

# VALUABLE CONNECTIONS: A SOCIAL CAPITAL PERSPECTIVE ON TEACHERS' SOCIAL NETWORKS, COMMITMENT AND SELF-EFFICACY

## CONEXIONES DE VALOR: UNA PERSPECTIVA DEL CAPITAL SOCIAL SOBRE LAS REDES SOCIALES DE PROFESORES, EL COMPROMISO Y LA AUTOEFICACIA CONEXÕES VALIOSAS: UMA PERSPECTIVA DE CAPITAL SOCIAL EM REDES SOCIAIS DE PROFESSORES, COMPROMISSO E AUTO-EFICÁCIA

Kees J. de JONG\*, Nienke M. MOOLENAAR\*, Eghe OSAGIE\*\* & Chris PHIELIX\*

\* Department of Education, Utrecht University, The Netherlands

\*\* Wageningen University, The Netherlands

Received date: 20.I.2016  
Reviewed date: 18.III.2016  
Accepted date: 18.IV.2016

<p><b>KEYWORDS:</b> social capital social networks commitment self-efficacy student achievement</p>	<p><b>ABSTRACT:</b> In research on educational reform implementation, scholars have highlighted the importance of teacher collaboration in support of increased student achievement. In this study, we examine whether teachers' knowledge exchange in social networks is related to key elements that have been associated with increased student achievement, namely teacher self-efficacy and commitment. Drawing on social capital theory, we study teachers' social networks to assess whether greater access to resources, as captured by a more central network position, is related to a greater sense of teacher efficacy and commitment. We collected survey and social network data from eight elementary schools in the Netherlands (N=114), which were then analyzed using social network analysis and correlational analysis. Results suggest positive relationships between teachers' social network indicators, teacher self-efficacy, and commitment to the organization and to students. Our findings yield directions for more relationally oriented educational policy instruments.</p>
<p><b>PALABRAS CLAVE:</b> capital social redes sociales compromiso autoeficacia rendimiento escolar</p>	<p><b>RESUMEN:</b> En la investigación sobre la aplicación de la reforma educacional, los investigadores han subrayado la importancia que la colaboración entre profesores tiene en el rendimiento escolar. En el presente estudio se examina si el intercambio de conocimiento en las redes sociales entre profesores tiene relación con los elementos esenciales asociados al aumento del rendimiento escolar: la autoeficacia y el compromiso de los profesores. Desde el punto de vista de la teoría del capital social, estudiamos las redes sociales de profesores para valorar si el mayor acceso a los recursos tiene relación con un mayor sentido de la eficacia y el compromiso de los docentes. Recopilamos encuestas y datos del entorno social de ocho escuelas de primaria en los Países Bajos (N=114), que fueron comparados utilizando un análisis correlacional y un análisis de redes sociales. Los resultados sugieren relaciones positivas entre los indicadores de las redes de profesores, la autoeficacia y el compromiso con la organización y con los estudiantes. Nuestras conclusiones abren el camino a posteriores instrumentos de política educativa orientados al estudio relacional.</p>
<p><b>PALAVRAS-CHAVE:</b> Social capital redes sociais auto-eficácia e realização</p>	<p><b>RESUMO:</b> Em pesquisa sobre implementação da reforma educacional, os estudiosos têm destacado a importância da colaboração do professor no apoio ao melhor desempenho do aluno. Neste estudo, nós examinamos se o intercâmbio de conhecimentos de professores nas redes sociais está relacionado com elementos-chave que têm sido associados com o au-</p>

CONTACT WITH THE AUTHORS: Susana María García Vargas. C/ Fenelon, 5, 1ºA. 28022 Madrid. E-mail: sgarciav@hotmail.es

mento de êxito do estudante, ou seja, professor, auto eficácia e comprometimento. Com base na teoria de capital social, nós estudamos a rede social de professores para avaliar se um maior acesso aos recursos, como capturada por uma posição mais central de rede, corresponde a um maior senso de eficácia e comprometimento do professor. Nós pesquisamos e coletamos dados de rede social de oito escolas básicas/primárias nos Países Baixos (N=114), que analisamos, através da rede social e de análise de correlação. Resultados sugerem um relacionamento positivo entre indicadores de rede social dos professores, auto eficácia dos professores e comprometimento para com a organização e para com os estudantes. Não foram encontrados resultados significativos para a relação entre indicadores da rede social dos professores e comprometimento destes. Nossas descobertas indicam direções para instrumentos de política educacional orientados mais relacionadamente.

## 1. Introduction

Given that current educational policies often include stringent accountability demands, the stakes are high for schools to achieve optimal student outcomes. In the past decade, elementary schools around the world have been experiencing a growing amount of governmental pressure to improve student achievement (Rijksoverheid, 2014). In the Netherlands, where this study takes place, this has resulted in what can be called 'a revolving door' of educational reform.

Educational scholars are pointing to several key elements that may support teachers' work. On the one hand, these factors include teacher individual characteristics, such as teacher knowledge and skills, teacher self-efficacy (Fink, 1992; Moolenaar, Slegers & Daly, 2011), and teacher commitment (Fink, 1992). On the other hand, scholarly interest on the 'social side' of the reform process is growing (Moolenaar & Daly, 2012; Spillane & Kim, 2012), following the assumption that teacher interactions may support or constrain efforts at reform. However, the interplay between such 'individual' and 'social' processes in the process of reform is still understudied.

In this study, we will examine the interplay between three elements that have recently been foregrounded in the educational reform literature, namely teachers' social networks, teacher self-efficacy, and teacher commitment. Our study takes place in eight elementary schools in The Netherlands. Building on a social capital perspective and earlier work, we argue that teacher interaction in these schools, as assessed by social network analysis, may play a role in the extent to which teachers feel more or less able to teach well (self-efficacy) and the extent to which they are committed to their school, students, and profession.

## 2. Theoretical framework

### 2.1. Social capital theory

As defined by its principal theorists (Coleman, 1990; Putnam, 1993a, 1993b), social capital refers to 'features of social organization, such as trust, norms and

networks, which act as resources for individuals and facilitate collective action' (Lochner, Kawachi & Kennedy, 1999). Translated to the world of education, it can be said that teachers' social capital consists of their access to valuable resources (e.g., lesson materials, information, gossip) through their social relationships with others (e.g., Goddard, 2003; Moolenaar & Daly, 2012; Penuel, Riel, Krause & Frank, 2009).

Research on social capital in business suggested that firms' social capital is positively related to productivity and innovation (e.g., Adler & Kwon, 2002; Tsai & Ghoshal, 1998). In education, the social capital of students and their community has been proven to affect students' educational achievement and attainment (see for a complete review Dika & Singh, 2002). In recent years, scholars have started to examine the social capital of school organizations, arguing that the embeddedness of teachers in their school teams may support or constrain efforts at reform (Leana & Pil, 2006; see Moolenaar, 2012 for a comprehensive overview).

In general, this line of work seems to suggest that teachers who have greater access to social capital (often measured as the quantity and quality of their social relationships) may be in a better position to implement innovations and reform (Coburn & Russell, 2008; Frank, Zhao & Borman, 2004) and achieve higher student achievement (Pil & Leana, 2009; Daly, Moolenaar, Der-Martirosian & Liou, 2014; Siciliano, 2015). Such studies often examine social capital by focusing on the quantity (e.g., Leana & Pil, 2009; Moolenaar et al., 2011; Spillane & Kim, 2012) and quality of social relationships ('ties') (e.g., Van Waes et al., 2015) and/or the resources that flow through teachers' networks (Carolan, 2013).

### 2.2. Teachers' social networks

In the study of social capital, social network theory is helpful given its dual focus on both the individual actors and the social relationships connecting them (Wasserman & Galaskiewicz, 1994). Studies that involve social network analysis are concerned with relational questions such as who shares knowledge with whom and which organizations collaborate to-

gether (e.g., Díaz-Gibson, Civiš-Zaragoza & Guàrdia-Olmos, 2014; Moolenaar, 2012). These questions can reveal the underlying social structures that are important in understanding the exchange of resources in communities and explaining a range of social phenomena (Berkowitz, 1982; Burt, 1982).

At least three assumptions underlie social network research (Degenne & Forsé, 1999). First, the notion of social embeddedness implies that actors in a social network are interdependent rather than independent. Second, interpersonal relationships are regarded as conduits for the exchange or flow of resources such as information, knowledge, and materials. Third, patterns of interpersonal relationships may act as 'constraints' and offer opportunities for individual and collective action (Burt, 1982).

The study of social networks is receiving increased attention in educational research. Studies have been conducted at many educational levels (primary, secondary, and higher education), on teacher networks (Baker-Doyle & Yoon, 2010; Lima, 2007; Moolenaar et al., 2014); leadership networks, and departmental structures (Daly, Finnigan, Jordan, Moolenaar & Che, 2014; Lima, 2003; Spillane & Kim, 2010); school-parent networks (Horvat, Weininger & Laureau, 2003); between-school networks (Muijs, West & Ainscow, 2010; Veugelaers & Zijlstra, 2002); and student networks (Lubbers, Van der Werf, Kuyper & Offringa, 2006). In this study, we will focus on teachers' social network positions, meaning, the extent to which they occupy a central position in the advice networks in their schools. We will now zoom in on two social network measures that are commonly used to examine teachers' interactions in support of school improvement, namely degree centrality and closeness centrality.

The most straightforward type of centrality is degree centrality, which reflects the number of relationships a teacher is involved in. Degree centrality can be assessed in two ways, namely *in-degree centrality*, reflecting a person's number of incoming ties, and *out-degree centrality*, reflecting a person's number of outgoing ties. For example, a teacher's in-degree score reflects the number of people that ask him/her for advice. His/her out-degree score reflects the number of people to whom s/he goes for advice (e.g. Friedkin and Slater, 1994).

Another measure of a teacher's centrality described by Freeman (1979) is based on its closeness to other nodes. Closeness centrality indicates how far an individual is located relative to the others in his/her network. In teacher networks, a teacher will have a higher closeness centrality score when s/he is 'close' to other teachers in a network sense, meaning that this teacher has short distances to all other teachers in the network. Being centrally located means that the information a teacher may distribute,

reaches the rest of the team more quickly. Closeness centrality is conceptually and methodologically different from degree centrality because it not only takes into account direct relationships, but also indirect relationships to all other team members (Moolenaar, Daly & Slegers, 2010).

Being centrally located in a network through many relationships (degree centrality) has several implications for a teacher. Because of their network position, central actors have greater access to information and can have disproportionate influence over the team by hiding or altering information that passes 'through' their central position. As such, they have informal power, for they can regulate the information flow (Balkundi & Harrison, 2006). The same holds for being closely connected to other teachers (closeness centrality). According to Haythornthwaite (1996), acting on information is more likely when that information comes from a close colleague. Given the importance of teacher interactions for knowledge exchange and the potential power position resulting from occupying a central network position, we will now continue to argue that teachers' network centrality may be related to teachers' self-efficacy and commitment.

### 2.3. Teacher self-efficacy

Self-efficacy reflects someone's judgment about one's own capacities to act successfully in a specific situation (Bandura, 1977). Skaalvik and Skaalvik (2010, p. 1059) conceptualized teacher self-efficacy as 'individual teachers' beliefs in their own ability to plan, organize, and carry out activities that are required to attain given educational goals'. Research on teachers' self-efficacy has found it to be a powerful predictor of student achievement, with highly efficacious teachers also yielding higher student gains than teachers who have less strong beliefs in their own ability to teach (Caprara, Barbaranelli, Steca & Malone, 2006; Raudenbush, Rowan & Cheong, 1992; Ross, 1998). According to Tschannen-Moran and Hoy (2007), teachers with a low sense of self-efficacy are likely to put less effort in preparation and delivery of instruction and give up more easily when difficulties arise.

Bandura (1997) distinguished four key antecedents that suggest the importance of social interaction for the development of self-efficacy: mastery experiences, verbal persuasion, vicarious experiences, and psychological arousal. First, self-efficacy can be accumulated through mastery experiences. Teachers' self-efficacy will grow when their teaching performance turns out to be a success. Second, verbal persuasion, consisting of feedback about their performance, can have a positive as well as negative effect on self-efficacy. For ex-

ample, a pep talk by a colleague can be helpful to overcome a setback (Schunk, 1987), while a warning by the principal to work harder can lower a teacher's sense of efficacy (Gist & Mitchell, 1992). Third, teachers' self-efficacy can grow through vicarious experiences, i.e., by seeing someone else being successful and model the desired behavior (e.g., Schunk & Zimmerman, 1997). The more the teacher identifies with this person, the more influence the successful experience will have on the teacher's self-efficacy. Finally, psychological arousal, the joy or pleasure teachers may experience when they are teaching successfully, can also positively influence their self-efficacy, while stress or anxiety can have the opposite effect (Bandura, 1997).

Most of these antecedents that nurture self-efficacy cannot be experienced in a social vacuum. As such, many studies have suggested a link between teachers' social interactions and their sense of efficacy (Duyar, Gumus & Bellibas, 2013; Moolenaar, Sleegers & Daly, 2011; Raudenbush et al., 1992; Shachar and Shmuelewitz, 1997). According to Macinko and Starfield (2001) teacher collaboration networks not only give teachers the possibility to share their knowledge and information, but also to support each other socially. Similarly, recent work showed how beginning teachers feel more self-efficacious when they occupy a more central position in their teacher training networks (Liou et al., 2014). Social support and opportunities to share teaching experiences may positively influence teacher self-efficacy, because it may likely include antecedents of self-efficacy put forth by Bandura (1977) such as verbal persuasion or vicarious experiences (Moolenaar, Sleegers, and Daly, 2011). Based on these findings, we hypothesize:

*Hypothesis 1: In- and out-degree centrality will be positively related to teacher self-efficacy.*

*Hypothesis 2: In- and out-closeness centrality will be positively related to teacher self-efficacy.*

## 2.4. Teacher commitment

Organizational commitment is 'the relative strength of an individual's identification with and involvement in a particular organization' (Mowday, Porter & Steers, 1982, p. 72). Commitment to an organization is about believing in the organization's goals and values and having the intention to exert considerable effort for the organization (Firestone & Pennell, 1993). In the context of education, teacher commitment has been pointed out as an important element affecting job performance and the quality of education (Tsui & Cheng, 1999). Three dimensions of teacher commitment can be distinguished: commit-

ment to the school organization, commitment to the teaching profession, and commitment to students (Dannetta, 2002; Firestone & Rosenblum, 1988).

Teachers have high organizational commitment when they believe in, and accept their organization's goals and values, are ready to put a significant amount of effort into the organization, and are willing and desiring to stay with the organization (Mowday et al., 1982). Commitment to the teaching profession reflects a teacher's devotion for his occupation (Somech & Bogler, 2002). According to Park (2007), teachers with high commitment to their profession experience high job satisfaction and identify oneself with the profession of being a teacher. Teacher commitment to students is about being devoted to student behavior and learning (Dannetta, 2002; Elliott & Croswell, 2002; Nias, 1981). Teachers with high commitment to their students are ready to help students and feel responsible for students' learning and school life (Park, 2007).

Teachers may be more committed to their organization, profession, and students when they occupy more central positions in their school's network (Reyes, 1990). Social relationships between colleagues involve a continuing focus on collaborative effort and the development of shared goals and objectives, and as such may nurture commitment (Brookhart and Loadman, 1990; Zagenczyk and Murrell; 2009). Team members who are centrally located in the network often take more active part in group discussions which results in higher job satisfaction and commitment (Kameda, Ohtsubo & Takezawa, 1997; Scott-Ladd, Travaglione & Marshall, 2006). A teacher who is strongly embedded in the school's network through sharing knowledge and advice, and being closely linked to his colleagues, will highly likely be more invested in these relationships than teachers who are on the network's periphery (Scott et al., 1999). As such, we hypothesize:

*Hypothesis 3: In- and out-degree centrality will be positively related to teacher commitment.*

*Hypothesis 4: In- and out-closeness centrality will be positively related to teacher commitment.*

## 3. Method

### 3.1. Context and sample

This study was conducted in the central region of The Netherlands. Data were collected in the first half of 2015 among teachers from eight elementary schools. Three elementary schools belonged to the same school district, two were part of other school districts and another three schools were independent schools, each with their own administration. The



schools were all publicly funded and held a Protestant denomination.

We distributed online surveys including questions on teachers' social networks, self-efficacy and commitment to 131 teachers. A total of 114 teachers returned the questionnaire, resulting in a response rate of 87%. Descriptive statistics of the sample are shown in Table 1.

Table 1. Sample demographics			
Variable		Frequency	Percentage
Gender			
	Female	95	83.3 %
	Male	19	16.7 %
Years of experience in school			
	0-2 years	18	15.9 %
	3-5 years	20	17.5 %
	6-9 years	16	14.0 %
	10 years	60	52.6 %
Years of experience in education			
	0 to 2 years	7	6.1 %
	3 to 5 years	10	8.9 %
	6 to 10 years	20	17.5 %
	11 to 15 years	17	14.9 %
	More than 15 years	60	52.6 %

### 3.2. Instruments

**Social networks.** Building on our previous work (Moolenaar, 2010), we used the following question to assess teachers' social networks: 'Whom do you turn to for advice on a work-related problem?' Teachers could name as many colleagues as they wanted by checking the names of their colleagues on a roster. In order to provide this roster and derive the overall social network, the researchers needed access to all names of the teachers, and as such, these data could not be collected anonymously (see also Carolan, 2013; Daly, 2010). However, we aimed at safeguarding respondents' privacy by removing all personal information directly after data collection.

**Teacher commitment.** We examined teacher commitment using three different scales that were validated in earlier research. To assess 'commitment to the school organization', we used the Organizational Commitment Questionnaire (Mowday et al.,

1979). Occupational commitment, meaning 'commitment to the teaching profession', was assessed using an instrument developed by Park (2007). Finally, 'commitment to students' was measured using an instrument from Lee, Zhang, and Yin (2011). After the removal of three ambiguous items, factor analysis<sup>2</sup> revealed three distinct scales that together explained 53.3% of the variance.

**Teacher Self-efficacy.** The Teacher Self-Efficacy Scale (Schwarzer, Schmitz & Daytner, 1999) was used to assess teacher self-efficacy. Although a factor analysis revealed three factors, these factors were highly correlated and conceptually related, and therefore we chose to treat the items as a one-factor solution that explained 59% of the variance.

The scales for Commitment and Efficacy were translated to Dutch. Back-translation was done by an English teacher. The purpose of this back-translation was to make sure the translations were done correctly. Back-translation did not lead to any changes in the questionnaire. All survey items were measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). We included the reliability (Cronbach's alpha) and sample items for each of the scales in Table 2.

Table 2. Scale names, sample items and reliability for each of the survey scales.			
Factors	Sample item	Cronbach's alpha	No. of items
Commitment to the school organization	<i>I would accept almost any type of job assignment in order to keep working for this organization.</i>	.63	4
Commitment to the teaching profession	<i>If I could go back to college and start over again, I would still choose to become a teacher.</i>	.67	3
Commitment to students	<i>It is my responsibility to ensure good social relations among my students.</i>	.62	4
Self-efficacy	<i>When I try really hard, I am able to reach even the most difficult students.</i>	.77	9

### 3.3. Analysis

Teachers' advice networks were studied using social network analysis. To distinguish between giving advice and receiving advice, we calculated (normalized) teachers' degree centrality and closeness centrality using UCINET (Borgatti, Everett & Freeman, 2002). *Normalized in-degree centrality* is calculated as the number of in-coming ties, which is then normalized by dividing the number of ties by the maximum number of ties in a network. Normalization is done to facilitate comparisons across schools and teachers. *Normalized out-degree centrality* is calculated as the number of out-going ties divided by the maximum number of ties in the network. Both normalized scores vary from 0 (teacher has no relationships at all) to 1 (teacher is connected to all other teachers in the network). Closeness centrality is a measure that is based on the shortest paths between a teacher and his colleagues, meaning, the minimum number of 'steps' that connects a teacher to all of his colleagues in the network. As such, this measure reflects how 'closely connected' the teacher is to his/her colleagues (Moolenaar et al., 2010). Closeness centrality is calculated for each teacher as 1 minus the sum of these shortest paths. With the measure of *in-closeness centrality*, we select only those shortest paths that are in-coming to the teacher. *Out-closeness centrality* is assessed by taking into account only those paths that are out-going, meaning, that the teacher sends out to colleagues. Closeness centrality measures were normalized by dividing by the maximum possible closeness centrality in each school to facilitate comparisons across schools and teachers. Normalization resulted in scores between 0 (a teacher is not closely connected to all other teachers in the network an isolate) and 1 (a teacher is closely connected to all other teachers in the network, connected through direct ties).

To test the hypotheses the following steps were followed. First, descriptive statistics were calculated, including factor and reliability analysis. Second, correlation analyses were executed to examine the relationships between teachers' social networks, teacher commitment, and student achievement. Because data were not normally distributed Spearman's correlation was used Third, multiple regression analyses were conducted to examine the relationship between teachers' social networks, self-efficacy, and commitment.

### 3.4. Results

First, we calculated descriptive statistics for teachers' social network characteristics, self-efficacy, and commitment (see Table 3). Results suggest that on average, teachers ask advice from about three col-

leagues ( $M_{\text{out-going ties}} = 3.53$ , range 0-12), reflecting about 22% of their school's network ( $M_{\text{out-degree centrality}} = .22$ ). On average, teachers are ask advice from about three colleagues ( $M_{\text{in-coming ties}} = 3.27$ , range 0-16), reflecting about 21% of their school's network ( $M_{\text{in-degree centrality}} = .21$ ). Findings suggest that teachers vary more in the amount of in-coming ties, i.e. the degree to which they are asked for advice, than their out-going ties (their nominations of whom they go to for advice). In addition, the average closeness centrality ( $M_{\text{in-closeness centrality}} = .32 / M_{\text{out-closeness centrality}} = .33$ ) suggests that teachers' shortest network paths to their colleagues is relatively low, compared to the most closely connected teacher in their school. In other words, teachers seem to be 'loosely' connected in their school network, and often have to 'go through' others to receive, or give advice to all of their colleagues.

Descriptive statistics also showed some variation between the three dimensions of teacher commitment. Teachers reported to be most strongly committed to students ( $M = 4.58$ ,  $SD = .37$ ), to the organization ( $M = 4.37$ ,  $SD = .40$ ) and to the teaching profession ( $M = 4.05$ ,  $SD = .66$ ). Teachers also reported a strong sense of efficacy ( $M = 4.17$ ,  $SD = .39$ ), indicating that they believe in their ability to carry out the actions that are needed to reach educational goals (Skaalvik & Skaalvik, 2010). The minimum score

**Table 3. Descriptive Statistics**

	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
<i>Network characteristics</i>				
In-coming ties				
Number of in-coming ties	3.27	3.03	0	16
In-degree centrality	.21	.20	.00	.83
In-closeness centrality	.32	.14	.11	.86
Out-going ties				
Number of out-going ties	3.53	2.06	0	12
Out-degree centrality	.22	.12	.04	.67
Out-closeness centrality	.33	.08	.19	.58
<i>Individual characteristics</i>				
Teacher commitment				
Commitment to the organization	4.37	.40	3.25	5.00
Commitment to the teaching profession	4.05	.66	2.33	5.00
Commitment to students	4.58	.37	3.40	5.00
Teacher self-efficacy	4.17	.39	2.89	5.00

(Min. = 2.89) suggested that even teachers with the lowest scores indicate to have a moderate sense of efficacy.

### 3.5. Correlation analyses

We calculated correlations to examine the relationships between teacher network variables, teacher commitment, and teacher self-efficacy (see Table 4). Correlations were found between several network measures. In-degree centrality is related to in-closeness centrality ( $r_s = .81, p < .01$ ). Similarly, out-degree centrality and out-closeness centrality were found to be positively related ( $r_s = .67, p < .01$ ). These findings suggest that the more teachers are connected to others in the school's advice network, either by asking advice or by being asked for advice, the more closely connected they are to all others in their network. This is a logical finding, given the way that these network measures are calculated.

Results also suggest correlations between the dimensions of teacher commitment. Commitment to the organization correlates with teacher's commitment to the profession ( $r_s = .25, p < .01$ ), indicating that teachers who like to keep working at the same school are also committed to being a teacher. Commitment to the organization also correlates with teacher's commitment to the students ( $r_s = .22, p < .05$ ), which indicates that teachers who are committed to their school also feel responsible for student learning. A significant correlation between commitment to the profession and commitment to stu-

dents ( $r_s = .30, p < .01$ ) suggests that teachers who are committed to their job as a teacher also feel devoted to their students' success. As these correlations are moderate, the dimensions may be considered conceptually different and assessing different types of commitment. Although outside the scope of this study, self-efficacy was also found to be related to commitment, in specific commitment to the profession ( $r_s = .22, p < .05$ ) and commitment to students ( $r_s = .49, p < .01$ ), but not to organizational commitment ( $r_s = .09, ns$ ), reflecting earlier research (Coladarci, 1992).

Finally, the correlation analyses provide some first insights in the relationships between teachers' social network characteristics, teacher commitment and teacher self-efficacy. On the one hand, findings suggest a positive correlation ( $r_s = .19, p < .05$ ) between out-closeness centrality and organizational commitment, indicating that teachers with higher commitment to their school also tend to be more closely linked to other teachers through out-going relationships. In-closeness centrality, on the other hand, is suggested to be positively related to teachers' commitment to students ( $r_s = .23, p < .05$ ), meaning that the more strongly committed teachers are to their students, the more they are sought for advice (in-coming advice ties). Finally, this analysis suggests that the more central a teacher is in the school network in terms of in-coming ties, the higher the teacher's self-efficacy (both in-degree centrality,  $r_s = .23, p < .05$  and in-closeness centrality,  $r_s = .27, p < .01$ ).

**Table 4. Correlation Analysis**

	1b	1c	1d	2a	2b	2c	3
1. Network characteristics							
a. In-degree centrality	<b>.81**</b>	-.10	-.14	.04	.12	.17	<b>.23*</b>
b. In-closeness centrality	1.00	-.05	-.13	.00	.07	<b>.23*</b>	<b>.27**</b>
c. Out-degree centrality		1.00	<b>.67**</b>	.15	.14	.14	.03
d. Out-closeness centrality			1.00	<b>.19*</b>	.00	.17	.05
2. Teacher commitment							
a. Commitment to organization				1.00	<b>.25**</b>	<b>.22*</b>	.09
b. Commitment to profession					1.00	<b>.32**</b>	<b>.22*</b>
c. Commitment to students						1.00	<b>.49**</b>
3. Teacher self-efficacy							1.00

Note. \*\*  $p < .01$ , \*  $p < .05$

Note. Because of high intercorrelations between in-degree centrality and the number of in-coming ties ( $r_s = .92, p < .01$ ) and out-degree centrality and the number of out-going ties ( $r_s = .82, p < .01$ ), we only report on in- and out-degree centrality here.

### 3.6. Regression analyses

Next, we tested whether teachers' centrality would predict their commitment and self-efficacy using multiple regression analysis (see Table 5). This allowed us to include the covariates gender and experience at school, as previous research has suggested that these variables may be related to teachers' social network structure (e.g., Moolenaar, Daly, Slegers & Karsten, 2014). Although several positive, significant relationships were found, the proportion explained variance for each of the tested models is rather small ( $R^2 = .06$  to  $.09$ ), suggesting that only a small part of the variance could be explained with the demographic covariates and social network characteristics under study. Given the limited sample size and single setting, these results warrant caution and further study.

Results replicated our correlational analyses, suggesting that out-closeness centrality was positively related to organizational commitment ( $\beta = .22$ ,  $p < .05$ ). Moreover, also in-closeness centrality was found

to be related to organizational commitment ( $\beta = .20$ ,  $p < .05$ ). These findings take into account the negative relationship between experience at school and organizational commitment ( $\beta = -.23$ ,  $p < .05$ ). This suggests that the less experience a teacher has, the more committed s/he is to the school. In addition, findings suggest that teachers who are relatively more 'closely connected' to their colleagues through advice ties, also tend to report more organizational commitment. We found no significant relationships between organizational commitment and in- or out-degree centrality.

We did not examine commitment to the profession in a multiple regression analysis as correlational analysis had already pointed out no significant relationships between this type of commitment and network centrality.

Commitment to students was found to be related to in-degree centrality ( $\beta = .19$ ,  $p < .05$ ), out-closeness centrality ( $\beta = .19$ ,  $p < .05$ ), and in-closeness centrality ( $\beta = .22$ ,  $p < .05$ ), suggesting that the more a teacher occupied a central position in the advice network,

**Table 5. Regression analyses for variables predicting teacher self-efficacy**

	Commitment to organization			Commitment to students			Self-efficacy		
Network characteristics	B	S.E.	$\beta$	B	S.E.	$\beta$	B	S.E.	$\beta$
<i>Degree centrality</i>	4.36	.14		4.38	.13		3.99	.12	
- Experience at school	-.03	.01	<b>-.21*</b>	-.01	.01	-.10	.00	.01	-.01
- Gender	.06	.11	.05	.04	.11	.03	.01	.10	.01
- Out-degree centrality	.63	.33	.18	.55	.32	.16	.31	.29	.10
- In-degree centrality	.37	.22	.16	.41	.21	<b>.19*</b>	.49	.19	<b>.25*</b>
$R^2$	.08			.06			.06		
F	2.22			1.60			1.86		
<i>Closeness centrality</i>	3.98	.23		4.06	.22		3.71	.21	
- Experience at school	-.03	.01	<b>-.23*</b>	-.02	.01	-.12	.00	.01	-.03
- Gender	.08	.11	.07	.06	.11	.05	.03	.10	.03
- Out-closeness centrality	1.25	.53	<b>.22*</b>	1.02	.51	<b>.19*</b>	.62	.47	.13
- In-closeness centrality	.63	.32	<b>.20*</b>	.67	.31	<b>.22*</b>	.77	.28	<b>.27**</b>
$R^2$	.09			.06			.07		
F	2.70			1.84			2.10		

Note: \* $p < .05$ , \*\* $p < .01$

Note: df (4, 109) for all models

the more s/he reported to be committed to students. Gender and years of experience at the school were unrelated to teachers' commitment to students.

Finally, in line with the correlational analysis, results suggest that self-efficacy is positively related to in-coming ties (in-degree centrality,  $\beta = .25$ ,  $p < .05$  and in-closeness centrality,  $\beta = .27$ ,  $p < .01$ ), suggesting that the more teachers are asked for advice and are closely linked to other teachers in the advice network, the higher their self-efficacy. Again gender and years of experience did not play a role in these relationships.

### 3.7. Network visualization

Findings can also be presented graphically. Figures 3 and 4 illustrate the teacher advice networks in one of the participating schools. Team members are represented by squares. Lines that connect these squares represent teachers' advice ties. In Figure 3 three shades of blue represent teachers' sense of

efficacy. The darker the shade of blue, the stronger the teacher's sense of efficacy. For instance, teachers F (light blue, left) and G (light blue, right) have zero incoming ties, which indicates that no other teachers ask them for advice. The light shade of blue indicates that these teachers also have a relatively low sense of efficacy. This combination of low in-degree centrality and low sense of efficacy correspond to our regression results. However, there are also teachers with high self-efficacy and low network centrality, for instance teacher J (dark blue, left bottom corner).

Figure 4 indicates teachers' commitment to their school organization. In this figure, three shades of blue represent the extent to which team members are committed to the organization. The darker the shade of blue, the more committed to the school a teacher is. The most central actor, teacher A, is very committed to the organization. The more teachers are located in the periphery, the lighter the blue, indicating less commitment to the school.

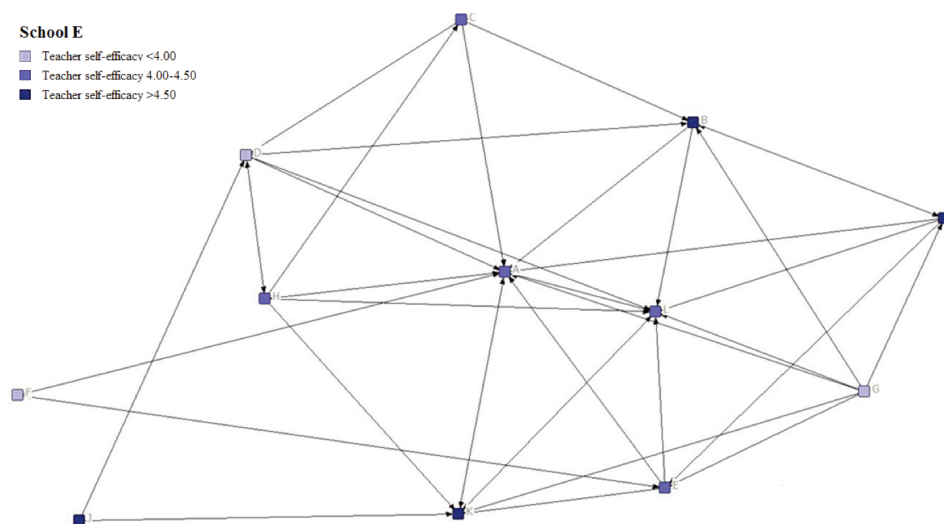


Figure 3. Example of teacher self-efficacy in a school's advice network

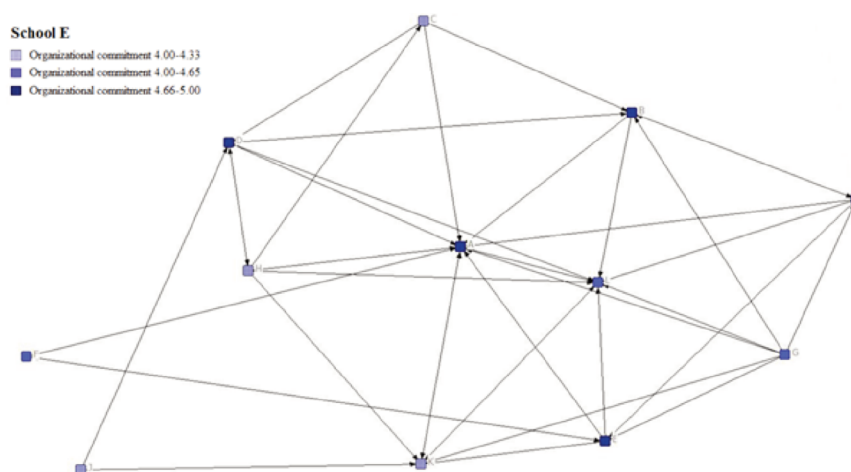


Figure 4. Example of teacher commitment in a school's advice network



## 4. Conclusion and discussion

### *Network centrality and teacher commitment*

Interestingly, we found that network centrality may be a predictor of teachers' commitment to students. The more a teacher is asked for advice, the more s/he is committed to improve student learning. This suggests the importance of the nurturing of advice seeking and processes of feedback seeking among teachers, and relationally oriented policy to support initiatives that attend to the 'social side' of policy implementation, above and beyond a focus on individual teachers' knowledge and skills.

We also found that short network distances support feelings of commitment to the school, which may provide leads for policy around teacher turnover. By supporting close, embedded relationships among teachers, schools may gain teachers' commitment to the school organization, and be better able to keep teachers motivated and invested in improving the school.

### *Network centrality and teacher self-efficacy*

This study supports earlier work that suggested a relationship between teachers' social networks and teacher self-efficacy (Liou et al., 2014; Shachar & Shmuelewitz, 1997). A stronger sense of efficacy has multiple benefits including greater teacher motivation and greater student achievement (Tschannen-Moran & Hoy, 2007). Our findings showed positive relationship between self-efficacy and in-coming ties. Knowledge sharing and being asked for advice may contribute to teachers' sense of efficacy because it shows that they are able to provide useful information to their team members (Lin, 2007). Highly likely, this relationship will be reciprocal, meaning that the self-efficacious teachers also do something that makes them more 'popular' in the advice network (Moolenaar et al., 2012). Testing this hypothesis is beyond this study as it would involve some longitudinal or experimental design, but our findings at least suggest that it may be worthwhile for school leaders and teachers to boost teachers' self-efficacy by asking them for advice. No significant relation was found between outgoing relationships and self-efficacy. This is also noteworthy, as it may sug-

gest that those who feel less efficacious do not turn to others to ask for advice. As such, a more detailed and larger investigation of the relationship between teacher networks and self-efficacy is welcomed, especially in educational contexts where teacher self-efficacy may be under pressure, for instance during reform implementation or the induction of beginning, potentially less efficacious teachers.

## 5. Limitations

Several limitations of this study should be mentioned. Because the context of Dutch elementary schools may not be like other countries, caution is warranted when generalizing the findings of this study. Dutch elementary schools are characterized by relatively small class sizes in comparison to other countries around the world, like France, the United Kingdom, or the U.S.A. (World Bank, 2015). Research has pointed out the relationship between class size and teacher self-efficacy (Klassen & Chiu, 2010), suggesting that in schools with larger classes, teachers may feel less efficacious. Future studies will have to test our findings in other countries and/or educational systems. Another related demographic that we did not include is teachers' type of employment. In the Netherlands, the proportion of part-time teachers (38.7%) is twice as high as the average in other countries of the Organisation for Economic Cooperation and Development (16.8%) (OECD 2015). Earlier research suggests differences in network centrality among part-time and full-time employed teachers (Moolenaar, 2010). Furthermore, perhaps part time teachers also differ from their full time colleagues in terms of commitment to their organization or profession (either showing increased or lower commitment), which may have affected our findings.

In sum, this study suggests that teacher relationships, in particular their network centrality, may offer opportunities for strengthening self-efficacy and commitment, two elements that may support teachers in efforts at implementing educational policy and improving student achievement. As such, it suggests the importance of attending to the 'social side' of the reform equation in designing new policy initiatives and nurturing valuable connections as effective routes to school success.

## References

- Balkundi, P., & Harrison, D. (2006). Ties, leaders, and time in teams: strong inferences about network structures effects on team viability and performance. *Academy of Management Journal*, 49, 49-68. doi:10.5465/AMJ.2006.20785500
- Bandura, A. (1997). *Self-efficacy: the exercise of control*. New York: Freeman
- Borgatti, S. P., Everett, M.G., & Freeman, L.C. (2002). *Ucinet 6 for Windows: Software for Social Network Analysis*. Harvard, MA: Analytic Technologies
- Brookhart, S. M., & Loadman, W. E. (1990). School-university collaboration: different workplace cultures. *Contemporary Education*, 61, 125-128

- Caprara, G. V., Barbaranelli, C., Steca, P., & Malone, P. S. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: A study at the school level. *Journal of school psychology, 44*, 473-490.
- Carolan, B. V. (2013). *Social network analysis and education: Theory, methods and applications*. Sage Publications: Thousand Oaks.
- Coladarc, T. (1992). Teachers' sense of efficacy and commitment to teaching. *The Journal of experimental education, 60*(4), 323-337. doi:10.1080/00220973.1992.9943869
- Daly, A. J., Finnigan, K., Jordan, S., Moolenaar, N. M., & Che, J. (2014). Misalignment and perverse incentives: Examining the politics of district leaders as brokers in the use of research evidence. *Educational Policy, 28*(2), 145-174. DOI:10.1177/0895904813513149
- Daly, A. J., Moolenaar, N. M., Der-Martirosian, C., & Liou, Y. (2014). Accessing capital resources: Investigating the effects of teacher human and social capital on student achievement. *Teachers College Record, 116*(7).
- Daly, A. J. (2010). *Social Network Theory and Educational Change*. Cambridge, MA: Harvard University Press.
- Daly, A. J., Moolenaar, N. M., Bolivar, J. M., & Burke, P. (2010). Relationships in reform: The role of teachers' social networks. *Journal of Educational Administration, 48*, 39-79. doi:10.1108/0957823101041062
- Dannetta, V. (2002). What factors influence a teacher's commitment to student learning? *Leadership and Policy in School, 1*, 144-171. doi:10.1076/lpos.1.2.144.5398
- Duyar, I., Gumus, S., & Sukru Bellibas, M. (2013). Multilevel analysis of teacher work attitudes: The influence of principal leadership and teacher collaboration. *International Journal of Educational Management, 27*(7), 700-719. doi:10.1108/IJEM-09-2012-0107
- Elliott, B., & Crosswell, L. (2002). Teacher commitment and engagement: The dimensions of ideology and practice associated with teacher commitment and engagement within an Australian perspective. Retrieved from <http://www.aare.edu.au/o2pap/cro02522.htm>.
- Fink, S. L. (1992). *High commitment workplaces*. New York: Quorum Books.
- Firestone, W. A., & Pennell, J. R. (1993). Teacher commitment, working conditions, and differential incentive policies. *Review of Educational Research, 63*, 489-525. doi:10.3102/00346543063004489
- Firestone, W. A., & Rosenblum, S. (1988). Building commitment in urban high schools. *Educational Evaluation and Policy Analysis, 10*, 285-299. doi:10.3102/01623737010004285
- Frank, K. A., Zhao, Y., & Borman, K. (2004). Social capital and the diffusion of innovations within organizations: Application to the implementation of computer technology in schools. *Sociology of Education, 77*(2), 148-171.
- Freeman, L. C. (1979). Centrality in Social Networks Conceptual Clarification. *Social Networks, 1*, 215-239. doi:10.1016/0378-8733(78)90021-7
- Friedkin, N. E., & Slater, M. R. (1994). Social Leadership and Performance: A Social Network Approach. *Sociology of Education, 67*, 139-157. doi:10.2307/2112701
- Gist, M. E., & Mitchell, T. R. (1992). Self-efficacy: A Theoretical analysis of its determinants and malleability. *Academy of Management Review, 17*, 183-211.
- Haythornthwaite, C. (1996). Social network analysis: An approach and technique for the study of information exchange. *Library & information science research, 18*(4), 323-342. doi:10.1016/S0740-8188(96)90003-1
- Johnson, B. (2003). Teacher collaboration: Good for some, not so good for others. *Educational Studies, 29*(4), 337-350. doi:10.1080/0305569032000159651
- Kameda, T., Ohtsubo, Y., & Takezawa, M. (1997). Centrality in socio-cognitive network and social influence: An illustration in a group decision-making context. *Journal of Personality and Social Psychology, 73*, 296-309. doi:10.1037/0022-3514.73.2.296
- Klassen, R. M., & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. *Journal of educational Psychology, 102*(3), 741. DOI:10.1037/a0019237
- Lee, J. C. K., Zhang, Z., & Yin, H. (2011). A multilevel analysis of the impact of a professional learning community, faculty trust in colleagues and collective efficacy on teacher commitment to students. *Teaching and Teacher Education, 27*(5), 820-830. doi:10.1016/j.tate.2011.01.006
- Lee, V. E., Dedrick, R. F., & Smith, J. B. (1991). The effect of the social organization of schools on teachers' efficacy and satisfaction. *Sociology of Education, 64*, 190-208. DOI:10.2307/2112851
- Lin, H. F. (2007). Effects of extrinsic and intrinsic motivation on employee knowledge sharing intentions. *Journal of information science, 33*, 135-149. DOI:10.1177/0165551506068174
- Moolenaar, N. M. (2012). A social network perspective on teacher collaboration in schools: Theory, methodology, and applications. *American Journal of Education, 119*(1), 7-39.
- Moolenaar, N. M., Daly, A. J., & Slegers, P. J. C. (2010). Occupying the principal position: Examining relationships between transformational leadership, social network position, and schools' innovative climate. *Educational Administration Quarterly, 46*(5), 623-670.
- Moolenaar, N. M., Daly, A. J., & Slegers, P. J. C. (2012). Exploring patterns of interpersonal relationships among teachers: A social network perspective. In T. Wubbels, J. van Tartwijk, P. den Brok and J. Levy (Eds.) (pp. 87-101), *Interpersonal Relationships in Education* (Advances in Learning Environments series). Rotterdam, The Netherlands: SENSE Publishers.
- Moolenaar, N. M., Daly, A. J., Slegers, P. J. C., & Karsten, S. (2014). The social forces of elementary school teams: How demographic composition shapes social networks. In T. Wubbels, J. van Tartwijk, P. den Brok, J. Levy & D. Zandvliet (Eds.), *Interpersonal Relationships in Education: From theory to practice* (Advances in Learning Environments series). Rotterdam, The Netherlands: SENSE Publishers.

- Moolenaar, N. M., Sleegers, P. J. C., & Daly, A. J. (2011). Teaming up: Linking collaboration networks, collective efficacy, and student achievement. *Teaching and Teacher Education*, 28(2), 251-262. DOI: 10.1016/j.tate.2011.10.001
- Moolenaar, N. M., Sleegers, P. J. C., & Daly, A. J. (2012). Teaming up: Linking collaboration networks, collective efficacy, and student achievement. *Teaching and Teacher Education*, 28, 251-262. doi:10.1016/j.tate.2011.10.001
- Moolenaar, N. M., Sleegers, P. J. C., Karsten, Sjoerd & Daly, A. J. (2012). The social fabric of elementary schools: A network typology of social interaction among teachers. *Educational Studies*, 38(4), 355-371. DOI: 10.1080/03055698.2011.643101
- Mowday, R. T., Steers, R. M., & Porter, L. W. (1979). The measurement of organizational commitment. *Journal of Vocational Behavior*, 14, 224-247. doi:10.1016/0001-8791(79)90072-1
- Nias, J. (1981). Commitment and motivation in primary school teachers. *Educational Review*, 33, 181-190. doi:10.1080/0013191810330302
- OECD (2015). Part-time employment rate (indicator). doi: 10.1787/f2ad596c-en (Accessed on 21 July 2015)
- Park, I. (2007). Teacher commitment and its effects on student achievement in American high schools. *Educational Research and Evaluation*, 11, 461-485. DOI:10.1080/13803610500146269
- Raudenbush, S. W., Rowan, B., & Cheong, Y. F. (1992). Contextual effects on the self-perceived efficacy of high school teachers. *Sociology of Education*, 150-167.
- Reyes, P. (1990). Organizational Commitment of Teachers. In P. Reyes (Ed.), *Teachers and their workplace: Commitment, performance, and productivity* (pp. 143 - 162). San Francisco: Sage.
- Rijksoverheid (2014). *Kamerbrief over de onderwijsakkoorden: samen werken aan het onderwijs van morgen*, Retrieved from <http://www.rijksoverheid.nl/documenten-en-publicaties/kamerstukken/2014/08/27/kamerbrief-over-de-onderwijsakkoorden-samen-werken-aan-het-onderwijs-van-morgen.html>
- Roberts, K. H., & O'Reilly, C. A. (1979). Some correlations of communication roles in organizations. *Academy of Management Journal*, 22, 42-57. doi:10.2307/255477
- Ross, J. A. (1998). The antecedents and consequences of teacher efficacy. In J. Brophy (Ed.), *Advances in Research on Teaching* (Vol. 7, pp. 49-74). Greenwich, CT: JAI Press.
- Schunk, D. H. (1987). Peer models and children's behavioral change. *Review of educational research*, 57(2), 149-174. doi:10.3102/00346543057002149
- Schunk, D. H. (1989). Self-efficacy and cognitive skill learning. In C. Ames & R. Ames (Eds.), *Research on motivation in education: Vol. 3. Goals and cognitions* (pp. 13-44). San Diego, CA: Academic.
- Schunk, D. H., & Zimmerman, B. J. (1997). Social origins of self-regulatory competence. *Educational psychologist*, 32(4), 195-208. doi:10.1207/s15326985ep3204\_1
- Schwarzer, R., Schmitz, G.S., & Daytner, G.T. (1999). The Teacher Self-Efficacy Scale [Online publication]. Retrieved from <http://www.strivetogether.org/sites/default/files/images/31%20Teacher%20Self-Efficacy.Schwarzer%20el%20al.pdf>
- Scott-Ladd, B., Travaglione, A., & Marshall, V. (2006). Casual inferences between participation in decision making, task attributes, work effort, rewards, job satisfaction and commitment. *Leadership & Organization Development Journal*, 27, 399-414. doi:10.1108/01437730610677990
- Scott, C. R., Connaughton, S. L., Diaz-Saenz, H. R., Maguire, K., Ramirez, R., Richardson, B., ..., & Morgan, D. (1999). The Impacts of Communication and Multiple Identifications on Intent to Leave A Multimethodological Exploration. *Management Communication Quarterly*, 12(3), 400-435.
- Shachar, H., & Shmuelewitz, H. (1997). Implementing cooperative learning, teacher collaboration and teachers' sense of efficacy in heterogeneous junior high schools. *Contemporary educational psychology*, 22, 53-72.
- Siciliano, M. D. (2015). Professional Networks and Street-Level Performance How Public School Teachers' Advice Networks Influence Student Performance. *The American Review of Public Administration*, 0275074015577110.
- Skaalvik, E. M., & Skaalvik, S. (2010). Teacher self-efficacy and teacher burnout: A study of relations. *Teaching and teacher education*, 26(4), 1059-1069. doi:10.1016/j.tate.2009.11.001
- Somech, A., & Bogler, R. (2002). Antecedents and consequences of teacher organizational and professional commitment. *Educational Administration Quarterly*, 38, 555-577. doi:10.1177/001316102237672
- Spillane, J. P., Kim, C. M., & Frank, K. A. (2012). Instructional advice and information providing and receiving behavior in elementary schools: Exploring tie formation as a building block in social capital development. *American Educational Research Journal*, 49(6), 1112-1145.
- Tschannen-Moran, M., & Hoy, A. W. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced teachers. *Teaching and teacher Education*, 23(6), 944-956. doi:10.1016/j.tate.2006.05.003
- Tsui, K. T., & Cheng, Y. C. (1991). School organizational health and teacher commitment: A contingency study with multi-level analysis. *Educational Research and Evaluation*, 5, 249-268. doi:10.1076/edre.5.3.249.3883
- Van Waes, S., Van den Bossche, P., Moolenaar, N., De Maeyer, S., & Van Petegem, P. (accepted, 2015). Know-who? Linking faculty's networks to stages of instructional development. *Higher Education*.
- World Bank. (2015). *Dupil-teacher ratio, primary*. Retrieved from <http://data.worldbank.org/indicator/SE.PRM.ENRL.TC.ZS>

## HOW TO CITE THE ARTICLE

De Jong, K. J., Moolenaar, N. M., Osagie, E., & Phielix, C. (2016). Valuable connections: a social capital perspective on teachers' social networks, commitment and self-efficacy. *Pedagogía Social. Revista Interuniversitaria*, 28 71-83. DOI:10.7179/PSRI\_2016.28.06

## AUTHOR'S ADDRESS

**Kees J. de Jong.** Utrecht University. Bretagne 51. 3524 RN Utrecht.  
Dirección de correo/e-mail: [dejong\\_kees@hotmail.com](mailto:dejong_kees@hotmail.com)

**Nienke M. Moolenaar.** P.O.Box 80.140. 3508 TC Utrecht. The Netherlands.  
Dirección de correo/e-mail: [n.m.moolenaar@uu.nl](mailto:n.m.moolenaar@uu.nl)

**Eghe Osagie.** P.O.Box 80.140. 3508 TC Utrecht. The Netherlands.  
Dirección de correo/e-mail: [e.r.osagie@uu.nl](mailto:e.r.osagie@uu.nl) ; [Eghe.osagie@wur.nl](mailto:Eghe.osagie@wur.nl)

**Chris Phielix.** Utrecht University. Bretagne 51. 3524 RN Utrecht.  
Dirección de correo/e-mail: [c.phielix@uu.nl](mailto:c.phielix@uu.nl)

## ACADEMIC PROFILE

**Kees J. de Jong.** Teacher in elementary education. In July 2015 he received his Master's degree in Educational Sciences. His masterthesis focused on teachers' social networks, their commitment and their sense of efficacy. During his Bachelor of Education in 2013 he examined reading skills in elementary education. His main research goal was to investigate which factors of Reading education may lead to better reading skills.

**Nienke M. Moolenaar.** Assistant professor at Utrecht University in the Netherlands. Her research interests include social capital theory, social network analysis, leadership and organizational behavior. She studies social networks among educators in both the United States and the Netherlands to understand the complexity of social dynamics in schools. For more information, please visit: <http://uu.academia.edu/NienkeMoolenaar>.

**Eghe Osagie.** E. R. Osagie is a teacher at Utrecht University and a PhD student at the Wageningen university in the Netherlands. Her research interests include employability; competence development; workplace learning; sustainability; corporate social responsibility; change management; and leadership. For more information, please visit: [https://www.researchgate.net/profile/E\\_Osagie](https://www.researchgate.net/profile/E_Osagie)

**Chris Phielix.** Lecturer and researcher at Educational Sciences within the department Education, Faculty of Social Sciences, Utrecht University, The Netherlands. After receiving his Master's degree (Educational Sciences) in February 2004, he worked as a lecturer at Utrecht University. In December 2004 he worked as a research assistant at an international testing and assessment company named Cito in Arnhem. Since May 2005 he worked as an educational consultant at FLOAT in Doorn. Chris completed his PhD-thesis between 2006 and 2012, which focused on socio-emotional aspects of group functioning. The main research goals are (1) examining ways to let group members become aware of their socio-emotional group behaviour by means of a peer-feedback tool and (2) examining ways to alter individual socio-emotional group behaviour by means of a reflection instruction. From January 2011 to June 2012, Chris worked as a researcher and thesis supervisor at the Interfaculty Centre for Teacher Education, Teaching (ICLON), at Leiden University. From 2014, Chris is involved in three research projects: teacher attrition, teacher accountability, and academic teachers in primary education.

