sharing and problem solving, shared decision making, and coordinated action are required. This is because in high trust situations, individuals feel supported and 'safe' to engage in risk taking and the innovative behaviour associated with efforts at sharing, developing or trialling new practices

(also Bryk & Schneider, 2002; Finnigan & Daly, 2012; Mintrop & Trujillo, 2007). In particular, a trusting work environment is instrumental to the type of 'double-loop' learning that is a prerequisite if teachers are to openly and collegiately challenge and question their foundational assumptions - as well as engage in ongoing and open disclosure about problems and challenges - as part of a process of seeking to continually improve teaching and learning (Argris & Schön, 1996; Bremm & Drucks, 2018). Trust takes time to develop (Howland, 2015) but can material-ises more quickly when networking takes place between schools with similar quality features and similar context factors (Bremm & Drucks, 2018). This represents the notion of **homogenous networks;** networks which are brought together based on certain key criteria that they have in common (e.g. in rela-tion to contextual, performance and process characteristics). A commonality in school development themes and a consen-sus of goals between schools is, in some jurisdictions – such as Germany – regarded as a precondition for successful collabo-rative and co-constructed network activities between schools (Manitius & Berkemeyer, 2015). Such an approach contrasts contrasts with much of the perceived knowledge of England, where networks can often comprise of high and low achieving schools in order that the latter can learn and benefit from engaging with the former (Chapman & Muijs, 2014; Howland, 2015; Muijs, 2015).

Increasing urbanization indicates that physical proximity appears more important than ever, with communications technology used to link megacities rather than encourage spatial diffusion (Castells, 2010). In physical networks,[ii] **geographical proxim-ity** often serves to act as a delineating boundary for approaches to collaboration and improvement (Armstrong & Ainscow, 2018). Reasons for employing a geographic focus include 'close-ness', which makes it easier for participants to physically come-together, but also in terms of shared community, aspirations and needs (especially in relation to demographics) (e.g. Coldron et al., 2014; Duveneck, 2016; Howland, 2015; Tulowitzki et al., 2018). Howland (2015) also suggests that with a shared geography comes a common history and understanding. Aligned here is the notion of **historical collaboration,** or the extent to which potential future networks have had pre-existing relation-ships or have previously worked together to solve common goals or problems (Briscoe et al., 2015). At the same time networks need to eschew fear of competition, for example competition regarding new ideas in terms of attracting students when in adjacent neighbourhoods (Bremm & Drucks, 2018).

Networks must have a **common focus and work on clearly defined topics** (Bremm & Drucks, 2018; Rempe-Gillen, 2017; Warren-Little, 1990). At the level of the PLN, focus refers to having a shared sense of purpose amongst the individual PLN members in relation to the specific goals of the PLN. While every member does not need to share exactly the same goal or reason for participating in the PLN, there should be at least a set of basic priorities or principles that serve to guide the choices of participants (Warren-Little, 1990). The more that participant's goals are aligned and the more PLN members agree on the reasons why they are working together, the easier it will be to maintain a conducive and productive environment and to ensure every-one's expectations are met (Hubers & Poortman, 2018). The commonality of focus should also be grounded in a shared understanding on the purposes of education. For example, what conclusions have network members reached in terms of the antinomy or tension that often exists between teachers being required to focus on performance in terms of instrumental exam outputs vs. the role of teachers/school in providing support for more affective aspects of students lives or their responsi-bility for students qua persons (Helsper & Hummrich, 2006)? Should views here be fundamentally different, then the network may find itself pulling in different directions in terms of the issues of teaching and learning that need to be addressed and the appropriate learning and action that should occur in response. In a similar vein is Butler & Schnellert's (2012) suggestions that all partners have to be equally highly committed to the goals and commitments of the collaborative process. Similarities in working style, philosophy, expertise and/or backgrounds will also therefore be helpful here.

The notion of **reflective professional inquiry** refers to the con-versations teachers have about serious educational issues or problems. Teachers should be actively and collectively ques-tioning ineffective teaching routines while finding proactive means to acknowledge and respond to them (Hubers & Poortman, 2018). As Warren-Little (1990) notes, we need to ensure col-laboration is directed towards the development of well-informed choices, rather than the mutual reinforcement of poorly informed habits. Reaching a situation of being well-informed means engaging with a range of perspectives through open debate and discussion (Bauman, 2012; Stoll, 2010). Explicit attention should also be given to both **individual and group learning,** which too promotes effectiveness. Linking this with the notion of collaboration is the assumption that teachers' understanding of their work will be advanced through time spent with others (Warren-Little, 1990). Thus, individual members' prior knowl-edge and motivation will influence their own learning, but will also influence the progress of others. However, having individual members with various backgrounds, can be experienced as impeding if some members are (or rapidly move) ahead in their thinking and learning in relation to the focus area, or are generally more motivated to spend time on PLN activity. At the same time any variation in backgrounds can also prove to be an advantage if different perspectives can provide input for discussion and reflection, enabling all participants to learn. In turn, progress made and activities undertaken by the PLN will also influence individuals, leading to self-reinforcing learning loops.

Networks can be **formal and contracted in nature** or **informal and involuntary** (Armstrong, 2015; Ehren & Godfrey, 2017).

[ii] And in this article the principal focus is on PLNs as primarily physical rather than virtual entities. This is not to preclude, however, aspects of PLN activity taking place via social media etc. (e.g. see Rempe-Gillen, 2012) and/or facilitated by transformations in communication technologies (Castells, 2010).
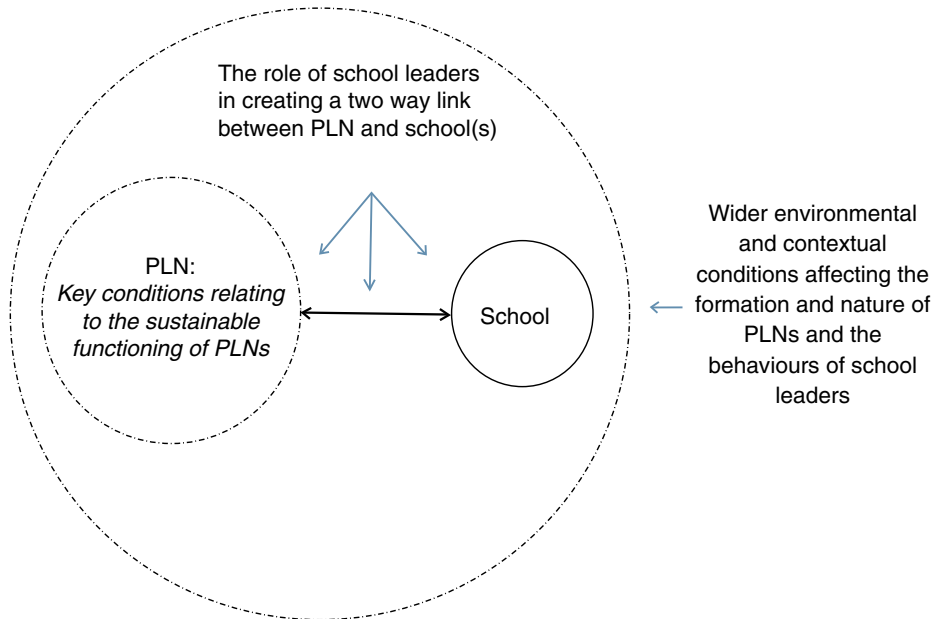
Formal, contracted networks are typically goal-directed and will benefit from more stable patterns of social relations, deliberate interactions and structure in their interactions with organizational arrangements and rules. There is little evidence to suggest however that either formal or informal networks have more or less impact on teaching and learning outcomes than the other: at the same time there tend to be more studies of impactful formalised networks (e.g. see Bremm & Drucks, 2018; Chapman & Muijs, 2014; Muijs, 2015). Likewise, the leadership and governance of networks can vary from **non brokered shared governance** to being **highly brokered by one organization**, and from **participant-led** to **externally led** (Ehren & Godfrey, 2017. It is suggested that highly brokered governance tends to be more effective when networks are larger: here trust, as well as the consensus, regarded the purpose of the network tends to decrease as a function of size; while the time, effort and skill required to coordinate the network increases (Ehren & Godfrey, 2017). Shared governance, on the other hand, is most likely to be effective when trust is pervasive throughout the network and the more homogenous nature of smaller networks provides a strong basis for bottom-up collaboration among network participants (ibid).

A final category is **leadership** (Brown & Flood, 2019; Hubers & Poortman, 2018). In the first instance, leadership is required of the networks themselves to ensure that they function effectively (Briscoe *et al.*, 2015; Dowling, 2016; Muijs, 2015). Second however, it is also the role of school leaders to ensure that there is meaningful participation by their teachers in network activity and that this participation makes a difference within teachers' 'home' schools. This is illustrated in Figure 2 where it can be seen that the factors affecting the likely formation and success of PLNs in improving teaching and learning do not only reside within PLNs but also relate to the schools to which they are connected and the contextual and environmental factors within which they are situated.

Of these two aspects of leadership, it is that latter that is explored in this paper. To begin with school leaders must want their school to actively engage with the work of the PLN. In other words, school leaders must want to reach out beyond the boundaries of their schools and for their teachers to engage in collaborative endeavours with others. Effective engagement with PLNs thus requires school leaders to adopt a very external focus and to couple their desire to do the best for their students with a recognition that this can often best be served through collaborative work. Conjoining an external focus with their moral driver for their students results in school leaders needing to: 1) sign up to the common purposes of the network and the focus area of networked activity; 2) recognize that, to ensure the successful ongoing operation of the network common resources might need to be established (e.g. new resource generated or existing resourced transferred) and that this resource will need to be maintained over time. For instance, Hutchings *et al.*, (2012) suggests that three years is the minimum time required to achieve meaningful improvement to children's outcomes. This means, therefore, that participating school leaders must have this long term perspective in mind and be willing to commit to it along with the resources this requires. A long term perspective also highlights the need for network participants to experience mutual benefit from engaging: collaboration is unlikely to last if PLN members believe they can achieve the same goals working as individual schools (Muijs, 2015; Warren-Little, 1990). Interim and externally validated short term 'wins' can often therefore be key (Muijs, 2015). At the same time a longer term commitment to PLNs is also likely to be a function of

The role of school leaders in creating a two way link between PLN and school(s)

PLN:
Key conditions relating to the sustainable functioning of PLNs

School

Wider environmental and contextual conditions affecting the formation and nature of PLNs and the behaviours of school leaders

Figure 2. Factors affecting the likely formation and success of PLNs in improving teaching and learning.

whether school leaders perceive engagement in networked learning activity as 'prestigious' or signify a particular attribute or brand value that is important to the story schools wish to tell about themselves (Brown, 2018; Close, 2016); 3) School leaders also need to acknowledge a moral obligation towards, and an acceptance of collective responsibility for, the outcomes of all children in all schools within the network. In other words schools engage in networks to gain in terms of their teacher's learning but also to support teachers in other schools others with their own learning requirements; 4) finally, it is argued by Di´az-Gibson *et al.*, (2017: 1044) that networked leadership represents a form of non-hierarchical leadership, where information and expertise substitutes for authority and the actualization of leading is a self-organizing process. Since network leaders and participants will not necessarily also be formal leaders, school leaders are required to understand notions of distributed leadership and to recognize that distributed leadership needs to be enabled to flourish (Jackson & Temperley, 2006). This means that PLN participants are supported by school leaders to engage in networked activity and to lead change within their own school. In keeping with Hairon & Goh, (2015), this support should occur via *empowerment* (enabling staff to make decisions within a specific domain of action), the facilitation of *interactions between staff* at all levels (leading to influence being able to flow throughout schools) and the *building of capacity* to enable staff at all levels to engaging in effective leadership action (intriguingly, the idea of distributed leadership also raises the notion of students acting as change agents and how they might be supported to do so). Such an approach to leadership represents a stark contrast to many schools where often the impetus for change and the introduction of new ideas comes from the school leader themselves.

Once prepared to engage in networked forms of learning, specific approaches designed to maximize the benefit to their school are school leaders' functions of *formalizing*, *prioritizing* and *mobilizing* (Brown & Flood, 2019). First, teachers and schools face a myriad of competing priorities. At the same time school leaders are responsible for overall direction setting: deciding on the priorities that should be focused on and signalling these to ensure common understanding. In this light, the notion of *formalization* relates to the need for school leaders to cement their school's and teacher's participation in the PLN by ensuring that: 1) the activity of the PLN corresponds to the improvement priorities and vision for the school; 2) PLN participation remains a key focus of the school, and that its importance is recognized. *Prioritizing* engagement in PLN activity, meanwhile, concerns ensuring adequate resources exist to allow the work of the PLN to get done. While engaging in learning networks can be beneficial, for this to occur, school leaders must be prepared to provide opportunities for such engagement, and this requires an intentional commitment of resources (especially *time* for both participation and within school interaction). Finally, the aim of the PLN is to engender the development and spread of effective practice. It is rare however that new knowledge automatically spread through schools, or innovations immediately

adopted by teachers. School leaders also need, therefore, to understand how the knowledge and innovation that emerges from networked learning can be best *mobilized* so ensuring that other teachers and educators within their school engage with and adopt such innovation - with teaching and learning benefiting as a result. Returning to the idea of distributed leadership above, decision making with regards to PLN activity is likely to resemble a process in which participants engage in iterative exploration with other teachers in their school. As such it is useful to consider Butler & Schnellert (2012) suggestion of co-regulation: the process that occurs when a 'social agent provides support to or "scaffolds" another's engagement in cycles of inquiry, whether as an equal partner or as a mentor'. In other words, when it comes to mobilisation, capacity building for distributed leadership is likely to involve helping PLN participants understand and also supporting them to fulfil their role as co-regulators of an ongoing process of investigation in their 'home' schools.

Moving forward

Although we know that ensuring a meaningful two-way link between PLNs and the 'home' schools of teachers requires school leaders to engage in acts of formalisation, prioritisation and mobilization; what we know less about are the actions school leaders currently take to address these factors. Also, the success of these actions and the support school leaders might need to engage effectively in PLN activity moving forward. Furthermore, we know PLNs can be especially beneficial for schools in challenging circumstances since they can enable schools to work with and learn from other schools with similar challenges and contextual factors (Bremm & Drucks, 2018). Again however, what is less clear is how school leaders in such schools can engage effectively with PLNs and what assistance might be required to help maximize the impact to their schools from doing so. As such these issues should be regarded as providing the agenda for research work into PLNs moving forwards, with pertinent research questions including:

1. What actions do school leaders undertake to ensure their school both supports and engages meaningfully and effectively with the aims and purpose of the PLN?

2. How do school leaders support participating teachers from their school to engage effectively in/with PLN activity??

3. What actions do school leaders engage in to ensure all other teachers in their school know about, input into, engage with and embed as well as continue to improve the products and outputs of the PLN?

4. What effect do these actions have on PLNs participants as well as their colleagues in school?

5. What actions can school leaders take to improve the benefits to their school of engaging in PLNs? What support might best help them to achieve this? Are there leadership actions/support that specifically ensure PLNs can drive educational improvement in disadvantaged areas?

By exploring the answers to questions these from within extant successful case studies of PLNs and by developing generalized or 'ideal type' actions that can be adapted and used by other school leaders, we will be in a better place start to realising the benefits of PLNs for teachers and students, in a consistent and sustained basis. Time to take up the challenge!

Data availability

No data is associated with this article.

Grant information

References

Argris C, Schön D: **Organisational learning II: Theory, Method, Practice, Increasing Professional Effectiveness.** (San Francisco, CA, Jossey Bass). 1996.

Arkhipenka V, Dawson S, Fitriyah S, *et al.*: **Practice and performance: changing perspectives of teachers through collaborative enquiry.** *Educ Res.* 2018; **60**(1): 97–112.
Publisher Full Text

Armstrong P: **Effective partnerships and collaboration for school improvement: a review of the evidence.** (London, Department for Education). 2015.
Reference Source

Armstrong P, Ainscow M: **School-to-school support within a competitive education system: views from the inside.** Presented at the *International Congress for School Effectiveness and Improvement*, Singapore, 8–12 January, 2018.
Reference Source

Azorín C: **Networking in Education: Lessons from Southampton**. *Presented at the European Conference on Educational Research annual meeting.* Bolzano (Italy). 4 to 7 September 2018. 2018.
Reference Source

Baum H: **Fantasies and Realities in University-Community Partnerships.** *J Plan Educ Res.* 2000; **20**(2): 234–246.
Publisher Full Text

Bauman Z: **Liquid Modernity.** (Cambridge, Polity Press). 2012.
Reference Source

Berkemeyer N, Bos W, Manitius V, *et al.*: **"Schulen im Team": Einblicke in netzwerkbasierte Unterrichtsentwicklung.** In N. Berkemeyer, W. Bos, V. Manitius and K. Müthing (Eds) *Unterrichtsentwicklung in Netzwerken: Konzeptionen, Befunde, Perspektiven* (Muünster, Waxmann), 2008; 19–70.
Reference Source

Berkemeyer N, Jrvinen H, Bos W: **Unterricht gemeinsam entwickeln. Eine Bilanz nach vier Jahren schulischer Netzwerkarbeit.** *Pädagogik.* 2011; **11**(11): 46–51.

Boylan M: **Enabling adaptive system leadership: Teachers leading professional development.** *Educ Manag Adm Lead.* 2018; **46**(1): 86–106.
Publisher Full Text

Bremm N, Drucks S: **Building up school to school networks using an evidence-based approach**. *Presented at the European Conference on Educational Research annual meeting*, Bolzano (Italy), 4 to 7 September 2018, 2018.
Reference Source

Briscoe P, Pollock K, Campbell C, *et al.*: **Finding the Sweet Spot: Network Structures and Processes for Increased Knowledge Mobilization.** *Brock Education Journal.* 2015; **25**(1): 19–34.
Reference Source

Brown C: **How social science can help us make better choices: Optimal rationality in action**. (London, Emerald). 2018.
Reference Source

Brown C, Flood J: **Formalise, Prioritise and Mobilise: How school leaders secure the benefits of Professional Learning Networks**. (London, Emerald). 2019.
Reference Source

Brown C, Poortman C: **Introduction.** In C. Brown and C. Poortman (Eds) (2017) *Networks for learning: effective collaboration for teacher, school and system improvement,* (London, Routledge). 2018.

Brown C, Schildkamp K, Hubers M: **Combining the Best of Two Worlds: A Conceptual Proposal for Evidence-Informed School Improvement.** *Educ Res.* 2017; **59**(2): 154–172.
Publisher Full Text

Bryk A, Schneider B: **Trust in schools: A core resource for school improvement.** (New York, NY, Russell Sage Foundation). 2002.
Reference Source

Butler D, Schnellert L: **Collaborative inquiry in teacher professional development.** *Teach Teach Educ.* 2012; **28**(8): 1206–1220.
Publisher Full Text

Castells M: **The Rise of the network Society.** (Chichester, Wiley-Blackwell). 2010.
Publisher Full Text

Chapman C, Muijs D: **Does school-to-school collaboration promote school improvement? A study of the impact of school federations on student outcomes.** *School Effectiveness and School Improvement.* 2014; **25**(3): 351–393.
Publisher Full Text

Close P: **'System leader' consultancy development in English schools: a long-term agenda for a democratic future?** *School Leadership & Management.* 2016; **36**(1): 113–132.
Publisher Full Text

Coldron J, Crawford M, Jones S, *et al.*: **The Restructuring of Schooling in England: The Responses of Well-positioned Headteachers.** *Educ Manag Adm Lead.* 2014; **42**(3): 387–403.
Publisher Full Text

Darling-Hammond L: **The flat world and education: How America's commitment to equity will determine our future.** (New York: Teachers College Press). 2010.
Reference Source

Department for Education: **The importance of teaching: The schools white paper.** (London, Department for Education). Accessed on 16 May 2018, 2010.
Reference Source

De Vries S, Prenger R: **A lesson study professional learning network in secondary education.** In C. Brown and C. Poortman, C. (Eds) (2018) *Networks for learning: effective collaboration for teacher, school and system improvement.* (London, Routledge). 2018.
Reference Source

Dı́az-Gibson J, Zaragoza MC, Daly AJ, *et al.*: **Networked leadership in Educational Collaborative Networks.** *Educ Manag Adm Lead.* 2017; **45**(6): 1040–1059.
Publisher Full Text

Dowling S: **Professional development and the Teaching Schools experiment in England: Leadership challenges in an alliance's first year.** *Management in Education.* 2016; **30**(1): 29–34.
Publisher Full Text

Duveneck A: **Bildungslandschaften verstehen: zum Einfluss von Wettbewerbsbedingungen auf die Praxis.** (Weinheim, Beltz Juventa). 2016.
Reference Source

Easton L: **From professional development to professional learning.** *Phi Delta Kappan.* 2008; **89**(10): 755–61.
Publisher Full Text

Ehren M: **Accountability and trust: two sides of the same coin?** invited talk as part of the University of Oxford's *Intelligent Accountability Symposium II.* Oxford, 12 December, 2018. 2018.

Ehren M, Godfrey D: **External accountability of collaborative arrangements; a case study of a Multi Academy Trust in England.** *Education Assessment Evaluation and Accountability.* 2017; **29**(4): 339–362.
Publisher Full Text

Finnigan KS, Daly AJ: **Mind the gap: organizational learning and improvement in an underperforming urban system.** *Am J Educ.* 2012; **119**(1): 41–71.
Publisher Full Text

Gilbert C: **Optimism of the will: the development of local area-based education partnerships. A think piece.** (London, London Centre for Leadership in Learning). 2017.
Reference Source

Greany T: **Are we nearly there yet? Progress, issues and possible next steps for a self-improving school system.** (London, IOE Press). 2014.
Reference Source

Greany T: **Karmel Oration: Leading schools and school systems in times of change – A paradox and a quest**. *Presented at Australian Council for Educational Research (ACER) Research Conference, Melbourne, Australia, 28–29 August, 2017.* 2017.
Reference Source

Greany T, Earley P: **The paradox of policy and the quest for successful**

Leadership. *Professional Development Today.* 2018; **19**(3&4): 6–12.
Reference Source

Hadfield M, Jopling M, Noden C, *et al.*: **What does the existing knowledge base tell us about the impact of networking and collaboration? A review of network-based innovations in education in the UK**. (Nottingham, UK: National College for School Leadership). 2006.

Hairon S, Goh J: **Pursuing the elusive construct of distributed leadership: is this search over?** *Educ Manag Lead.* 2015; **43**(5): 693–718.
Publisher Full Text

Handscomb G: **Improving the System.** *Professional Development Today.* 2018; **19**(3&4): 4.

Hargreaves A: **Foreword**. In C. Brown and C. Poortman (Eds) (2017) *Networks for learning: effective collaboration for teacher, school and system improvement.* (London, Routledge). 2018.

Hargreaves D: **Creating a Self-improving School System**. (Nottingham, National College). 2010.
Reference Source

Hargreaves D: **A self-improving school system: towards maturity**. (Nottingham, National College). 2012.
Reference Source

Hargreaves A, Shirley D: **The Fourth Way: The Inspiring Future for Educational Change**. (California, CA Corwin Press). 2009.
Publisher Full Text

Helsper W, Hummrich M: **Changes in the relation of education systems and youth in the horizon**. 2006.
Reference Source

Howland G: **Structural reform: The experience of ten schools driving the development of an all-age hard federation across a market town in northern England.** *Management in Education.* 2015; **29**(1): 25–30.
Publisher Full Text

Hubers M: **Capacity building by data team members to sustain schools' data use**. (Enschede, Gildeprint). 2016.
Publisher Full Text

Hubers M, Poortman C: **Establishing sustainable school improvement through Professional Learning Networks**. In C. Brown and C. Poortman (Eds) (2017) *Networks for learning: effective collaboration for teacher, school and system improvement*, (London, Routledge). 2018.
Reference Source

Hutchings M, Greenwood C, Hollingworth S, *et al.*: **Evaluation of the City Challenge programme (Research Report DFE-RR215)**. (London, Department for Education). 2012.
Reference Source

Huxham C, Vangen S: **Managing to Collaborate: The Theory and Practice of Collaborative Advantage**. (Abingdon, Routledge). 2005.
Reference Source

Jackson D, Temperley J: **From Professional Learning Community to Networked Learning Community**. (Nottingham, National College for School Leadership). 2006.
Reference Source

Lima J: **Thinking more deeply about networks in education.** *Journal of Educational Change.* 2010; **11**(1): 1–21.
Publisher Full Text

Manitius V, Berkemeyer N: **Unterrichtsentwicklung mithilfe von Netzwerken**. Iin H.-G. Rolff (Ed.), Handbuch Unterrichtsentwicklung, (Weinheim, Beltz), 2015; 595–608.

Mintrop H, Trujillo T: **The practical relevance of accountability systems for school improvement: A descriptive analysis of California schools.** *Educ Eval Policy Anal.* 2007; **29**(4): 319–352.
Publisher Full Text

Muijs D: **Improving schools through collaboration: a mixed methods study of school-to-school partnerships in the primary sector.** *Oxf Rev Educ.* 2015; **41**(5): 563–586.
Publisher Full Text

Muijs D, Rumyantseva N: **Coopetition in education: collaborating in a competitive environment.** *Journal of Educational Change.* 2014; **15**(1): 1–18.
Publisher Full Text

Muijs D, West M, Ainscow M: **Why network? Theoretical perspectives on networking.** *Sch Eff Sch Improv.* 2010; **21**(1): 5–26.
Publisher Full Text

Rempe-Gillen E: **Technologies in mathematics teacher cross-phase and cross-school collaborative professional development**. PhD Thesis, University of Leeds. 2012.
Reference Source

Rempe-Gillen E: **Primary school teacher experiences in cross-phase professional development collaborations.** *Professional Development in Education.* 2018, 2017; **44**(3): 356–368.
Publisher Full Text

Rittel H, Webber M: **Dilemmas in a general theory of planning.** *Policy Sci.* 1973; **4**: 155–169.
Publisher Full Text

Sammons P, Mujtaba T, Earl L, *et al.*: **Participation in network learning community programmes and standards of pupil achievement: does it make a difference?** *School Leadership & Management.* 2007; **27**(3): 213–238.
Publisher Full Text

Schleicher A: **Preparing teachers and developing school leaders for the 21st century: Lessons from around the world**. Paris, Organisation for Economic Co-operation and Development. 2012.
Publisher Full Text

Stoll L: **Connecting learning communities: Capacity building for systemic change**. In A. Hargreaves, A. Lieberman, M. Fullan & D. Hopkins (Eds.) *Second International Handbook of Educational Change.* Dordrecht, Springer. 2010; 469–484.
Publisher Full Text

Stoll L, Harris A, Handscomb G: **Great professional development which leads to great pedagogy: nine claims from research**. Nottingham, National College for School Leadership. 2012.
Reference Source

Tulowitzki P, Duveneck A, Krüger M: **A professional learning network for the entire local education system: Educational landscapes in Germany**. In C. Brown and C. Poortman (Eds) *Networks for learning: effective collaboration for teacher, school and system improvement*. London, Routledge. 2018.
Reference Source

van Holt N, Berkemeyer N, Bos W: **Netzwerkarbeit und Schülerleistungen**. In N. Berkemeyer, W. Bos, H. J.rvinen, V. Manitius and N. van Holt (Eds) *Netzwerkbasierte Unterrichtsentwicklung. Ergebnisse der wissenschaftlichen Begleitforschung zum Projekt 'Schulen im Team'.* Münster, Waxmann, 2015; 119–152.
Reference Source

Warren Little J: **The Persistence of Privacy: Autonomy and Initiative in Teachers' Professional Relations.** *Teach Coll Rec.* 1990; **91**(4): 509–535.
Reference Source

Wenger E: **Communities of Practice: Learning, Meaning and Identity**. (Cambridge, England: Cambridge University Press). 1998.
Publisher Full Text

Woods P, Levacic R, Evans J, *et al.*: **Diversity and collaboration? Diversity Pathfinders evaluation. Report, (826)**. London: Department for Education and Skills. 2006.
Reference Source

Open Peer Review

Current Peer Review Status: ✔ ✔ ✔ ✔ ✔

Version 2

Reviewer Report 16 May 2019

https://doi.org/10.21956/emeraldopenres.14151.r26359

✔ **Paul Wilfred Armstrong** (iD)

Manchester Institute of Education, University of Manchester, Manchester, United Kingdom

Chris has addressed and indeed built upon and developed the comments and suggestions I (and the other reviewers) have made. The article is stronger and more insightful as a result. I would suggest the article is now ready for indexing.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: School collaboration.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 12 April 2019

https://doi.org/10.21956/emeraldopenres.14151.r26358

✔ **Sølvi Lillejord** (iD)

Norwegian Knowledge Centre for Education, Research Council of Norway, Lysaker, Norway

I have read Chris Brown's response to the reviewers and the latest version of the article, and approve of the changes being made.

Is the topic of the opinion article discussed accurately in the context of the current literature?

Yes

Are all factual statements correct and adequately supported by citations?
Yes

Are arguments sufficiently supported by evidence from the published literature?
Yes

Are the conclusions drawn balanced and justified on the basis of the presented arguments?
Yes

Is the argument information presented in such a way that it can be understood by a non-academic audience?
Yes

Does the piece present solutions to actual real world challenges?
Yes

Is real-world evidence provided to support any conclusions made?
Yes

Could any solutions being offered be effectively implemented in practice?
Yes

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 1

Reviewer Report 27 March 2019

https://doi.org/10.21956/emeraldopenres.13970.r26353

✅ **Leyton Schnellert**
Faculty of Education, University of British Columbia, Vancouver, BC, Canada

This commentary and synthesis is timely as Professional Learning Networks (PLNs) are increasingly enacted around the world. This article outlines the key factors and conditions within PLNs and the role of school leaders. The literature used to position the analysis is both current and

includes leading thinkers (e.g., Hargreaves, Timperley, Stoll, Muijs, Ainscow, Warren Little, Shirley, Fullan). The author suggests a case will be made regarding PLNs' role in catalysing, supporting, and sustaining improvements in teaching and learning in schools. I appreciated the literature cited about when PLNs do and do not have an impact, but I was not convinced that there is enough literature to support that changes are sustained. This might be something to add to the questions for further research.

As explained in this piece, PLNs include a small number of individuals from various schools or organizations innovating on behalf of their schools/sites. This is a common definition in the literature. Through the latter parts of the article, the author zeroes in on the role of school leaders. This narrowing of focus led to a conclusion with questions for possible research. Here I found the third question for further research compelling. How do school leaders successfully take up PLN knowledge mobilization with the rest of their staff and at a school level? My own work, and that of others might be of assistance to researchers and practitioners (Butler & Schnellert, 2012[1]; Butler, Schneller, & MacNeil, 2015[2]) to consider if and how educators can learn or innovate for one another. How might the literature related to professional learning come in to play here? Sustainable change in practice requires not just change in practice but educators learning and understanding how and why practice change/innovation is important and beneficial to learners (e.g., Borko, 2004[3]; Timperley, 2013[4]).

Overall, I appreciated and found this article useful for the depth and breadth of the explanation of PLNs, their make-up and function, and the concise summary of benefits to the approach. This was balanced with attention to tensions and critiques in the conditions section. There were a few terms that could be better defined – agency, informal and involuntary networks, and a definition of meso and macro systems could be helpful (perhaps using Bronfenbrenner). I was curious that there was no mention of (1) relational or collective agency, (2) little about how networks can flatten hierarchy allowing those closest to implementation of innovation to be co-authors of innovation, and (3) little about PLNs' potential to bridge the theory/research and practice divide. I would also introduce distributed leadership sooner. I did not find the references to chapters 5 and 6 helpful in this stand alone piece.

I will use this article as a resource in graduate courses and with PLNs I work with. Reading the piece left me with two lingering questions to explore in my own work: Whose responsibility is PLN knowledge mobilization? and How might PLNs' innovation and learning intersect with ongoing inquiry-oriented professional learning with/for teachers in schools who are not actively part of the PLN their school participates in?

References
1. Butler D, Schnellert L: Collaborative inquiry in teacher professional development. *Teaching and Teacher Education*. 2012; **28** (8): 1206-1220 Publisher Full Text
2. Butler D, Schnellert L, MacNeil K: Collaborative inquiry and distributed agency in educational change: A case study of a multi-level community of inquiry. *Journal of Educational Change*. 2015; **16** (1): 1-26 Publisher Full Text
3. Borko H: Professional Development and Teacher Learning: Mapping the Terrain. *Educational Researcher*. 2004; **33** (8): 3-15 Publisher Full Text
4. Timperley H: Learning to practise. A paper for discussion. *New Zealand: Ministry of Education*. 2013. Reference Source

Is the topic of the opinion article discussed accurately in the context of the current literature?

Yes

Are all factual statements correct and adequately supported by citations?

Yes

Are arguments sufficiently supported by evidence from the published literature?

Yes

Are the conclusions drawn balanced and justified on the basis of the presented arguments?

Yes

Is the argument information presented in such a way that it can be understood by a non-academic audience?

Yes

Does the piece present solutions to actual real world challenges?

Yes

Is real-world evidence provided to support any conclusions made?

Yes

Could any solutions being offered be effectively implemented in practice?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: My relevant areas of expertise include teacher professional development, professional learning communities, professional learning networks.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 26 March 2019

https://doi.org/10.21956/emeraldopenres.13970.r26328

✓   **Jo-Ann Baird**
    Department of Education, University of Oxford, Oxford, United Kingdom

This is an excellent article, which embeds an important argument in the existing literature. It is

work which is needed in the field and adds to what we currently know. The following comments are by way of engagement with the text. I learned a lot from reading this work.

1. I find the background on the rise of networks and networks in education to be limited and too broad. The dismantling of formal network and organisational structures through the erosion of the (hollow) state is missing from the analysis in my view. Other rationales for networks exist in different places, but they have always been there - its just that their raison d'être differs across time and place, which affects their operation in terms of the infrastructure available, including expertise and other resources.

2. The narrative is very positive about the benefits of professional learning networks. I too, have observed many such positive effects and indeed, side-effects of such networks. However, we also need to consider the limitations. How should they be structured and what are they for? Oftentimes, such things are put together without being thought through properly and they are inadequately resourced to tackle the issues that they are charged with. As such, they become a poor use of time, distract teachers or even misinform them and create worse practice.

Is the topic of the opinion article discussed accurately in the context of the current literature?

Yes

Are all factual statements correct and adequately supported by citations?

Yes

Are arguments sufficiently supported by evidence from the published literature?

Yes

Are the conclusions drawn balanced and justified on the basis of the presented arguments?

Yes

Is the argument information presented in such a way that it can be understood by a non-academic audience?

Yes

Does the piece present solutions to actual real world challenges?

Yes

Is real-world evidence provided to support any conclusions made?

Yes

Could any solutions being offered be effectively implemented in practice?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Educational assessment

I confirm that I have read this submission and believe that I have an appropriate level of

expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 13 March 2019

✔️ **Sue Brindley**

Institute of Continuing Education, University of Cambridge, Cambridge, United Kingdom

This is a timely and useful conceptual framing of the issues associated with sustaining teacher research. Although there is currently an appreciation of the need for structures and systems, these tend to be localised (i.e. within schools or at most, academy chains). The wider tracking of intellectual associations that this article offers opens up a useful pathway for developing ways in which teachers might both link within the profession and extend those links with other potential research collaborators, including university colleagues. There are still other conditions for success mentioned but not fully developed here, such as the notion of leadership, not simply residing with headteachers, but within the school community more widely, and the involvement of students within the research community. Nevertheless, this article addresses some key questions and raises pertinent questions about future research behaviours that PLNs might address.

Is the topic of the opinion article discussed accurately in the context of the current literature?

Yes

Are all factual statements correct and adequately supported by citations?

Yes

Are arguments sufficiently supported by evidence from the published literature?

Yes

Are the conclusions drawn balanced and justified on the basis of the presented arguments?

Yes

Is the argument information presented in such a way that it can be understood by a non-academic audience?

Yes

Does the piece present solutions to actual real world challenges?

Yes

Is real-world evidence provided to support any conclusions made?

Yes

Could any solutions being offered be effectively implemented in practice?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Practioner Research Networks

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 04 March 2019

?

Sølvi Lillejord (iD)
Norwegian Knowledge Centre for Education, Research Council of Norway, Lysaker, Norway

This is a very interesting and well-written article with important insights for researchers, policy-makers and school professionals. In the process of reading the paper, five (naïve) questions emerged. While – admittedly – some of the questions talk more to problems inherent in educational research, they are intended to be constructively critical and contribute to strengthening the article's line of argument.

The first question I struggled to find an answer to: What *is* the current context of PLNs? Are they ongoing activities that can be investigated empirically? Are they established, in the making or an idea? Are they many or few? Do they have distinctive traits? Professional learning networks (PLNs) are described as *emerging*, and it is difficult, from the text, to understand *how* they emerge and *who* initiates the development of networks. It seems to just be happening. *Where* and *when* they emerge is also underexplored – are we talking about England or is this a development trend with global reach?

The second question I struggled with was Bauman's Liquid Modernity. Is this the appropriate analytical approach when the intention is to build the argument that professional learning networks can solve problems in English schools? Based on an assumption that modern people are constantly mobile and rootless; liquid modernity problematizes postmodern conditions for identity formation. I find it hard to see how a theory of action can be extracted from Bauman's rather abstract and general claims- even though Bauman says that individuals should use their agency to learn from the best practices of others. (For a critique of contradictions, inconsistencies and weaknesses, see Atkinson, W. (2008) Not all that was solid has melted into air (or liquid): a critique of Bauman on individualization and class in liquid modernity[1]. The paper describes what PLNs are, why they emerge and why they have the potential to solve problems in schools. Three drivers are identified: a) challenging, complex expectations about what each school should

achieve; b) the dismantling of old structures; c) expectations that schools should be self-improving and self-led.

Third question is therefore: How did English schools get into this predicament, being left alone with problems that are too big for them to handle? Why and when did schools become *competitors*? Who dismantled the structures? I assume that this did not just "happen", and that it was not caused by liquid modernity. As I understand it, all teachers belong to a learning community (their home school). It is not clear from the text what teachers learn in their home school, but as teachers must *leave* this community to learn from teachers who belong to other communities, the home school community obviously does not fulfil the requirements of a 'self-improving system'.

The fourth question *is therefore: What can individual teachers who float in and out of schools learn about improving education?*
I fully agree that teachers can learn from other teachers, but when they have participated in a PLN, they are expected to serve as agents of change in their home school. Not only are they returning with ideas about how they can change their own practice; they are also expected to use this knowledge to help colleagues change *their* practice (self-improve). As research on data-based decision-making along with research on research use shows that teachers find it hard to use external sources of information, the **fifth and final question is**: If home school communities are not self-improving systems, how can individual teachers who learn from teachers who belong to other (not self-improving systems) travel back to their home school as agents of change and assist in self-improvement efforts? Or, to rephrase: What kind of (actionable) knowledge do teachers generate in PLNs that they can use in their home school?

Suggestions for improvements:
As the paragraph on leadership is the least developed, I suggest moving the paragraph on page 8, right column (Beginning with 'Networks can be formal and contracted in nature....') to page 3 or 4, where networks are presented. Then write up Leadership in combination with Long term commitment and Reflective professional inquiry. This will underline the long-term perspective that leaders must have and indicate how leaders can work to reach the goal of self-improvement. It will also support the argument on page 9 in the article: 'There are many ways to collaborate and not all of them are always effective'.

References
1. Atkinson W: Not all that was Solid has Melted into Air (or Liquid): A Critique of Bauman on Individualization and Class in Liquid Modernity. *The Sociological Review*. 2008; **56** (1): 1-17 Publisher Full Text

Is the topic of the opinion article discussed accurately in the context of the current literature?

Yes

Are all factual statements correct and adequately supported by citations?

Yes

Are arguments sufficiently supported by evidence from the published literature?

Yes

Are the conclusions drawn balanced and justified on the basis of the presented arguments?
Yes

Is the argument information presented in such a way that it can be understood by a non-academic audience?
Yes

Does the piece present solutions to actual real world challenges?
Yes

Is real-world evidence provided to support any conclusions made?
Yes

Could any solutions being offered be effectively implemented in practice?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Educational leadership, educational policy, organizational learning, evaluation, teacher education

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 31 January 2019

https://doi.org/10.21956/emeraldopenres.13970.r26308

? **Paul Wilfred Armstrong** iD

Manchester Institute of Education, University of Manchester, Manchester, United Kingdom

This is a timely article in respect of the increasing tendency towards organisational collaboration as a means of educational improvement, notably within the English school context, but also further afield in other school systems internationally. The author is an established scholar in this area of the field, specifically the growing body of work he is developing within school and professional learning networks (PLN). As such he is well placed to reflect on the notion of PLNs and the conditions that facilitate and hinder how effective they might be.

I have a small number of relatively minor suggestions that the author might consider to develop the article further:
  ○ The author draws, predominantly, on literature and evidence from the English and German

contexts by way of comparison. It would be helpful if this comparative approach were introduced or signposted much earlier in the article (in the abstract and introduction for example) rather than partway through the section entitled 'Networks in education'.

○ Within this section, the author also talks about 'chapters' and a 'study'. These references need to be removed and the paragraph in which they can be found reworded.

○ The contrast between homogenous (Germany) and hierarchical (England) networks is interesting. It would be useful if this contrast were explored further. For instance, why have networks tended to evolve in these different ways across these two different contexts?

○ Related to the above point, the author might also point to the tensions within the English school system that remains a highly competitive arena and therefore one in which collaboration does not always sit comfortably.

○ The author acknowledges a number of important factors that influence the success of networks. One notable omission is the historical context (i.e. whether and the extent to which organisations and individuals have worked together in the past.)

I enjoyed reading this piece. The suggestions I have put forward should be interpreted constructively.

Is the topic of the opinion article discussed accurately in the context of the current literature?

Yes

Are all factual statements correct and adequately supported by citations?

Yes

Are arguments sufficiently supported by evidence from the published literature?

Yes

Are the conclusions drawn balanced and justified on the basis of the presented arguments?

Yes

Is the argument information presented in such a way that it can be understood by a non-academic audience?

Yes

Does the piece present solutions to actual real world challenges?

Yes

Is real-world evidence provided to support any conclusions made?

Yes

Could any solutions being offered be effectively implemented in practice?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: School collaboration

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 31 Jan 2019

Chris Brown, University of POrtsmouth, Portsmouth, United Kingdom

Thanks for reviewing this - these are all helpful and valid points. As other feedback comes in I will respond to them and revise the article accordingly.

Competing Interests: No competing interests were disclosed.