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The networking teacher in action: A qualitative analysis of early career teachers' induction process

Virginie März [a, *], Geert Kelchtermans [b]

[a] Interdisciplinary Research Group in Socialisation, Education and Training (GIRSEF), Université catholique de Louvain, Place Cardinal Mercier 10, bte L3.05.01, 1348 Louvain-la-Neuve, Belgium
[b] Centre for Innovation and the Development of Teacher and School, KU Leuven, Dekenstraat 2, box 3773, 3000 Leuven, Belgium

HIGHLIGHTS

- We describe the evolution of ECTs' support network during their first school year.
- ECTs' school-internal support networks stabilize quickly over the course of the school year.
- School-external and non-professional support networks fulfill an important role in the process of teacher induction.
- ECTs are in need for knowledge exchange with their more experienced colleagues.
- ECTs struggle with their positioning as a newcomer at their school.

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1. Introduction

The transition from teacher training to the teaching profession has been amply documented as a particularly challenging career phase for teachers (e.g., Avalos, 2016; Feiman-Nemser, 2001; Ingersoll & Strong, 2011; Kelchtermans, 2017; März, Kelchtermans, & Dumay, 2016). Early Career Teachers[1] (ECTs) have often characterized this transition as "lost at sea" or "sink or swim" experience (Flores & Day, 2006; Stokking, Leenders, De Jong, & Van Tartwijk, 2003). This transition has been reported in terms of a "reality shock" (Veenman, 1984) and explained by the fact that the expectations developed during initial teacher training often do not correspond to the full reality of the workplace (Lortie, 1975; Melnick & Meister, 2008). As a result of this reality shock, many ECTs leave the teaching occupation within the five first years of teaching (Darling-Hammond & Sykes, 2003; Dupriez, Delvaux, & Lothaire, 2016; Ingersoll, 2003). To prevent early teacher attrition, the need to provide particular support for ECTs has become widely accepted in educational policy, practice, and research over the past three decades (Hobson, Ashby, Malderez, & Tomlinson, 2009). In most cases, the support implies a form of mentoring, including the pairing with a more senior teacher who will transfer knowledge, advice, values, and beliefs to the novice teacher (Kemmis, Heikkinen, Fransson, Aspfors, & Edwards-Groves, 2014).

Multiple studies have illustrated the crucial role of formal induction programs and mentoring in overcoming the difficulties of the career start and to keep ECTs in the profession (Feiman-Nemser, 2001; Heikkinen, Wilkinson, Aspfors, & Bristol, 2018; Smith & Ingersoll, 2004). Though well intended and relevant, the emphasis on formal and structured support for ECTs has moved away the researchers' attention from the more informal, collegial interactions that have been found relevant for the way ECTs experience their induction phase (Baker-Doyle, 2011; Fox, Wilson, & Deaney, 2011). Inspired by social capital theory, a number of authors therefore recently started to look into the specific role of informal support in the way ECTs experience the induction process (Fleming, 2014; Kelchtermans, 2019; Smith Risser, 2013; Ulvik & Langørgen, 2012). For example, Smith Risser (2013) emphasized the fact that "there may be multiple experienced teachers in a novice teacher's social circle that provide advice and support" (p. 25). More systematic research is nevertheless required to better understand the particular role of informal support networks for teacher induction. Or following Baker-Doyle (2011), we learn that "much of this research has been focusing on the efficacy of mentoring and induction programs. . . . However, the reverse

* Corresponding author.
E-mail addresses: virginie.marz@uclouvain.be (V. März), geert.kelchtermans@kuleuven.be (G. Kelchtermans).

[1] By Early Career Teachers or ECTs, we refer in this article to teachers who have less than five years of teaching experience in general. Often also referred to as novice or beginning teachers.

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perspective on induction programming has rarely been investigated—that is, who, and what do new teachers seek for support?" (p. 42).

Joining this recent trend, our study starts from the premise that ECTs not only enter as recipients of formal support structures, but at the same time function in informal support networks. More specifically, this article uses ECTs' perspectives in order to understand how they experience this induction period and what kind of informal support relationships they seek. Using a longitudinal single case study design, we unpacked ECTs' identity and network formation at different moments in time during their start at a new secondary school. This study offers new insights regarding early career phase teachers' work life, teacher induction, and the relevance of novice teachers' social relationships for their own professional development as well as school improvement in general.

2. Theoretical framework

To conceptually grasp ECTs' informal support networks, we combine a social network perspective with sense-making theory, more in particular the notion of personal interpretative framework.

2.1. Social network perspective

Understanding with whom ECTs interact, the content of these interactions as well as the factors affecting these, are crucial for an in-depth understanding of ECTs' induction process. Inspired by the research of Baker-Doyle (2011), Fox and Wilson (2008, 2009, 2015), and Smith Risser (2013), we therefore use a network perspective to get access to and disentangle ECTs' informal support networks. Rather than explaining social phenomena in terms of individual attributes, social network theory focuses on the system of social relations within which the phenomenon is embedded (Borgatti & Ofem, 2010). Drawing upon this network perspective, we look at teacher induction as a social process, involving interactions with others through which the ECTs finds or creates a position within the school organization.

Social network theory foregrounds individuals' attitudes and behavior as affected by the social structure(s) in which they find themselves (Fox & Wilson, 2015). Social network theory frames these social structures in terms of nodes and ties (Borgatti & Ofem, 2010). Whereas nodes symbolize the individual actors within the networks (such as people, groups, or organizations), ties are the relationships between these actors. These ties can represent friendship relationships, kinship, knowledge exchange, etc. As such, a social network is a map of all the existing relationships between the actors under investigation. Social networks moreover produce social capital: being part of a relationship, provides the actors with a wide range of possible resources, like help, support, or even a sense of well-being (Lemke & Sabelli, 2008; Nardi, Whittaker, & Schwarz, 2000). For instance, the exchange of knowledge within networks has been identified as contributing to the professional development of individual teachers (Datnow, 2012; Little, 2005). Through professional interactions and networks, teachers can learn from each other, transfer information, and get access to knowledge and social support (Coburn, Russell, Kaufman, & Stein, 2012). With regard to ECTs' social networks, previous studies have documented how relationships matter for gaining access to needed knowledge and information regarding the subject matter, pedagogy, curriculum, or the functioning of the school organization (Baker-Doyle & Yoon, 2011; Fox & Wilson, 2015). Social network theory uses different network measures to characterize the social networks. Inspired by qualitative social network studies (Coburn & Russell, 2008; Crossley, 2010; Tubaro, Ryan, & D'Angelo, 2016), this study focuses on the type of actors within ECTs' support networks (with whom?), the frequency (how often?) and the content (about what?) of these interactions.

2.2. Personal interpretative framework

In order to give voice to how ECTs give meaning to their induction into the teaching profession, we draw upon the notion of the personal interpretative framework (as developed by Kelchtermans, 2009). The personal interpretative framework helps us to study ECTs' feelings, motivation, and perceptions of their work, as well as their general educational perspectives related to teaching and learning. ECTs' personal interpretative framework will give us insight in the reasons why they interact with certain people and not others, and how the structure of the support network changes. More specifically, the personal interpretative framework can be described as the "set of cognitions, of mental representations that operates as a lens through which teachers look at their job, give meaning to it and act in it" (Kelchtermans, 2009, p. 260). Within this personal interpretative framework, two interconnected domains can be distinguished: teachers' professional self-understanding and their subjective educational theory.

Professional self-understanding refers to how teachers see themselves as teacher, their sense of self or identity. These self-representations are dynamic and biographical, and as such need to be seen as both product and process, that is, as "the understanding one has of one's 'self' at a certain moment in time (product), as well as the fact that this product results from an ongoing process of making sense of one's experiences and their impact on the 'self'" (Kelchtermans, 2009, p. 261). The professional self-understanding is further constituted by five components: self-image, self-esteem, task perception, job motivation, and future perspective. Self-image describes the way teachers typify themselves. This image is the result of both self-perception and what others (e.g., pupils, colleagues, school principal, etc.) mirror back to them. Self-esteem reflects how teachers evaluate their actual job enactment. Teachers' task perception refers to their normative understanding of their job, more in particular of what they should consider to be their duties and responsibilities in order to have a justified feeling of doing a good job. Next, job motivation includes what made somebody choose to become a teacher, stay in the job, or give it up for another career. Finally, future perspective refers to a teacher's expectations about his/her future in the teaching profession.

The second domain, teachers' subjective educational theory, can be described as the personal system of knowledge and beliefs about education that teachers use when performing their job (Kelchtermans, 2009, p. 263). It refers to teachers' professional knowhow, as developed during pre-service and in-service training, as well as the beliefs they have built throughout their career. It is the personal response of teachers to the question: How do I best tackle this situation, and why is this the best approach? Based on their experiences, teachers construct their own personal interpretative framework through which they observe, interpret, and evaluate their professional situation (Kelchtermans, 2009).

3. Methodology and methods

We aimed to obtain in-depth descriptions of the formation and evolution of ECTs' support networks by taking into account ECTs' social relationships and their personal interpretative framework. The following research questions guided our study:

RQ1: How do ECTs' support networks evolve during the induction phase?

RQ2: How do ECTs make sense of the evolution of their support networks during the induction phase?

3.1. Case study

Since we wanted to obtain an in-depth description and understanding of ECTs' support networks during their start at a new school, we used a qualitative-interpretative methodology (Bryman, 2008). More specifically, we employed an embedded single case study design (Baxter & Jack, 2008; Yin, 2014). In particular, we followed the induction process of six ECTs in one school (Springfield, pseudonym) during the 2013–2014 school year. The in-depth, longitudinal, and contextualized approach in one school provided the opportunity to not only capture the individual ECTs' experiences, but also study the role of their situatedness in a particular organizational context that was the same for all ECTs.

Springfield is a secondary school located in a municipality in the north of the country (Flanders, Belgium), enrolling 1200 students supported by a team of 220 teachers. The school provides the first, second, and third stages of general, technical, and vocational secondary education. We purposefully selected Springfield, because of two reasons. Firstly, Springfield's school culture can be characterized by mutual support and an explicit advocacy and caring ethos towards novice teachers. Providing appropriate guidance and advice to novice colleagues is perceived as an important value at Springfield. Secondly, this particular attention to ECTs was also reflected in Springfield's elaborated formal mentoring program. Springfield has an active mentoring and induction policy, illustrated by a detailed manual for ECTs and the presence of four staff members who operate as formal mentors. They organize intervision meetings, information sessions, and one-to-one meetings with the ECTs. As such, the particular context of Springfield provided a theoretically interesting context to analyze and understand the value and role of ECTs' informal support networks, against the background of a school with a strong formal support structure.

As case study participants, we selected all the ECTs (N = 6) that had started their first full year at this school and that had less than five years of teaching experience in general (Table 1). This allowed us to capture in sufficient detail the subtle process of ECTs' network formation during induction as well as their personal interpretative framework.

3.2. Data collection

Data collection entailed a document search, the use of social network diaries, and semi-structured interviews (see Table 2).

First, in order to understand the school's induction policy and mentoring program, we collected relevant **documents** related to Springfield's policy on human resource management, teacher professional development, and induction and mentoring. Furthermore, we interviewed one of the formal mentors (i.e. mentor coordinator) as well as the principal (lasting between 60 and 90 minutes each).

Second, we combined social network data (i.e. sociograms) and semi-structured interviews. The network data were used to support the semi-structured interviews. Following Tubaro et al. (2016), we believe that "the narratives and the sociograms combined together provide insights not only into how networks are composed now but also how they have changed over time" (p. 7). We gathered **qualitative social network data** to document the ECTs' social network formation and its evolution during their induction phase. In particular, the collection of qualitative social network data enabled us to study the structure of ECTs' support networks and the content of their interactions (Crossley, 2010). Since the research questions were focused on ECTs' voices and lived experiences, we deliberately opted for an egocentric network approach. More specifically, the ECTs were asked to keep a record of the people with whom they interacted about teaching- or school-related issues (i.e. enabling their induction), together with some details on those interactions (Borgatti & Ofem, 2010; Fox & Wilson, 2015). This egocentric approach allowed us to map ECTs' support networks without imposing or overemphasizing the formal structures or boundaries (such as mentoring relationships, grade, discipline, subject matter, or school-internal structures) within which ECTs are positioned (Coburn & Russell, 2008; Reagans & McEvily, 2003). In order to avoid bias as a result of memory recall and with the aim of collecting data that were as complete as possible, we decided to use a network diary. In particular, the six ECTs completed a pre-structured network diary for their interactions during one school week (Annex 1); they did this four times over the period of one school year (below referred to as Social Network Analysis – SNA 1, 2, 3, and 4). More specifically, the ECTs were asked to write down the names of all the people with whom they have been in contact during that particular day of that week regarding teaching- or school-related issues. This included both contacts within the school (teachers, administrators, …) and contacts outside the school (fellow teachers, friends, family, …). Next, for each of these contacts they were asked to indicate the number of interactions they had, characterize the kind of interactions with that person (e.g., discussion, cooperation, advice seeking, friendship, etc.), and specify what this contact was about (e.g., lesson content, problem with students, lesson planning, pedagogy; Moolenaar, 2012; Tuomainen, Palonen, & Hakkarainen, 2012). In order to facilitate the visualization of each ECT's support network, we decided to use Gephi visualization software. Gephi permitted to map the different actors

Table 1
Overview of the early career teachers.

Name	Gender	Age	Educational background	Teaching experience (# years)	Program year	Teaching contract (# hours per week)
Bob	M	24	Professional Bachelor Lower Secondary Education	1	1B 3 & 4 Vocational Education	21 h (70-75%)
Hannah	F	35	Master Spanish-French Professional Bachelor Journalism Post-graduate Teacher Education	0	5 General Education 5 Technical Education 6 Technical Education	22 h (100%)
Emily	F	24	Master Bio-sciences Post-graduate Teacher Education	0	5 & 6 General Education 5 & 6 Technical Education	22 h (100%)
Lisa	F	27	Master in Philosophy Master in Religion Post-graduate Teacher Education	3	1, 3, & 4 General Education 4 & 6 Technical Education	22 h (100%)
Alice	F	25	Master in Languages: Dutch & German Post-graduate Teacher Education	2	5 General Education 6 Technical Education	22 h (100%)
Kris	M	23	Professional Bachelor Lower Secondary Education	1	5, 6, & 7 Vocational Education	22 h (100%)

Table 2
Overview of the data collection.

Date	Data collection activity
July 2013	School's mentoring and induction policy: Semi-structured interviews with school principal and mentor coordinator
September 2013	Social network analysis 1
	a) Network diary: September 16–20, 2013
	b) Interviews with ECTs: September 23–27, 2013
November 2013	Social network analysis 2
	a) Network diary: November 4–8, 2013
	b) Interviews with ECTs: November 11–15, 2013
January 2014	Social network analysis 3
	a) Network diary: January 13–17, 2014
	b) Interviews with ECTs: January 20–24, 2014
March 2014	Social network analysis 4
	a) Network diary: March 10–14, 2014
	b) Interviews with ECTs: March 17–21, 2014

in our ECTs' networks as well as the number of interactions. Based on these network visualizations (i.e. N = 4 network visualizations per ECT; Table 2), we were able to map the formation of the support networks as well as how these networks evolved during the course of one school year (Annex 2-5).

Because of our interest in understanding the process of teacher induction, the ego network visualizations were embedded in face-to-face **semi-structured interviews** with our six ECTs. These visualizations presented them with information about the support networks in which they function, thus "shifting their role from being observed to becoming observers" (Molina et al., 2014, p. 310, as cited in Bellotti, 2016, p. 4). The use of network visualization as a prompt for the interview helped the ECTs to remember the people with whom they interacted, and to stimulate the discussion about the role of support networks during induction (Hogan, Carrasco, & Wellman, 2007). As such, discussing these sociograms together with our ECTs enabled more comprehensive insights in their support networks (Tubaro et al., 2016). More specifically, during the four subsequent visits to the school (after each network diary completion), we interviewed the ECTs using the same set of questions (N = 24 interviews, lasting between 60 and 90 minutes each). This allowed us to reconstruct and explore the nature of the support networks, including the type and content of interactions; as well as reflect upon how and why these support networks changed during the school year. The interviews with the ECTs consisted of three parts. In the first part, we asked questions regarding their perceptions of themselves as a teacher, aimed at reconstructing their professional self-understanding and subjective educational theory. It further helped us to identify ECTs' challenges, how they perceived their position within the network of the school, and how their induction needs evolved. During the second part of the interview, the ECTs were presented with their network visualization and asked to systematically reflect and comment on it, exploring why they interacted with some people and not others. Listening to the ECTs as they were confronted with the network visualization(s), provided insights into how they explained their support networks and their evolution (Fox & Wilson, 2015; Tubaro et al., 2016). The interview ended with questions on how ECTs experienced the formal induction and mentoring program in their school over the course of one school year. This helped us to understand if and how their induction and mentoring needs evolved during the first year in a new school, both in relation to the formal and informal support networks in which they functioned.

3.3. Data analysis

The interviews were all audiotaped, transcribed verbatim, and interpretatively coded. The interview responses were examined and coded by the first author. Specifically, "content analysis" was used for the data analysis: reduce data, show data, draw conclusions, and verify (Miles & Huberman, 1994). The transcribed protocols were divided into text fragments and coded through strategies of open and axial coding (Strauss & Corbin, 1990). First, during the process of open coding, we assigned initial codes to the data, labelling the issues addressed in the text fragment. Next, based on comparison and relationships among the open codes, we grouped them in broader categories of codes (axial coding). As additional transcripts/texts were coded and discussed, we were able to further refine the list of codes. For example, codes were assigned to characterize ECTs' self-image (e.g., being a classroom teacher/a colleague/a subject matter expert), professional needs (e.g., classroom management/differentiation/collaboration with others), the type of interactions they engaged in (e.g., question oriented/supply oriented; subject matter interactions/personal conversations), etc. Once completing the coding, we conducted a vertical analysis for each individual participant, followed by a horizontal analysis. In the horizontal analysis, we compared the findings for the different participants (principal, mentor coordinator, and the six ECTs) for systematic similarities and differences (Miles & Huberman, 1994).

3.4. Ethical considerations and methodological quality

Participation in the study was entirely voluntary. All the participants received an information letter enabling them to make an informed decision about whether to take part in the study or not. Informed consent was obtained for every interview and participants knew they could stop the recording of the interview at any time, or —more generally— even withdraw as participant. None of them withdrew from the study. Detailed information on the storage and use of the data was provided and confidentiality and anonymity were guaranteed. The interview data were anonymized and the results of this study were reported without compromising the identities of the participants (using pseudonyms).

During data collection and data analysis, different strategies were used to ensure the trustworthiness and accuracy of the findings: triangulation of data sources, peer debriefing, and member check (Creswell, 2003; Strauss & Corbin, 1990).

Firstly, the study's results are drawn on multiple sources of information. We used methods triangulation by combing document analysis, network data, and semi-structured interviews. For instance, the network data and visualizations were complemented with in-depth interviews, during which we had the chance to test preliminary interpretations and probe for more information if necessary. Triangulation of sources was achieved by interviewing not only the ECTs, but also the formal mentor coordinator and

principal. The combination of perspectives enabled us, for instance, to have a more complete understanding of the (in)formal support measures implemented in the school. The cyclical process of data collection and data analysis (reading, interpreting, and checking) as well as the use of different data sources confirmed saturation. In the analysis, we focused on identifying and understanding patterns and mechanisms of ECTs' induction process and the meaning of their support networks. The ultimate goal of the study was to further conceptualize and theorize the experience of teacher induction and as such reached beyond the empirical and experiential cases of the concrete participants.

Secondly, the fact that multiple researchers (authors, assisted by student-researchers) were involved in the process of collecting and analyzing data, helped strengthen the integrity of the findings. Three researchers analyzed the transcripts in their entirety and coded the transcripts, which helped to establish data trustworthiness and credibility (Creswell & Miller, 2000). Preliminary interpretations were checked during the interviews, but also during meetings of the research team in a process of constant comparative analysis (Strauss & Corbin, 1990). In line with the principle of reflexivity (Creswell, 2003), we critically interrogated each other as team members on possible biases, white spots or unwarranted conclusions, making sure all conceptualizations were properly grounded in the data. The researchers' extensive experience with doing qualitative research through interviews, their deep acquaintance with the 'life in schools' and the Flemish educational system, their "general cultural understanding" (Radnor, 2002, p. 49) of teachers' work lives (partly because of former research) all contributed to the trustworthiness and validity of the analysis and findings. The researchers' actions and their possible influence on data-collection and analysis were thus a constant concern and were systematically addressed in the team meetings (Creswell, 2013).

Thirdly, the fact that data were collected through multiple moments throughout one school year, and that each new data round started with a reflection on the results of the previous one, member check was implemented. Thanks to this, we were able to check the accuracy of our findings with the participants across the stages of our interpretation and our evolving theoretical model.

4. Results

We present our findings, structured according to our two research questions. Firstly, we give a narrative description of the structure of ECTs' support networks as well as how these evolved over the course of a school year in a new school. Secondly, we describe how the evolution in ECTs' support networks could be explained by ECTs' personal interpretative framework.

4.1. ECTs' support networks: beyond the mentor-mentee relationship

Based on the data analysis, we identified how ECTs' **school-internal networks** stabilized quickly and how the formalized support networks were complemented by informal networks inside the school. At **SNA1** (September), three weeks after their very start in the school, the six ECTs depicted large and diverse networks, involving numerous, but superficial interactions with a wide and varied group of colleagues to meet their diverse needs. For instance, in the first weeks the number of interactions the ECTs had with the same person was rather low (usually one or two) and most of their interactions occurred with colleagues from other grades and other subject fields. Being new to the school, they were trying to navigate within the school organization and resolve administrative issues; therefore they contacted many different people for practical information and support. They tried to understand the organizational routines and the way things were working at this school. For that purpose, they looked for non-subject-related support from a variety of colleagues. This explains why their subject department colleagues were not the only, nor even the prominent actors in their networks. More in particular, their peers —i.c. the other novice colleagues appeared very prominently in SNA1. Emily, for instance, described her relationship with another ECT as follows:

> "Even though she is teaching French, a completely different subject than I teach . . . we tend to rely on each other. Whenever we run into each other, we will sit down to chat. For the professional development day tomorrow, we have registered for the same workshops. She is a little bit older than me, she also has two children . . . But that's not an issue, because we are both in this together [as ECTs]."

Because they were facing the same challenges, their novice colleagues were perceived as allies in their exploration and navigation of their school. At the start of the school year, the formal mentors had, maybe surprisingly, a less visible position within the ECTs' networks. The content of the interactions ECTs had with these mentors was mostly centered on technical issues or practical difficulties in dealing with students, the communication and collaboration with parents, or pedagogical skills. Similarly, interactions with other leaders, such as the school principal or ICT-coordinator, were less frequent and sometimes even actively avoided for strategic reasons. For instance, Bob replied: "[As an ECT], you don't need to have a lot of contact with the administrators. Actually, it is better to have as little contact as possible. Otherwise you are seen as not doing your job properly, I think." The ECTs avoided reaching out to school administrators, because this could be interpreted by them as lack of independence or professional competencies.

SNA2 (November) showed a reduction in the network size. The number of interactions with a wide range of different colleagues was lower and the number of superficial contacts (i.e. only one or two interactions) was decreasing. At this point, their interactions with subject field colleagues were becoming more frequent (more recurring interactions). This shows how their professional interests and needs were gradually shifting from general concerns with the operation of the school as a whole to issues at the level of their classroom or the functioning of their subject department. As Hannah, for instance explained: "You also look at your own subject department. In any case, these are the people you will depend on for exchanging materials, data, and for advice." While in SNA1 the ECTs were trying to unravel the practical organization within the school, this exploration was replaced by more focused interactions relating to finding one's place within the boundaries of subject departments in SNA2. So, while in SNA1 they stressed the similarity with the other ECTs (them being in the same organizational position), SNA2 showed how they started to identify more with the colleagues from the same subject department, indicating that their self-understanding as teacher of a particular subject, became more prominent than their self as a novice teacher. The number of interactions with the formal mentors remained low. However, this does not mean that the mentors were not relevant or supportive, but the ECTs indicated that they preferred to first contact other peers in their (more subject-related) network. The mentor was perceived as a possible last rescue when the network did not provide the necessary resources. Lisa, for instance, mentioned:

> "Maybe I am not a good participant for your study, because I actually ask very little from my mentors . . . For the daily activities or questions . . . you just do not go to your mentor for every little thing. You talk to those who are really physically around or in your neighborhood."

Kris also referred to the limited exchanges he had with the formal mentors:

> "Yes, I see them [mentors] in the lunchroom now and then, and they say hello and they will ask how things are going. But, they are mainly responsible for the workshops or meetings they organize. I try to attend these sessions, but apart from that, no, they do not have an immediate influence . . . I actually have little contact with them."

During **SNA3** (January) and **SNA4** (March), we identified how the observed trend continued and the networks of the ECTs were stabilizing. The networks showed increased and recurrent interactions with colleagues from the same subject department and grade-level. The data from SNA3, clearly indicated that the ECTs had established their own relevant network within the school, smaller in size and related to their interests and needs, and characterized by more intense relationships. The core people within their support networks were grade and subject department colleagues as well as other ECTs. Alice, for instance, mentioned the relevance of subject matter colleagues: "Yes, in any case, mainly subject matter colleagues. I think you should have a very good relationship with your subject department members. Because sometimes you teach in parallel with them, and as such they can be relevant to collaborate with." Other ECTs played a crucial role regarding support for all kinds of organizational issues. They saw the organization through the same lens, feeling they all were facing the same challenge of learning to fit in or deal with the same implicit routines, traditions, and habits. Emily described this as follows:

> "If things have gone less well, she is like 'And, how are you?' and then she says 'Come on! We can do it' and that means a lot, it helps. We give each other some suggestions on how we can do it."

Because the mentors were not always subject matter colleagues, but worked in other domains and other grades, they were perceived by the ECTs as less functional or helpful for these issues. Hannah explained:

> "Why do they not give me a mentor with whom I teach at least some courses in parallel or on the same topics? My mentor does not teach at all in the 5^{th} or 6^{th} year, she works in the 3^{rd} and 4^{th} year. So, I think if they want to assign mentors to us, they'd need to select someone who really teaches the same course, or in the same grade."

According to our participants, the mentor's advice was not always attuned to their particular (situated) and evolving needs and interests. For that support and guidance, they preferred to contact colleagues from the same grade or who were teaching the same topics. The number of new people appearing within their networks at SNA4 was very limited.

Furthermore, the data illustrate the relevance and particular role of **school-external networks** in ECTs' induction process. The ECTs did not only function within school-internal networks, but also actively searched for support in their networks outside of their school. More specifically, the data analysis showed how other school-external actors appeared as sources of knowledge and support for our ECTs. In particular, they regularly reached out to or were contacted by (instructional) coaches, their former teacher educators, or classmates from teacher education. Bob (SNA1), for instance, referred to his interactions with the (instructional) coaches:

> "The (instructional) coaches for our subject . . . Actually, they also play a very important role . . . I only have one coach for my two teaching subjects and he gives a lot of advice on how to apply certain methods or to develop course materials."

Apart from (instructional) coaches, the former teacher educators also appeared very often in our ECTs' networks. After graduation, many of them stayed in touch with their teacher education institute for questions with regard to their subject matter or pedagogy. Kris (SNA2) explained:

> "With my former peers [teacher training], I still have regular contact . . . In fact, if I have a question, regarding theoretical or didactical issues, they help me out . . . We speak on Facebook. We e-mail, we occasionally exchange stuff."

Moreover, all of the ECTs referred to the important role of family members and friends, even when they did not have a teaching background, in helping them to survive their first year at the school. Kris (SNA2) referred to the relevance of interacting with his uncle, who had been a school principal:

> "My uncle has been a school principal of a high school. So sometimes, when I have issues . . . such as administrative questions regarding my salary or my teaching schedule, I contact my uncle 'How about that? Is that right?' . . . Outside the school's network, I also still have contact with my peers from teacher education. If I have a question, I can certainly ask them for help. Also one of my friends, who is a teacher as well, is someone that I regularly contact."

Emily (SNA 1) talked about the support she received from her partner:

> "So that's my partner. With him, I talk a lot about what I've experienced during my day at work . . . Yes, I see him every day and I tell him everything about what I have been through, how my day has been . . . Even though he is not a teacher at all, because he is in IT, he helps me to feel better at the school."

4.2. ECTs' personal interpretative framework: from being a classroom actor to becoming an organizational member

In analyzing the content of the ECTs' interactions, we were able to observe how our ECTs' interests and needs were multiple and gradually broadened from a focus on their functioning at classroom-level to including also more school-level issues.

During SNA1, 2, and 3, the ECTs mainly identified themselves in terms of their duties and actions in their classroom. When talking about the "ideal teacher", for instance, they emphasized the importance of being a subject matter expert and being able to motivate their students. At that point in their work life, the ECTs' self-esteem depended strongly on how they were perceived and appreciated by their students. In talking about their personal interpretative framework, it became clear that their students operated as "significant others". Lisa (SNA3), for instance, stated that the ideal teacher could be described as being an expert in his/her field and as being liked by students:

> "Someone who first of all knows the teaching job very well and is very enthusiastic about the subject, so he/she can translate it to the students, in a way that they can also become enthusiastic

about that subject or at least be able to see why it is interesting . . . But I think the main thing is being a teacher who likes his/her students and knows his or her field well."

This classroom-centeredness was also visible when the ECTs described the main difficulties they had been facing during their first months at Springfield. During SNA1, 2, and 3 the ECTs mainly referred to challenges and issues situated at the classroom-level. In other words, a big part of their self-image and feelings of self-esteem seemed to be determined by what was happening during the lessons and the respect they received from their students. In other words, during the first months at Springfield, the ECTs tended to function primarily within the walls of their classroom. Their developing professional self-understanding and subjective educational theory were largely influenced by and depending on their experiences with the students in the classroom. This was also visible in the content of their interactions, which focused on classroom-level issues such as classroom management, subject matter expertise, or their pedagogical content knowledge.

Between January and March (SNA3/SNA4), we started to observe a widening of their professional self-understanding and subjective educational theory. In talking about their task perception, self-esteem, self-image, their challenges, or in describing their ideal teacher, we learned how their classroom-level focus gradually broadened to include issues at the level of the school as an organization. By the end of their first year at Springfield, the ECTs no longer saw themselves only in terms of their classroom tasks, but started to see themselves as actors within a bigger structure. After having survived the first months, they were getting more aware of the organization within which they are functioning. They gradually learned to navigate within the school and understood how the school was characterized by many informal rules and routines as well as collegial and collaborative relationships; something they indicated not having been trained for during teacher education. Lisa (SNA3) said:

"There are a lot of problems at the moment in our subject department and for some reason –I actually get along very well with everyone– I feel like being in the position of Switzerland, opting for the neutral position in conflicts . . . I think that as a new person in the school it is nice not to have a history with people and therefore to be able to communicate and engage with everyone . . . But we were not prepared for these issues during teacher training . . . not prepared for working in a subject department or so."

Emily (SNA4) noticed, for instance: "My image of being a teacher changed the last months. I came to realize that you really have many administrative tasks as a teacher . . . These are all tasks that are added on top of your teaching responsibilities."

The ECTs also explained how they tried to fit within their school organization and how they invested a lot of energy in building their social networks. At this point, the group of significant others expanded from their students to also include their colleagues. Apart from the importance of receiving the respect of their students, they were searching for a sign of social recognition from their colleagues. The relevance of feeling accepted and appreciated as colleagues was furthermore visible in the importance they attached to informal, non-teaching conversations. This implies having the opportunity to develop collegial relationship in which jokes, gossip, or information about their private life (family, hobby, …) could be shared. In analyzing the content of ECTs' interactions, we observed that many interactions with other teachers at their school did not focus on work-related topics. Alice (SNA3): "We talk about our boyfriend, our relationship . . . So you can say that we have become friends . . . They [other ECTs] don't have an influence on my way of teaching. But they all help me to feel good at school." Emily (SNA4) expressed a similar view:

"I have noticed that my colleagues are showing more openness towards me. I feel a little bit more comfortable when I sit at the lunch table and my colleagues start talking to me and share stuff. For instance, when they talk about things at home and not only about school issues, then you realize 'ah, okay' . . . This shows that they appreciate me because otherwise they would not share that."

Finally, their sense of belonging and being an organizational member was also determined by whether they were able to share their knowledge and expertise with colleagues. We observed that in the second semester some ECTs started to have troubles with being labeled as "newbie". Being a novice teacher at the school at first helped them to navigate within the landscape of formal and informal rules at Springfield. Being new at the profession and school, they felt allowed to make mistakes and ask questions. But at a certain point (second semester), some ECTs referred to the fact that they no longer wanted to be exclusively labeled as being a novice teacher. They explained their need to participate in the school's decision-making processes, share their expertise, and give something (i.e. knowledge, expertise) in return to their colleagues instead of only receiving support. They wanted their voice to be heard, to receive respect, and to be recognized by their peers as knowledgeable others. Hannah (SNA4), for instance, referred to this need for two-way interactions as follows:

"I try hard to give a lot of input to my subject matter colleagues, such as 'Look, I also found something'. Now I developed – I believe – a very clear activity for the exam in the fifth year. Valérie responded with 'Wow, very clever idea! We can certainly do something with this.' I am also someone who really tries to do her best to belong to the school, not to be a parasite, not just relying on the efforts of others . . . I mean, I want to try to contribute. I have the impression that if you do that, that your colleagues will appreciate you more."

The ECTs described it as a confidence booster when other (senior) teachers asked for their advice and help. Nevertheless, the results also showed that – except for their novice peers – the ECTs were not often approached by their colleagues for their expertise. Their colleagues were not always very receptive to the new ideas of the novice teachers (see also Kelchtermans, 2019). The data indicate how the ECTs' social networks can be typified as transmission-oriented and unidirectional: ECTs mainly received/sought help from colleagues. When interacting with more experienced colleagues, these collaborations were focused on the ECTs' further professional development. The ECTs mentioned few initiatives at the school-level allowing them to make their expertise and knowledge available for other colleagues. They encountered few opportunities at school-level to be involved in the collaborative exchange of experiences and insights.

5. Conclusion and discussion

In this final section of the article, we will summarize the main results in line with existing research, present two theoretical implications, and give suggestions for future research.

5.1. Summary

We started this article wondering about how ECTs' lived experiences at their start within a new school, would offer new insights into understanding their induction process. We noticed within teacher induction research a tendency to focus on formal support structures. Combining the notion of personal interpretative framework with a social network approach, we therefore aimed to obtain in-depth comprehension into ECTs' informal support networks. On the one hand, the social network perspective allowed us to describe the structure of ECTs' support networks, going beyond the formal support boundaries. On the other, the personal interpretative framework gave us the conceptual tools to explain this network structure based on ECTs' professional interests and needs.

Our study has revealed how the structure of our ECTs' support networks changed over the course of a school year, as well as their access to certain types of resources. The data showed how the size of ECTs' school-internal support networks stabilized quickly. At the start, ECTs developed wide networks, with a large number of actors, which indicates their searching for different kinds of information and support. However, this broad exploration ended rather quickly, evidenced by smaller and more stable networks from January onwards. From that moment on, the ECTs became more selective and strategic about whom they interacted with. Their networks became functional in terms of their agenda and needs (knowing where to get what they wanted/needed). In other words, after a couple of months, our ECTs functioned within a social structure that did not easily changed anymore. The data furthermore showed how the ECTs' networks crossed the borders of the school's formal support network. Despite the extensive mentoring program at Springfield, the formal mentors were only one of the support persons our ECTs referred to (and not the most important ones). Apart from the formal mentors, the ECTs reached out for help to other people within their school, such as other novice teachers and subject matter colleagues. As such, the results of our study are consistent with the insights of Fox and Wilson (2009, 2015), Baker-Doyle (2011), and Smith Risser (2013) emphasizing the relevance of taking into account the informal networks in which ECTs function. Previous studies have also demonstrated the less central role of formal mentors in novice teachers' induction process (Moolenaar, 2010; Owen & Solomon, 2006). According to these studies, ECTs will seek for informal support relationships (beyond the formal mentor), when they experience a lack of similarity between them and the assigned mentor in terms of grade-level, subject matter, or even personality (Marable & Raimondi, 2007). Social network studies have framed this in terms of homophily: "The more similar two individuals are, the more likely that they will initiate and sustain a relationship" (Smith Risser, 2013, p. 26).

Moreover, our study illustrated how ECTs seemed to find great value and support in school-external and non-teaching networks. For instance, we have seen the relevance of (instructional) coaches, former teacher educators or former classmates, and even family members. These school-external actors provided support, both for the ECTs' professional duties (pedagogical/curricular) and for their sense of identity and self-esteem. Whereas school-internal colleagues appear to be key resources for questions on practical and pedagogical issues (i.e. classroom management, subject matter questions, etc.), it was within their school-external networks that the ECTs looked for opportunities to talk about organizational concerns. Many interactions with these school-external actors were centered on issues or questions regarding the culture, norms, values, and rules of their subject department or school. These conversations within their school-external networks enabled them to take some distance from their particular school context, frame their experiences within a bigger picture, and discuss these organizational issues within a "safe" environment. According to Schuck (2003), this can be explained by the fact that novice teachers often find it easier to share certain problems and concerns with individuals outside of their school. Smith Risser (2013) in her study on ECTs' use of twitter to create an informal mentoring network, has also concluded how "outsiders can provide access to different points of view as well as a safe space to discuss concerns" (p. 31). In particular, it is within these school-external networks, that ECTs seem to find a safe environment to discuss certain issues that could otherwise not easily be discussed with colleagues within their school (for example because of micro-political interests, see Kelchtermans & Ballet, 2002). As such, a school-external support network might be especially helpful regarding organizational concerns (such as collaboration, collegiality, school culture), since it allows teachers to get some (emotional) distance and reflect more clearly.

The importance of ECTs' organizational concerns and functioning was also reflected in their need to be seen not only as novice teachers or classroom-level actors. As the school year continued, the ECTs gradually developed more confidence in their classroom and teaching practice, which allowed them to gradually look for opportunities to collaborate and share their knowledge and resources with colleagues. The ECTs valued these collaborations as important, since it enabled them to fully feel part of their school as an organization. This implicates that ECTs not only have the need to further optimize their classroom competencies (i.e. in terms of subject matter, pedagogy, classroom management), but also want to be accepted as a full member of the school organization. This was reflected in their need for knowledge exchange and more collegial interactions (in which also non-work-related conversations were important). In other words, ECTs' induction experience is not only determined by their functioning within a classroom, but also by their feeling of being accepted as a full organizational member of the school. As such, within the construction of induction or mentoring measures, we need to take into account ECTs' interests to discuss issues at the level of the classroom and the organization.

The conclusion we draw is thus not to question the importance of formalized school-based mentoring by skilled veteran teachers. There is indeed sufficient evidence that mentoring contributes to ECTs' socialization, professional competencies, practices, well-being, and helps reduce the practice shock (Avalos, 2016; Hobson et al., 2009; Ingersoll & Strong, 2011; Orland-Barak, 2014, 2016; Richter et al., 2013; Wang, Odell, & Schwille, 2008). Nevertheless, based on our results and in line with other recent studies, we can see that it may be necessary to redefine the particular role formal mentors could fulfill in ECTs' induction process (Aspfors & Fransson, 2015). Instead of only focusing on assigning a formal mentor, our study has shown how this is only one part of ECTs' induction story. Teacher induction cannot be linked only to a formal position, but is embedded within a broader network of informal school-internal and school-external actors. In other words, it is about what could be called "distributed mentorship": the mentor – although meaningful and relevant as a formal position– is only one actor within a broader network determining socialization and induction. This confirms the research that has shown how mentors need to enact a boundary-spanning role, helping ECTs to search for different support resources and helping them to make connections (Baker-Doyle, 2011). Research on peer group mentoring is illustrative for this, showing how groups in which novice teachers, together with more senior teachers, and mentors can share personal and professional experiences create a powerful professional development context for all teachers involved (Geeraerts et al., 2015; Uitto, Kaunisto, Kelchtermans, & Estola, 2016).

5.2. Theoretical implications

5.2.1. Beyond treating ECTs as passive actors in their induction process.

Prior teacher induction research and practices have often framed ECTs as passive socializing agents (Baker-Doyle, 2011; Kelchtermans, 2019). Many formal induction and mentoring arrangements, despite being relevant, conceive of novice teachers' professional development in terms of transmission-oriented and unidirectional relationships in which *others* decide what their needs are (Baker-Doyle, 2011; Rehm & Notten, 2016). Our study has illustrated how ECTs not only function within the available formal support structures of their school, but also create their own informal support networks within and outside the school organization. In this way, ECTs fulfill an active role in their induction process. The results indicate how ECTs appeared as actively creating their own support network, both within and beyond their school based on their particular needs, interests, and agenda. They operated as active agents in the creation of their support networks, and deliberatively and strategically looked for help and advice beyond the school walls when necessary. Based on their evolving interests and needs, our novice teachers created a functional support network and strategically reached out to certain contacts and avoided others. These informal and school-external networks can compensate for or complement the formal mentoring support, giving our ECTs a much broader support network. As such, the results of this study corroborate the conclusion by Baker-Doyle (2011) and Fox and Wilson (2015) regarding the fact that it is important to help ECTs to become more self-initiated and intentional in their networking. For instance, it can be assumed that the extent to which ECTs are more centrally positioned in their school's networks will foster connections to more “knowledgeable” colleagues who might be helpful for their professional development as teachers. However, research has shown that new teachers often face obstacles in achieving this network intentionality. Or in the words of Baker-Doyle: “many are bewildered at the thought of building networks of support with colleagues, administrators, or parents” (p. 1). In order to be able to network, they need to understand how to navigate within the different networks, and they must be able to read the cultural and political scripts of their school's organization. Friedman and Kass (2002) highlighted: “the importance of training teachers as 'organizational persons', possessing the necessary skills to function in an organization. This includes an understanding of organizational processes, communications within the organization, group decision-making processes, and most of all, the importance of equipping teachers with skills in informal aspects of relationships among colleagues, and the capacity to deal with difficult social situations arising within the organization” (p. 685; see also Kelchtermans & Ballet, 2002). More research is needed, however, in order to understand ECTs' network intentionality and how teacher education can help prepare future teachers to navigate within the landscape of the school community) (see also März, Gaikhorst, & Van Nieuwenhoven, in press; März & Van Nieuwenhoven, in press).

5.2.2. Beyond a deficit-perspective

In line with Hoyle (1980), we observed that ECTs' professional orientation at the start is more “restricted” (focusing on their subject and the classroom), while it gradually develops over the time of the school year to a more “extended professional orientation”. The analysis of ECTs' support networks and their lived experiences of the induction phase showed how they are not only in need of support but also capable of sharing knowledge and expertise. They need to be viewed as potential resources or as an asset for the school (Fox & Wilson, 2009; Kelchtermans, 2019; März & Van Nieuwenhoven, in press). Nevertheless, both teacher induction research and practice have been dominated by a so-called deficit or remedial perspective. This remedial view focuses on helping novice teachers to adapt to the norms and expectations of their specific schools and ignores the potential for school development that becomes available through the arrival of new staff. More recent studies therefore have emphasized the relevance of approaching ECTs as resources in the school as workplace (see Correa, Martínez-Arbelaiz, & Aberasturi-Apraiz, 2015; Fleming, 2014; Fox & Wilson, 2008). In these studies, greater attention is paid to the importance of acknowledging ECTs as active organizational actors (see Friedman & Kass, 2002; Ulvik & Langørgen, 2012). Despite their limited classroom experience and their learning needs, novice teachers have some professional knowledge to offer to their colleagues at the school (Fleming, 2014). Having the opportunity to exchange their knowledge and expertise and being accepted by their peers may be important factors in developing ECTs' self-efficacy and in increasing retention. Fleming (2014), for instance, showed how the active engagement of ECTs' expertise in induction programs was a confidence booster for those novice teachers. In particular, their sense of self-efficacy increased when they were stimulated to share their expertise (see Friedman & Kass, 2002, for a study on the interplay between ECTs' sense of classroom and organizational self-efficacy). These results give an interesting perspective for induction programs to foster connections not only among novice teachers, but also between novice and experienced teachers; and to give ECTs roles that take them beyond departmental boundaries (Fox & Wilson, 2009). Moreover, Ulvik and Langørgen (2012) showed how novice teachers, as well as experienced teachers and the school as a whole, benefited from the implementation of a cooperative network in which novice teachers' strengths were actively nurtured. This is in line with earlier studies that showed how mentoring is not only beneficial for the mentees, but also has “a positive impact on the professional and personal development of mentors” (Hobson et al., 2009, p. 209). ECTs should therefore be considered as potential "catalysts for educational change" that, given their newly acquired knowledge base, are expected to provide an impulse for school improvement (Ulvik & Langørgen, 2012). Given the contested nature of this suggestion, further empirical insights into how ECTs may contribute to school improvement are much needed. Using a non-deficit approach, further research can investigate how ECTs' expertise is used within schools, what this means for their socialization specifically (for instance, in terms of self-efficacy) and for school development in general.

5.3. Methodological reflections

This study also exhibits some methodological reflections and limitations. First, we opted for using a qualitative social network approach (Bellotti, 2016), enabling us to unravel ECTs' induction process. In order to get insight into how structural characteristics of networks influence novice teachers' network formation and induction process, it would also be relevant to adopt a quantitative social network approach. Using network measures such as density and centrality, network evolution can be measured in a more systematic way (Borgatti & Ofem, 2010). Second, we deliberately limited our study to six ECTs within one school organization. Prior research has shown how induction (or mentoring in particular) is always influenced by the specific school context and culture (Orland-Barak, 2014, 2016). For instance, the open and supportive culture at Springfield, could explain the rich and elaborated informal school-internal support networks for ECTs. Therefore, a multiple case study design in which ECTs at different schools are followed would be relevant. Third, because of practical reasons, we decided to follow teachers who had a contract for one full academic

year. However, many ECTs do not have the luck to start immediately with a full-time contract within one school. Often, they combine different temporary contracts, making it even more challenging for them to become part of different school communities. In general, teacher induction research needs more research into that particular group of ECTs, in particular with regard to how they are supported and create a support network within the different schools.

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Annex 1

NETWORK DIARY

HOW TO FILL OUT?

During this week, we would like to ask you to fill out this network diary every day (preferably after the end of the working day) about your social interactions of that day. As soon as you have filled out this form, you may send it to us by e-mail.

- Column 1: Write down in the first column the names of all people with whom you have had contact today on teaching- or school-related matters. This includes both contacts within the school (teachers, administrators, …) and contacts outside the school (fellow teachers, friends, family, …).
- Column 2: Number of interactions: In the '# interactions' column, note for each person how many times you have been in contact with him/her today.
- Columns 3–9: Indicate for each person what kind of interaction or contact you had with that person by placing an 'X'. Also note briefly (in a few keywords) exactly what this contact was about (e.g. lesson content, problem with students, lesson planning, pedagogy, …). You can indicate several types of interaction per person:
  - o Discussion: With which colleagues did you discuss your work?
  - o Cooperation: With which colleagues did you cooperate?
  - o Advice & information seeking: Which colleagues did you ask for advice or information about your work?
  - o Break: With which colleagues did you spend the break?
  - o Personal conversations: With which colleagues have you had personal conversations?
  - o Friendship: With which colleagues have you had friendly contacts?
  - o Other: If there was any other form of interaction or contact than the one mentioned in the table, briefly describe the nature and reason of the contact in the column 'Other'.

SURNAME & FIRST NAME OF THE PERSON	# interactions	Discussion	Cooperation	Advice & information seeking	Break	Personal conversations	Friendship	Other

Annex 2

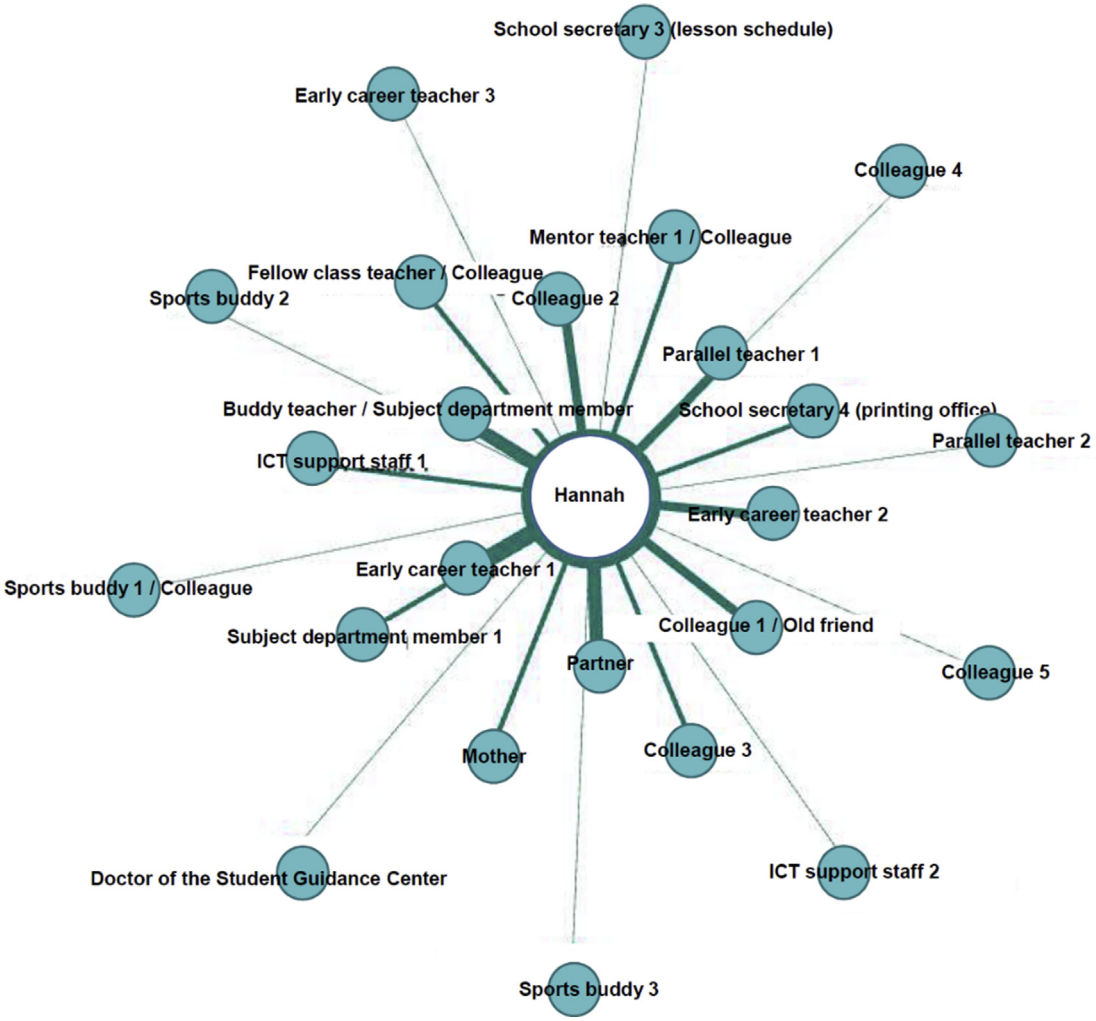

Fig. 1. Sociogram of Hannah (SNA1 – September).

Annex 3

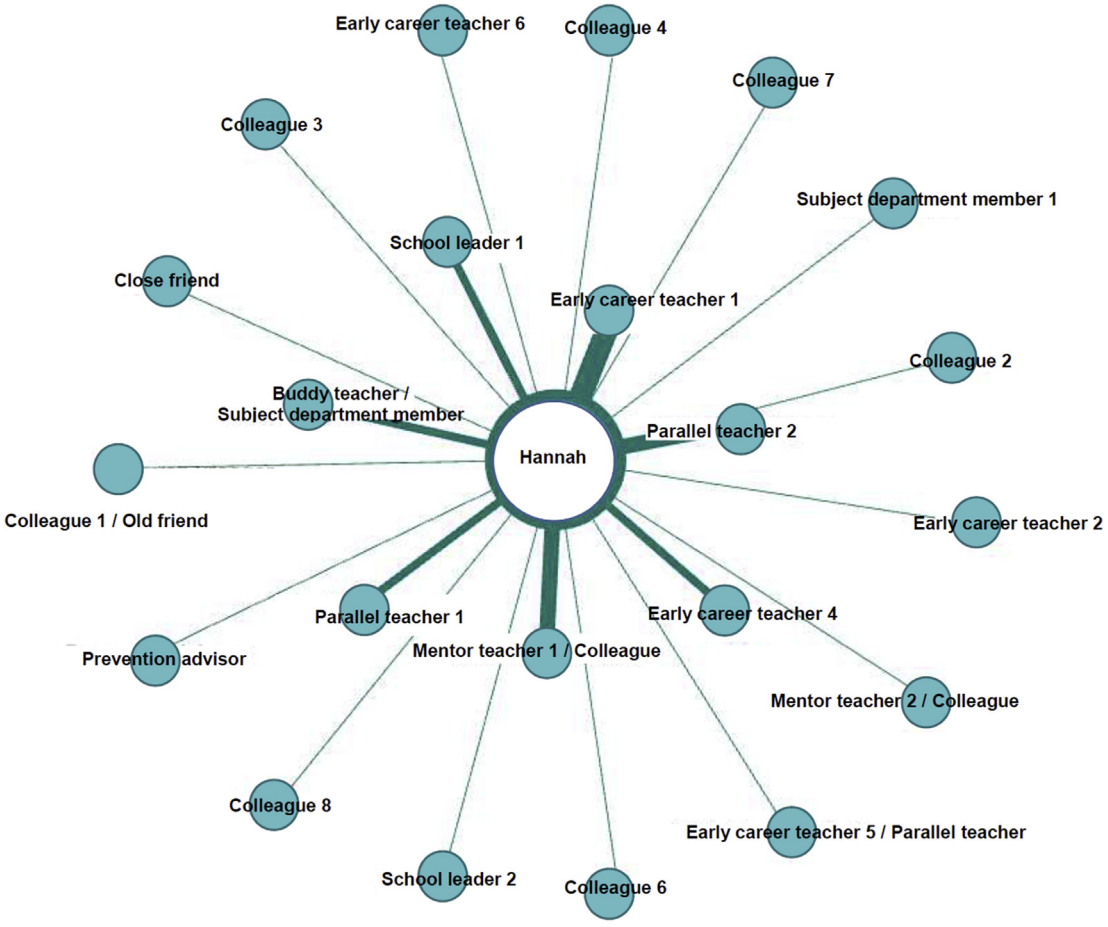

Fig. 2. Sociogram of Hannah (SNA2 – November).

Annex 4

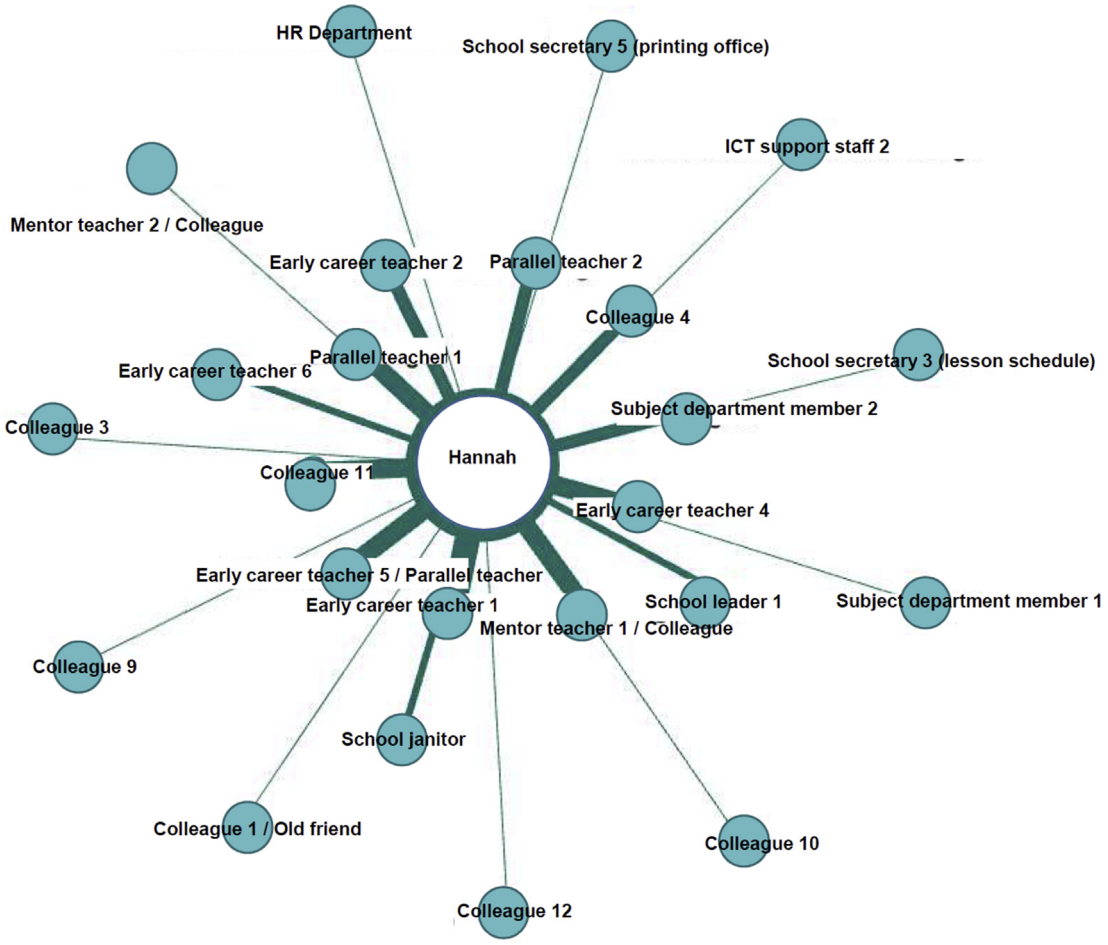

Fig. 3. Sociogram of Hannah (SNA3 – January).

Annex 5

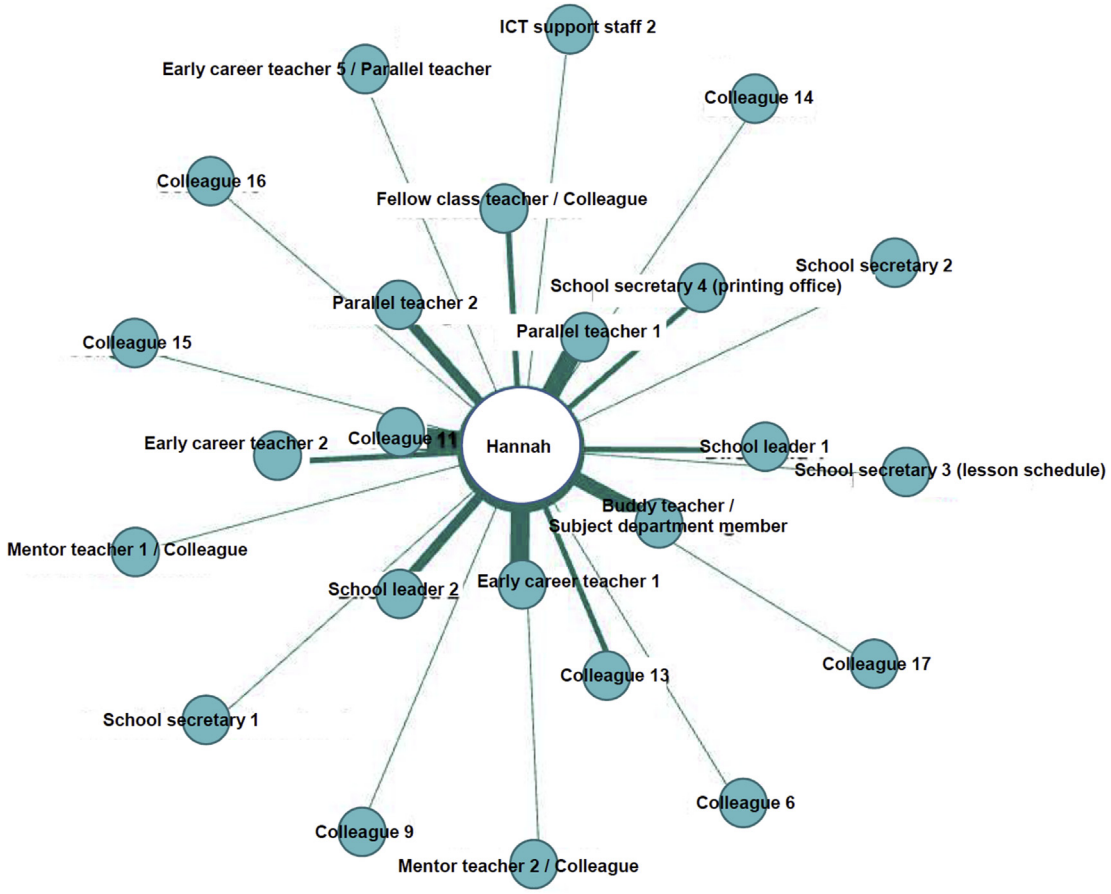

Fig. 4. Sociogram of Hannah (SNA4 – March).

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.tate.2019.102933.

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