Networked professional learning: relating the formal and the informal

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Abstract

The increasing complexity of the workplace environment requires teachers and professionals in general to tap into their social networks, inside and outside circles of direct colleagues and collaborators, for finding appropriate knowledge and expertise. This collective process of sharing and constructing knowledge can be considered 'networked learning'. The processes involved are informal and largely invisible to the official framework of the organisation. Consequently, a large amount of learning that takes place is unrecognised and the dynamics, impacts and benefits of such networked learning are often overlooked by organisations. This situation brings about tensions between formal and informal processes, which in turn raise issues concerning adequate professional development, professional autonomy and management. It also leads to questions about facilitating the creation and exchange of knowledge and expertise within the existing social networks. Taking an interdisciplinary approach, we explore a number of educational and organisational studies. Our key questions are: what are the formal and informal mechanisms underlying networked professional learning, related to professional development, autonomy and management? How can networked learning be positioned in the most optimal way? Currently, a clear academic understanding of how to optimally align and make use of networked learning is lacking. The goal of our exploratory review is to describe mechanisms that influence the alignment of informal and formal learning of teachers within their workplace: schools. We work towards a theoretical and practical integration of the different chosen fields by means of a framework of mechanisms related to networked learning.

Keywords: Networked learning; Teachers; Professional development
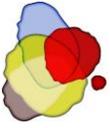
1.   Introduction

Entering the 21st century, pervasive communication technologies together with increased attention for situational knowledge have resulted in an emphasis on collaboration and exchange, highlighting the importance of social networks both within organisations and across organisational borders (Lieberman, 2000; Price, 2013; Pugh & Prusak, 2013). Making good use of social networks has become increasingly important in educational settings, where teachers develop relationships within and outside schools that help them to learn, solve problems, and innovate their teaching (De Laat, 2012). Access to networks resulting from these informal relationships has become an important aspect of continued professional development. These informal networks help teachers to deal with the increasing complexity of their work. Research shows that most of what professionals learn is learnt informally (Cross, 2007)**,** which highlights the need for professional autonomy and personal creativity in problem-solving and professional development. Furthermore, research shows the need to understand the role and impact of informal social networks on teacher professional development (Villegas-Reimers, 2003; Darling-Hammond et al., 2009; Boud & Hager, 2012; Hargreaves & Fullan, 2012).

1.1 The value of networked professional learning

Networked learning is a perspective on social learning that describes how participants learn through communication, exchange and connections. People in a person's network can be seen as a source of knowledge (Siemens, 2004). Learning in networks can be informal (a chat during a break) or formal (attending a group training), and the networks themselves can be formal (a taskforce) or informal (talking to a student's parent). Learning networks often can be of value when we are in need of certain knowledge, especially the 'weak ties'; those people that we know but don't interact with very often can have something 'new' to offer (Granovetter, 1973). Learning in networks is nothing new, it happens where people interact and gain experience (Eraut, 2004), connected to the work context (Billet, 2004). Professional learning has proven to drive organisational learning and innovation (Bessant et al., 2012). Addressing complex problems is a forte of the networked learning paradigm (Earl & Katz, 2007; Hodgson, De Laat, McDonnel & Ryberg, 2014).

1.1.1 Networked learning and professional development

In spite of the proven importance of informal networks, professional development of teachers is almost invariably approached in a largely formal manner (Darling-Hammond & Wei, 2009; Villegas-Reimers, 2003). School organisations often think of schooling in terms of hiring an expert, in-house training, or individual training trajectories such as coaching. However, formal trajectories are seldom tailored to the challenges teachers face in daily practice. Furthermore, these challenges at work induce teachers to learn informally (Billet, 2004). Both formal trajectories and informal learning processes are part of the learning of teachers, and professionals in general (Billet, 2002; Le Clus, 2011). Unfortunately, this continuous process of workplace learning, where people customarily exchange knowledge with others in their networks, is hardly ever recognised as professional development. As such, informal learning processes are often overlooked by the management and as a consequence do not receive adequate attention. This suboptimal situation (Billet, 2004; De Laat, 2012) can be remedied by aligning formal and informal learning processes through networked learning.

Instead of contrasting formal with informal learning, we emphasise the need to develop a hybrid form of learning where both formal and informal learning activities are recognised and promoted (cf. McGuire & Gubbins, 2010). This requires a new role from school management, one that expands a culture of learning by creating social learning spaces for professional development (De Laat, 2012). Growing evidence is available that shows how informal professional development can be given a place within the formal organisational context by establishing learning networks and professional learning communities, such as 'communities of practice' (cf. Wenger, Dermott & Snyder, 2002). Promoting and strengthening these
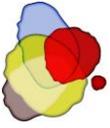
informal networks builds on the already existing social structures and networks within and between schools (cf. Hodkinson & Hodkinson, 2005; De Laat, 2012).

1.1.2 Networked learning and professional autonomy

Participation in learning networks is aimed at sharing knowledge and expertise as individuals personally see fit. Networked learning, in our view, is aimed at promoting professional autonomy, self-directedness and independent decision-making. Networked learning opens up the social environment to optimally make use of (new) possibilities to connect to other professionals (cf. De Laat, 2012). For networked learning to be effectively integrated into the organisation, a balanced and integrated approach is required (Agterberg, 2012). Since informal learning through networks is often bottom-up, self-governing, spontaneous and practice-driven, it is not an easy task to combine this with the formal need for control and performance: management and 'personnel' have different roles and outlooks (Fuller & Unwin, 2003; Hargreaves & Fullan, 2012; Hodkinson & Hodkinson, 2005) As soon as the management gets involved too much, participants in learning networks risk losing their sense of autonomy, the result of which can be loss of motivation (Agterberg, 2012; Kubiak & Bertram, 2010). Related to issues of teacher autonomy are teachers' influence on management control and leadership (Forrester, 2000) as well as teachers' participation in planning and innovation (De Laat, 2012).

1.1.3 Networked learning and management

Providing autonomy, which allows individuals to interact and develop expertise as they see fit, means lowering formal control (Hulsbos, Andersen, Kessels & Wassink, 2012). This brings into view issues of management and leadership, which directly influence the amount of professional autonomy that individuals have in the organisation (Bass, 1991; Tynjälä, 2013). With greater individual autonomy, thinking, learning and acting independently is increased and people can personally take up responsibility. This requires a different style of leadership, where responsibilities are shared among the members of the organisation: distributed leadership. Distributed leadership promotes the sharing of knowledge and increases motivation for work and learning (Spillane, 2008). When leaders pay attention to informal factors in the organisation, such as the personal interests of individuals (i.e. 'transformative leadership') this increases commitment to organisation goals. This can be contrasted with purely transactional leadership, which functions according to standards, performance and rewards, which can engender mediocrity in the organisation (Bass, 1991). To create an organisation where the day-to-day complexity is successfully dealt with and different interests are accounted for, where responsibility is shared and where people can grow and together create value and quality, the management needs to shift focus from a traditional centralised role to a position that reflects a deeper insight into the dynamics of the organisation. This entails an integrated view of formal and informal dynamics. Directions and strategies can be developed 'top-down' as well a 'bottom-up' (Groot and Homan, 2012). Networked learning then involves the organisation as a whole, management as well as teachers.

1.1.4 Aim of this study

We have argued the importance of informal networked learning and illustrated how this relates to professional development, autonomy and management of informal and formal learning in organisations. However, to date, these areas of research have not been integrated in the scientific literature. Theory in the field of teacher professional development is still much under development (McCormick, 2010). Findings from the private sector can advance theory and practice in the public sector (Binz-Scharf, Lazer, & Mergel, 2011).

In this study we examine underpinning mechanisms, using a networked learning perspective, in order to develop a better conceptual understanding and to examine how this facilitates a better alignment of informal and formal learning in organisations. Since professional development of teachers is directly related
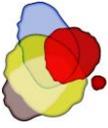
to teaching quality (Darling-Hammond & Wei, 2009; Villegas-Reimers, 2003), we deem it important that this topic receives the attention it deserves.

1.2   The 'iceberg' metaphor as background of our study: formal and informal working and learning

The formal side of how things are officially organised, and the informal side of how in everyday life people work, learn, experience and give meaning to their work, are two faces of the organisation. The analogy of an iceberg illustrates this point. The visible tip of the iceberg represents the formal organisation, where planned decisions are made and organisational structures are developed in order to divide the work, create order, and provide stability. Under the waterline we find the huge mass of the iceberg, largely invisible, informally structured, yet much larger and often at least as influential as the official organisation structures, consisting of everything that is not formal (De Caluwe and Vermaak, 2003; De Laat, 2012).

'Formal' and 'informal' aspects of working and learning both are part of professional life and play a role at the level of individuals, groups, and organisations. The worlds 'above' and 'under' water mutually influence each other: by interacting in networks people create and influence both the formal and the informal organisation. Within both formal and informal networks we find aspects of control, autonomy, performance, development and management. Actions and procedures can be planned or spontaneous, visible or invisible, controlled or chaotic, under orders or autonomous. Both formal procedures and informal influences are crucial for the organisation and its members (Brown, Collins & Duguid, 1989; Snowden, 2005). Formal and informal mechanisms play a role for all individuals, groups and organisations, be it 'above water', or 'under water'.

2.   Research question

In this paper we research the mechanisms underlying networked professional learning in order to increase our understanding of how to optimally align networked learning in the school organisation.

Our key questions are:

- What are the formal and informal mechanisms underlying networked professional learning, related to professional development, autonomy and management?

- How can networked learning be positioned in the most optimal way?

The term mechanism is used here as: the way in which something functions.

We first address how networked learning contributes to professional development. Then, because a prerequisite for networked learning is the possibility of spontaneous and autonomous action and decision-making, we outline how networked learning is related to professional autonomy. Lastly, we explore how networked learning is related to issues of management and leadership.

Literature in these different research areas has until now not been integrated, and we work toward a framework in order to bring these different areas together. We do this by means of analysing formal and informal mechanisms that play a role in networked learning.

3.   Methodology

The studies presented in this exploratory review were identified in several systematic steps. First, searches on the database of EBSCOhost were applied. We chose this database as it is a multi-disciplinary meta-database that allows to search for articles that covers studies in education and professional development, management and organisational learning. EBSCOhost includes, amongst others, the databases
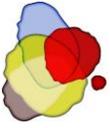
of Academic Search Elite, Business Source Premier, E-Journals, PsycINFO, and ERIC. Peer reviewed journal articles and international peer reviewed book chapters published between January 1st 2004 and January 1st 2014 were included in the search. The following keywords were used for a Boolean search: 'networked learning' OR 'learning networks' AND 'professional development' AND 'teachers' NOT 'online'. This search resulted in 74 articles. The aim of the literature research was to recognise formal and informal mechanisms underlying networked learning, related to professional development, professional autonomy and management. For this purpose, the abstract, summary and references of all selected sources were studied first, 26 studies were shortlisted and the articles were read, which resulted in a final selection of 22 sources. The other 52 articles were left out of further analysis because they did not discuss networked professional development of teachers, or had a single focus on online learning tools. The snowball method of checking references in the remaining articles resulted in 22 extra references relevant to our aim. In total 44 studies (see Appendix 2) were read in depth and provided the basis of our analysis. The result is an overview of formal and informal mechanisms involved in networked professional learning. This overview is then condensed into a conceptual framework.

4.   Findings

First we discuss our findings of how networked learning is related to professional development. After this, we look at networked learning and professional autonomy. Then we consider the relation of networked learning and management. We conclude each section with an overview of formal and informal mechanisms regarding networked learning found in the literature.

4.1   Networked learning and professional development

Professional development comprises formal and informal activities related to intellectual, personal and social domains (De Laat, Schreurs & Nijland, 2013), and can be seen as a "non-linear ongoing process rather than as an outcome of linear, one-off training events" (Varga-Atkins, O'Brien, Burton, Campbell & Qualter, 2008, p.42). Furthermore professional development can be regarded as "a flow of acquired knowledge, as well as participation in a learning community" (Pahor, Škerlavaj & Dimovski, 2008). In networked learning communities, knowledge is constructed and developed, rather than being transferred from one person to the next (Schultz, 2011). Influence from colleagues can be noted as a contributing factor in order to learn and develop, for example, in changing a style of teaching (Supovitz, Sirinides & May, 2009). It is argued that theory in the field of professional development still has to be developed, insights gained from networked learning could contribute to how and what teachers learn professionally (cf. Appleby & Hiller, 2012; McCormick, 2010).

Exchange between individuals happens through formal and informal networks (Carmichael, Fox, McCormick, Procter & Honour, 2006) and the flow of knowledge related to professional development occurs both between organisations and within organisations (Jones, 2006; Seezink, Poell & Kirschner, 2010) as well as cross-culturally (Ryan, Kang, Mitchell & Gaalen, 2009). Professional learning activities can be formal (obtaining a diploma or a degree from an institute), or informal (sharing a drink after a conference day). Studies comparing effectiveness of professional development programmes have found that collaborative approaches are more effective than individual ones (Varga-Atkins et al., 2010), for example when teachers together research and evaluate their own practices (Bartlett & Burton, 2006). Baker- Doyle and Yoon, (2011) also found that while teachers personally gather information, it is within and through social networks that this information comes to life as it is shared, interpreted, developed and sustained. Professional development can be seen as an ongoing process of becoming where people grow and learn in connection with each other and events in their professional life (Boud & Hager, 2012; Poell & Van Der Krogt, 2013). Schools however, have traditionally been formally designed in a way that teachers work individually. "They have rarely been given time together to plan lessons, share instructional practices, assess students, design curriculums, or contribute to administrative or managerial decisions" (Darling-Hammond & Wei, 2009, p.11). Increasing possibilities for communication and exchange across organisational boundaries is therefore
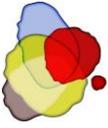
an important aspect of networked learning initiatives, aiming to bring together people in order to exchange and create knowledge to support each other. For example, questions can be explored, new insights can be discussed, or meeting an expert can provide valuable new information. Both formal and informal learning opportunities enable teachers to improve their practice (O'Brien, Varga-Atkins, Burton, Campbell & Qualter, 2008).

Making social learning processes part of a learning programme can complement or replace formal education such as seminars in situations where this formal education does not address the learning needed. For example, a project was carried out in a primary school setting where teachers, parents and other parties outside of the school studied problems together (Angelides, Georgiou & Kyriakou, 2008). These learning networks, aimed at developing a social learning approach, were found to facilitate experimentation and reflection. The teachers felt strengthened in their profession when being able to collaborate with the outsiders (school advisors or academics) that came to the school (Angelides et al., 2008).

Learning through networks and partnerships within and between schools sustains contextualised knowledge (Baumfield & Butterworth, 2005). Beckett (2012) describes a situation in which school staff operated in a political context focused on targets and performance levels. The school was situated in a poor area, which required adaptation and dealing with complexities. The school staff felt that the government-imposed recommendations were not reflecting their immediate concerns, and developed a school network including researchers in order to develop understanding about the relation between poverty and children's educational experiences.

Professional learning networks can function as a 'learning incubation centre' (Attard, 2012). Participating in a learning network can promote reflective awareness and development through collaborative analysis, for example when participants note that they "started to dig deeper into their experience" (p.199). When what happens in learning networks is of direct relevance to the participants' needs, this can increase participants' motivation to engage in the reflective process that the network entails (Attard, 2012).

The main findings of this section are: professional learning is an ongoing process, rather than something occasional, which naturally happens in formal and informal social structures. Furthermore, networked learning is often situated and most effective when it is directly related to the work practices. Promoting collaboration through networks has proven to be effective to enhance the learning process.

In Table 1 we outline the formal and informal mechanisms regarding networked learning and professional development that we have found in this section.

Table 1

Formal and informal mechanisms in networked learning regarding professional development

Mechanisms	
'Informal'	'Formal'
Knowledge is constructed	Knowledge is transferred
Invisible	Visible
Transcending borders	Within boundaries
Continuous	Event-driven
Demand-driven	Supply-oriented
Voluntary	Under orders

4.2 Networked learning and autonomy

If teachers are to improve their skills, they must have the possibility to influence their work and the way they learn (cf. Villegas-Reimers, 2003). Learning networks provide individuals with the opportunity to
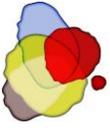
learn about topics they personally find of interest to their practice or personal development. In addition to being able to choose what they want to learn, networks also open up the environment by providing links to others outside of the direct working environment (cf. Büchel & Raub, 2002). The option to personally choose the areas to explore improves a person's performance (Akkerman, Petter & De Laat, 2008) because the opportunity to choose brings a feeling of responsibility which increases personal motivation (Varga-Atkins et al., 2010). Research shows that when teachers have more autonomy they are more committed and share more of their practices (Hökkä & Eteläpelto, 2013; Imants, Wubbels & Vermunt, 2013). Trotman (2009) warns for too much pressure to meet formal performance standards, pointing out that one should be careful to ensure that true learning is happening, where professionals are intrinsically motivated because of their own interest.

For reflective processes to take place among colleagues, there must be trust, so that mistakes can be discussed openly and learned from (Hargreaves et al., 2013). Positive school culture and atmosphere for collaboration are thus important contributors to quality of networked professional development (Varga-Atkins et al., 2010). Hodkinson and Hodkinson (2005) refer to the notion of an 'expansive' rather than a 'restrictive' learning environment where formal learning is combined with an effective approach to informal and networked learning. Through networked learning, possibilities for collaboration and personal initiative can be created (Hodkinson & Hodkinson, 2005).

Learning networks can function as open platforms where participants can meet and develop issues of their own interest. However, issues surrounding accountability can come up when learning networks are misunderstood and misused, for example when formal leaders take part, disturbing genuineness and exchange, or when financial interests are involved that create pressure (Trotman, 2009). Group processes of power, role ambiguity, and lack of direction can create complications. When personal responsibility takes the form of accountability toward control from superiors or school inspection, spontaneous learning processes can be impeded (Hargreaves et al., 2013).

Among members of the group a sense of autonomy is created and sustained and in this sense, autonomy does not mean acting alone as an isolated individual (Hargreaves et al., 2013; Imants et al., 2013). A flat organisation structure and a culture that fosters democracy and participation, allows for easier contact between people and increases the chance that networked learning occurs. In open organisational environments where people freely can use their networks to connect to each other and learn, it is easier to find and contact the right person to learn from. Hierarchy and a centralised culture can hinder possibilities to learn from more experienced people (Pahor et al., 2008).

Trust is an important factor when it comes to developing networked learning communities (Day & Hadfield, 2004; Trotman, 2009). Penuel et al. (2009) describe how in a school there were more opportunities to learn from colleagues, because the principal and the teachers themselves encouraged sharing and communication. Authority structures were more open, and teachers often used their networks to go outside the school for helpful resources. The school showed a pragmatic attitude towards teachers using these networks and resources, rather than one requiring formal approval from superiors. This led to a high level of trust in relationships and a sense of collective responsibility. More openness, generated by trust and social coherence, can lead to more success in implementing change and development (Penuel et al., 2009). Promoting open collaboration requires trust in order for members to open up, discuss differences, deal with uncertainty and respect individual differences (Attard, 2012).

Hökkä and Eteläpelto (2013), studying autonomy and learning of teachers, note three aspects to consider in order to improve continuous professional learning facilitated by networks: teachers often do not identify with their role as active researchers and developers, barriers between groups can hinder collaboration between groups in different fields, and too strongly adhering to one's views can limit collaboration, cultural change and organisational learning. Hanraets, Hulsebosch and De Laat (2011) note that networking skills need to be developed over time in order to make better use of the social environment . Employing initiative, valuing others with whom you learn, sharing responsibility and building relations or actively looking for connections are not necessarily skills that people have by nature. New skills have to be developed, by getting used to the new networked way of thinking and working (Day & Hadfield, 2004).
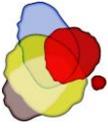
Concluding, an important aim of promoting networked learning is to provide individuals with more professional autonomy by creating an open environment in which people can connect to others to learn. We have seen that a number of mechanisms that play a role here: freedom of choice, commitment, responsibility, accountability, power, control, trust, communicative openness and willingness to share and reflect are all factors that contribute to the professional autonomy of the individual, and to a collaborative atmosphere in the organisation, and the success of networked learning activities. We stipulate that aiming to integrate these informal tendencies with the necessary formal requirements (see Table 2) will create a situation with most value for all involved.

Table 2

Formal and informal mechanisms regarding professional autonomy

| Mechanisms	
'Informal'	'Formal'
Personal choice	Rules
Commitment	Accountability
Personal interest/development	Performance standards
Personal reflection	Directives
Communicative openness	Communicative barriers
Trust	Control

In what follows we outline how networks and networked learning are related to management, how networked learning is important, and what can be done to promote it. We identify formal and informal mechanisms that are of influence in the context of management and networked learning.

4.3 Networked learning and management

Schools can be seen as examples of ´open practices´ (De Laat, Schreurs & Nijland, 2014), connecting different parties and practices in an open and complex environment as they are directly related with governments, parents and families, companies and other collaborative institutions (Darling-Hammond & Wei, 2009; Villegas-Reimers, 2003). The importance of networks for the organisation and the way they are embedded within organisational structures have been widely recognised (cf. Carmichael et al., 2006). Knowledge developed in learning networks form a significant part of the 'social capital' of an organisation (Van Emmerik, Jawahar, Schreurs & Cuyper, 2011), and learning networks build capacity for change (Edwards, 2012). Since networked processes comprise a large part of the learning in organisations, it raises the question of how to manage the relations and knowledge involved.

By relinquishing some control, managers can provide a creative and productive network environment where organisation members take part out of their own interest, understanding the benefits of having a strong professional network (Büchel & Raub, 2002). Leaders need to 'let it happen' while at the same time facilitating adequate room for emerging networks and embedding network activities in the organisation (Kubiak & Bertram, 2010). Leadership is not only embedded in formal positions, but emerges from interactions between people and activities that are performed (Scribner, Sawyer, Watson & Myers, 2007). In a more open and decentralised authority structure, leadership is less central but distributed over the members in the networks of the organisation (cf. Frost, 2008).

Büchel and Raub note the importance of multi-directionality, each member or unit can learn from all the others. Responsibility for success lies within all the network members. Learning networks can be designed for problem-solving and creating new knowledge, generated by input from all participants.
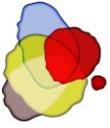
Although the motivation of the participants is crucial in attaining success, learning networks need to be supported by the management (Büchel & Raub, 2002; Carmichael et al., 2006).

Promoting learning and change entails that both formal processes and informal processes are considered important and where possible brought into agreement. When the formal and the informal organisation of a school are in harmony, it increases the chance of successful collaboration (Penuel et al. 2010). Managing responsibilities and allocation of time and resources have found to be of influence to perceptions of the social space on the work floor. The "designed" and "lived" organisations are equally important and influence each other mutually (Penuel et al., 2010).

In addition to promoting an open culture of learning and exchange in general, organising network activities or setting up networked learning communities can be helpful to promote the exchange of knowledge (Moses, Skinner, Hicks & O'Sullivan, 2009) and to create a more distributed leadership where members of the organisation all can contribute their expertise (Baumfield & Butterworth, 2005). Holmes (2004) describes a networked learning project where collective enquiry was the underlying mechanism that fuelled the activity in the learning networks. In order to be successful, a learning network needs a common purpose which benefits individual needs, fruitful collaboration which promotes commitment, purposeful and relevant network activities, a good facilitator who has sound knowledge and expertise in the given area, and funding (Varga-Atkins et al., 2010). Fostering networked learning communities is most successful when participants have shared goals, such as clearly defined aims and activities, where a balance between short- and long-time goals is important, observe Kubiak and Bertram (2010).

In order to promote learning networks, it has shown to be important to respect the natural bottom-up, self-governing culture of learning. Since informal learning is often spontaneous and practice-driven, it is not an easy task to combine this with the need for control and performance of 'above the waterline': management and employees have different roles and outlooks. As soon as the management gets involved too much, learning networks risk losing their sense of autonomy, the result of which can be loss of motivation (Agterberg, 2012; Kubiak & Bertram, 2010).

For a network facilitator, his or her task involves creatively working with whatever emerges and take up the role of for example an inspirer, guide, pr-manager or an investigator. In order to work with bottom-up processes the facilitator has to develop a non-directive attitude, and to investigate profoundly the needs and expectations of the participants and use this information to make suggestions for developing the network. Also, coaching participants intensively in personal and communication skills and online literacy can be part of the procedures. Furthermore it can be necessary to promote networked learning as a recognised strategy for professional development in order for it to be understood and supported by supervisors and managers (Hanraets et al. 2011)..

School principals are important agents when it comes to implementing learning networks. They can act as gate-keepers, facilitators or as barriers (O'Brien et al., 2008). The way networks are promoted and developed by leaders and co-leaders is highly influential (Daly, Moolenaar, Bolivar & Burke, 2009), while the way networks develop can vary from network to network (Kubiak, 2009, Kubiak & Bertram, 2010). Some may be more short-lived, others become more mature and individuals and schools might opt in or out according to their individual needs. Network leaders, being aware of these particularities and developing appropriate strategies, can prove vital for the healthy development of learning networks (Fox, Haddock & Smith, 2007; Kubiak & Bertram, 2010; Schechter, 2012; Varga-Atkins et al., 2010). Hökkä and Eteläpelto (2013) conclude that because the management is crucial in creating openness and the possibility for change, leaders and managers themselves need to reflect on their own identity, since they are the ones implementing strategic decisions and then deal with the emotions of the personnel.

Concluding; regarding networked learning and organisational leadership, we found a number of mechanisms at play. Managerial acknowledgement of informal networks, promoting networked learning, organisational structure, a distributed leadership, open communication patterns, and an organisational culture in favour of collaboration and exchange, not only between direct colleagues but also between different organisational layers, all contribute to an environment that promotes a healthy learning culture that is conducive to both formal learning procedures and informal networked learning (see Table 3).
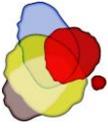
Table 3

Formal and informal mechanisms regarding management

Mechanisms	
'Informal'	'Formal'
Recognition of informal networks	Recognition of formal authority structures
Shared leadership	Centralised leadership
Bottom-up decision-making	Top-down decision-making
Open organisational structure	Rigid organisational structure
Open communication	Closed communication

Learning and working together in an inspiring environment is more likely to succeed when the work floor and the management understand each other and respect each others' decisions. Networked learning facilitates understanding and collaboration in respect to the content of work practices, and also contributes to the formal and informal organisational context.

5.   Conclusion and discussion

In this study we examined underpinning mechanisms regarding networked learning and professional development, autonomy, and management. We used the perspective of networked learning in order to develop a better conceptual understanding and to examine how this facilitates a better alignment of informal and formal learning in organisations.

Our key questions were:

- What are formal and informal mechanisms underlying networked professional learning related to

    professional development, autonomy and management?

- How can networked learning be positioned in the most optimal way?

5.1   Formal and informal mechanisms underlying networked professional learning

Concerning our first question: we analysed the formal and informal mechanisms that we found in each of the sections of the results (see Appendix 1) and found three main groups of mechanisms at play:

Learning mechanisms: what we have seen in the literature indicates that networked learning is a natural activity through which professionals develop their expertise, in addition to participating in formal learning procedures. This form of professional development is a continuous process. Networked learning is often directly related to work practices and promoting it has proven to be effective to enhance the learning process.

Mechanisms regarding autonomy can be considered to be motivational: networked learning provides individuals with the opportunity to connect to others with the same interests, in this way opening up the learning environment to learn what one deems necessary. Personal learning and learning initiatives can be promoted through networked learning. Issues of trust, freedom of choice, and willingness to share and connect are intrinsically motivated factors that play a role here. This can be contrasted with pressure to perform, obligations to follow rules, and follow strict regulations which, however necessary, creates an external motivational force (cf. Ryan & Deci, 2000).

Organisational mechanisms: if management acknowledges the value of informal networks, professionals can be encouraged to make use of their informal networks in order for the organisation to adapt to the always changing environment. Through networks, organisational structures become more flexible, and open communication can be promoted. In an expansive rather than a restrictive organisational environment, leadership can be seen as a process where responsibilities are distributed and 'bottom-up' initiatives are encouraged. The management has an important role in creating a conducive and collaborative learning environment by providing opportunities for networked learning activities and structuring the formal organisation accordingly

These three groups of mechanisms can be brought together in the following framework against the background of our 'iceberg' (Figure 1).
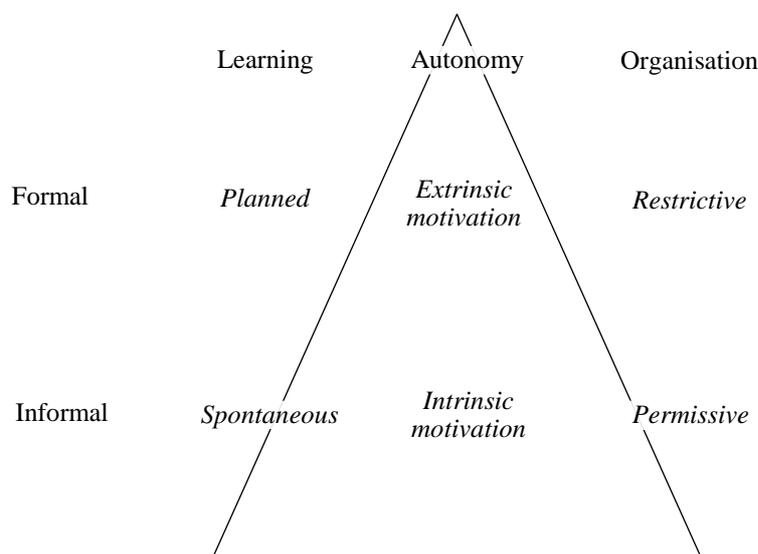

Figure 1. Three groups of formal and informal mechanisms related to networked learning in school organisations

5.2   How can networked learning be positioned in the most optimal way?

Our second key question was: how can networked learning be positioned in the most optimal way?

As we have argued in the introduction, formal and informal learning procedures in teacher professional development often not are integrated in a satisfactory way. The core mechanisms depicted in the formal-informal framework illustrate how networked learning can be positioned so that formal learning procedures can be augmented, complemented and informed by informal networked learning. Already existing informal networks can be made visible and then strengthened by giving them a place in the organisation. For this to happen it is helpful for the networks to develop a learning agenda that is visible to the management (De Laat, 2012), and have support from the management (Büchel and Raub, 2002). For members of networks to be motivated, autonomy, trust and efficacy are important factors in order for networks to be effective (cf. Van den Beemt, Ketelaar & Diepstraten, 2014). Networking skills need to be developed by both the participants in learning networks and by the management of school organisations in order for networked learning to be most effective. Formal regulations and standards are a professional reality, but school leaders, in addition to judging teachers' performance through accountability practices, can strive to create an open organisational culture where responsibilities are shared, encourage participation, and promote looking for new ideas outside of the direct working environment in order to create an environment
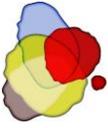
where formal study and informal learning can both have their place. Recognising both parts of the 'iceberg' by understanding the mechanisms at play is helpful in order to understand how to balance and integrate both positions so that professionalism can prosper.

5.3 Discussion

Research in this area raises questions about how, what, why, and when teachers learn. Currently we do not know much about the way the different mechanisms that we found in this study influence each other, which, in our view, merits further investigation. Developing a 'social awareness' of learning processes (Boud & Hager, 2012) can help to develop new metaphors for professional development (cf. De Laat, Schreurs & Nijland, 2013) and open up new avenues of practice and research. Findings from this study can be used to advance the theoretical understanding about the alignment of informal and formal professional development (cf. Evers et al., 2011; McGuire & Gubbins, 2010) and develop an instrument to engage school leaders and teachers in a constructive dialogue, and collect further data.

Our study has its limitations. By focusing on the interplay of formal and informal processes, we have provided a far from exhaustive overview of the findings in each of the chosen fields related to the subject. However, combining the insights from different areas of research in order to come to a shared framework there is scientific relevance to our study and our findings can be further conceptualised and validated.

We would like to add to this the observation that there might not be one specific 'optimal situation' for (networked) professional development to be effective; different people have different needs and views. Organisations can be seen as a 'complex responsive process' with many unexpected complexities and local realities, and only one-third of change efforts to improve quality in organisations are considered successful (Pieterse, Caniëls & Homan, 2012). We believe that this is where making use of networks can be helpful: to provide open space for communication and learning, where individual differences can exist and prosper.

Openness, exchange, trust, and communication are relevant to both school leaders and teachers. Promoting openness and development in the light of performance pressure, market-oriented reforms, and centrally imposed standards is no easy task. However, to be in control can sometimes mean, within limits, letting go of control. Networks flourish by a healthy balance between formalities and informalities. Striking this balance can be achieved by aiming both at facts and figures and at shared values and meaning.

Keypoints

- Networks and networked learning are increasingly impostant for the work of teachers because of the increased complexity of the work

- Professional development entails formal and informal processes. Informal processes, that take up a large proportion of the learning process, are often overlooked and consequently do not receive much attention. Networked learning can be helpful to integrate informal processes in the formal school context and align formal and informal learning procedures.

- Creating a balance between the personal interest and performance requirements can provide for a healthy level of professional autonomy and increase motivation for working and learning

- Adopting a perspective of networked learning can have implications for management and leadership. Leadership and responsibilities can be shared in order to create a more 'open' organisation.

- Striking a healthy balance between attention for formal and informal processes means paying attention to both facts and figures and shared values and meaning.
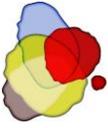
Acknowledgements

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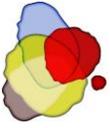
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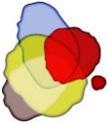
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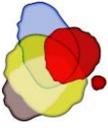
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