

Stimulating teachers' learning in networks: Awareness, ability, and appreciation.

Femke Nijland, Daniël van Amersfoort, Bieke Schreurs en Maarten de Laat

Abstract

A three-phased intervention was designed to stimulate teachers' learning in networks at five schools for primary education in The Netherlands, drawing on insights from literature on what works in learning in networks. The aim was to study how learning networks could emerge using the existing social networks within the organization. The three-phased intervention consisted of 1) *awareness*: creating network awareness and accessibility, 2) *ability*: providing teachers with tools for developing networking skills and 3) *appreciation*: assessing the network value to create a greater organizational recognition for learning in networks. Eight learning networks were established between five schools, resulting in more learning ties between teachers, new perspectives for participating teachers on the nature of learning and an overall greater recognition of the emancipatory role of networked learning.

Key words: networked learning, social networks, learning networks, network awareness, teacher professional development, informal learning, primary education, social network analysis, networking skills, value creation framework, value creation, trust building

Introduction

Learning in networks is receiving increased attention in Dutch primary education. It is perceived as a way to stimulate teachers professional development (Meijs, Prinsen, & De Laat, 2013; Vaessen, Beemt, & De Laat, 2014) and to provide teachers with the opportunity to regulate their own professional development in line with their professional needs (De Laat & Schreurs, 2013). In education, such alignment is particularly important since teachers often perceive their professional development as unrelated to their classroom practice (Lieberman & Pointer Mace, 2008). In addition, learning in networks is believed to lead to a more efficient flow of complex knowledge and routine information within the organization (Coburn, Mata, & Choi, 2013; Granovetter, 1973; Hansen, 1999; Reagans & Mcevily, 2003), stimulate innovative behavior (Coburn et al., 2013; Moolenaar, Daly, & Slegers, 2010; Thurlings, Evers, & Vermeulen, 2014) and result in a higher job satisfaction (Flap & Völker, 2001; Lovett & Cameron, 2011; Stoll, Bolam, McMahon, Wallace, & Thomas, 2006). In this respect learning in networks can be perceived as an effective approach to for both professional and organizational development.

In this chapter, we report on a three-phased, mode 2 research (Nowotny, Scott, & Gibbons, 2003), intervention for stimulating teachers' learning in face-to-face learning networks at a between school level. The intervention was informed by insights from literature on what works in learning in networks, and was developed in close cooperation with the participating teachers and principals. The main aim of the project was to study how learning networks could emerge, building upon the informal social networks already in place within the organization. We did so by creating awareness of learning in networks, by offering tools for the development of networking abilities that facilitate learning in networks, and by providing insight in the usefulness of these activities for the appreciation of their value creation. Our intention was to accompany

participating teachers and principals on a journey into the what, the how and the why of learning in networks. The main question answered in this project is: *How does stimulating awareness, developing networking ability and offering insight into the outcomes of learning in learning networks, contribute to learning in social networks for professional development within an organization for primary education?*

Social networks and learning networks

Learning in networks is situated in practice and can occur in a multitude of fashions and constellations (cf. Vrieling, Van den Beemt, & De Laat, 2016). It is a form of informal learning, where people rely strongly on their social contacts for assistance and development (De Laat & Coenders, 2011; Jones, Asensio, & Goodyear, 2000). Knowledge is shared and created through social interaction with these contacts (Nijland, 2011). In social networks, both social capital and human capital are stored. Social capital is defined by Nahapiet & Ghoshal (1998, p.243) as “the sum of actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit.” Human capital is defined as “the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being.” (OECD, 2001, p.18).

In this chapter we make a distinction between two appearances of learning in networks. The first appearance we refer to as *learning in social networks*, which we define as the natural and often unconscious emergence of learning ties between people, based on their learning needs. Social networks can be defined as “the configurations of connectivity that exist when people interact with each other by communicating, sharing resources, and working, learning or playing together, supported through face-to-face interaction as well as through using educational, and information and communication technology” (Haythornthwaite & De Laat, 2012, p.352). These configurations of connectivity embody, facilitate and enable learning. They are fluid and membership is ever-changing. Even stronger, members of these social networks often don’t even regard themselves a member. The value of networking lies in having access to a rich web of information sources offering multiple perspectives and dialogues, response to queries, and help and guidance (De Laat, Schreurs, & Nijland, 2014).

The configurations of connectivity in social networks are made up of both strong and weak ties between people, with each tie having its own function in the sharing and construction of knowledge (Granovetter, 1973). Strong ties can be found in long lasting friendships between people, or close professional relationships, for instance between members of the same community of practice, sharing a common identity, a knowledge domain and professional values. Weak ties can be found in acquaintances, who participate in different communities of practices, hence forming access points to different systems of knowledge, value and perspective (Bruffee, 1984). For professional development both types of ties are important: strong ties facilitate the joint construction and embedding of knowledge in the daily practice of professionals, weak ties are important for gaining new perspectives, insights and knowledge (Granovetter, 1973).

The second appearance of learning in networks we distinguish, is the learning in *learning networks*. These learning networks can be defined as consciously formed groups of people concerned with the same topic, which meet on a regular basis to discuss their common interest, to create knowledge and share

understandings. In this chapter, we define learning networks according to Doppenberg, Bakx and Den Brok (2012) as: “undertaking (a series of) learning activities by teachers in collaboration with colleagues, resulting in a change in cognition and/or behavior at the individual and/or group level” (Doppenberg, Bakx, & den Brok, 2012, pp. 548–549). These teacher groups are often perceived as entities with a more or less formal status and membership is explicit. Learning networks are comparable to Professional Learning Networks (Trust, 2012) or Personal Learning Networks (PLN’s) (Rajagopal, Joosten-ten Brinke, Van Bruggen, & Sloep, 2012; Tour, 2017), which can be defined as systems of interpersonal connections and resources that support informal learning needs. However, in these PLN’s interaction is usually mediated through digital technology. The interaction in learning networks is predominantly face-to-face and not necessarily aided by technology.

The distinction between social networks and learning networks plays a pronounced role in this chapter. Learning in social networks is fueled by the social capital between teachers, however, both the process of learning in social networks and the concept of social capital are difficult to perceive and use in the daily practice of a teacher. Despite attempts for alteration, the teaching profession is still predominantly solitary due to occupational norms of privacy. Seeking out others for help and guidance is not custom in teacher behavior and may violate norms and expose teaching problems (Coburn et al., 2013). In addition, the impact and benefits of learning in social networks are often unseen and unrecognized by professionals and organizations alike (Boud & Hager, 2012; De Laat, 2012; De Laat & Schreurs, 2013). Therefore, the adequacy of the way teachers make use of the social capital in their social networks can be questioned (Vaessen et al., 2014). Actively stimulating learning in learning networks within educational organizations is believed to open up the social environment to optimally make use of possibilities to connect to others and draw upon their social capital (De Laat, 2012; Jennings, 2010; Moses, Skinner, Hicks, & O’Sullivan, 2009; Vaessen et al., 2014; Yoon, Koehler-Yom, Yang, & Liu, 2017). The idea is that if we actively support the setup of learning networks amongst teachers and provide tools to reveal the learning process and the value of these learning networks, teachers become more aware of the power of social networks as a vehicle for learning. Therefore, the setup of learning networks could stimulate learning in social networks in the future.

To support the setup of learning networks we created a three-phased intervention based on recent insights on conditions for effective learning and knowledge sharing in social networks. When starting with stimulating learning in social networks, two elements have been proven to be essential: awareness and accessibility. First, participants have to be aware of their social and human capital in order to effectively use their networks for knowledge sharing and construction (Baker-Doyle & Yoon, 2011; Hu, Kuhlenkamp, & Reinema, 2002). Knowledge in social networks is often implicit (Novak & Wurst, 2005), therefore knowing what others know is imperative for capitalizing on the value of a social network (Cadima, Ferreira, Monguet, Ojeda, & Fernandez, 2010). Second, participants have to be able to access the knowledge of others, preferably at the moment help or knowledge is needed. Supporting the awareness of the ideas, knowledge, activities of others, and with that promoting the accessibility of social capital, has generally been used as one of the strategies to increase knowledge sharing and collaboration opportunities (Cross & Parker, 2004; DiMicco, Hollenbach, Pandolfo, Bender & Morris, 2007; Gutwin, Greenberg & Roseman, 1996; Ogata & Yano, 1998). Mapping the relationships between people and the knowledge they share in diagrams of social networks aids to this

accessibility and visualizes who can reach whom (Cross, Parker, Prusak, & Borgatti, 2001). Implicit in awareness and accessibility are two conditions: autonomy in learning (Eteläpelto, Vähäsantanen, Hökkä, & Paloniemi, 2013; Imants, Wubbels, & Vermunt, 2013; Varga-Atkins, O'Brien, Burton, Campbell, & Qualter, 2010) and connecting to the personal learning interests of teachers (Akkerman, Petter, & De Laat, 2008), for when people feel the need to solve a problem, they are driven to make use of the knowledge of their social network.

A condition necessary for stimulating knowledge sharing between professionals, is the existence and quality of a social relationship. Knowledge which is shared with professionals without a social relationship between the professional and the provider is hardly used, even when the knowledge would be useful (Daly, 2012; Davidson & Nowicki, 2012; Levin, 2011). Davidson and Nowicki (2012) argue that teachers in particular tend to feel resistant when receiving knowledge from someone they don't know. The importance of both a trusting relationship in knowledge sharing and reciprocity on an equal level is also recognized in other studies (Boshoff, 2014; Crona & Parker, 2012; Daly, 2012; Day & Hadfield, 2004; Dobbins, Rosenbaum, Plews, Law, & Fysh, 2007; Mitton, Adair, Mckenzie, Patten, & Wayne Perry, 2007; Trotman, 2009; Varga-Atkins et al., 2010). Feelings of relatedness can be fostered by socio-emotional interaction between people (Cutler, 1996; Rovai, 2001). It fosters feelings of social closeness (Reagans & Mcevily, 2003; Rivera, Soderstrom, & Uzzi, 2010), which stimulates community building and the forming of learning ties (Borgatti & Foster, 2003; Granovetter, 1985; Rovai, 2001).

An important condition for stimulating social learning in networks is insight into the revenues of this type of learning. When people are aware of the value of their personal networks, they may actively shape it to further their professional development (Uzzi & Dunlap, 2005; Van Waes et al., 2016). Wenger, Trayner and De Laat (2011) therefore developed a framework that was explicitly intended for grasping both the process and the revenues of network and community engagement. They note that learning is not solely valuable for the learner, but also for his or her stakeholders: people in the social network of the learner, who experience the effects of what is learned by the learner. Learning is therefore an inherently collective event. Wenger, Trayner and De Laat (2011) propose a value creation framework, a means to promote and assess value created in communities and networks. They define the framework as a genre of storytelling, following a particular format. A value creation story starts with a ground narrative: a network activity, such as a meeting, a conversation or even a project, and its context, called the ground narrative. The story continues with elements of value derived from this activity: an experience, a resource, or an idea for instance. The story explores these elements of value and the value it created in five cycles. The cycles they describe are:

Cycle 1, Immediate value: The most basic cycle. Activities can have value in and of themselves. They can be fun and inspiring. They can recognize your competence, provide a sense of social relatedness and reaffirm your sense of autonomy.

Cycle 2, Potential value: Not all value is immediately realized. Activities and interactions can produce 'knowledge capital', which value lies in its potential to be realized later. This knowledge capital can consist of personal assets, like a piece of information or a skill, relationships and connections as social

capital, resources like documents and tools or collective intangible assets like the reputation of the network.

Cycle 3, Applied value: Looking at applied value means identifying the ways practice has changed as a result from network involvement. This could happen by reusing a lesson plan or a piece of code or changing a procedure. It is the value of experimentation and innovation, of doing something new.

Cycle 4, Realized value: In some cases changed practice can lead to improved performance. Reflecting on what effects network involvement, such as the application of knowledge, is having on the achievement of what matters to stakeholders can lead to the distinguishing of realized value.

Cycle 5, Reframing value: When social learning causes a reconsideration of the learning imperatives and the criteria by which success is defined, value is reframed.

There is a relationship between these five cycles. However, as Wenger, Trayner and De Laat (2011) argue, it is important not to assume a hierarchy of levels or a causal chain in which one cycle leads to the following. Learning is a dynamic process in which producing and applying knowledge are tightly intertwined and often indistinguishable. In practice, cycle 2 may lead to cycle 4 and the other way around, and some cycles will not even be filled.

About the Learning Networks project

Context

The intervention described in this chapter took place at five schools for primary education in the Netherlands. The number of faculty members per school varied from 13 to 28, the number of pupils varied from 100 to 350, which are average sizes in The Netherlands. The five participating schools were part of a cluster of twenty-two schools controlled by one school board. It is worth noting that the administration of schools in The Netherlands is highly decentralized. School boards often have legal authority over a cluster of schools, generally located in the same geographical area and having a similar denomination. School boards have great autonomy and are responsible for both managing personnel and resources as well as the organization of instruction and quality monitoring (OECD, 2014). As such, school boards also have an important role to play in the continuous professional learning of their staff.

The school board of the five schools reached out to our institution because they wondered how they could organize knowledge exchange and talent development between teachers. A project team was convened which included teachers and principals from the schools involved on the one hand, and university-based researchers on the other. In a process of co-creation and practice-based research the project team explored how learning in networks could contribute to the professional development teachers. This collaborative effort

resulted in a three-phased intervention mode 2 research (Nowotny, Scott, & Gibbons, 2003) that helped teachers to recognize, strengthen and leverage their social networks to foster learning.

Participants

In the first phase of the project, nearly all teachers, principals and supporting staff working at the five participating schools participated. Table 8.1 shows the numbers of the participants per school. Participation was voluntary.

[Insert Table 8.1 here]

In the second phase of the project, in which teachers were provided with tools for forming learning networks, 42 teachers, 5 principals and 1 supporting staff-member participated. Participation was again voluntary for all teachers. The third phase of the project consisted of creating and publishing the stories of value creation of network participants. Table 8.2 shows the participating teachers in the construction of these stories.

[Insert Table 8.2 here]

Research Design, Data gathering and Analysis

In education, teaching professionals are generally highly occupied professionals. Time is scarce and researchers are sometimes considered a nuisance rather than allies. To minimize our disturbance to teachers' practice, we combined data-gathering with interventions that stimulated learning in learning networks, making them twice as useful. Every intervention therefore resulted in both data for the researchers and in knowledge, social capital or enlarged connectivity for the participating teachers.

The intervention was aimed at using the informal and mostly unconscious social networks that already existed in the organization as point of departure for the emergence of conscious volitional learning networks to stimulate learning in social networks. The intervention consisted of 1) creating network awareness, 2) providing teachers with tools for forming learning networks and developing networking abilities and 3) assessing and appreciating the network value to create a greater organizational recognition for learning in networks. By using this three-phased intervention, we capitalized on the specific situation of the participating teachers to clarify the what, the how and the why of learning in social networks: What is my social network? How can I use my social network for professional development? Why is learning in social networks relevant for me, my pupils and my organization? In every phase, instruments were used to obtain the desired goal.

Phase 1: Awareness and Accessibility

The first phase of our intervention was driven by a social network awareness and accessibility perspective. In order to stimulate awareness, we first mapped out the existing learning relations between teachers (Cross, Parker, Prusak, & Borgatti, 2001). To visualize social networks, we asked all participating

teachers to share with whom they conducted valuable conversations and what the contact was about, thus focusing on the learning relationships between teachers. We used an instrument we called the Contact Card (Korenhof, Coenders, & De Laat, 2011; Schreurs, 2014) to gather this data. The Contact Card was a pre-printed A4 sheet, containing a circle in the middle. Teachers were asked to write their main learning topic at the top of the sheet, to write their own name in the circle, and to draw lines with circles with the name of the people they would engage with in valuable conversations concerning the learning topic written above. Teachers could fill in up to three sheets.

After collecting the learning contacts and themes, we created social network diagrams on both a contact and a thematic level using the UCInet software package for social network analysis (Borgatti, Everett and Freeman, 2002), de facto making the social capital within the five schools visible. The diagrams were printed on A2 formatted posters and were published in the hallways of all five participating schools for a period of four weeks, providing the teachers with an insight into the informal social learning structures of their organization.

Phase 2: Ability

In the second phase of the intervention, our focus shifted from social networks to learning networks. We based the construction of this second phase on studies into conditions for knowledge sharing between teachers, that indicate that feelings of social closeness are necessary for the formation of learning ties (Borgatti & Foster, 2003; Granovetter, 1985; Reagans & McEvily, 2003; Rivera, Soderstrom, & Uzzi, 2010; Rovai, 2001).. We therefor started phase 2 with a start-up event for teachers to get to know each other. We planned the event in the informal surroundings of a café-bar, accompanied by snacks and beverages. By combining teachers' professional development with an informal setting and ample opportunity for informal interaction, we provided teachers with the opportunity to interact on both a professional and on a social level, thus facilitating learning tie formation.

The start-up event centered the fourteen themes that teachers had mentioned most during phase 1. Each of these themes was printed on a paper sheet and the sheets were placed on tables throughout the café-bar, with each table representing one theme. One table had a blank sheet in case teachers could not relate to one of the identified themes. Teachers were asked to walk around the room and go sit at a table with the theme of their interest, thereby forming groups with others who shared the same interest. To stimulate interaction, three envelopes were placed at each table which contained tasks for the group to complete. These tasks included writing down all individual learning questions concerning the topic on the table, writing down the most important learning questions for the entire group, and sharing practical information concerning the learning network to be formed, such as each other's contact information and a date on which the network would meet for the first time to discuss their learning questions.

When a learning network is established, the development of networking skills is important for effective professional development (Day & Hadfield, 2004; Hanraets, Hulsebosch, & De Laat, 2011). In the process of becoming active members of learning networks, teachers encountered everyday problems in communication, autonomy, trust and learning. To help them overcome these challenges and enhance their

networking skills, we provided teachers with a physical “networking toolkit” (Korenhof, Coenders & De Laat, 2011). This toolkit had been developed based on experiences in previous projects (cf. De Laat, 2012). The toolkit contained a set of cards that provided background information on networked learning, inspirational stories from other projects, networking activities and instruments for monitoring progress. For instance, teachers were encouraged to formulate a learning agenda that would give focus to their conversations and activities. A start on this learning agenda was made using the three task envelopes at the start-up event: by formulating their own learning questions and aligning them with the learning questions of others, learning networks learned to explore their learning needs and prioritize in learning activities.

The toolkit also provided teachers with tools to gain insight into their own learning preferences and into the workings of their networks. One of these tools was a questionnaire called the Quiz (Meijs, Prinsen, & de Laat, 2016). This questionnaire focused on five aspects of learning in networks being professional development, collaboration, learning from others, autonomy and a general attitude towards knowledge dissemination. The results of this questionnaire provided teachers with an insight into their learning in networks mindedness in the context of teacher professional development. A second toolkit tool was the Barometer (Meijs et al., 2013), a questionnaire for all network members concerning the workings of their learning network on four dimensions: domain - what the network is about; community - social aspects and the relationships between members; practice - a developing, shared repertoire; and evaluation – the value of the network for the school, teachers own development and their pupils. The outcomes of the questionnaire provided the network members with insight into how the learning network functioned, for instance in terms of member diversity, and subsequently what the learning network could change to make the network more effective, like searching for new members with different backgrounds.

Phase 3: Appreciation

To make the revenues of their participation in a learning network visible, we interviewed six teachers on their experiences with learning in learning networks. We conducted semi-structured interviews of about an hour, to provide teachers with conversational space to tell their particular stories. We centered our interviews around six questions, using the value creation framework (Wenger, Trayner, & De Laat, 2011):

1. What learning network did you join and what happened?
2. How did you experience your participation in the learning network?
3. What did you get out of your participation in the learning network?
4. How did that affect your work in practice?
5. What difference did that make for your achievements, those of your pupils or those of your school?
6. Did you gain a different perspective on something by your participation in the learning network?

The learning network meetings the teacher had participated in were used as a starting point for the interview. Based on the experiences the teacher had had in one of his network meetings, the value of the experience was explored using the six questions as a guide, focussing both on value for the teacher and on value for her pupils, colleagues and the school. To ensure that every network experience (or so-called “value creation strand”) was

explored across all cycles without interfering with the natural flow of the interviews, the interviews were conducted by two interviewers. The lead interviewer had an open conversation guided by the six questions mentioned above. The second interviewer tried to label as much information in terms of the value creation cycles and oversee whether each strand had been fully talked through. If needed, the second interviewer redirected the conversation to a previous remark to explore any value creation processes that may be associated with that part of the story. The stories were fed back to the teacher and the organization to serve as carriers of the value networked learning had created.

Results

Phase 1: Awareness and Accessibility

Teachers reported to be very enthusiastic about the visualizations of their everyday social networks and noted that it provided them with new insights in the social structures in which they worked. In addition, the thematic oriented diagrams provided an insight into the trending topics within their organization. For instance, it showed all social networks on the themes of gifted pupils, time management and digital learning materials between the five schools. This resulted in recognition for the teachers: “I found it very insightful to discover there were more teachers dealing with the same things as I am” (Maria, 2nd grade teacher). In addition, it provided the organization with an overview of the themes teachers discussed informally, which is not often visible within organizations. Figure 8.1 shows one of the (anonymized) published diagrams: the diagram containing the overall learning contacts.

As Figure 8.1 illustrates, there were already learning connections between the five schools, although the number of such connections was limited. Research shows that diversity in terms of hierarchical positions, proximity and time of acquaintance is advantageous for learning through social networks (Cross & Parker, 2004; Patariaia, 2014). As the diagram shows, in the participating schools, most learning relationships were formed between teachers of the same school, only three to five people per school had a between-school learning relationship. In all schools the principal was one of these people, accompanied by the vice-principal and the special needs coordinator. In Dutch schools, these occupations are generally the only ones that allow professionals to work outside school walls during school hours and thus contact professionals in other organizations.

[Insert Figure 8.1 here]

Figure 8.1: Learning contacts between the five schools

Phase 2: Ability

After visualizing the social capital of their organization, we used the existing learning relations on fourteen most mentioned learning topics at the start-up event, as a catalyst for teachers to get to know each other and form learning networks. The entire afternoon took up about three hours, and afterwards, many

teachers stayed and had a drink together in a purely informal setting. Table 3 shows how many teachers had assembled at each table. Some tables remained empty, while others gathered a crowd. All in all, eleven learning networks were formed, most of them consisting of members of at least two different schools, enhancing connectivity between the five schools. The learning networks formed at the start-up event, met every three months. Most of them attracted more members as time went on, resulting into learning networks containing members from all participating schools.

[Insert Table 8.3]

Phase 3: Appreciation

After a year of participating in learning networks, we interviewed six teachers on their experiences and the revenues of their participation. This resulted in eight value creation stories, which reflected the value of the learning in networks both with regard to teachers themselves and their professional development, as well as with regard to their pupils and the school as an organization. The stories of the network members were written down and fed back to the organization, to serve as both carriers of collective knowledge and as an agency for change in the learning climate of the participating school by validating the use of learning in networks. The interviewees themselves noted that being probed about their network experiences had made them realize they had gotten a lot more from their networks than they had appreciated beforehand.

The textbox below contains the value creation story of Janice, a first grade teacher, participating in the learning network centering around dyslexia. Janice's value creation story was sparked by a problem she encountered in her daily practice: the reading problems of one of her pupils. She used the start-up event to find other teachers with the same interests, resulting in the learning network dyslexia.

The story of Janice and the learning network dyslexia

Janice, a first grade teacher, suspected one of her pupils was suffering from dyslexia. He had trouble learning to read. His pace was slower than that of his classmates, resulting in feelings of frustration. Janice wondered whether there was an easier way in which she could have taught him how to read, if his reading disability had been discovered earlier. At the networked learning start-up event, she therefore decided to join a learning network concerning dyslexia. Her main learning question was whether and how dyslexia could be diagnosed in kindergarten children.

Janice's learning network started with three teachers of her own school. Something she regretted, because this meant that there would be no input from other schools and no network members with knowledge on the subject. She assumed that her learning network would therefore not be very useful. She and her fellow network members decided to search for information themselves, so they would at least find an answer to their questions. They planned on abandoning the network after it had served its purpose.

However, things started to turn around. Janice and her fellow network members found so much information about dyslexia, they decided to investigate the matter further and meet on a regular basis to discuss their findings. They planned on publishing the articles, so other teachers could use the information as well. Janice reported:

We've made a turnaround. All of a sudden we realized we could gain knowledge ourselves. We discovered that together we actually knew quite a lot. It was like: together we come to completely new things. [...] In itself it's nothing, but if we put it together then suddenly it means something, something important.

Janice's learning network has resulted in several things. Not only did it result into a published file on dyslexia available for teachers of all five schools, it also made Janice more aware of dyslexia. Coincidentally, she read about Montessori education, in which knowledge is offered through multiple senses. This inspired her to create an alphabet box, which allowed pupils to not only look at letters, but also feel and draw them. And the little boy with whom it all started? "I'm not saying it is because of the alphabet box, but he is getting the hang of it quite nicely."

Janice's initial idea of learning in learning networks was to consume the knowledge of other teachers on dyslexia. However, when she and her fellow learning network members realized that neither of them knew more than the other on the subject, they were posed with a problem. The perceived urgency of their learning questions sparked the search for an alternative way of learning. Instead of counting on a colleague who could provide them with the answers, they decided to find the answer to their questions themselves. Their discussions of the articles they found and published, which can be described as potential value for the participating schools, lead to personal reframing value on the nature of their own professional development: they realized that joining forces with others increased their knowledge potential:

We discovered that together we actually knew quite a lot. It was like: together we come to completely new things. [...] In itself it's nothing, but if we put it together then suddenly it means something, something important.

Serendipitously, it was the absence of knowledge in this learning network that led to this insight on learning. The aspect of serendipity also plays a role in the potential and applied value for her pupils that Janice reported in the final paragraph. By coincidentally learning something about another educational concept and combining this knowledge with the learning questions on dyslexia Janice had posed for herself, she created something new: an alphabet-box, so her pupils could perceive letters with their touch. Her participation in the learning network and the activities she consequently employed resulted into realized value: a greater reading fluency for the little boy that sparked her journey of professional development.

In addition to the value that Janice's participation in her learning network created for herself, her school and her pupils, her value creation story also illustrates three important elements in learning in learning networks: serendipity, new perspectives on learning and the emancipatory function of teacher regulated professional development. First, the story shows the serendipity of the processes involved, which make these learning processes valuable yet intangible and difficult to reproduce. As De Laat, Schreurs & Nijland (2014:253) argued:

Information flows can be picked up, interpreted, and propagated in unexpected ways; they traverse networks with a high levels of spontaneity and unpredictability. This potential for spontaneous connections and serendipity is a key aspect of the value of networks for learning and professional development.

Learning in learning networks equals opening the door for coincidental, unplanned learning. Many of the learning processes that take place in organizations are unplanned and the outcomes are unclear at the start of the process. In schools however, the core-business is to plan and fix knowledge to make it easy to transfer for educational purposes. Therefore, a cultural change is needed in schools – even more than in other types of organizations to embrace the uncertainty learning in networks and let it blossom to its full potential.

The importance of serendipity corresponds with the other two important elements from Janice's story: the perspective on learning and the emancipatory function of learning in learning networks. The story illustrates the perspective on learning that many teachers consciously or unconsciously adhere to: learning is acquiring the knowledge from others on a certain subject. It took a process of reframing for Janice to realize that learning could also be a self-initiated search for knowledge, even outside the boundaries of her own organization, and that in using this alternative path the learning could still be effective. In addition, Janice and her fellow network members realized that they could actually control their own professional development. They realized that they didn't need to depend on others for their learning, but that they could shape, regulate and control their own professional development. In a culture in which most learning, for pupils and for teachers, is planned and fixed, these are important realizations. The embracing of serendipity that is necessary in learning in learning networks combined with a changed perspective on learning, had an emancipatory function. It allowed teachers to regulate their own professional development. Or as Janice stated: "All of a sudden we realized we could gain knowledge ourselves. We discovered that together we actually knew quite a lot."

Discussion

The question we set out to answer was *How does stimulating awareness, developing networking ability and offering insight into the outcomes of network learning, contribute to learning in social networks to stimulate professional development within an organization for primary education?* We developed a three-phased intervention for stimulating networked learning in five schools for primary education. We based our intervention on using the natural social networks that already occurred in the organization. The intervention consisted of 1) creating network awareness, 2) providing teachers with tools for forming learning networks and developing networking ability and 3) assessing the network value to create a greater organizational recognition for learning in networks.

In phase 1, we made the existing informal social networks and social capital within the five schools visible using social network analysis and fed the results back to the teachers in printed diagrams. This resulted in awareness of both the existing learning ties between people and the themes on which teachers learned from each other. We capitalized upon the concepts of awareness and availability: by creating awareness on relations and themes, we stimulated the availability of both, as knowing who to approach is the first step in using the social capital of one's network. In phase 2, we used the informal social networking in the stimulation of the creation of learning networks, by centering the themes in a start-up event in which teachers could join together based on their learning questions. The learning networks that formed were supported with tools to provide them with insight in the workings of their network and thus support their developing networking ability. In phase 3, we collected value creation stories, to map the value teachers created for themselves, their organizations and their pupils by participating in a learning network. We subsequently fed these stories back to the organization to make the value of learning in learning networks visible and thus support the creation of a new perspective on teacher professional development.

As the results show, implementing the three-phased intervention stimulated professional development in the participating schools. Becoming aware of the social structures in which they worked helped teachers to specifically seek out peers that could complement their learning. As some seemed to struggle with shaping their learning networks at the start, the provision of networking tools enabled teachers to find their own ways in learning in networks. Finally, being probed about their value creation stories especially helped teachers to become aware of what had happened within their networks and share the fruits of their work with others.

In this chapter we have outlined how existing learning in social networks can be leveraged to create learning networks that contribute to teacher professional development. Apart from evidencing the potential of the three-phased intervention, this chapter also sheds light on the challenge of stimulating learning in networks in general. For instance, the value creation stories also showed the change in perspective teachers underwent through their participation in learning networks. Participating in learning networks had an emancipatory function. As noted earlier, teachers are rarely in control of their own professional development. Their engagement in learning networks and the active role they inevitably needed to play stimulated a changed perspective on the nature of learning, from knowledge transfer (learning as consuming knowledge) to transformational (learning as actively constructing knowledge). As such, it also helped them to reframe their own role in their ongoing professional learning. Learning in learning networks provides teachers with an

opportunity to take control of their professional development and align their learning with their professional needs.

Although the value creation stories showed that participating in learning networks contributed to teachers' professional development, the contribution to teachers' social networks was not yet clear. The reason for this may lie in the fact that the project was still in its first year. It takes time for teachers to develop skills for informal social networking, like taking initiative, valuing others with whom you learn, sharing responsibility and building relations (Hanraets et al., 2011). It takes time to get used to the new networked way of thinking and working (Day & Hadfield, 2004). However, this also entails a pitfall. During this time, the general perception of learning in social networks and informal learning may become limited to the participation in learning networks, thus not opening up the social environment for learning, but in fact closing it. And when these learning networks become part of the formal organization, it is at risk of becoming idiosyncratic, with obligatory participation and without teacher autonomy.

Principals and teachers play an important part in evading this pitfall. Stimulating the use of social networks to foster learning through the support and setup of learning networks entails a change in their perspective on knowledge and learning. Such changes require both awareness on their part as well as a change in school culture. Both principals and teachers will have to make a shift from perceiving professional development as consumption to understanding it as an ongoing and intrinsically social enterprise. They will also have to move away from planned, top-down organized professional development towards professional learning that is serendipitous and teacher-regulated. Teachers and principals should guide each other in this process through reflection and by supporting and correcting each other in this continuing learning process.

Since principals are key players in bringing about cultural change within schools, they play a crucial role in creating affordances for learning in networks. In the follow-up on the project we have described in this chapter, we experienced that it is very important to involve principals and support them in creating the right conditions for learning in networks. When learning in social networks is controlled and participation in learning networks is made an aim, instead of a means to an end, it fails to support serendipity and the potential for spontaneous connections. Future initiatives on learning in networks would be well-advised acknowledge that this may challenge principals' belief systems and leadership styles. Principals are challenged to find ways in which they can provide teachers with the professional space to explore the serendipity that encompasses learning in social networks and allow autonomy for self-regulated professional development.

In conclusion, this chapter has provided valuable insights in how learning in social networks can be elevated through the setup and facilitation of learning networks. In that respect, we have emphasized the importance of leaving room for self-regulation and serendipity, and have noted how learning (and leadership) paradigms may need to shift for learning in networks to prosper. The three-phased intervention we have introduced in this chapter has certainly shown its potential in stimulating professional development through such learning networks. Understanding and evidencing how participation in learning networks also elevates the quality of learning in social networks, will be the next step for initiatives that aim to facilitate learning in networks.

References

- Akkerman, S., Petter, C., & De Laat, M. F. (2008). Organising communities-of-practice: Facilitating emergence. *Journal of Workplace Learning, 20*, 383–399.
- Baker-Doyle, K. J., & Yoon, S. A. (2011). In search of practitioner-based social capital: A social network analysis tool for understanding and facilitating teacher collaboration in a US-based STEM professional development program. *Professional Development in Education, 37*, 75–93.
<http://doi.org/10.1080/19415257.2010.494450>
- Borgatti, S. P., Everett, M. G., & Freeman, L. C. (2002). *UCInet for Windows: Software for Social Network Analysis*. Harvard, MA: Analytic Technologies.
- Borgatti, S.P., & Foster, P. (2003). Recent research on team and organizational diversity: SWOT analysis and implications. *Journal of Management, 29*, 991–1013.
- Boshoff, N. (2014). Use of scientific research by South African winemakers. *Journal of Science Communication, 1*, 1–18.
- Boud, D., & Hager, P. (2012). Re-thinking continuing professional development through changing metaphors and location in professional practices. *Studies in Continuing Education, 34*, 17–30.
- Bruffee, K. (1984). Collaborative learning and the “Conversation of Mankind”. *College English, 46*, 635–652.
- Cadima, R., Ferreira, C., Monguet, J., Ojeda, J., & Fernandez, J. (2010). Promoting social network awareness: A social network monitoring system. *Computers & Education, 54*, 1233–1240.
<http://doi.org/10.1016/j.compedu.2009.11.009>
- Caplan, N. (2003). The two-communities theory and knowledge utilization. *American Behavioral Scientists, 22*, 459–470.
- Coburn, C. E., Mata, W. S., & Choi, L. (2013). The embeddedness of teachers’ social networks: Evidence from a study of mathematics reform. *Sociology of Education, 86*, 311–342.
<http://doi.org/10.1177/0038040713501147>
- Crona, B. I., & Parker, J. N. (2012). Learning in support of governance: Theories, methods, and a framework to assess how bridging organizations contribute to adaptive resource governance. *Ecology and Society, 17*(1). <http://doi.org/10.5751/ES-04534-170132>
- Cross, R. L., & Parker, A. (2004). *The hidden power of social networks: Understanding how work really gets done in organizations*. Cambridge, MA: Harvard Business Press.
- Cross, R. L., Parker, A., Prusak, L., & Borgatti, S. P. (2001). Knowing what we know: Supporting knowledge creation and sharing in social networks. *Organizational Dynamics, 30*, 100–120.
<http://doi.org/10.1093/0195165128.003.0005>
- Cutler, R. H. (1996). Technologies, relations, and selves. In L. Strate, R. Jacobson, & S. B. Gibson (Eds.), *Communication and cyberspace: Social interaction in an electronic environment* (pp. 317–333). New Jersey: Hampton Press INC.
- Daly, A. J. (2012). Data, dyads, and dynamics: Exploring data use and social networks in educational improvement. *Teachers College Record, 114*(Nov), 1–38.
- Davidson, K., & Nowicki, E. (2012). An exploration of the utility of a knowledge utilization framework to study

- the gap between reading disabilities research and practice. *Alberta Journal of Educational Research*, 58, 330–349.
- Day, C., & Hadfield, M. (2004). Learning through networks: Trust, partnerships and the power of action research. *Educational Action Research*, 12, 575–586. <http://doi.org/10.1080/09650790400200269>
- De Laat, M. (2012). *Enabling professional development networks: How connected are you?* Heerlen: Open University.
- De Laat, M., & Coenders, M. (2011). Communities of Practice en netwerklere. In J. Kessels & R. Poell (Eds.), *Handboek Human Resource Development* (pp. 417–428). Houten: Bohn Stafleu van Loghum. http://doi.org/10.1007/978-90-313-8565-2_24
- De Laat, M., & Schreurs, B. (2013). Visualizing informal professional development networks: Building a case for learning analytics in the workplace. *American Behavioral Scientist*, 57, 1421–1438. <http://doi.org/10.1177/0002764213479364>
- De Laat, M., Schreurs, B., & Nijland, F. (2014). Communities of practice and Value Creation in networks. In R. F. Poell, T. Rocco, & G. Roth. (Eds.), *The Routledge Companion to Human Resource Development* (pp. 249–257). New York: Routledge.
- DiMicco, J. M., Hollenbach, K. J., Pandolfo, A., Bender, W., & Morris, J. (2007). The impact of increased awareness while face-to-face. *Human-Computer Interaction*, 22(22), 47–96. <http://doi.org/10.1080/07370020701307781>
- Dobbins, M., Rosenbaum, P., Plews, N., Law, M., & Fysh, A. (2007). Information transfer: What do decision makers want and need from researchers? *Implementation Science*, 2(20). <http://doi.org/10.1186/1748-5908-2-20>
- Doppenberg, J. J., Bakx, A. W. E. a., & den Brok, P. J. (2012). Collaborative teacher learning in different primary school settings. *Teachers and Teaching: Theory and Practice*, 18, 547–566. <http://doi.org/10.1080/13540602.2012.709731>
- Eteläpelto, A., Vähäsantanen, K., Hökkä, P., & Paloniemi, S. (2013). What is agency? Conceptualizing professional agency at work. *Educational Research Review*, 10, 45–65. <http://doi.org/http://dx.doi.org/10.1016/j.edurev.2013.05.001>
- Flap, H., & Völker, B. (2001). Goal specific social capital and job satisfaction. Effects of different types of networks on instrumental and social aspects of work. *Social Networks*, 23, 297–320.
- Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology*, 78, 1360–1380. <http://doi.org/10.1086/225469>
- Granovetter, M. (1985). Economic-action and social-structure - the problem of embeddedness. *American Journal of Sociology*, 91, 481–510. <http://doi.org/Doi 10.1086/228311>
- Gutwin, C., Greenberg, S., & Roseman, M. (1996). Workspace awareness in real-time distributed groupware: Framework, widgets, and evaluation. In R. Sasse, A. Cunningham, & R. Winder (Eds.), *People and Computers XI (Proc. HCI'96)* (pp. 281–298). Berlin Heidelberg: Springer- Verlag.
- Hanraets, I., Hulsebosch, J., & De Laat, M. F. (2011). Experiences of pioneers facilitating teacher networks for professional development. *Educational Media International*, 48, 85–99.

<http://doi.org/10.1080/09523987.2011.576513>

- Hansen, M. T. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly*, 44, 82–111. <http://doi.org/10.2307/2667032>
- Haythornthwaite, C., & De Laat, M. F. (2012). Social network informed design for learning with educational technology. In A. Olofson & O. Lindberg (Eds.), *Informed Design of Educational Technologies in Higher Education: Enhanced Learning and Teaching* (pp. 352–374). Hershey: IGI-Global.
- Hu, B., Kuhlkamp, A., & Reinema, R. (2002). Supporting Group Awareness in Web-Based Learning Environments. In Y. Han, S. Tai, & D. Wikarski (Eds.), *Engineering and Deployment of Cooperative Information Systems* (Lecture No, pp. 525–536). Berlin: Springer Berlin Heidelberg. http://doi.org/10.1007/3-540-45785-2_42
- Imants, J., Wubbels, T., & Vermunt, J. D. (2013). Teachers' Enactments of Workplace Conditions and Their Beliefs and Attitudes toward Reform. *Vocations and Learning*, 6, 323–346. <http://doi.org/10.1007/s12186-013-9098-0>
- Jennings, J. L. (2010). School choice or schools' choice? Managing in an era of accountability. *Sociology of Education*, 83, 227–247. <http://doi.org/10.1177/0038040710375688>
- Jones, C., Asensio, M., & Goodyear, P. (2000). Networked learning in higher education: practitioners' perspectives. *Research in Learning Technology*, 8(2), 18–28.
- Korenhof, M., Coenders, M., & De Laat, M. F. (2011). *Toolkit Netwerkleren Primair Onderwijs* [Toolkit Networked Learning Primary Education]. Heerlen: Ruud de Moor Centrum, Open Universiteit.
- Levin, B. (2011). Mobilising research knowledge in education. *London Review of Education*, 9, 15–26. <http://doi.org/10.1080/14748460.2011.550431>
- Lieberman, A., & Pointer Mace, D. H. (2008). Teacher learning: The key to educational reform. *Journal of Teacher Education*, 59, 226–234. <http://doi.org/10.1177/0022487108317020>
- Lovett, S., & Cameron, M. (2011). Schools as professional learning communities for early-career teachers: how do early-career teachers rate them? *Teacher Development*, 15, 87–104.
- Meijs, C., Prinsen, F., & De Laat, M. F. (2013). Evaluation of the functional status of learning networks based on the dimensions defining a Community of Practice. *Teaching and Teacher Education*, 12, 279–295.
- Meijs, C., Prinsen, F. R., & de Laat, M. F. (2016). Social learning as approach for teacher professional development; how well does it suit them? *Educational Media International*, 53, 85–102. <http://doi.org/10.1080/09523987.2016.1211333>
- Mitton, C., Adair, C. E., Mckenzie, E., Patten, S. B., & Wayne Perry, B. (2007). Knowledge transfer and exchange: Review and synthesis of the literature. *The Milbank Quarterly*, 85, 729–768.
- Moolenaar, N. M., Daly, a. J., & Slegers, P. J. C. (2010). Occupying the Principal Position: Examining Relationships Between Transformational Leadership, Social Network Position, and Schools' Innovative Climate. *Educational Administration Quarterly*, 46, 623–670. <http://doi.org/10.1177/0013161X10378689>
- Moses, A. S., Skinner, D. H., Hicks, E., & O'Sullivan, P. S. (2009). Developing an educator network: The effect of a teaching scholars program in the health professions on networking and productivity. *Teaching and Learning in Medicine*, 21, 175–179.

- Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *The Academy of Management Review*, 23, 242–266. <http://doi.org/10.2307/259373>
- Nijland, F. J. (2011). *Mirroring interaction. An exploratory study into student interaction in independent working*. Tilburg: Tilburg University. Retrieved from <http://arno.uvt.nl/show.cgi?fid=121427>
- Novak, J., & Wurst, M. (2005). Collaborative knowledge visualisation for cross-community learning. In S. Tergan & T. Keller (Eds.), *Lecture Notes in Computer Science* (Vol. 3426, pp. 95–116). Berlin Heidelberg: Springer-Verlag. http://doi.org/10.1007/11510154_6
- Nowotny, H., Scott, P., & Gibbons, M. (2003). Introduction: Mode 2' Revisited: The New Production of Knowledge. *Minerva*, 41(3), 179-194.
- OECD. (2001). *The Well- Being of Nations: The Role of Human and Social Capital*. Paris: OECD Publishing.
- OECD. (2014). *Education at a Glance 2014: OECD indicators*. Paris: OECD Publishing. <http://doi.org/10.1787/eag-2013-en>
- Ogata, H., & Yano, Y. (1998). Knowledge awareness: Bridging learners in a collaborative learning environment. *International Journal of Educational Telecommunications*, 4, 219–236. Retrieved from <https://www.learntechlib.org/p/15122>.
- Pataraiia, N. (2014). *The Role of Networks in Supporting Academics' Professional Development and Change in Teaching Practice*. Glasgow Caledonian University.
- Rajagopal, K., Joosten-ten Brinke, D., Van Bruggen, J., & Sloep, P. B. (2012). Understanding Personal Learning Networks: their structure, content and the networking skills needed. *First Monday*, 17(1), 1–29. <http://doi.org/10.5210/fm.v17i1.3559>
- Reagans, R., & Mcevily, B. (2003). Network structure and knowledge transfer: The effects of cohesion and range. *Administrative Science Quarterly*, 48, 240–267. <http://doi.org/10.2307/3556658>
- Rivera, M. T., Soderstrom, S. B., & Uzzi, B. (2010). Dynamics of Dyads in Social Networks: Assortative, Relational, and Proximity Mechanisms. *Annual Review of Sociology*, 36, 91–115. <http://doi.org/10.1146/annurev.soc.34.040507.134743>
- Rovai, A. P. (2001). Classroom community at a distance. *The Internet and Higher Education*, 4, 105–118. [http://doi.org/10.1016/S1096-7516\(01\)00053-7](http://doi.org/10.1016/S1096-7516(01)00053-7)
- Schreurs, B. (2014). Analysing learning ties to stimulate continuous professional development in the workplace. In V. Hodgson, M. De Laat, D. McConnell & T. Ryberg (Eds.), *The Design, Experience and Practice of Networked Learning*, (pp. 207-224). London, UK: Springer.
- Stoll, L., Bolam, R., McMahon, A., Wallace, M., & Thomas, S. (2006). Professional learning communities: A review of the literature. *Journal of Educational Change*, 7, 221–258. <http://doi.org/10.1007/s10833-006-0001-8>
- Thurlings, M., Evers, A. T., & Vermeulen, M. (2014). Toward a model of explaining teachers' innovative behavior: A literature review. *Review of Educational Research*, 85, 430–471. <http://doi.org/10.3102/0034654314557949>
- Tour, E. (2017). Teachers' personal learning networks (PLNs): exploring the nature of self-initiated professional learning online. *Literacy*, 51(1), 11–18. <http://doi.org/10.1111/lit.12101>

- Trotman, D. (2009). Networking for educational change: concepts, impediments and opportunities for primary school professional learning communities. *Professional Development in Education, 35*, 341–356. <http://doi.org/10.1080/13674580802596626>
- Trust, T. (2012). Professional Learning Networks Designed for Teacher Learning. *Journal of Digital Learning in Teacher Education, 28*(4), 133–138.
- Uzzi, B., & Dunlap, S. (2005). How to build your network. *Harvard Business Review, 83*(12).
- Vaessen, M., Beemt, A. Van Den, & De Laat, M. F. (2014). Networked professional learning: relating the formal and the informal. *Frontline Learning Research, 2*, 56–71. <http://doi.org/10.14786/flr.v2i2.92>
- Van Waes, S., Moolenaar, N. M., Daly, A. J., Heldens, H. H. P. F., Donche, V., Van Petegem, P., & Van den Bossche, P. (2016). The networked instructor: The quality of networks in different stages of professional development. *Teaching and Teacher Education, 59*, 295–308. <http://doi.org/10.1016/j.tate.2016.05.022>
- Varga-Atkins, T., O'Brien, M., Burton, D., Campbell, A., & Qualter, A. (2010). The importance of interplay between school-based and networked professional development: School professionals' experiences of inter-school collaborations in learning networks. *Journal of Educational Change, 11*, 241–272. <http://doi.org/10.1007/s10833-009-9127-9>
- Vrieling, E., Beemt, A. Van Den, & De Laat, M. F. (2016). What's in a name : dimensions of social learning in teacher groups. *Teachers and Teaching: Theory and Practice, 22*, 273–292. <http://doi.org/10.1080/13540602.2015.1058588>
- Wenger, E., Trayner, B., & De Laat, M. F. (2011). *Promoting and assessing value creation in communities and networks: A conceptual framework*. Heerlen. Retrieved from <http://isites.harvard.edu/fs/docs/icb.topic950998.files/Assessing Learning Communities.pdf>
- Yoon, S., Koehler-Yom, J., Yang, L., & Liu, L. (2017). The effects of teachers' social and human capital on urban science reform initiatives: Considerations for professional development. *Teachers College Record, 119*(4), 1–32.