Frontline Learning Research
An official journal of EARLI

Frontline **L**earning **R**esearch 5 - Special Issue 'Learning through Networks' (2014) 72-80
ISSN 2295-3159

Unfolding perspectives on networked professional learning: Exploring ties and time

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Article received 26 June 2014 / revised and accepted 27 June 2014 / available online 15 July 2014

Abstract

Networked learning and learning networks are commonplace concepts in most contemporary discourse on learning in the 21st century. This special issue provides a collection of studies that address the need for a growing body of empirical work to extent the limited understanding of the use and benefits of networks in relation to learning and professional development. In this article we attempt to offer a synthesis of the studies presented in this special issue and reflect on their findings. The studies in this issue present a rich combination of networked professional learning research addressing issues related to the composition and structure of learning networks, their content and activities, showing how multi-faceted research in the field of networked learning really is. Based on the findings and methods used in the articles in this issue, we articulate some recommendations for further research. The recommendations are focused on the need for advanced multi-level analysis to understand the complexity of learning ties, the need for employing a multi-method research approach to triangulate and contextualize findings, the need to conduct process and time-based analysis and finally the need to further develop a theory and toolkit for applying Social Network Analysis in the context of networked learning.

Keywords: Networked professional learning, Networked learning, Professional development, informal-formal learning.

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Doi: http://dx.doi.org/10.14786/flr.v2i2.122

1. Introduction

The domain of networked learning research has been around for some time. The term has been used predominantly in the UK, where the research by Steeples and Jones (2002) and Goodyear, Banks, Hodgson and McConnell (2004) played a central role in the early days. Originally there was a strong focus on higher education, but nowadays a networked learning approach to understanding learning practices has extended to include learning in formal, non-formal and informal settings (Hodgson, De Laat, McConnell, & Ryberg, 2014).

According to Hodgson et al. (2014), networked learning refers to learning through connections between learners, learners and their tutors, and a learning community and its learning resources. Within networked learning, learners have always been seen as proactive and engaging agents. Many contemporary perspectives on networked learning derive from critical and humanistic traditions (Dewey, 1916; Freire, 1970; Illich, 1971; Mead, 1934) positing that learning is social, takes place in communities and networks, is a shared practice, involves negotiation, and requires dialogue (Hodgson, McConnell, & Dirckinck-Holmfeld, 2012). Often, digital technology is used to support networked learning processes (Goodyear et al., 2004).

The field of networked learning aims to understand the pedagogical values and beliefs underpinning networked learning in order to advance teaching and learning practices and the design of technologies supporting such practices. The focus is on understanding how relations between learners influence teaching and learning in physical, online and/or blended settings. This special issue is an example of how a networked approach to learning has spread beyond education, since all the articles address questions around professional development, in this paper termed "networked professional learning".

This special issue forms an important and timely collection of articles especially because there is a strong interest in the promise and value of networked professional learning. There is considerable consensus that professionals organise and carry out their own professional development effectively through their own social networks and communities (Cross & Parker, 2004; Duguid, 2005; Hargreaves & Fullan, 2012; Weinberger, 2011; Wenger, 1998). However, we lack empirical evidence about people's specific networked learning experiences. In particular, it is not well-understood how professionals build and maintain networked connections for learning, what the composition of these networks is, whether and how these learning relationships create value, and how to assess the outcomes of learning through networks in the context of professional development. Research brought together in this special issue advances our understanding of networked professional learning, allowing us to reflect on and contribute to networked learning theory and helping us to develop and facilitate networked learning in practice. Each article investigates learning from a relational point of view, in formal, informal or mixed settings. This final article offers a reflection on the unfolding perspectives and research presented by the articles collected in this special issue.

2. Exploring networked professional learning

The articles in this special issue are focused on understanding how social networks influence and impact professional development in networks and communities. Vaessen, Van den Beemt and De Laat (this issue) present a conceptual literature review to uncover some underlying mechanisms and factors that influence usage of networked learning in the context of teacher professional development. They explicitly explore the tension between formal and informal learning. They argue that the increased complexity of work requires professionals to use their networks to access and/or develop knowledge and expertise to stay up to date and function successfully. Understanding the role and impact of these informal social networks on professional development can foster a better relationship – if necessary – with the traditional, yet dominant, formal professional development activities informed by acquisition and transfer of knowledge via expert-driven, pre-planned courses. Vaessen et al.'s literature review provides a broader framework for understanding professional development through participation in social networks, setting the context for the other articles in the special issue that examine particular aspects of "networked professional learning" in greater detail.

Pataria, Falconer, Margaryan, Littlejohn and Fincher (this issue) investigate academics' learning through their personal professional networks. Pataraia et al. build on Roxå and Mårtensson's (2009) research on teacher networks in academic contexts, focusing on conversations about teaching. More specifically, Pataria et al. examined whether the composition of personal networks (i.e., the proximity of people with whom one is connected) and characteristics of interactions in these networks (i.e., what is exchanged and how it is valued) may support change of teaching practice in universities. This important descriptive research showed that the networks of academics were small, discipline-specific and strongly localised. Based on data from interviews from two studies, they conclude that the academics interacted most frequently with closely proximate colleagues, typically from the same discipline. These findings support the notion that homophily (degree of similarity) influences establishment of ties and the development of networks.

Hytonen, Palonen and Hakkarainen (this issue) investigated network patterns and structures that contribute to professionals' cognitive centrality within a network. The context of their study was a professional training course in the field of energy efficiency. Cognitive centrality was based on ties that represented who people contacted for professional advice over the course of twelve months; as such the networked ties constitute the product of the networked learning. More specifically, Hytonen et al. examined the central actors within the network and their learning connections in order to identify possible factors that could explain cognitive centrality. Their study showed that cognitive centrality is influenced by several factors, such as personal characteristics, expertise, and organisation that the actor represents, but a single decisive factor could not be found. These findings emphasise the complexity of social learning, suggesting that learning is highly contextualized and situated.

Rehm, Gijselaers and Segers (this issue) examined the transferability of knowledge in relation to the hierarchical network positions of members of an online community of learners during a professional development training program. Rehm et al. addressed the notion that participants' hierarchical positions within the organization can have an effect on the collaborative processes within communities of learning. They showed that higher in- and out-degree and centrality scores were associated with higher hierarchical positions within the organization. Their longitudinal analysis indicated that these trends were established relatively early on during the professional development programme.

The studies present a rich combination of networked professional learning research addressing issues related to the composition and structure of learning networks, their content and activities, showing how multi-faceted research in the field of networked learning really is. Based on the findings reported and methods used, the following sections articulate some recommendations for further research.

3. Unfolding networked professional learning

The articles in this special issue provided us with snapshots of networked professional learning and details about the constitution of the learning networks in a variety of contexts. Combined these articles challenge the naïve view that large(r) networks with many ties, or very elaborate networks with many ties of a specific type (e.g., weak vs. strong), are better and/or preferable by default. Needless to say professionals take part in and maintain many networked relationships, but in essence networks are always about something, focused on a particular problem or shared interest. The "whole might be greater than the sum", but the merit of the research presented in this special issue is to understand how particular (sub)networks or networked activity that professionals take part in contribute to their learning. For example, Pataraia et al., and to some extent also Hytonen et al., clearly show that professionals maintain many networked relationships with a variety of people for a number of reasons. Done from an ego perspective, this work shows that professionals use their relations for exchanging information and ideas, to talk about work-related problems and to seek advice. Rather than focussing on the impact and effects of networking in general it is very important to understand in great detail "what goes on in particular networks" and see how participation in networks affects learning.

Although the articles present findings at different levels of analysis and network scale (ego-personal network, sub-network, and/or whole network), there are interesting connections between the findings of

these different studies to be reflected upon. In the following synthesis we will try to address these differences in theory, method and network scale and explore if and how these different levels can be connected.

Boud and Hager (2012) highlighted the importance of uncovering the ways in which people participate in social settings (networks) through which they seek to co-create knowledge and become a better professional. All articles in this issue take a social perspective on learning. In reflecting on professionals' network positions and the role of these networks in the learning processes, these studies draw on the "participation" metaphor of learning (as opposed to the acquisition metaphor, see Sfard, 1998, for an elaborate discussion on these metaphors). While Rehm et al. concentrate on the transfer of knowledge amongst members of a community of learners, they too position professional learning as a process of collaborative knowledge creation in social networks.

Social participation and network building is predominantly seen as an informal activity promoted, for example, through professional autonomy (Cross & Parker, 2004; Kessels, 2012). However, Vaessen et al. specifically argue that the underlying mechanisms for networked learning are found in both formal and informal settings. They further argue that networked learning is the most effective when located within work practices. In the workplace, learning is collaborative and situated within social relationships. Networked learning is most effective in work settings in which professionals have high levels of autonomy, trust, openness and accountability and where these is an organisational culture of management promoting collaboration, discursive and open communication, and bottom-up learning and change.

The findings presented by Vaessen et al. are to some extent reflected in the studies by Pataraia et al., Hytonen et al., and Rehm et al., but criticised as well. For example, the finding by Pataraia et al. that academics' teaching networks were small, discipline-specific and strongly localised reveals that the establishment of connections with others is influenced by proximity, homophily, as well as perceived relevance and anticipated value of these connections. Pataraia and colleagues' empirical data seems to suggest that academics' teaching networks are predominantly formed around strong ties. In a similar vein, findings by Hytonen et al. show that cognitive centrality of core participants is affected by a multitude of factors, including personal characteristics (e.g., expertise, engagement), openness, and their organisational background. Finally, Rehm et al. show that characteristics of the formal work setting – i.e. people's hierarchical position – influence interaction patterns in an informal setting. The findings are in line with Vaessen et al. in the sense that a similar structure (hierarchy) in the formal setting affects networked learning ties in the informal setting, but not necessarily as intended (although Rehm et al. do not comment on this aspect).

Rehm et al. concluded that more senior professionals could draw more actively upon the input of colleagues allowing less senior participants to gradually move towards the centre of a network. Likewise, Vaessen et al. concluded that the network(s) transcend organisational boundaries, while Rehm et al. indicate that this process may also benefit from some facilitation and/or intervention. Both agree that management may need to promote networked learning by opening up organisational structures where management and community members can learn together.

Finally, Vaessen et al. indicate that informal networks thrive in open practices, in which strong and weak ties co-exist (Granovetter, 1973). Such open network practices and "culture of learning" that is facilitated and promoted by the management appear especially relevant for professional learning (Price, 2013). Open practices consist of networks that are collections of individuals across organisational, spatial and disciplinary boundaries, who come together to create and share a body of knowledge (De Laat, Schreurs, & Nijland, 2014). Open networks focus typically on developing, distributing and applying knowledge (Pugh & Prusak, 2013). Open network members connect around a common goal and share social and operational norms. They typically participate out of common interest and of a shared purpose rather than because of contract, quid pro quo or hierarchy. They are not bound or confined by shared identities and knowledge and meaning is not retained in the way in which it is done in communities of practice. The relationship between the members is much more loose and dynamic, yet effective in the creation of new ideas. Open network practices offer professionals a more dynamic platform to connect with relevant peers who can help them to stay up to date than communities of practice do. A further feature of such open network practices is that they

are self-directed and non-hierarchical. Wellman's (2002) notion of networked individualism emphasizes the point that professionals have a great ability to act on their own, to solve their problems and organise their lives, but they do this in a networked way with the help of friends and other relationships. The diversity of sources in a professionals' network is also echoed in the findings by Pataraia et al. and Hytonen et al.

Although rather implicitly, the articles in this special issue suggest several avenues for further research. In the next subsections we will discuss some directions for further research.

3.1 Need to clarify the "what" and "why" of "learning tie"

There is a clear need to develop theoretically-based and differentiated qualifications of the meaning of a tie, that is to investigate the "what" and "why" of a tie. In this special issue, Pataraia et al., Hytonen et al. and Rehm et al. explicitly unfold the meaning of a tie. Pataria et al. and Hytonen et al. focused on both the "what" (content of a tie) and "why" (explanation for a tie or structure of personal/ego-network or the entire network), whereas Rehm et al. focused only on the "why".

Furthermore, networked learning ties can be treated both as relations that connect people as well as outcomes of relations (Haythorntwaite & De Laat, 2012). In the first instance, the tie refers to relational ties used for learning, such as a student learning from a teacher, students or professionals learning from peers, or novice professionals learning from experts. An example of networked learning ties as outcomes is when a group collectively acquires a competence in a certain domain that helps them to deal with new situations. As relational ties can represent both the process and the product of learning, there is a clear need to separate them or at least treat each tie as a compound construct consisting of several layers of process and product components. For example, at the individual level, a tie may consist of 30% on-going learning activities, 40% current project work, 20% personal bonds, and 10% status. A multi-layered perspective on ties allows for (multilevel) multiple regression approaches to understand the multifaceted nature of ties. The conceptualisation of ties as multi-layered constructs also opens up new directions regarding how these ties can be afforded, fostered, and facilitated through social interaction, design for learning, and technology.

3.2 Need to examine networks at multiple levels and the interplay between levels

Combined the articles in this special issue cover all levels of scale possible. Pataria et al. investigated the individual level in terms of academics' personal teaching networks and the characteristics of their interactions with colleagues. In a slightly different way, Hytonen et al. examined the individual level to understand both the structure and heterogeneity of central participants' personal networks. They analysed the entire network to identify which other participants (alters) connected to the cognitively-central actors and to examine the associated network clusters and the degree of collaboration within these. Finally, Rehm et al. investigated networks as communities of learners, adopting a whole network analysis approach to explore the positions within these online communities based on participants' rank and hierarchical position within the organization. Although these articles cover the range of possible levels – personal (ego), sub-network (community or larger cluster) and entire network – the explicit comparison or investigation of the interplay between various levels was not attempted. It is conceivable, for example, that an individual's personal network may be low in density, yet the individual may hold a key brokering position in the entire network. Examining the interplay between levels might be a promising direction in future research in professional networked learning. Referring back to the issue of the "whole being greater than the sum", research on the interplay of levels will help to uncover how to potentially assess the nature of learning ties for the individual, a particular network and the organization. Within human resource development (HRD) – especially from a formal management point of view – there is interest in monitoring and assessing networked learning in order to validate and award it. The immediate response seems to be on trying to assess networks, similar to registration of attendance of professional development programmes, rather than focussing on the value that is created through networks and communities (Wenger, Trayner, & De Laat, 2011). Multi-level research on the value of learning ties can help assess the outcome of networked professional learning in relation to different stakeholders.

3.3 Need for extending the methodological toolkit

As there are different ways to conceptualise learning ties, there are different analysis techniques to study them. For example, who learns from whom, what do learners learn from each other, the kinds of interactions between learners, the direction of ties, flow of resources, and the frequency of interactions. Several of these aspects are related to communication and information patterns, whereas others directly deal with learning itself. Networked learning studies often address these aspects, however some reflection on how we may be more critical and cautious about the way in which network analysis is used to understand learning ties is required.

A popular method for studying networked (professional) learning is the use of Social Network Analysis (SNA). Two studies in this issue applied SNA (Hytonen et al.; Rehm et al.) to understand the network structures or dynamics. SNA has become rather popular for trying to understand learning ties, but we have to remain cautious about its application. SNA was developed to understand for example the flow of information or communication across networks – i.e., more factual data. If person A passes something on to person B, traditional SNA assumes that person B has received it. However, when learning is concerned this assumption may not hold. First, the extent to which whatever was passed on was received may be uncertain. Second, the contribution of information to the actual learning process of the receiver is uncertain. Hence, the network theory or operationalization of indicators behind the tests that researchers conduct may have different implications. Does density in a communication network imply the same as density in a learning network? What does the shortest path mean in terms of "learning"? Are all SNA indicators by default useful indicators of learning? A more advanced theory of SNA is needed to guide studies on "Social Network Learning Analysis" (SNLA). SNA is a very flexible method, but it requires a solid theoretical framework to enable interpretation of findings. In the absence of a solid theoretical framework of learning through networks, researchers rely on conceptualisation from related research domains. When applying analysis techniques that reflect a different theoretical orientation, researchers risk type I and II errors. Furthermore, despite the ease with which network visualisations can be produced from SNA, such visualisations should be approached with more restraint when interpreting the network structures.

Another approach would be the application of multilevel analyses, discussed by Rehm et al. (this issue). An example is the recent study by Eberle, Stegmann and Fischer (2014), who investigated Legitimate Peripheral Participation (a well-known construct introduced by Lave and Wenger (1991) to describe learning processes in communities of practice), in terms of support structures used to foster newcomers' participation. They applied a 2-level model, which included 14 student councils (communities) and 68 newcomers. They found that exposure time (duration of community membership) and the support structure of "accessibility of community knowledge" positively predicted the newcomers' participation, whereas community size and "recruitment strategies" negatively predicted participation.

Finally, the instruments and methods applied in the articles in this special issue reflect that a multi-method approach is required to investigate networked professional learning and obtain a more complete understanding of the nature of "learning" reflected by the ties and the indicators that SNA offers. A potential direction would be the combination of SNA, content analysis of communication, and a contextual analysis through interviews (De Laat & Lally, 2003). The contributions by Pataraia et al. and Hytonen et al. are examples of such a contextualised approach to understanding network structures. Rehm et al. acknowledge that their study would have benefitted from content analysis to help uncover how the "what" of the tie might have impacted network position and exchange of knowledge.

3.4 Need to examine networked learning over time

Over the past decade, the issue of time has slowly developed into a more focal point of research on interactive learning processes. An early contribution in this respect is the work by De Laat and Lally (2003), who identified changes in both interactive and tutoring patterns within a community of learners, by distinguishing between the early, middle and end phase of the community experience. Similarly, the notion of time is receiving more attention in the domain of (small) group collaborative learning, where learning is studied longitudinally, in terms of sequences of actions (Suthers, Dwyer, Medina, & Vatrapu, 2010), specific

timeframes such as days, weeks or months (Arrow, Henry, Poole, Wheelan, & Moreland, 2005; Reimann, 2009), or in terms of activities in a learning environment over time (Schümmer, Strijbos, & Berkel, 2005).

Vaessen et al., Pataraia et al., and Hytonen et al. implicitly refer to issues of time. Vaessen et al. describe professional development as an "ongoing process", arguing that "networking skills need to be developed over time". Pataraia and colleagues' data were collected over a 12-months time span. They argue that "the temporal component of interactions determines the strength of ties", and that the networks are not only influenced by proximity and/or discipline, but also have a "historical or temporal component". Hytonen et al. analysed data collected after a 12-months period following a training programme. Their study focused on small group and community level aspects, but the development of the networks of cognitively central participants was not part of their aim. In contrast, Rehm et al. explicitly adopted a longitudinal analytical lens when analyzing reply structures in online communities collected over a 14-week time span in terms of two blocks of about six weeks. Their analysis showed that the more central positioning of senior management was established relatively early on and persisted – in fact slightly increased – over time.

4. Closing remarks

The articles comprising this special issue have advanced our understanding of networked professional learning. The empirical studies provided detailed accounts of the structure and focus of networked learning at various levels (ego, sub-network and whole network). They improve our understanding of the characteristics of networked learning and contribute to a much-needed empirical knowledge base in this area of research. The literature review provided by Vaessen et al. helps to broaden our horizon as well as situating the findings of the other articles, by offering the mechanisms that influence networked professional learning. The three empirical studies, although addressing different levels of scale, reinforce and supplement each other. For example, where Pataraia et al. find that professionals maintain multiple networks for their development, Hytonen et al. identify several sub-networks centralized around key actors. The emergence of these personal networks hinges on expertise, interest, enthusiasm, competency, familiarity, organizational background, as well as hierarchy and formal organizational relationships and structures. Simultaneously the studies (implicitly) generated some directions for future research that we elaborated upon: (a) the need to clarify the "what" and "why" of "learning tie", (b) the need to examine networks at multiple levels and the interplay between levels, (c) the need for extending the methodological toolkit, and (d) the need to examine networked learning over time.

The importance of professional autonomy and cross-boundary collaboration that seems to foster networked professional learning brings the emergence of open practices into perspective. Both professionals and organizations are increasingly becoming aware that knowledge and innovation processes are not bounded by the organizational context and that boundary crossing becomes an important aspect of professional development. This raises further questions about how to monitor, promote and assess networked professional learning. The naïve view of "the more contacts the merrier" is too simplistic. Studies in this special issue have shown that important features and mechanisms of networks are personal (probably small and localized), centralized around shared topics interests and key members, driven by professional autonomy and negotiate both informal and formal settings influenced by hierarchical organizational structures. These findings shed some light on how networks operate and create value, based on which knowledge about how to facilitate and manage networked professional learning can be inferred.

Keypoints

- The studies in this issue present a rich combination of networked professional learning research addressing issues related to the composition and structure of learning networks, their content and activities, showing how multi-faceted research in the field of networked learning really is.
- Need for advanced multi-level analysis to understand the complexity of learning ties
- Need for employing a multi-method research approach to triangulate and contextualize findings
- Need to conduct process and time-based analysis
- Need to further develop a theory and toolkit for applying Social Network Analysis in the context of networked learning

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