Networked individualism and learning in organizations

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Networked individualism and learning in organizations

An ego-network perspective on informal learning ties

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Informal
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95

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Abstract

Purpose – This paper aims to investigate the extent professionals from the vocational sector are networked individuals. The authors explore how professionals use their personal networks to engage in a wide variety of learning activities and examine what social mechanisms influence professionals' agency to form personal informal learning networks.

Design/methodology/approach – This study applied a mixed-method approach to data collection. Social network data were gathered among school professionals working in the vocational sector. Ego-network analysis was performed. A total of 24 in-depth, semi-structured, qualitative interviews were analyzed.

Findings – This study found that networked individualism is not represented to its full potential in the vocational sector. However, it is important to form informal learning ties with different stakeholders because all types of informal learning ties serve different learning purposes. The extent to which social mechanisms (i.e. proximity, trust, level of expertise and homophily) influence professionals' agency to form informal learning ties differs depending on the stakeholder with whom the informal learning ties are formed.

Research limitations/implications – This study excludes the investigation of social mechanisms that shape learning through more impersonal virtual learning resources, such as social media or expert forums. Moreover, the authors only included individual- and dyadic-level social mechanisms.

Practical implications – By investigating the social mechanisms that shape informal learning ties, this study provides insights how professionals can be stimulated to build rich personal learning networks in the vocational sector.

Originality/value – The authors extend earlier research with in-depth information on the different types of learning activities professionals engage in in their personal learning networks with different stakeholders. The ego-network perspective reveals how different social mechanisms influence professionals' agency to shape informal learning networks with different stakeholders.

Keywords Informal learning, Continuing professional development, Social networks, Networked individualism

Paper type Research paper

Introduction

The viability of today's organizations increasingly depends on professionals' capabilities to learn. Previous research has shown that professionals mostly rely on their relationships with colleagues, peers and experts to learn (Baker-Doyle and Yoon, 2010; Boud and Middleton, 2003; Cross and Sproull, 2004; De Laat, 2012; Lohman, 2006; Pataraija *et al.*, 2014; Wilson and Hartung, 2015). To facilitate professionals' informal learning, organizations around the world are exploring how to enhance the social processes of learning by encouraging professionals to build strong professional networks. Learning is here defined as a value creation process, embedded in the informal ties that professionals build while dealing with work-related issues (Wenger *et al.*, 2011).

Traditionally, organizations were tight-knit, stable, simple structures, in which it was sufficient for professionals to build and maintain rather small, dense and stable networks of trusted relationships with people in their immediate (local) neighborhood (Wellman, 2002). However, today's organizations are much more fluid and complex, requiring professionals to engage in *ad hoc* collaboration possibilities and to form (and dissolve) more instant, short-term alliances and network ties, thereby weaving a more complex social web that continuously changes over time, a phenomenon that has been described as networked individualism (Rainie and Wellman, 2012; Wellman, 2002).

The phenomenon of networked individualism is especially salient in educational organizations, such as in Dutch vocational education, where this study takes place[1]. The vocational education sector is typified by a large, rich eco-system and a wide variety of stakeholders, including (but not limited to) students, fellow educators, parents, communities, and non-commercial and commercial business partners. Relationships with such stakeholders have the potential to provide professionals with the necessary learning opportunities to keep up with new developments in their fields of expertise, offer authentic-real life experiences and prepare students for future participation in the labor market (de Bruijn *et al.*, 2017). Yet, insights in such large-scale, diverse networks and empirical evidence of the learning opportunities generated by these networks are scarce, thereby limiting our understanding of how professionals' learning can be supported and leveraged.

The notion of networked individualism builds on three important assumptions (Rainie and Wellman, 2012). First, networked individualism implies that to learn in complex organizations, professionals build a varied and complex network using (online) tools to transcend the boundaries of the traditional, local and dense – village-type – networks and connect with professionals across (organizational) boundaries. Second, networked individualism suggests that professionals use informal relationships with different stakeholders for different purposes. In contrast to traditional organizations, in current organizational landscapes, knowledge and competences are much more specialized and dispersed (Wellman, 2002), urging professionals to gain access to a larger number of individuals to serve multiple learning goals. Third, professionals actively build up a personal network “substantially based on their personal skill, individual motivation, and maintaining the right connections” (Rainie and Wellman, 2012, p. 125). As such, networked individualism implies that professionals need to take the responsibility to build and maintain informal learning ties with different stakeholders, implying that professionals can exercise agency in building and maintaining their personal networks (Chua, 2013; Rainie and Wellman, 2012).

In this paper, we argue that the individual agency required for professionals to engage in informal learning ties with a large variety of stakeholders is influenced by social mechanisms that shape social networks (Chua, 2013; Gulati and Srivastava, 2014; Kleinbaum *et al.*, 2013; Schreurs *et al.*, in press). Examples of such mechanisms, also

described as “the social cogs and wheels that bring a tie into existence” (Hedström and Swedberg, 1996, p. 268), are organizational proximity (i.e. professionals prefer to form ties with other professionals close-by) (Kleinbaum *et al.*, 2013; Pataraia *et al.*, 2014; Spillane *et al.*, 2012) and network homophily (i.e. professionals prefer to form ties with others who are similar to themselves) (McPherson *et al.*, 2001; Pataraia *et al.*, 2014). While the conceptual tension between such structural, social constraints and individual agency may be explored to find opportunities for informal learning (Gulati and Srivastava, 2014), it is not self-evident that professionals in the vocational sector act on their agency to form networks for the purpose of learning from a wide variety of stakeholders. It is not evident what kind of learning opportunities and activities are offered through these learning ties. In addition, it is unclear to what extent professionals’ agency to shape their own learning network is influenced by certain social mechanisms (e.g. proximity, homophily). Insights in the interplay, or tension, between learning ties, learning activities and social constraints for professionals in vocational education may offer leverage to support the learning process of this understudied, yet growing group of professionals. In sum, to increase our understanding of how professionals form and maintain informal learning ties, three main questions guide this paper:

- Q1. To what extent do professionals in the vocational sector form and maintain informal learning ties with different stakeholders?
- Q2. Which types of learning activities do professionals engage in through their informal learning ties?
- Q3. What social mechanisms influence professionals’ agency to form and maintain informal learning ties with different stakeholders?

In this study, we present a mixed-method study that combines quantitative social network analysis of 216 educational professionals of a large vocational school in The Netherlands with interviews with a subsample of these professionals (24 in total). Using a mixed-method approach and examining informal learning ties from the perspective of networked individualism allowed us to gain a more fine-grained, deeper understanding of the research phenomena under study. Our findings offer practical suggestions for building and leveraging of informal learning ties to support the professional development, workplace performance, and personal growth of professionals in the vocational education sector.

Theoretical background

To what extent do professionals in the vocational sector form and maintain informal learning ties with different stakeholders?

Recently, studies have started to examine professionals’ ego-networks to explore affordances for informal learning, for instance in elementary and higher education (Van Waes *et al.*, 2015). Ego-networks focus on one individual (ego) and his/her ties with others (alters), irrespective of organizational boundaries. The exploration of variations in these ego-networks is the first step toward understanding networked individualism in vocational education. In this study, we distinguish five types of ties that professionals build to learn (Schreurs *et al.*, 2014), namely:

- (1) informal learning ties with formal team members (i.e. colleagues within the same organization and the same team who work toward a common goal) (Dechant *et al.*, 1993; Salas *et al.*, 1992);
- (2) informal learning ties with managers;

- (3) informal learning ties with members from a community of practice (CoP) (Wenger, 1998);
- (4) internal boundary crossing ties (with colleagues within the same organization, but across formal teams); and
- (5) external informal boundary crossing ties (i.e. with professionals from outside the organization).

Earlier research suggests that informal learning ties with team members and managers may be overrepresented in professionals' ego networks compared to informal learning ties with CoP members and internal and external boundary crossers (Pataraiia *et al.*, 2014). The preference for informal learning ties with team members builds on earlier work that suggests that teachers prefer to interact with others who are similar to themselves in terms of gender, age, experience, ethnicity, grade level, subject matter, prior professional relationships and physical proximity (Moolenaar, 2012; Spillane *et al.*, 2012). People who experience similar issues may learn more easily from each other, because they understand each other's practice and the daily problems that could arise from it (Pataraiia *et al.*, 2014).

In contrast, informal boundary crossing ties may less easily be formed, as these ties can come at a cost (Borgatti and Cross, 2003). Learning through boundary crossing asks from professionals to move beyond their own practice and translate learning experiences back to their own context, resulting in discontinuities leading to intrapersonal conflict (Akkerman and Bakker, 2011). Boundary-crossing professionals may also run the risk of being acknowledged less by their own department (Akkerman and Bakker, 2011). While networked individualism implies that professionals build a varied and complex network, insights in the pattern of these ties in vocational education are scarce.

What type of learning activities do professionals engage in within their personal networks with different stakeholders?

Second, based on recent literature, we expect that professionals engage in different types of learning activities depending on the stakeholders with whom they interact (Baker-Doyle and Yoon, 2010; Boud and Middleton, 2003; Cross and Sproull, 2004; de Bruijn *et al.*, 2017; Decuyper *et al.*, 2010; Eraut, 2004; Lohman, 2006; Wilson and Hartung, 2015). For instance, learning ties with team members will focus mostly on job content and problems of practice (Horn and Little, 2010) and are formed to co-construct and share new knowledge, ideas and routines, to form a shared identity and to learn by actively doing things together, planned or unplanned (Decuyper *et al.*, 2010). In contrast, learning ties with managers may be more related to learning activities that offer opportunities for personal growth (Eraut, 2004); to set new goals and provide new perspectives (Ellinger and Bostrom, 1999); and for inspiration (Beattie, 2006; Warhurst, 2013). Similar to learning ties with team members, learning activities with CoP members are also closely related to practice, but may focus more generally on what it takes to be a skilled professional, rather than on specific job content (Lave and Wenger, 1991; Wenger, 1998). Finally, informal learning ties across boundaries may be used to reflect, to get new ideas and to create a space of mutual problem recognition across contexts (Akkerman and Bakker, 2011). However, while networked individualism suggests that professionals use informal relationships with different stakeholders for different purposes, our understanding of these differences in learning activities is limited.

What social mechanisms influence professionals' agency to form and maintain informal learning ties with different stakeholders?

Research suggests that several universal social mechanisms influence the process of informal tie formation (Chua, 2013). Based on earlier research, we specifically focus on the role of trust (Cross and Parker, 2004), (organizational) proximity (Kleinbaum *et al.*, 2013), norms of reciprocity (Gouldner, 1960), homophily (McPherson *et al.*, 2001) and the value of expertise (Borgatti and Cross, 2003).

Interpersonal trust is an essential element to stimulate learning (Lynn *et al.*, 2016), which shows when a professional is willing to be vulnerable to another professional (Mayer *et al.*, 1995). Wellman (2002) argues that trust in more local, interpersonal relationships is implicitly derived from trust that may already be present at the group level. *Physical proximity* refers to nearness in space, creating opportunities for learning through serendipitous encounters and a mutual space to learn (Agterberg *et al.*, 2009). Yet, distant ties have also been argued to stimulate learning, as distant ties are more likely to convey new, non-redundant information (Granovetter, 1973). The *norm of reciprocity* reflects the tendency of individuals to reciprocate behavior, such as learning from each other (Gouldner, 1960; Hanneman and Riddle, 2005). As Gouldner (1960) claims that the norm to reciprocate may vary with hierarchical status, it may be that reciprocating learning is more likely among individuals with a similar hierarchical position (e.g. between teachers) than individuals with different hierarchical positions (e.g. between teachers and managers). *Homophily* refers to the social mechanism that individuals are more likely to form ties with others who are similar to themselves (McPherson *et al.*, 2001; Moolenaar, 2012). A distinction can be made between status homophily – referring to similarity in socio-demographic traits (e.g. educational level, age and gender) – and value homophily – referring to similarity in identities, values, attitudes and beliefs (McPherson *et al.*, 2001). Previous studies in education suggest that teachers are more likely to form ties with others who are similar to them in terms of demographic characteristics (Moolenaar and Slegers, 2010; Spillane *et al.*, 2012). In this article, we extend earlier research on homophily by including similarity in personality. Boundary crossing ties are more likely to form amongst like-minded professionals (Wellman, 2002). Finally, an important driver for professionals to connect with others outside the organization is the search for specialized knowledge and *expertise* (Wellman, 2002). The extent to which professionals know and value each other's expertise is an important predictor for information seeking ties in organizations (Borgatti and Cross, 2003). As such, it could be that valuing the expertise of others could be driving the formation and maintenance of learning ties, and more so with others outside the organization and in CoPs than with peers and managers from the own organization.

Thus, while networked individualism suggests that professionals can exercise full agency in forming informal learning ties with different stakeholders, we investigate the extent to which the different types of informal learning ties are influenced by diverse social mechanisms.

Method

Context

Data were collected at a school offering courses on vocational level in the design and technology industry, for instance, event management, media and restoration techniques. The school comprises around 3,200 students and 274 professionals. The school has a relatively flat organizational structure with a board of directors, three school leaders and educational staff. Within the educational staff (teachers and support staff), around 10 per cent of the professionals have additional responsibilities (e.g. curriculum development

and management). The school consists of 17 departments situated in two geographical locations approximately 14 miles apart.

Data collection

This study applied a mixed-method approach to data collection. First, network data were gathered among 216 school professionals (response rate of 79.2 per cent), using a survey with a single name generator question: *With whom did you have valuable conversations around work-related topics in the past three months?* The respondents counted 48 per cent female, and staff members' age ranged from 23 to 64 years ($M = 46.95$ years; $sd = 10.05$ years). Of the total population, 15 per cent was younger than 35 years and 44 per cent older than 50. Also, 9 per cent had a university degree, 61 per cent a bachelor degree and 14.7 per cent a degree below bachelor. We randomly selected 24 professionals (8 female) to be interviewed. Next, 9 per cent were younger than 35, 47 per cent were between 35 and 50 and 44 per cent was older than 50 (based on data of 19/24 participants).

Second, a total of 24 in-depth, semi-structured, qualitative interviews were conducted to further explore the social mechanisms that may affect informal learning tie formation. For purposive sampling, we predefined six groups of management, teachers and support staff at both locations, and from these groups, we randomly selected 24 professionals (8 female) to be interviewed. Also, 9 per cent were younger than 35, 47 per cent were between 35 and 50 and 44 per cent was older than 50 (based on data of 19/24 participants). Interviews lasted on average 45 min. We first asked a single name generator question (Borgatti and Cross, 2003). Participants could name whoever they wanted (Van Waes *et al.*, 2015). For each of the people that were named, participants were provided with follow-up questions (Appendix 1).

Data analysis

Data analysis of ego-network data

Based on the survey data, a case-by-case matrix was created for each participant (ego) and the people with whom he/she engaged in informal learning ties (alters). Subsequently, all alters were uniquely categorized into five types of informal learning ties. Ties with team members were ties between professionals of the same team, without difference in formal hierarchy. Ties between a team member and their direct supervisor (e.g. school leader) were categorized as informal learning ties with a manager. Ties with colleagues from other teams, without difference in formal hierarchy, were categorized as informal boundary crossing ties. Ties with former colleagues or external consultants were categorized as informal learning ties with CoP members. Ties with professionals from outside the organization, who cannot be defined as CoP members, were categorized as external boundary crossing ties.

To represent the variety of ego's informal learning ties, three measures were calculated using the social network software program UCINET 6.579 (Borgatti *et al.*, 2002): ego-network size, ego-network composition, and Blau's heterogeneity measure. *Ego-network size* represents the total number of outgoing informal learning ties in ego's network. *Ego-network composition* measures the proportion of the five types of alters are in ego's ego-network. *Blau's heterogeneity* measures the proportion of variation in the ego-network based on five types of alters (see for more information Borgatti *et al.*, 2002).

Data analysis of in-depth interviews

The analysis of the interview data focused on the characteristics of alters, and the type of learning activities that participants described. The interviews were audiotaped and transcribed verbatim. A coding scheme was developed based on the theoretical framework (Appendix 2). Two researchers independently coded 10 per cent of the interview transcripts,

resulting in a sufficient inter-rater reliability of 0.75 (Cohen's Kappa). The interviews were analyzed in three stages. In Stage 1, informal learning ties were categorized into five types of informal learning ties (with team members, managers, CoP members, internal and external boundary crossers). In Stage 2, answers from participants were analyzed (within-case analysis). In Stage 3, we performed a cross-case analysis to search for patterns. Constant comparative analysis (Glaser *et al.*, 1968) was used to continuously compare preliminary interpretations with participants' answers, as well as the theoretical framework. To get insights into the importance of each social mechanism we counted the total number of codes related to each social mechanism for each type of informal learning tie. Next, we counted the proportion of frequencies of the codes divided by the total number of all codes related to all social mechanisms for each type of informal learning tie separately.

Results

To what extent do professionals in the vocational sector form and maintain informal learning ties with different stakeholders?

Ego-network analysis shows that vocational professionals form an average of 19 informal learning ties with other professionals. Ties with stakeholders within the organization make up most of the personal learning network, only 13 per cent are stakeholders from outside the organization (4 per cent CoP members and 9 per cent external boundary crossers, see Table I). Blau's heterogeneity measure shows an average variety of 0.51 (1 is a perfect balanced variety and 0 means no variety), reflecting that professionals of the vocational sector have some variety in the composition of their learning network, but given the ego-network composition, this variety is not equally distributed over the type of ties.

The results of the ego-network analysis are reflected in our interview analyses. These results show that professionals in our sample experienced that learning through informal learning ties is part of their daily job. Moreover, professionals considered, next to reading, problem solving on the job, experimenting and learning from others as one of the most valuable informal learning activities, represented in the relatively large amount (19) of informal learning ties. Learning from others happened mainly in core teams. Professionals discussed their work, ideas and pedagogical challenges with their direct colleagues. Moreover, within their team, the policy of open classrooms generated a lot of feedback possibilities and opportunities to learn by observing others. This is reflected in a large amount of informal learning ties with team members. Learning in teams was reported as very valuable. Some respondents reported that the strong team culture has the side-effect, that teams became entities of their own. Five respondents reported that they were triggered to learn from external organizations through their visits in the context of internships. Five respondents were also autonomously engaged in external networks, mostly in the context of their own expertise. Six respondents were triggered to do a targeted search for experts to solve specific issues. One of the interviewees mentioned that he wanted to talk to experts

Type of informal learning tie	Total sample (<i>N</i> = 216)		Interview participants (<i>N</i> = 24)	
	Proportion of ties (%)	SD	Proportion of ties (%)	
Team members	36	0.27	39	
Manager	18	0.12	18	
Internal Boundary Crosser	36	0.25	6	
External Boundary Crosser	09	0.18	11	
CoP-member	04	0.07	13	

Table I.
Ego-network
composition (*n* = 216)

more but that he was not able to act on this because he was occupied with daily responsibilities. Two respondents searched online for solutions to concrete questions, often technical, like for example how does this program/device work. One respondent mentioned an expert weblog and two persons mentioned online training courses as interesting learning resources. Based on these findings we can conclude that professionals in our sample actively build up an ego-network by maintaining informal learning ties based on their personal needs, closely related to their own practice.

Which types of learning activities do professionals engage in through their informal learning ties?

Next, cross-case analysis suggests that a wide variety of learning activities are undertaken in the informal learning ties (Figure 1). Moreover, we find that professionals undertake different learning activities with different stakeholders. Ties with team members are most important for learning by actively doing things together, getting feedback, finding a role model, engaging in constructive conflict and getting new perspectives on the job. Learning ties with managers are vital for autonomy to learn, motivation for trying new things, and to learn from the manager as a role model. Learning ties with CoP members reflect the creation of shared history and being induced into the profession. External boundary crossing ties provide new perspectives, inspiration, and opportunities to reflect. These learning activities were also mentioned as important learning activities in other types of ties, but to a lesser extent. Internal boundary crossing ties were found most relevant for sharing new knowledge and getting critical feedback. Participants did not seem to leverage the full potential of boundary crossing ties. Akkerman and Bakker (2011), for example, describe a

Figure 1.
Learning activity for
different types of
informal learning ties

list of potential learning activities that may occur at boundaries, such as learning to implement hybrid solutions in practice or to create a space of mutual problem recognition across contexts. None of these informal learning activities were reported by the participants. Moreover, an account of actual change of one's own practice through confrontation with others was very limited.

What social mechanisms influence professionals' agency to form and maintain informal learning ties with different stakeholders?

We investigated to what extent the different social mechanisms (interpersonal trust, proximity, the norm of reciprocity, homophily and expertise) influenced each type of informal learning tie. We found considerable overlap in the social mechanisms that support the formation and maintenance of informal learning ties (Figure 2).

Interpersonal trust is an essential element to learn

Participants confided that they did not learn from professionals they do not trust. Trust is described as knowing that the person does what he says he will do, experiencing an atmosphere of open communication, being able to give feedback openly or discuss personal matters, the belief that the other person is competent and feeling respected by the other person. This reflects the well-known work on trust by Hoy and Tschannen-Moran (2003), who describe trust as the will to be exposed to another person based on the assurance that the other person is reliable, open, benevolent, competent and honest. An exemplary quote:

I know that if X is going to do something, he will do it well. I know he is willing to be accountable for what he does, and he also understands that I want to. And he will not do things that are in violation of the principles we have discussed together. In other words, I'm telling you that I can totally rely on X and if something is not going to go well, he will alert me. He takes up his role very professionally. (Don describing an informal learning tie with team member 1.1)

In contrast, four participants explained that trust was not completely in place when learning took place. In these cases, the process of building up a trust relationship was described as the learning experience, reflecting the search of how to understand each other, finding a way

Note: The proportion of frequencies is based on the total number of codes related to each social mechanism divided by the total number of all codes related to all social mechanisms for each type of informal learning tie separately

Figure 2.
Social mechanisms
that influence
informal learning ties

to set up a collaborative atmosphere and finding common ground. Interestingly, these informal learning ties are sometimes triggered by “forced” proximity. For example, a teacher with a coordinating role explained:

Now I learn a lot from her because we are in a room together and we do things together every day. She knows how I think and I know how she thinks. [...] Now I can trust her to do things. In the beginning, I felt I couldn't let her do things, but now I ask feedback because she has another perspective on things [...] It almost took a year for the both of us to trust each other, but now, we can't let go of each other anymore. (Maria describing an informal learning tie with team member 1.13)

Different types of proximity affect informal learning ties

Physical proximity made it likely to engage in learning with team members, often in the form of serendipitous learning opportunities during daily encounters (e.g. during coffee breaks) and opportunities to work side-by-side. While physical proximity also supported learning from managers and within-organizational boundary crossing, such proximity was more often formally organized (e.g. work meetings, project meetings). Professionals stated to be more inclined to learn from managers when working one-on-one on a particular work-related issue. Learning ties with CoP members were also described as proximal, but here, proximal often had a different meaning. The members of a CoP were not physically close, but the respondents recounted that they felt the mentioned CoP members from whom they learn, often described as mentors, were always close-by in their thoughts and reflections about how to do the job. Even though there could be a long period of time without actual contact, participants felt they could reach CoP members whenever needed:

X is a very important key person in my learning, I would feel lost without him [...] Sometimes I don't see him for more than a year, but that doesn't matter, I can call him whenever is needed. (Maria describing an informal learning tie with CoP member 3.3)

I hear their voices and advice often in my reflections on how to present myself to my students and in how I design my classes. (Paul describing an informal learning tie with CoP member 3.6)

Norm of reciprocity rules, but not if formal status is involved

Reciprocity was reported as an important social mechanism for informal learning ties with team members and for internal and external boundary crossing ties. Participants described the norm of reciprocity as based on a process of mutual appreciation. Mutuality is also described as a game of give and take with no feeling of hierarchy within the learning process. Moreover, mutuality made the learning process a fun experience:

We value each other's expertise and the way we share our expertise amongst each other. It feels very mutual. (Anna describing an informal learning tie with team member 1.6)

I am encouraged by him in my learning because he is so dutiful. And what he says in return is that he gets inspired by my energy and the way I talk about education and other subjects. (Suzan describing an external boundary crossing tie 4.1)

There is a real form of interplay that is fun. He comes to me and I go to him that makes it really fun. (Patrick – Informal learning tie with team member 1.17)

Reciprocity is far less mentioned as important social mechanism for the formation of informal learning ties with managers and CoP members. Managers and CoP members are seen more as experts or role models. This finding is in line with the idea that professionals

who have a formal or informal feeling of status are not inclined to actually play the game of give and take (Gouldner, 1960; Agneessens and Wittek, 2012).

Having a similar background was not considered important most types of informal learning ties

Most participants did not have a shared background with alter. Most participants did not explicitly mention any effect of different backgrounds. Three participants even mentioned explicitly that having a shared background did not really matter in the informal learning tie formation.

He also comes from the creative sector, once I even was his teacher, so there is a connection in background there. But still you need that personal connection. It is much more what he is working on [...] which was also my driving force to start this job in the first place. (Don - Informal learning tie with team member 1.1)

Personality influenced the formation of the informal learning tie in different ways

For informal learning ties with team members, five participants talked about the importance of complementarity. Complementarity is a relationship in which the personality of the respondent and the personality of the key learning source improve each other. As offered by one participant:

Complementarity is what you learn from. If you are completely the same, you will not learn. If you are the same, you will confirm each other and that is not the case now. Now you can be really critical. And then you learn. (Don – Informal learning tie with team member 1.3)

Contrarily, three participants talked about how much they resembled each other and how the resemblance stimulated their learning process:

We are almost the same, very human-oriented and innovative. I recognize myself. It really feels like boosting each other. (Victoria – Informal learning tie with team member 1.5)

Three other participants saw the personality of the other person in and of itself as driving the learning process. This was most often the driver for learning from managers:

He has something enthusiastic, youthful; he knows when to ask for a sense of proportion and when it is time to take action. (Anna – Informal learning tie with manager 2.3)

Uniquely for informal learning ties with CoP members, internal and external boundary crossers, more than half of the accounts on personality described how opposites attract within the informal learning ties:

It was an interesting process of opposite attract. You see the other person do things what actually irritates you at first, and then you reflect I will never ever do it that way. But then you witness the actual result [...] and you see that it actually works much better than your own approach and then you learn how to do it differently. (Ben - Informal learning tie with CoP member 3.5)

Moreover, a small number of codes (nine) related to having a “personal connection” as an important reason to form an informal learning tie. The personal connection is described as an intuitive feeling, a reason without specific explanation:

We just have this personal connection, sometimes it can be as easy as that (Bob – Informal learning tie with team member 1.16).

Shared values and shared identity reported considerably less

Five informal learning ties with team and two informal learning ties with managers were linked to shared values as an important social mechanism. Participants declared that

learning through constructive conflict with their manager was possible because they know they share the same values and goals:

We may collide and disagree, but it always turns out fine, we know we can find each other in our mutuality that we both love our jobs and that we want the best for the school (Victoria – Informal learning tie supervisor 2.2).

Valuing a colleague's expertise was important for informal learning ties with team members and external boundary crossers

Professionals build up interpersonal learning ties with team members who they consider an expert in the field. Professionals look for team members with complementary expertise to make it possible to get the job done. They mostly learn by actively doing things together on the job. For the boundary crossing ties, valuing the other persons' expertise was equally important to personality and reciprocity but far less mentioned as an important reason to form informal learning ties with professionals across boundaries. Expertise was considerably less mentioned as important social mechanism for the other types of informal learning ties.

Main conclusions and practical implications

By combining ego-network data of 216 professionals working in a vocational school with data gathered from 24 in-depth interviews, we sought to better understand the notion of networked individualism in the vocational sector. Our results show to what extent professionals form informal learning ties with stakeholders within, and outside their organization, and how they use these networks to engage in a wide variety of learning activities.

Summary of results

Networked individualism is not represented to its full potential in the vocational sector. Our findings support previous studies that professionals are most likely to form informal learning ties with colleagues who are close-by, working in the same team (Kleinbaum *et al.*, 2013; Lazega *et al.*, 2006; Patariaia *et al.*, 2014; Spillane *et al.*, 2012). Informal learning ties with managers are also well represented in personal learning networks. Professionals are prone to see managers as valuable informal learning ties (Cross and Parker, 2004). Informal learning ties that cross organizational boundaries are rather sparse in comparison to the other type of ties present in the personal learning networks.

Our findings may be explained by the fact that networked individualism implies that professionals have much autonomy in building learning networks with diverse stakeholders (Rainie and Wellman, 2012). A first important step could be to make professionals aware of their personal learning network and how they can leverage their network for learning and innovation (Cross and Parker, 2004; Schreurs *et al.*, 2014). Research on visualizing informal learning networks (De Laat *et al.*, 2014; Schreurs *et al.*, 2014) and recent work on network interventions (Cross and Parker, 2004; Van Waes *et al.*, 2015; Valente, 2012) could help practitioners to raise awareness on the untapped potential of professional's personal learning networks.

Networked individualism is needed to engage in a rich variety of learning activities. Most learning activities identified in earlier review studies are well represented in our data. Informal learning ties with team members are relevant for learning on the job by actively doing things together and solving *ad hoc* solutions. Team members are also seen as experts who have complementary expertise. Managers on the other hand provide the motivation,

space, and time to learn. CoP members were often mentioned to be role models and mentors. Boundary crossing was scarce, and the accompanying learning activities were restricted to gaining new perspectives and inspiration, thereby not fully leveraging the potential of these boundary ties. It may be that our respondents did not have the skills or were unaware of the possibilities to learn across boundaries. More research is needed to understand learning from boundary crossing ties and investigate how professionals can be trained to use these ties to their full potential.

Different types of informal learning ties build on specific social mechanisms to make it work. For learning with team members, professionals need balanced, trustworthy learning ties with access to expertise. The importance of access to expertise has been underlined by [Borgatti and Cross \(2003\)](#). They found that knowing the expertise of your colleagues is an important condition to seek for information and advice. Therefore, to stimulate informal learning tie formation among professionals, it could help to raise awareness of each other's expertise and knowledge areas. There are several tools available to surface expertise of professionals in organizations ([Schreurs and De Laat, 2014](#); [De Laat and Strijbos, 2014](#)). Furthermore, team members look for complementarity in personality to support learning. They actively search for balance by investing time to interact regularly and to build trust by creating opportunities for feedback. If they engage in constructive conflict, their shared values make it possible to transform the conflict into a learning experience ([Tagliaventi and Mattarelli, 2006](#)). Interpersonal trust is also essential for informal learning ties with managers. Professionals learn most from managers who are close-by, while working together in a one-to-one interaction in which they provide in-depth feedback and provide new perspectives to solve problems that arise in practice ([Warhurst, 2013](#)). Informal boundary crossing ties are also supported by trust, reciprocity, and proximity. Working side-by-side and in a balanced relationship makes it easier to transfer tacit knowledge and to enhance deeper-learning ([Hansen, 1999](#)). CoP members – in our study restricted to professionals who are related to the professional community of the organization (e.g. former colleagues, guest teachers)- are often referred to as mentors. Professionals build up a shared history and shared values with CoP members. Professionals are often – as a newcomer to the field – guided by CoP members and inspired to know what it means to become a professional in their specific domain or craft. The ties with their mentors are so strong they feel proximal all the time, although they are not physically present in day-to-day work. These descriptions are in line with the original theory on communities of practice of [Wenger \(1998\)](#). The only big difference with the theory of Wenger is the lack of emphasis on reciprocity or mutual engagement within the informal learning ties with CoP members. Possibly mutuality is embedded within their shared history as professionals explicitly state they have strong and long lasting informal learning ties with CoP Members.

External boundary crossing ties, although sparse, also build on trust, reciprocity, access to expertise and the personality of the professional involved. In contrast to other work ([Agterberg et al., 2009](#); [Tagliaventi and Mattarelli, 2006](#)) proximity was not frequently mentioned in relation to external boundary crossing ties. The increasing popularity of open learning spaces in education, where schools are opening up their physical building to external stakeholders to work and learn together, would be an interesting place to investigate the effect of proximity on the value of boundary crossing ties ([De Laat and Strijbos, 2014](#)).

Contributions to research and practice

Unique to our study is the large amount of personal learning networks under investigation, in contrast with previous research on personal learning networks with much smaller

populations (Patariaia *et al.*, 2014; Van Waes *et al.*, 2015). We confirmed earlier research that professionals are most likely to form informal learning ties with professionals close-by and who do similar work (Patariaia *et al.*, 2014). Moreover, we extended these insights with in-depth information on the different types of learning activities professionals engage in. By investigating the social mechanisms that shape informal learning ties, we know more how we can stimulate professionals to build rich personal learning networks.

Our results contribute to the long-standing debate on the balance between structure and agency in the formation of informal ties. Human agency is reflected in the motivation, will and free choice of professionals to form informal learning ties. We found evidence that professionals actively form informal ties to learn. For most informal learning ties, professionals take concrete action based on mutuality. Professionals actively formed informal learning ties with peers. This type of learning is perceived as “part of the job”. Moreover, professionals adjust their preferences depending on the type of tie. Different social mechanisms seem important for different types of informal learning ties. For example, for ties with team members professionals seek for expertise and complementarity in personality. For informal learning ties with external boundary crossers they seek more for opposite personalities to be inspired. However, this does not imply that professionals exercised full agency in the formation of informal learning ties. We found preliminary evidence for constrained agency (Gulati and Srivastava, 2014). Professionals often form informal learning ties within the contours of the formal organization. For example, organizational proximity makes it easy to learn from team members, but informal learning from direct supervisors and internal boundary crossers are mostly restricted to more formally organized events.

To understand more how professionals are constrained by other people in the formation of informal learning ties, future research could include isolates in their research to understand social mechanisms that prevent individuals from forming informal learning ties. Preliminary research revealed that professionals do not engage in the formation of informal learning ties because they feel unconnected to the larger group (Van den Beemt *et al.*, 2018). In addition, future research could investigate how professionals are constrained in forming informal learning ties by other professionals in the overall network with whom they are not directly connected (Borgatti *et al.*, 2014).

For example, in our sample, boundary crossing ties are not used to their full potential. Boundary crossing ties are not used for building a mutual space, or to change professionals’ own practice. This may be due to the tension that exists between the need for interpersonal trust to learn in informal ties and the need for frequent interaction to build up trust relationships (Moolenaar, 2012). To counter this tension, organizations could experiment with the setup of fast trust environments. Within these environments, opportunities could be created to build fast trust relationships (Smedlund, 2008). According to Smedlund (2008) and Blomqvist (2002), fast trust relationships are characterized by the ability of professionals to engage in short-term co-operation on short notice.

Moreover, this study sheds light on the role of reciprocity in the formation of informal learning ties. On the one hand, researchers argue that informal learning ties lack reciprocity due to a natural strive for status (Borgatti and Cross, 2003; Lazega *et al.*, 2006; Škerlavaj *et al.*, 2010). On the other hand, researchers claim that professionals put a premium on the value of resources rather than on status (Agneessens and Wittek, 2012). We found evidence for both perspectives. In relationships where status is indeed in place, like informal learning ties with managers or CoP members (who were described as mentors in our data) reciprocity is less prominent. However, for learning with peers, both in and outside the organization, professionals prefer to learn in a more stable, reciprocal environment (Hanneman and

Riddle, 2005). We also extended earlier research on homophily based on a shared background, similarity in personality, having a shared identity and shared values. This study invites future research on the role of personality on tie formation to take a multilevel approach to understand the full complexity of the role of personality in the process of tie formation.

Limitations and future directions

Several limitations with regards to the study's generalization need to be addressed. In our data, we explicitly asked for key learning people and not learning resources in general. As such, our study excludes learning through virtual learning resources, such as social media or expert forums. Moreover, we only included individual- and dyadic-level social mechanisms. Possibly, the fact that shared values did not surface as much as other social mechanisms in our data may be a result of excluding social mechanisms at the group/organizational level. Only for ties with CoP members shared values surfaced more as an important social mechanism, perhaps because the process of building shared values is a core process of CoP's. In contrast to having a shared background, where respondents explicitly stated that a shared background was not relevant for forming informal learning ties, shared values may possibly more implicitly present within the formation of informal learning ties on the group level, rather than explicitly on the interpersonal level (Siciliano *et al.*, 2017).

A second limitation of our study is that we did not investigate if characteristics of professionals, for example age or work experience, have an influence on professionals' agency to learn as networked individuals. In our sample, most professionals were older than 35 years. More research is needed to fully grasp the differences of how professionals act as networked individuals. For example, it is possible that professionals in different stages in their career need different types of learning activities. Future research could therefore investigate if professionals in the vocational sector change their ego- networks over time. Possibly, teachers form more informal learning ties with team members in the beginning of their career, and may look gradually outside the organization to stay up-to-date with innovations, resulting in a balanced network at the end of their careers. Because of the changing age structure of the workforce in vocational schools, it could be interesting to investigate how different generations of professionals working in vocational education build informal learning networks.

This study offers a valuable exploration of the overall eco-system of ties in a vocational school. While our case study approach made it possible to analyze rich data with a mixed-method approach, we acknowledge the need for large-scale empirical studies for enlarging the generalizability of our findings. A meta-analysis of different case studies in the vocational sector focusing on informal learning ties could support our findings. To conclude, dynamic network analysis could reveal more closely the causal relationship between the different social mechanisms and ties investigated. We know trust, proximity, and reciprocity are closely related, and affect the formation of informal learning ties, but only a longitudinal study can reveal the actual causal relationships.

Main conclusion

Vocational schools are complex eco-systems with different stakeholders closely related to the core processes of the school. A networked individualism perspective to investigate informal learning makes it possible to grasp the full complexity of the informal learning activities that professionals are engaged in. This holistic understanding will make it easier to support the formation of informal learning ties with all stakeholders needed to optimize the quality of the educational system. The results show that professionals from

the vocational sector form rather dense, homogenous networks with professionals close-by. These types of ties are important for deep learning, getting feedback, and actively doing things together. But professionals of the vocational sector may not yet use their personal learning networks to the full potential. As networking outside one's own organizations becomes an important competence for professionals in the 21st century, our study aims to make professionals and policymakers aware that professionals need skills to use their networks to the full potential. Professionals need to get support to learn the art of networking, to understand the potential of their networks, and to become aware that they can actively build a network in support of their own professional learning.

Note

1. In vocational education, young students from 12-22 and older can develop competences in specialized job fields through a combination of theory and work experience.

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Appendix 1. Interview questions

Questions

- Name three key people who are valuable for your learning around work related issues. You can name whoever you want, people from within your organization or beyond the borders of your organization.
- Can you describe a specific situation in which you have learned from Key person 1?
- What role did Key person 1 play in your learning? What was your role?
- Why did you choose this person as a key figure in your learning?
- Do you work together on a frequent basis?
- How would you describe the feeling of trust?
- Do you have a shared background? Does this shared background make learning from each other easier?
- Do you consider this person an expert in his/her field?

Forms of learning	Description
Share	Sharing knowledge, ideas and routines
Develop	Developing a shared practice
Build a shared Identity	Creating a shared identity of what it means to become a professional
Constructive Conflict	Being involved in a constructive conflict that results in a learning outcome
Work actively together	Learning by actively working together
Inspire	Give inspiration to learn new things
Motivate	Motivate to learn
Feedback	Provide information over one's previous behavior so that the person involved can react or reflect to adapt or change their behavior in the future
Advice	Advice Ask or give advice
Reflect	To think deeply about a work-related issue together
Discuss work related issues	Discuss work related issues
Facilitate	Removing Obstacles and/or providing resources to make learning possible
Setting new goals	proposes (together with) the respondent new goals
New perspectives	Gaining new perspectives in the light of the insights gained from another context
Ownership	The respondent receives ownership in the form of autonomy and/or involvement
Newcomer	The key figure introduces the respondent in the field
Profession	Expanding expertise in a particular field of profession
Cross-border work	Learn to work easily across different contexts
Modify practice	Customize the own practice in the light of the insights gained from another context
Hybrid solutions	Hybrid solutions developed together with the key figure implement in practice. Hybrid solutions are solutions that contain a close blend of elements from both different contexts
Shared space	Creating a space in which common thinking about shared issues from different contexts is considered
Shared space	Creating a space in which common thinking about shared issues from different contexts is considered
<i>Code: Social mechanisms</i>	Social mechanisms are social processes that take place or have taken place between the respondent and their alter that facilitates or does not facilitate the learning process
Trust	Trust means that the respondent is open to alter. The openness can be about the fact that he or she does not know everything, is open for improvement and change in his or her own practice, based on the feedback from the other person
Proximity	Proximity refers to proximity both in time and in space. The respondent indicates that he or she often collaborates with alter, they often speaks or sees this person. Proximity can also refer to physical proximity, for example sitting in the same room
Shared values	Shared values means that the respondent has the same values as alter. They consider the same as important, for example, having the same goals around the organization or profession
Shared identity	Shared identity means that the respondents believe that they are very similar and belong to the same group. The respondent and alter have built a common identity and only need a few words to understand each other

Table AI.
Codebook

(continued)

Forms of learning	Description
Shared background	The respondent and their alter share a common background and this helps in learning
Reciprocity	There is a reciprocal relationship. The respondent indicates that the other person also learns from him, that there is mutual engagement and that they are equal in the learning relationship. (no hierarchy)
Similarity in personality	The respondent describes the other person as similar to him or her and this similarity facilitates the learning process
Opposites in personality	The respondent describes the other person as dissimilar to him or her and this dissimilarity facilitates the learning process
Complementarity in personality	The respondent describes the other person as complementary to him or her and this complementarity facilitates the learning process
Search for specific expertise	The respondent learns from alter, based on the specific expertise of alter

Table AI.

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