



Review

Teacher collaboration: A systematic review



Katrien Vangrieken*, Filip Dochy, Elisabeth Raes, Eva Kyndt

Centre for Research on Professional Learning & Development, Corporate Training and Lifelong Learning, University of Leuven, Dekenstraat 2 (Box 3772), 3000 Leuven, Belgium

ARTICLE INFO

Article history:

Received 15 March 2014

Received in revised form 8 April 2015

Accepted 19 April 2015

Available online 22 April 2015

Keywords:

Teacher collaboration

Teacher teams

Team entitativity

ABSTRACT

This paper presents a systematic review on teacher collaboration. In total, 82 studies were selected based on predefined selection criteria and reviewed by means of a narrative review method to thematically gather information across the studies. The first aim of this review was to provide an overview of the terminological framework to describe teacher collaboration used in previous research. Collaboration was perceived here as a continuum ranging from mere aggregates of individuals to strong team collaboration. This continuum was conceptualised as the degree of team entitativity. Second, the review investigated the focus and depth of collaboration. These appeared to be important issues and provide different opportunities for (collaborative) learning. Third, although realising teacher collaboration proves to be challenging, this review listed benefits for students, teachers, and the school. Fourth and fifth, various facilitating and hindering factors were explored that may serve as valuable points of action to realise effective collaboration. The latter has vital importance for the future as it is needed to build schools into learning organisations, to anticipate the growing importance of collaboration in society and to use education as a role model for students to properly prepare them for the future.

© 2015 Elsevier Ltd. All rights reserved.

Contents

1.	Introduction	18
2.	Present study	18
3.	Earlier reviews	18
3.1.	Gaps in current reviews	19
4.	Aims and research questions	19
5.	Method	20
5.1.	Literature search procedure	20
5.2.	Selection criteria and selection results	21
5.3.	Synthesising research	21
6.	Results	21
6.1.	Terminological framework	21
6.1.1.	Overview of terminology	23
6.1.2.	Clarifying the framework for teacher collaboration	23
6.2.	Focus and depth of teacher collaboration	26
6.3.	Benefits and negative consequences of teacher collaboration	27
6.3.1.	Benefits of teacher collaboration	27
6.3.2.	Possible negative consequences of teacher collaboration	29

* Corresponding author. Tel. +32 (0)16 32 09 67.

E-mail address: katrien.vangrieken@ppw.kuleuven.be (K. Vangrieken).

6.4.	Preconditions for teacher collaboration	29
6.4.1.	Facilitating factors for teacher collaboration	29
6.4.2.	Hindering factors for teacher collaboration	33
6.5.	Effective collaboration	33
7.	Conclusions and discussion	35
8.	Limitations and recommendations for future research	36
	Appendix Supplementary material	37
	References	37

1. Introduction

The educational sector is confronted with an increasing pressure towards collaboration: teachers need to be proficient collaborators in order to successfully perform their job. There are different reasons for this evolution and the fact that teamwork is a phenomenon of growing importance in society overall is one of the contributing factors. A collaborative work environment seems to become the norm for every organisation (Decuyper, Dochy, & Van den Bossche, 2010; Edmondson, 2013). Education is often seen as an important context for students to acquire these collaborative skills before they enter the labour market. Within education, teacher collaboration plays an important role in transforming students into proficient future collaborators as teachers model cooperative learning for students by working together as a team (Coke, 2005). They can only teach collaborative skills when they “practice what they preach” (Coke, 2005). Moreover, in order to successfully implement innovative, student-centred, and collaborative learning methods proficient collaboration among the teaching staff is required (Dochy, Segers, Van den Bossche, & Gijbels, 2003; Meirink, 2007; Shipley, 2009; Slavit, Kennedy, Lean, Nelson, & Deuel, 2011). Results from The Teaching and Learning International Survey (TALIS) 2013 showed that teachers involved in collaborative learning reported using more innovative pedagogies (e.g., working in small groups), and displayed more job satisfaction and self-efficacy (European Commission, 2013). In countries with high performance in education such as Finland, teachers collaborate to a high extent with excellent results as a consequence. In other countries, this appears to be rather difficult to achieve.

2. Present study

As teacher collaboration is important, this review can form a contribution by investigating different forms of teacher collaboration, the positive and negative consequences, and facilitating and hindering factors of teacher collaboration.

In order to get an overview of the state-of-the-art of research on teacher collaboration, previous reviews on the topic were reviewed (section 2), aiming to provide an overview of what is known and to expose the gaps in current research. This review set five research aims that are deemed relevant for research as well as practice. These focus on terminology used in previous research to describe teacher collaboration, gaining insight in what teacher collaboration is about (the focus and depth thereof, distinguishing between superficial and deep-level collaboration), benefits and negative consequences of collaboration, facilitating and hindering factors for teacher collaboration, and clarifying what effective collaboration includes. The aims were addressed using a systematic literature search and a narrative review method to synthesise the literature that was selected (section 4). In the results section, the five aims described above are elaborated upon based on analyses of the collected studies. This is followed by an overview of conclusions and discussion on the main results (section 6), limitations of the article at hand, and possible areas for future research (section 7).

3. Earlier reviews

In this section an overview of the current state-of-the-art of research on teacher collaboration will be presented based on earlier reviews. To focus on the most recent knowledge on this topic, the overview is deliberately limited to three most relevant reviews written after 2000.

The three reviews investigated different aspects and kinds of teacher collaboration. Kelchtermans (2006) focused on the broad constructs collaboration and collegiality. Both other reviews looked at teacher professional communities. The review of Lomos, Hofman, and Bosker (2011a) specifically focused on the relationship between teacher professional communities and student performances. Similarly, Fulton and Britton (2011) investigated Science, Technology, Engineering and Mathematics (STEM) teachers in professional learning communities (PLCs), focusing on what happens when teachers work together in PLCs in order to improve teaching and student achievement.

As the reviews had a different focus, they also used different terminological frameworks. Kelchtermans (2006) conceptualised teacher collaboration and collegiality as working conditions for teachers and as embedded in the organisational context. He used a micropolitical stance, including a focus on individual differences, diversity of goals and conflict, the use of informal power, and the different interests that are at play in interactions in an organisation. Collaboration was used here as a descriptive term, referring to the cooperative actions teachers undertake for job-related purposes (their actual doing things together). Kelchtermans (2006) distinguished collaboration as being a descriptive concept from collegiality. The latter was used to describe the quality of the relationships among staff members in a school and has a normative dimension because it often includes a positive value, referring to good relationships among colleagues, and is part of the organisational culture.

Fulton and Britton (2011) and Lomos et al. (2011a) discussed professional communities, a construct that is not easy to capture. Lomos et al. (2011a) argued that a universal definition and operationalisation of professional community is lacking and discussed different conceptualisations. This lack of clarity was reflected in the work of Fulton and Britton (2011) who did not provide a clear conceptualisation of professional learning communities and adopted a very broad definition of the construct: they required that it involved three or more teachers in a sustained effort over time.

Different, more or less systematic, methodological approaches were applied in these reviews. In the case of Kelchtermans (2006) little methodological information was provided. The approach of collaboration and collegiality as meaningful organisational entities guided literature selection and analysis. Kelchtermans (2006) listed the topics that were not included in the review (e.g., the pedagogy of cooperation, formal relationships of supervision), but more information on the selection and analysis procedure was not provided. Fulton and Britton (2011) provided more detailed information on their search process. Different variants of “professional learning community”, related to STEM teachers with Boolean logic, were used as search terms to gather literature. Researchers then judged the strength of the retrieved studies using 31 standards of evidence (developed by Horizon Research Inc.; Heck & Minner, 2010). Besides these selected research studies, published expert knowledge and advice, published descriptions of models of STEM teaching in PLCs, and a panel of practitioner experts were included for analyses as well. However, a clear description of selection criteria and analyses were lacking. Finally, Lomos et al. (2011a) performed a systematic and comprehensive search of the literature, using the databases EBSCOhost, ERIC, PiCarta², and Google Scholar. The search was restricted to articles from 1982 (first official publication on teachers working together in a professional group) until 2009. The authors used conceptual (a clear conceptualisation of professional community) and methodological criteria (quantitative empirical research into the effects of professional communities on student achievement within secondary education) to select literature. Five articles were included in the meta-analysis. The latter included the computation of correlation coefficients at the student level for each study (transformed in Fischer Z Units and Cohen's *d*) and analyses by means of a random effects model.

The results of the review of Kelchtermans (2006) showed that collaboration and collegiality are determined and mediated by the organisational context, that is, the structural and cultural working conditions in schools. Collaboration and collegiality are thus considered to be organisationally embedded, taking different forms with different values and contributing to different agendas that are not all necessarily positively appreciated. Kelchtermans (2006) stressed that the school context has to be taken into account when looking at collaboration and collegiality and that a cultural perspective (that focuses on sense-making, the values, and norms) as well as a micro-political perspective (addresses issues of power, interests, and influence) is needed to clarify these concepts. He furthermore argued that professional learning communities (PLCs) are cultural and political (rather than structural) environments in which collaboration and collegiality can occur in a way that they really contribute to the learning of students, teacher professional development and school improvement. Such a community should balance a focus on interpersonal ties and room for constructive controversy in which differences in opinion and beliefs can arise in order to enhance authentic professional learning. Moreover, not only teachers' learning progresses but also the review of Lomos et al. (2011a) showed a small but significant aggregated effect of professional communities on student performance. More specifically, the presence of professional communities enhances student performance ($d = .25$, $p < .05$). The results of Fulton and Britton (2011) confirmed this finding, showing that students of teachers in STEM learning communities learn math better. They provided more information on the underlying mechanisms supporting this relationship. Fulton and Britton (2011) found that teachers engaged in discussions about the mathematics and science they teach, understood mathematics and science better, felt more prepared to teach mathematics and science, used more research-based methods for teaching, paid more attention to students' reasoning and understanding, and used more diverse modes of engaging students in problem solving. The review furthermore mentioned a few design and implementation principles considering STEM learning teams: shared values and goals, leadership support, time, use of student data and work, collective responsibility, good facilitation, trust, and a single school subject (learning teams being composed of teachers who all teach one particular school subject).

3.1. Gaps in current reviews

Looking at these three studies, it became clear that no systematic review on actual teacher teams as such was found but that the focus was on professional learning communities or ad hoc forms of collaboration. Moreover, the reviews of Kelchtermans (2006) and Fulton and Britton (2011) did not provide sufficient information on the literature search and analyses performed. This is in line with the statement of Crow and Pounder (2000) who argued that literature on teacher teams and other collaborative work arrangements are vulnerable to a critique on its lack of methodological rigor. Additionally, the reviews focus on one aspect of teacher collaboration (e.g., effects on student achievement). A review presenting a more holistic picture of teacher collaboration, clearly defining and differentiating between different kinds of collaboration, appeared to be lacking. In conclusion, there seemed to be a need for a new systematic review on teacher collaboration.

4. Aims and research questions

Below, the specific aims and corresponding research questions are listed, providing the focus and structure of this review.

The first aim of this review included providing an overview of how teacher collaboration was described in previous research. Thus, the first research question to be answered was: What is the terminology used in previous research to describe teacher collaboration?

The second aim included what teacher collaboration is about. While the first aim of this review referred to structural aspects of collaboration, this aim zoomed in on the content of collaboration, distinguishing between superficial and deep-level collaboration. In this way, the aim was to gain insight into the depth of prevailing teacher collaboration and how this is important. The question to be answered thus included: Is there a variety in the focus and depth of teacher collaboration and how is this important?

The third aim of this study was to display positive consequences of teacher collaboration, but also to inform about potential downsides. The third research question can be stated as: What are possible positive and negative consequences of teacher collaboration?

Furthermore, the fourth aim included gaining insight into what is needed for teacher collaboration to be successful. This resulted in a fourth research question: Which factors facilitate and which factors hinder successful teacher collaboration?

The previous research question elicited the fifth and final aim of this study, namely, clarifying what *successful teacher collaboration* actually is. What is it we actually aim for? Hence, the research question to be answered was: What is *effective teacher collaboration*?

5. Method

5.1. Literature search procedure

Literature was collected in August–September 2012 using the following databases: ERIC (U.S. Dept. Of Education), APAPsyncnet and Scirus and the search engines Limo (databases included: OneFile [GALE], Taylor & Francis Online – Journals, Informa – Taylor & Francis [CrossRef], SciVerse ScienceDirect [Elsevier], MEDLINE [NLM], Arts & Sciences [JSTOR], Sage Publications [CrossRef], SAGE Journals, Emerald Management eJournals, MLA International Bibliography, Informa [CrossRef], Wiley Online Library, Directory of Open Access Journals [DOAJ], SpringerLink, Social Sciences Citation Index [Web of Science], NARCIS [Royal Netherlands Academy of Arts and Sciences], M.E. Sharpe, Science Citation Index Expanded [Web of Science], Lirias, Arts & Humanities Citation Index [Web of Science], SpringerLink Open Access, American Chemical Society [CrossRef]) and Web of Knowledge (databases included: Web of Science, Inspec, BIOSIS Citation Index and BIOSIS Previews).

The most relevant literature sources were found through ERIC. Searching through the other databases did not lead to a considerable amount of additional literature and no literature was selected from APAPsyncnet. The search terms used were ‘teacher teams’, ‘teacher collaboration’, ‘teacher groups’, ‘professor teams’, ‘professor collaboration’, ‘lecturer teams’, and other Flemish terms to describe teacher collaboration (teacher teams [‘*leerkrachtenteams*’], lecturer teams [‘*docententeams*’], professor teams [‘*professorenteams*’], subject area groups higher education [‘*vakgroepen hoger onderwijs*’], teams in higher education [‘*teams hoger onderwijs*’], cooperation teachers [‘*samenwerking leraren*’] and cooperation lecturers [‘*samenwerking docenten*’]). In order to limit our searches, the searches were limited to full text online and from 2000 onwards.

An overview of the number of sources delivered by and selected for each search term and database can be found in Table 1. The first selection in the wide variety was done on the basis of the titles. Literature sources with titles that were not relevant for the subject under study, not referring to any of the terms describing teacher collaboration or referring to elements that do not meet the selection criteria (see subsection 5.2.) were eliminated. The remaining sources were further assessed by their abstract and, if necessary (if the abstract did not provide proficient information), further reading. In the next step, the snowballing technique was applied, the references of the sources that were deemed relevant were examined in order to find more important studies. These were again judged based on their title, abstract and, if necessary, further reading. The relevance of the delivered sources was judged using selection criteria specified in advance that are discussed in the next subsection.

Table 1
Results literature search: Number of sources delivered by the database and articles retrieved.

		ERIC	Limo	Web of Knowledge	Scirus
Teacher teams	Sources	1174	24085	1547	9423
	Selected	19	5	1	4
	Snowballing	12	7	2	1
Teacher collaboration	Sources	1605	49089	1914	9423
	Selected	11	0	1	4
	Snowballing	6	0	2	2
Collaboration lecturers (‘ <i>samenwerking docenten</i> ’)	Sources	0	14	0	80165
	Selected	0	0	0	1
	Snowballing	0	0	0	0
Collaboration teachers (‘ <i>samenwerking leraren</i> ’)	Sources	0	17	0	10362
	Selected	0	0	0	1
	Snowballing	0	0	0	0

5.2. Selection criteria and selection results

To ensure the relevance of the selected literature, the following criteria were applied during the selection process. First of all, the discussed collaboration had to pertain to teachers (e.g., no leadership teams or administrative collaboration) and teacher collaboration had to be (part of) the primary focus. Second and third, sources with a primary focus on team teaching (two teachers who simultaneously teach a class) and research studying teams with only two members were excluded. A fourth criterion included that the studies had to be recent: from 2000 onwards. Finally, literature discussing special education was excluded and the focus was on teams within schools, no collaboration concerning other external parties. Research in all educational levels was included, ranging from kindergarten to university.

The number of sources selected for each search term and database can be found in [Table 1](#). Snowballing was used to look through the references for additional relevant literature, bearing the same selection criteria in mind. Overall, the literature search led to a total of 82 sources being selected. Besides journal articles, one book chapter, research reports ($n = 5$), doctoral dissertations ($n = 12$), master's theses ($n = 2$), and one published conference proceeding were included. For reasons of convenience we will refer to all these sources as 'studies' here. Of the studies that were included ($n = 82$), there were 39 qualitative studies (48%), 21 quantitative (26%), 20 mixed method studies (combining one or more qualitative and quantitative methods) (24%) and 2 theoretical papers (2%).

5.3. Synthesising research

In order to gain deep-level insight in teacher collaboration, a narrative review method was chosen to synthesise the research. This presents the author with the opportunity to bring a considerable amount of information from different sources together and to synthesise this in such a way that it gives new conclusions to the literature rather than just presenting a summary ([De Rijdt, Stes, van der Vleuten, & Dochy, 2013](#); [Green, Johnson, & Adams, 2011](#)). The steps taken in the synthesis process are elaborated upon below.

In this paper tools and techniques proposed by [Arai et al. \(2007\)](#) to improve the quality of narrative synthesis were used. In the first step, the development of a preliminary synthesis, a combination of several tools was used. A large synthesis table was made after carefully reading the studies, inventorying study characteristics and containing the content of all studies on different dimensions (see [Appendix S1](#) for a full overview). Furthermore, groupings and clusters were used: grouping studies across terms used to describe teacher collaboration and categorising preconditions and (positive and negative) consequences of teacher collaboration.

The use of tables, groupings, and categorisations made it possible to investigate similarities and dissimilarities between studies and to group the studies according to the sort of teacher collaboration under study as encouraging, and working towards a clarified terminological framework was a central aim of this review. This was needed because it may not be justifiable to draw conclusions when different forms of collaboration are not taken into account. For that reason, for every study the sort of collaboration investigated was mentioned (see [Table 2](#)) and the results (goals and benefits, possible negative consequences, hindering and facilitating factors) were organised according to the descriptor used in the study at hand. As there were ample facilitating factors, subcategories were made with regard to studies discussing *teams* as most of the studies retrieved used this term. The task component of the teacher team typology by [Vangrieken, Dochy, Raes, & Kyndt, 2013](#) was used here as a guiding framework (instruction or pedagogy, innovation and school reform and learning). However, because a lot of studies did not clearly describe the sort of teacher team under study, a category of general factors for studies in which the task was not specified was added.

In the next step, data from the tabulations were translated in text form by means of thematic analyses. Assessment and comparison of the components included in the overview table ([Appendix S1](#)) and clusters formed the starting point. Later on, the studies were read again and other elements were included in the text to provide a more elaborate and complete picture of the phenomenon of teacher collaboration.

6. Results

In this section the results of the review will be discussed following the structure of the aims and research questions.

6.1. Terminological framework

This first subsection discusses the terminological framework of the studies reviewed. It addresses the first aim of providing an overview of the terminology used in previous research on collaboration. Exploring this terminology showed that various, often ill-defined, terms were used. It was often unclear whether different terms referred to different or the same kinds of collaboration and they were often used interchangeably. Hence, in the next step this review attempted to provide a clarified terminological framework by defining different forms of teacher collaboration and possible ways for them to be structured and conceptualised.

Table 2
Grouping of studies according to term used to describe collaboration.

Term	Articles
Teacher collaboration (n = 13)	Berry, Daughtry, and Wieder (2009) Cameron (2005) Datnow (2011) Doppenberg, den Brok, and Bakx (2012) Goddard, Goddard, and Tschannen-Moran (2007) Hindin, Morocco, Mott, and Aguilar (2007) Kelchtermans (2006) Kougioumtzis and Patriksson (2009) Leonard and Leonard (2001a) Leonard and Leonard (2003) Shipley (2009) Stephenson, Warnick, and Tarpley (2008) Vogels (2009)
P(L)C (n = 6)	Grossman, Wineburg, and Woolworth (2001) Leonard (2002) Leonard and Leonard (2001b) Lomos, Hofman, and Bosker (2011a) Scribner, Hager, and Warne (2002) Westheimer (2008) Williams (2010)
Communities or CoP (n = 5)	Achinstein (2002) Brouwer, Brekelmans, Nieuwenhuis, and Simons (2011) (community development in teacher teams) Brouwer, Brekelmans, Nieuwenhuis, and Simons (2012) (community development in teacher teams) Levine and Marcus (2007) (also 'P(L)C') Lima (2001)
Teacher teams (n = 52)	Bertrand, Roberts, and Buchanan (2006) Bovbjerg (2006) Brouwer (2011) Carroll and Foster (2008) Chance and Segura (2009) Cheng and Ko (2009) Conley, Fauske, and Pounder (2004) Crow and Pounder (2000) Dickinson (2009) Doppenberg, den Brok, and Bakx (2012) Drach-Zahavy and Somech (2002) McDougall and Stoilescu (2011) Flowers, Mertens, and Mulhall (2000) Fulton and Britton (2011) Graham (2007) Gregory (2010) Gunn and King (2003) Hackmann et al. (2002) Havnes (2009) Helstad and Lund (2012) James, Dunning, Connolly, and Elliot (2007) Johnson (2003) Levine and Marcus (2010) Main (2007) Main (2012) Main and Bryer (2005) Meirink (2007) Meirink, Imants, Meijer, and Verloop (2010) Mertens and Flowers (2004) Markow and Pieters (2010) Moolenaar (2010) Moolenaar, Slegers, and Daly (2011) Ohlsson (2013) Park, Henkin, and Egley (2005) Plauborg (2009) Prytula, Hellsten, and McIntyre (2010) (collaborative teams) Rone (2009) Saunders, Goldenberg, and Gallimore (2009) Scribner, Sawyer, Watson, and Myers (2007) (professional learning teams) Slavit, Kennedy, Lean, Nelson, and Deuel (2011) Smetser (2007) Smith (2009) Somech (2005) Somech (2008) Somech and Drach-Zahavy (2007) Supovitz (2002) Tonso, Jung, and Colombo (2006) Tuijten, Slegers, Meelissen, and Nieuwenhuis (2013) Voelkel (2011) (PLC-teams) Watson (2005) Wigglesworth (2011) Yisrael (2008)
Teacher (learning) groups (n = 1)	
Departments (n = 2)	Visscher and Witziers (2004) Lomos, Hofman, and Bosker (2011b)
Other (critical friends groups, collaborative practice, interactions, networks) (n = 2)	Curry (2008) (critical friends groups) Hargreaves (2001) (interactions)
Different forms (n = 1)	Gajda and Koliba (2008) (teacher teams as part of communities of practice, which are in their turn part of professional learning communities)

6.1.1. Overview of terminology

As argued above, there appeared to be a lot of conceptual confusion concerning teacher collaboration. A considerable amount of different terms is used to describe this phenomenon: teacher teams, teacher collaboration, professional (learning) communities, (teacher) learning communities, (teacher) learning teams, etc. (an overview of the different terms to describe collaboration can be found in [Appendix S2](#)). These terms were often used interchangeably and different researchers tended to allot different interpretations to the same term.

For example, the lack of a clear distinction between ‘team’ and ‘community’ was found in the work of [Brouwer \(2011\)](#), [Fulton and Britton \(2011\)](#), [Lomos, Hofman, and Bosker \(2011b\)](#), and [Supovitz \(2002\)](#). On the one hand, [Brouwer \(2011\)](#) characterised teacher teams as “a community to a certain degree” ([Brouwer, 2011, p. 12](#)), without clearly defining ‘teams’. On the other hand, [Supovitz \(2002\)](#) suggested that teacher teams are divided into communities of practice (CoPs), without clarifying both notions. He stated that teachers can be conceptualised as working in CoPs irrespective of whether they interact on teams, departments, or whole faculty meetings. Furthermore, according to [Kelchtermans \(2006\)](#) and [Lima \(2001\)](#) ‘collaboration’ and ‘collegiality’ are often used interchangeably. The term ‘collaboration’ was often used to describe forms of teacher interactions that are basically occasional, meaningless, and lacking in rigor ([Lima, 2001](#)).

The conceptual confusion suggested above made unambiguous interpretation and drawing clear conclusions difficult. This also made it difficult to clearly list and define the different forms of collaboration described in research and to categorise the studies accordingly, which was one of the aims of this review. Hence the studies were now grouped according to the concept used most dominantly throughout the study. A detailed overview of the categorisations and the number of studies in each category can be found in [Table 2](#). First of all there was an extensive number of studies actually referring to ‘teacher teams’ ($n = 52$). However, they rarely appeared to provide a clear definition of what they perceived to be a team. A previous article of ours ([Vangrieken, Dochy, Raes, & Kyndt, 2013](#)) already attempted to clarify and structure the concept of teacher teams. Of the studies included in this review, six explicitly referred to ‘professional learning communities’. Another thirteen studies used the broad term ‘collaboration’ and one referred to teacher ‘(learning) groups’. Other terms used were ‘departments’ ($n = 2$) ‘communities (of practice)’ ($n = 5$) and names as ‘critical friends groups’, ‘collaborative practice’, ‘interactions’, ‘community’ ($n = 2$). One final study used different terms that actually referred to different forms of collaboration (‘teams’, ‘family’, ‘departments’, etc.).

6.1.2. Clarifying the framework for teacher collaboration

6.1.2.1. Defining the different terms. As different terms used to describe collaboration were not clearly delineated and defined, this section aimed to provide the first steps towards a clarified terminological framework. The most important terms to describe collaboration are discussed and clarified, clearly distinguishing between different forms of collaboration.

6.1.2.1.1. Collaboration. This generic construct was refined by [Little \(1990\)](#), who distinguished four different types of collaboration situated on a continuum ranging from independence to interdependence and include: storytelling and scanning for ideas, aid and assistance, sharing, and joint work. An important characteristic of collaboration appeared to be its task-related focus, including working and reflecting together for job-related purposes ([James, Dunning, Connolly, & Elliott, 2007](#); [Kelchtermans, 2006](#)). In the case of collaboration, this working together includes the partners in the process doing all their work together as opposed to cooperation in which partners split the work and combine each of their partial results into the final outcomes ([Sawyer, 2006](#)). Collaboration is seen as different from collegiality as the first tends to refer to the cooperative actions ([Kelchtermans, 2006](#)) while the latter focuses on the relationships among colleagues ([Bovbjerg, 2006](#); [Kelchtermans, 2006](#)). While collegiality has an inherent positive value as described by [Kelchtermans \(2006\)](#), collegiality is defined as consisting of relationships with colleagues as obligations based on mutual sympathy, solidarity based on an equal work situation, etc. in the case of [Bovbjerg \(2006\)](#). Similarly, [Datnow \(2011\)](#) distinguished between collaborative cultures that support and stimulate spontaneous collaboration and contrived collegiality. While a collaborative culture originates from teachers perceiving collaboration to be valuable, productive, and pleasant, contrived collegiality results from administrative regulation obliging teachers to collaborate.

Based upon the studies above, it can be stated that collaboration can be defined as joint interaction in the group in all activities that are needed to perform a shared task. This concept is not static and uniform but different types of collaboration can occur with varying depths. In a sense collaboration can be seen as an umbrella term, being part of different collaborative concepts.

6.1.2.1.2. Professional (learning) community (P(L)C). The terms ‘professional community’ and ‘professional learning community’ were often used interchangeably. However, [Westheimer \(2008\)](#) did make a distinction as he described a professional/teacher learning community to be a subset of teacher professional communities. On the one hand, teacher professional communities were described as a group of teachers that is concerned with professional endeavours together. Similarly, [Achinstein \(2002\)](#) was inspired by an older definition of [Van Maanen and Barley \(1984\)](#) when describing a professional community as “a group of people across a school who are engaged in common work; share to a certain degree a set of values, norms, and orientations towards teaching, students, and schooling; and operate collaboratively with structures that foster interdependence” (p. 422). On the other hand, a professional learning community includes those subsets of teacher professional communities that focus on learning together with and from colleagues and they are generally restricted to a school site ([Westheimer, 2008](#)).

Similarly, Rone (2009) defined a professional learning community as consisting of “groups of teachers who share and critically question their practice in an on-going, reflecting, collaborative, learning-oriented way to promote their growth and skill” (p. 4).

Sometimes professional (learning) communities seemed to be perceived as a school-level construct, capturing the whole school as a P(L)C (or even teachers from different schools or school sites) instead of a subset of teachers (e.g., Birenbaum, Kimron, & Shilton, 2011; Leonard, 2002; Leonard & Leonard, 2001b). The school as a community entails teachers collaborating; they are bonded together to a set of shared ideas and ideals, rather than individualism and isolation (Leonard, 2002; Leonard & Leonard, 2001b). These can then be divided into communities of practice (e.g. Gajda & Koliba, 2008) or teams (e.g., Rone, 2009).

The construct of a professional (learning) community can be understood as overarching different teams or other forms of teacher groupings in schools, gathering all (or a large part) of the teachers of the school in a collaborative culture. It is to some extent characterised by shared values and vision and is learning-oriented (in the case of professional learning communities).

6.1.2.1.3. Community of practice (CoP). As suggested above, CoPs can be perceived as the building blocks of PLCs (Gajda & Koliba, 2008; Lima, 2001). CoP was described as one of the three central elements to be found in most conceptions of teacher community (besides community of understanding, i.e., common values, shared beliefs, goals, and norms; and community of affection, i.e., personal meaningful relationships among teachers) (Lima, 2001). CoP as one of the binding elements of teacher community then includes the characteristics of teacher mutual support, collaboration, and collegiality. In this conception, community of practice is not seen as a distinct form of collaboration, but the aspect of practice is seen as one of the binding elements in a community.

Other authors do refer to CoPs as a separate collaborative form with its own characteristics. For example, Supovitz (2002) argued that “in communities of instructional practice teacher teams continually explore their curricular and pedagogical strategies and the influences of these efforts on student learning” (p. 1592). In this view, a community of (instructional) practice is a way of grouping (teams of) teachers. Lave and Wenger (1991), who introduced the construct, defined a CoP as “a set of relations among persons, activity, and world, over time and in relation with other tangential and overlapping communities of practice” (p. 98). Three dimensions of CoPs were distinguished: 1) mutual engagement, 2) a joint enterprise, and 3) a shared repertoire (Wenger, 1998). Overall, practice is seen as the source of coherence of a community. Mutual engagement is described as what defines the community: membership of a CoP is seen as a matter of mutual engagement in practice. It creates relationships among people that can go deeper than similarities in terms of personal features or social categories. Joint enterprise refers to the fact that the enterprise of a community is communally negotiated; it is not joint in the sense that everybody believes the same thing or agrees with everything. It results from a collective process of negotiation and renegotiation and this relates to the self-governing of the group. The development of a shared repertoire means that the joint pursuit of an enterprise creates resources for negotiating meaning (e.g., routines, words, tools, ways of doing things, stories, gestures, symbols, genres, actions or concepts that belong to the practice of a community pursuing an enterprise). This repertoire was produced or adopted in the course of the community’s existence and as such they have become part of the practice of the community.

Brouwer, Brekelmans, Nieuwenhuis, and Simons (2012) build on this definition, referring to a teacher community as “a group of teachers who are socially interdependent, who participate together in discussion and decision making, and share and build knowledge with a group identity, shared domain, goals and interactional repertoire” (p. 320). They state that in this definition group identity refers to the aforementioned mutual engagement, it holds the members together in a social entity. The shared domain is equated to joint enterprise and shared interactional repertoire refers to shared practice and beliefs. Brouwer, Brekelmans, Nieuwenhuis, and Simons (2011) furthermore argued that a community of practice is not a static entity but that it develops through time.

We will define a CoP following Lave and Wenger (1991) as the studies referring to this construct often build on this definition (e.g., Brouwer, 2011; Brouwer et al., 2011, 2012; Levine & Marcus, 2007).

6.1.2.1.4. Team. Within educational practice, the term team is often used to refer to the complete teaching staff, regardless of whether they actually collaborate in a team or not. The term then merely refers to the collection of individual teachers who are employed in the school. Even an extensive part of the scientific literature on teacher teams lacked clear definitions and appeared to use the term in this way, making it difficult to assess whether they discussed actual teams and to draw warranted conclusions on actual teacher teams (Vangrieken, Dochy, Raes, & Kyndt, 2013). Although this use of the term is common, the entire workforce of any large and complex organisation can never be a team (Katzenbach & Smith, 2005).

Team literature provides more clear descriptions of teams. Cohen and Bailey (1997) provided an integrative definition of a team: “A team is a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems (for example, business unit or the corporation), and who manage their relationships across organizational boundaries” (p. 241). Katzenbach and Smith (2005) argued that the essence of a team is common commitment and mutual accountability, and Salas, Burke, and Cannon-Bowers (2000) added team interaction and the development of a shared vision to the list of criteria to discern teams from mere aggregates of individuals or groups.

Table 3
Distribution of articles across discipline and grade level of collaboration discussed.

	Disciplinary	Interdisciplinary	Unclear	Mix	Total
Within grade	2	11	5	0	18
Cross grade	3	2	0	0	5
Unclear	5	14	26	2	47
Mix	1	2	0	9	12
Total	11	29	31	11	82

A team can thus be defined as a distinguishable collection of individuals, who identify themselves as a team and interact as a team to reach certain shared goals for which they share responsibility and hold themselves mutually accountable. Members are jointly committed to the common purpose and task and are interdependent in their tasks and outcomes. Teacher teams mostly do not meet the criteria of a ‘team’ as embedded in this definition.

6.1.2.1.5. Group. Groups can broadly be defined as a collection of individuals being characterised by the sharing of a common social categorisation and identity (Raes, Kyndt, Decuyper, Van den Bossche, & Dochy, 2015). The terms ‘group’ and ‘team’ were often used interchangeably and they partially do share the same characteristics (bounded social units that work in larger social organisations) (Main, 2007). However, they do not equate to each other as a team is mostly described more narrowly than a group, all teams are groups but the opposite does not apply as groups do not necessarily meet all team criteria (Main, 2007; Raes et al., 2015; Van den Bossche, Gijsselaers, Segers, & Kirschner, 2006). Katzenbach and Smith (2005) argue that the main difference between groups and teams resides in the fact that a working group’s performance results from what members do as individuals, the focus is on individual goals and accountabilities. In contrast, teams build on common commitment and mutual accountability (Katzenbach & Smith, 2005). Salas et al. (2000) state that teams differ from groups with respect to task interdependence, structure, and time span.

Thus a group can be defined as a collection of individuals who share a common social categorisation and identity, but the focus remains on individual goals and individual accountability. It can be discerned from a team by the fact that groups do not have to comply with all criteria of a team as described above.

6.1.2.2. Structure of collaboration. According to the literature, the aforementioned diverse collaborative forms (collaboration, P(L)C, CoP, team, group) can be structured in different ways. First of all, a distinction can be made between within-grade and cross-grade level collaboration (the latter is also referred to as vertical; Supovitz, 2002). The first refers to groups consisting of teachers teaching in the same grade, while the latter refers to a group consisting of teachers who teach in different grade-levels. Secondly, a distinction can be made between disciplinary collaboration consisting of teachers teaching the same subjects (e.g., mathematics) and interdisciplinary collaboration that gathers teachers who teach different subjects (e.g., mathematics, English, science, etc.). The combination of these two distinctions led to different groups of studies. An overview of the number of studies in each group can be found in Table 3.

In our sample of studies, groupings organised within grade level ($n = 18$) were more common than cross grade level ($n = 5$). This is in line with the fact that within grade level collaboration occurs most: teachers more often collaborate with colleagues who teach the same grade level group than with colleagues throughout the school (Doppenberg, Bakx, & den Brok, 2012; Markow & Pieters, 2010). This confirms the finding of Moolenaar (2010) showing that teachers prefer relationships with teachers from the same grade level. However, when focusing on secondary teachers more cross grade level was reported (Markow & Pieters, 2010). Furthermore, teacher collaboration in the studies reviewed was mostly organised interdisciplinary (across subject areas) ($n = 29$) rather than disciplinary (within subject area) ($n = 11$).

Furthermore, groups of teachers may be fixed or they may be more loosely organised in the sense that the collaborations are of a more ad hoc nature (no fixed groups of teachers who always work together but changing constellations). When a fixed group of teachers collaborates and shares a certain group of students, this can loop, meaning that the group stays with the same students for several years, or it can stay in fixed grade levels (teaching different students every year) (Supovitz, 2002). Another organisational feature includes the size of the group. Teacher collaboration may include all teachers of the school (mostly in smaller schools) or can be divided in subgroups (e.g., by grade level or subject discipline). Furthermore, teacher collaboration can be of a temporary or a longer-lasting nature. For example, teachers can collaborate on a specific temporary project or be a fixed grouping that is meant to stay. Meirink (2007) appeared to be the only one explicitly referring to temporary teams.

Another important feature of teacher collaboration includes the nature of their collaboration. Teacher collaboration may range from being no more than an aggregate of individuals to being a team characterised by cohesion, interdependence, etc. This issue is discussed more in depth in the following subsection.

6.1.2.3. The collaborative continuum. Collaboration among teachers is not a black and white issue but it has different, more or less collaborative, forms. Different forms of teacher collaboration can be placed on a continuum with on the one end completely individualised teacher work and on the other hand collaborative work in its fullest form. Different authors who mentioned

a diversity of teacher collaboration support this collaborative continuum. They seemed to present different interpretations of the collaborative continuum, focusing on different aspects underlying the continuum.

Most of the authors who acknowledged the diversity in teacher collaboration focused on teams and how these can vary. [Bovbjerg \(2006\)](#) stated that teamwork can go two ways, it can be about collaboration and exchanging ideas, but it can also be a form of individualism in which the focus is on the individual ambitions for teachers' own work life. Different interpretations and underlying argumentations were given for the difference with regard to the individual or collaborative focus of teams. On the one hand, [Ohlsson \(2013\)](#) stated that the difference between teams resides from differences in collaboration, team atmosphere, and willingness to learn collaboratively. On the other hand, [Brouwer \(2011\)](#) conceptualised different levels of collaboration occurring in teams as the evolution of a teacher team to a work community. This evolution is characterised by growing levels of reciprocal connectedness, shared interaction repertoire, and shared enterprise (see also [Brouwer et al., 2011, 2012](#)).

While the above-mentioned studies referred to a variety in teacher teams, referring to various underlying mechanisms, other studies categorised this continuum by naming and defining different forms of collaboration or teamwork that can be placed on various places of the collaborative continuum. Moreover, while the above studies spoke of teams in all degrees of collaboration, others reserved the term team for groupings characterised by high levels of collaboration. For example, [Smith \(2009\)](#) distinguished a continuum with five levels characterised by growing levels of interdependence (based upon [Little, 2002](#)) and teamwork can be found at the end of this continuum. This continuum starts off with *storytelling and scanning for ideas* as being situated at the independence end of the continuum, going through *aid and assistance*, *sharing*, *joint work*, and finally *teamwork* presenting increasing levels of interdependence ([Little, 1990; Smith, 2009](#)).

While it is clear that different forms of collaboration or teamwork can be distinguished and that these can be placed on a continuum in a hierarchical way, this underlying continuum was not yet explicitly named and conceptualised in literature on teacher collaboration. Here a clear conceptualisation of the continuum underlying various forms of collaboration is put forward. This continuum is characterised by an evolution from a mere aggregate of individuals to high levels of collaboration in teams. This presents an important discussion on what it means to be a team and encloses a continuum-based view on teams, described with the construct of *team entitativity* (see also [Vangrieken et al., 2013](#)).

The generic construct of entitativity resides from social psychology, and more specifically group perception research. It was introduced by [Campbell \(1958\)](#) as “*the degree of being entitative. The degree of having the nature of an entity, of having real existence*” (p. 17). The main question for [Campbell \(1958\)](#) was the way in which outsiders use information cues that are available to them in order to assess the degree to which an aggregate of individuals possesses the quality of being a group. These cues were derived from Gestalt psychology (originating from Wertheimer).

While traditional entitativity literature mixed up the phrases ‘group’ and ‘team’, a clear distinction between both is made here, hence the adding of the phrase ‘team’ and speaking of ‘team entitativity’. This is put forward as a characteristic of the team and how it is perceived by its members. Team entitativity is conceptualised here as the degree to which a collection of individuals possesses the quality of being a team. This supports the distinction between groups and teams as groups do not necessarily meet all criteria for being a team (see section 6.1.2.1) and thus possess lower levels of team entitativity. The indicators determining the degree of team entitativity were derived from a combination of key elements mentioned in entitativity literature ([Campbell, 1958; Carpenter et al., 2008; Hamilton, Sherman, & Castelli, 2002](#)) and the team definition as presented in section 5.1.2.1. This resulted in the following indicators: (1) team members having shared goals and shared responsibilities; (2) task cohesion – a shared commitment on the task, the task acting as a binding force; (3) identification – feeling a sense of affinity with the team and perceiving team membership as an important aspect of one's job; (4) task interdependence – needing each other to perform the task; and (5) outcome interdependence – the feeling that one's own goal accomplishment depends on others' goal accomplishment.

Although this continuum view is relevant in a variety of teamwork contexts, the context of teacher collaboration especially shows its importance, as teacher teams (and how they are defined in literature) often do not meet all criteria of a team as defined in current team literature ([Vangrieken et al., 2013; Smith, 2009](#)). The construct team entitativity is important in this context as it allows to theoretically capture the existing variety in teacher collaboration and provides the possibility for future research to empirically investigate the influence the degree of team entitativity present in groupings has on their functioning.

6.2. Focus and depth of teacher collaboration

Structural aspects are not only important when studying teacher collaboration but it is also needed to gain insight into the focus of teacher collaboration and the level of depth it shows. This brings us to the second aim of this review, namely, gaining insight in the focus and depth of the prevailing teacher collaboration and how this matters. This is an important issue as the focus of teacher collaboration can influence the nature of the collaborative endeavour as it can entail mere superficial or deeper level collaboration ([Moolenaar, 2010](#)). For example, [Havnes \(2009\)](#) described different interaction processes that show a hierarchy in levels of depth of teacher collaboration. These range from *preserving individualism* – focusing on individual teacher responsibility and autonomy, over *coordination* – coordinating responsibilities and tasks without discussion of the substance of teaching, *cooperation* – establishment of a common ground for joint enterprise through focusing on the content and process of classroom activity, and finally *sharing* – sharing and clarification of pedagogical motives that direct the way the teaching and learning is being structured.

However, deep level teacher collaboration seemed to be less frequent as teachers often tend to restrict collaboration to a focus on practical affairs (Plauborg, 2009). Consultation with colleagues is often restricted to discussing ideas and materials, planning teaching activities, the nature and content of testing, and the pace and content of teaching (Cheng & Ko, 2009; Visscher & Witziers, 2004). Discussing aspects of the didactics of teaching, problems teachers meet in their daily practice, observing each other in the classroom, discussing each others' functioning, and critical examination of teaching seemed to be rare (Cheng & Ko, 2009; Markow & Pieters, 2010; Visscher & Witziers, 2004; Vogels, 2009).

The lack of such forms of deep-level collaboration may result from different sources of resistance in teacher culture. First of all, deep-level collaboration inevitably requires touching teachers' underlying beliefs, which will inevitably lead to disagreement and conflict. This seems difficult because teachers tend to restrict collaboration to more safe and less threatening aspects, focusing on psychological safety and cohesion, avoiding conflict, and preserving their norms of privacy and autonomy (Achinstein, 2002; Gajda & Koliba, 2008; Gunn & King, 2003; Hargreaves, 2001; Levine & Marcus, 2010; Lima, 2001; Ohlsson, 2013; Somech, 2008; Supovitz, 2002). Striving for an optimal balance between room for cognitive conflict and constructive controversy on the one hand and a focus on personal ties on the other hand proved to be a challenge in teacher collaboration (Kelchtermans, 2006; Lima, 2001). A second source of resistance resides from the fact that deep-level collaboration requires higher levels of interdependence, which may conflict with teachers' focus on autonomy (Moolenaar, 2010). Besides teacher culture, certain school characteristics appeared to influence the occurrence of deep-level collaboration. Leonard (2002) found that enrolment size of the school influenced the prevailing depth of collaboration as mid-sized schools were most likely to be characterised by a collaborative nature. While collaboration including team planning appeared to be common in the opinion of primary/elementary teachers, this was not the case for teachers in the large and the smallest schools, all-grade schools and the high school/junior high school/middle school combination. Moreover, Vogels (2009) found that close collaboration was more often found in practical education.

Although deep-level teacher collaboration appeared to be less frequent, the focus of collaboration has a definite impact on different aspects. Focusing collaboration on the primary task of teachers – the ensuring of effective and enriched teaching for all pupils – is deemed important; and a focus on student learning outcomes is needed to enhance teacher efficacy (James et al., 2007; Williams, 2010). Moreover, collaboration that is deep enough and touches the underlying beliefs of teachers is needed for actual school change and improvement and influences the opportunities collaboration provides for teacher learning to occur (Clement & Van den Berghe, 2000; Doppenberg, den Brok, & Bakx, 2012; Levine & Marcus, 2010; Plauborg, 2009). Teacher learning in collaboration can be induced by giving teachers the opportunity to observe each others' practice and to discuss their educational practice, evaluate it, and reflect upon it with colleagues (Plauborg, 2009), exactly those things that were often reported to be missing. Learning in the case of teacher collaboration often appeared to be focused on individual learning and literature on the topic often focused on individual teacher learning (Dickinson, 2009; Gregory, 2010; Levine & Marcus, 2010; Meirink, 2007; Meirink, Imants, Meijer, & Verloop, 2010).

6.3. Benefits and negative consequences of teacher collaboration

This subsection addresses the third aim, which is twofold: on the one hand, displaying benefits and positive consequences of teacher collaboration, and on the other hand, informing about potential negative consequences of teacher collaboration.

6.3.1. Benefits of teacher collaboration

Literature mentioned a large amount of positive outcomes of teacher collaboration. Students, teachers as well as the school as an organisation appeared to profit. There thus seem to be ample reasons for teachers to part from the often-present culture of isolation (e.g., Gajda & Koliba, 2008) and different goals are strived for by teacher collaboration. In the following, benefits on three levels will be distinguished: student level, teacher level, and school level. Some of these could be seen as being situated on different levels, these were mentioned in the category that was perceived most appropriate. The benefits of teacher collaboration are summarised in Table 4. It was opted to categorise the findings in the table according to the term used to describe collaboration in the studies to maintain the overview that was used throughout this review.

As can be seen in Table 4, most reported advantages of teacher collaboration are situated at teacher level, although the other levels profit from more collaboration as well. Students were reported to improve understanding and performance (e.g., Egodawatte, McDougall, & Stoilescu, 2011; Goddard, Goddard, & Tschannen-Moran, 2007; Lomos et al., 2011b; Wigglesworth, 2011). Teachers were reported to be more motivated, to experience decreased workload, a positive impact on teacher morale, greater efficiency, increased communication, improved technological skills, reduced personal isolation; next to advantages such as the conclusion that instruction strategies became more student-centred and alignment between the real and hidden curriculum increased, etc. (e.g., Bertrand, Roberts, & Buchanan, 2006; Egodawatte et al., 2011; Slavit et al., 2011; Yisrael, 2008). At the organisational level, benefits reported include a positive influence on the perception that the school climate is supportive of innovation, better adaptation and more innovation, a cultural shift to more equity, a school-wide attention for needs of students, a flattened power structure, fostering of a professional culture of intellectual enquiry (e.g., Euwema & Van der Waals, 2007; Moolenaar, 2010; Westheimer, 2008).

Table 4

Overview of benefits of teacher collaboration.

Team		
Student level	Teacher level	Organisational level
<ul style="list-style-type: none"> - Student success (Egodawatte et al., 2011) - Improved student understanding (Wigglesworth, 2011) - Student learning (Main & Bryer, 2005) 	<ul style="list-style-type: none"> - Veterans and beginning teachers learn from each other: cross-generation learning, using valuable expertise of veteran teachers (Carroll & Foster, 2008) - Innovation and dealing with the complexity of teacher work (Brouwer, 2011) - Confirmation in ideas about new teaching methods and assignments (Meirink, 2007) - Enhanced goal achievement (Egodawatte et al., 2011) - Capacity to initiate and improve professional development (Egodawatte et al., 2011) - Co-planning and co-teaching possibilities leading to a sense of decreased workload (Egodawatte et al., 2011) - Greater efficiency (Egodawatte et al., 2011) - Increased communication (Egodawatte et al., 2011) - Improved technological skills (Egodawatte et al., 2011) - Teacher collective efficacy which in turn supports teacher performances (in case of well-connected teacher social networks) (Moolenaar et al., 2011) - Increased teaching effectiveness (if certain conditions are met) (Graham, 2007) - Improvement in instruction (Bertrand et al., 2006) - Improved teacher morale (Johnson, 2003; Yisrael, 2008) - Improved teacher motivation (Wigglesworth, 2011; Spry, Sultmann, & Ralston, 1992, in Main & Bryer, 2005) - Moral support (Johnson, 2003) - Absenteeism (Johnson, 2003) - Teacher learning (opportunities to learn from each other) (Johnson, 2003) - More productive teacher conversations (Slavit et al., 2011) - Increased teacher efficacy (Slavit et al., 2011) - More student-centred instruction strategies (Slavit et al., 2011) - Teacher collegiality (Main & Bryer, 2005) - Reduced personal isolation (Mills, Powell, & Pollak, 1992, in Main & Bryer, 2005) - Increased sense of work-related enjoyment by means of socialisation (Flowers et al., 2002, Sandholtz, 2000, in Main & Bryer, 2005) - Raise professional dialogue, sharing of ideas and resources (Newman & Wehlage, 1995, in Main & Bryer, 2005) - Flexible environment (larger working space and more adaptable working time) (Main & Bryer, 2005) - Alignment of written, taught, and tested curriculum (Bertrand et al., 2006) 	<ul style="list-style-type: none"> - Adaptation and innovation (Euwema & Van der Waals, 2007) - Needed for restructuring and reconfiguring schools (Rone, 2009) - Cultural shift to more equity (Slavit et al., 2011) - School-wide attention for the mathematical needs of all students (Slavit et al., 2011) - Flattened power structure (Slavit et al., 2011)
P(L)C		
Student level	Teacher level	Organisational level
<ul style="list-style-type: none"> - Student learning resulting from improved teacher practice (Westheimer, 2008) - Improved student performances (Lomos et al., 2011b) 	<ul style="list-style-type: none"> - Improving teacher practice (Westheimer, 2008) - Teachers learning to be leaders, to work together as leaders of the school site (Westheimer, 2008) - Teacher learning for novice teachers (Westheimer, 2008) - Reducing alienation so teachers can learn from each other (Westheimer, 2008) - Collective teacher efficacy (Voelkel, 2011) 	<ul style="list-style-type: none"> - Making ideas matter and realising a culture of intellectual enquiry: fostering of a professional culture of intellectual enquiry in the workplace (because teachers are committed to collective reflection and exchange on pedagogy and teaching practice) (Westheimer, 2008) - Pursuing social justice, democracy and a communal way of life (Westheimer, 2008)
Collaboration		
Student level	Teacher level	Organisational level
<ul style="list-style-type: none"> - Improved student performances (Goddard et al., 2007) 	<ul style="list-style-type: none"> - Extension of the repertoire of teaching tools and activities (ShIPLEY, 2009) - Better educating (ShIPLEY, 2009) - Continuity of the curriculum and the instruction across different teachers (ShIPLEY, 2009) - More effective teaching (Berry et al., 2009) - More likely to stay in high needs schools which need them the most (Berry et al., 2009) 	
Other terms		
Student level	Teacher level	Organisational level
	<ul style="list-style-type: none"> - Density of work-related advice networks leads to perception of strong teacher involvement in decision-making (Moolenaar, 2010) - Dense teacher networks increase collective efficacy which in turn improves school-level student achievement (Moolenaar, 2010) - Improved collegial relationships between teachers (Curry, 2008) - Improved awareness of research-based practices and reforms, school-wide knowledge (Curry, 2008) - Improved capacities to realise improvements in their instruction (Curry, 2008) 	<ul style="list-style-type: none"> - Density of work-related advice networks positively influences the perception that the school climate is supportive of innovation (Moolenaar, 2010)

Table 5
Possible negative consequences of teacher collaboration on different levels.

Team		
Teacher level	Group level	Organisational level
<ul style="list-style-type: none"> - Competitiveness (Johnson, 2003) - Interpersonal conflict (Johnson, 2003) - Loss of autonomy (Johnson, 2003) - Work intensification (Johnson, 2003) - Time consuming, increased work load (Bovbjerg, 2006) - Silence dissonant voices and foster conformity with the norms and practices of the majority (Johnson, 2003); members can be silenced (Gunn & King, 2003) - Collaboration as a means for enforcing conformity of practice and monitoring the professionalism of the individual teachers (Main & Bryer, 2005) - Tensions among colleagues: positively and constructively critiquing fellow teachers is a delicate matter (Bovbjerg, 2006) 	<ul style="list-style-type: none"> - Cultivating groupthink (Janis, 1982, in Scribner et al., 2007; Main, 2007) - Convergent thinking (Weick, 2001, in Scribner et al., 2007) - Social loafing (Main, 2007) - Heightening of incompatibilities among different personalities, differences in teaching style and differing pedagogical beliefs (Main & Bryer, 2005) - Contrived collegiality (Main, 2007) - Focus on practical affairs and use team collaboration as a means to expand their action repertoire (Plauborg, 2009) - Balkanisation: teams as closed social structures (hampers flexibility) (Bovbjerg, 2006; Main, 2007) - Hierarchies can emerge (Gunn & King, 2003) - Genuine consensus can be elusive (Gunn & King, 2003) 	<ul style="list-style-type: none"> - Collaboration as a control mechanism by which teachers can be tied stronger to standardised performance expectations (Ball, 1993, Barker, 1999, Bottery, 1996, in Scribner et al., 2007) - Collaboration as a servant of centralised control (discipline teachers and constrain autonomy) (Watson, 2005)
P(L)C		
Teacher level	Group level	Organisational level
		<ul style="list-style-type: none"> - Some forms of collaboration can impede school change (Lima, 2001)

6.3.2. Possible negative consequences of teacher collaboration

Teacher collaboration is not always positively appreciated and success is not guaranteed (Clement & Van den Berghe, 2000; Kelchtermans, 2006). Thus the positive consequences of teacher collaboration are not always obvious and it is important to take possible risks into account. Teacher collaboration is not a panacea that solves all problems and attention should be given to possible negative consequences of collaboration; these are summarised in Table 5.

Most negative consequences reported are situated at the teacher or group level. Teachers may experience competitiveness, tensions that can escalate into conflicts, a loss of autonomy, an increased workload and a push towards conformity with the majority (e.g., Bovbjerg, 2006; Johnson, 2003; Main & Bryer, 2005). Possible negative consequences on the group level involve for example groupthink, social loafing, increased incompatibilities and a mere practical focus (e.g., Gunn & King, 2003; Main, 2007). Bovbjerg (2006) and Main (2007) both refer to balkanisation as a possible group level negative consequence. However, both authors appear to put forward different interpretations of this concept. Bovbjerg (2006) stated that teams may result in more closed social systems, forming exclusive groups in the organisational structure of the school. Teachers tend to stay in their team in the staffroom and barely know the rest of the staff members. Balkanisation according to Bovbjerg (2006) is thus a new form of isolation on the group level. Main (2007) used the term balkanisation to refer to the formation of subgroups within one teacher team or group. Finally, on the organisational level collaboration may begin to function as a control mechanism that ties teachers to standardised performance expectations, disciplines teachers, and constrains their autonomy (e.g., Watson, 2005).

6.4. Preconditions for teacher collaboration

Effective teacher collaboration does not come by itself. For example, Supovitz (2002) argued that it is unlikely that teamwork in itself will improve instruction and student learning. Certain conditions need to be fulfilled. The fourth aim of this review addressed here was to gain insight on which factors facilitate and which hinder teacher collaboration.

6.4.1. Facilitating factors for teacher collaboration

In order to foster teacher collaboration certain conditions need to be fulfilled and literature mentioned ample factors that can facilitate collaboration. An overview of different facilitating factors, organised according to the term used by the authors to describe teacher collaboration and according to task type (Vangrieken et al., 2013) when the term team was used, can be found in Table 6a–c.

As shown in Table 6a–c a distinction between different kinds of facilitating factors was made. First of all, influencing personal characteristics include facilitating factors pertaining to individual group members' attitudes, personalities or capacities. These include, for example, a willingness or commitment to collaborate, understanding the benefits of teaming and the combination of particular skills, knowledge and experience in teaming (e.g., Main, 2007; Stephenson, Warnick, & Tarpley, 2008).

Table 6

Factors facilitating (a) teams; (b) P(L)C; (c) collaboration.

(a) Team					
Personal characteristics	Structural characteristics	Group characteristics	Process characteristics	Organisational characteristics	Guidance
Instruction(/pedagogy)					
<ul style="list-style-type: none"> - Willingness to team (Main, 2007) - Positive attitude towards teaming (Main, 2007) - Understanding the benefits of teaming (Main, 2007) - Communication skills (Main, 2007) - Experience in teaming (Main, 2007) - Knowledge of team processes (e.g. planning, meetings, goal setting) (Main, 2007) - Self/team evaluation skills (Main, 2007) - Employability (members are employable for multiple tasks) (Smetser, 2007) 	<ul style="list-style-type: none"> - Team structure: role, goals, norms of procedure (Main, 2007) - Staff continuity (Main, 2007) - Time: scheduled common planning time for teams (Main, 2007; Flowers et al., 2000; Erb & Stevenson, 1999, in Mertens & Flowers, 2004); cycles of time to support teaming practices (larger blocks of time for teaching) (Main, 2007) - Time (Main, 2007; Rone, 2009; Watson, 2005) - Consistent meeting times (Saunders et al., 2009) - Individual planning time (Erb & Stevenson, 1999, in Mertens & Flowers, 2004) - Physical structures (open doors, double classrooms) (Main, 2007) - Allowing teams to design their students' daily schedule (Erb & Stevenson, 1999, in Mertens & Flowers, 2004) - Assign team to own area of the building (Erb & Stevenson, 1999, in Mertens & Flowers, 2004) - Allow teams to work together for multiple years (Erb & Stevenson, 1999, in Mertens & Flowers, 2004) - Regulation possibilities of the team (internal and external latitude) (Smetser, 2007) 	<ul style="list-style-type: none"> - Matching of personalities in teams (Main, 2007) - Teaming skills (conflict management; communication) (Main, 2007) - Teacher choice (who will they work with in teams) (Main, 2007) - Lowered isolation (Crow & Pounder, 2000) - Team size (Erb & Stevenson, 1999, in Mertens & Flowers, 2004; Smetser, 2007; Truijen et al., 2013) - Team tenure (Flowers et al., 2000) - Coordination (contact for internal and external coordination) (Smetser, 2007) - Empowerment of teachers (making them part of the decision-making process) (Yisrael, 2008) - Supportive atmosphere (Yisrael, 2008) - Participation (Yisrael, 2008) - Diversity in educational level and gender (corresponds positively with the degree of mutual engagement, shared repertoire and joint enterprise) (Brouwer, 2011) - Homogeneity in educational view and motivation (Truijen et al., 2013) - Equal distribution of younger and older, and male and female members (Truijen et al., 2013) - Leadership: informal leader in the team providing guidance (Truijen et al., 2013) - Group efficacy (Truijen et al., 2013) - Working relationships: adequate working relationship or knowledge of members' roles and responsibilities (Truijen et al., 2013) 	<ul style="list-style-type: none"> - Flexibility (Main, 2007) - Backing up behaviours (Main, 2007) - Relationship building (Main, 2007) - Conflict (Main, 2007) - Focus on learning to collaborate and group activities (Flowers et al., 2000) - Autonomy (Crow & Pounder, 2000; Scribner et al., 2007; Yisrael, 2008); Self-management (importance of certain level of autonomy) (Truijen et al., 2013) - Task emphasis (Crow & Pounder, 2000) - Student-centred focus (George & Alexander, 2003, in Mertens & Flowers, 2004) - Strong commitment to academic achievement (George & Alexander, 2003, in Mertens & Flowers, 2004) - Collaborative policies and accountability systems (George & Alexander, 2003, in Mertens & Flowers, 2004) - Strong sense of team community (George & Alexander, 2003, in Mertens & Flowers, 2004) - Proactive approach (George & Alexander, 2003, in Mertens & Flowers, 2004) - Task domain: complete group task, clear boundaries, measurable result (Smetser, 2007) - Internal structuring of the team task (interdependence) (Smetser, 2007) - Team task: clear direction and common goals (Truijen et al., 2013) - Dialogue about what teachers think is important (Yisrael, 2008) - Explicit protocols that focus meeting time on students' academic needs and how they might be instructionally addressed (Saunders et al., 2009) - Distributed leadership (Saunders et al., 2009) - Development of task interdependency (Truijen et al., 2013) - Observe each others' practice and discuss educational practice, evaluate it and reflect upon it with colleagues (Plauborg, 2009) - Defined focus for collaboration (Plauborg, 2009) - Trust among teachers (for team development) (Cheng & Ko, 2009) 	<ul style="list-style-type: none"> - Whole school-philosophy that supports teaming (rituals and customs, espoused values, shared meanings, group norms) (Main, 2007) - Commitment to the reform: administrative support, leadership, stability of teams, ongoing training (Main, 2007) - Established culture in schools, new school issues influence teams through increased work load and time pressure (Main, 2007) - School's administration's commitment to teaming (Main, 2007) - Administrative support (Main, 2007) - School culture (Main, 2007) - Performance alignment (Watson, 2005) - School governance structures (Watson, 2005) - Schoolwide instructional leadership (Saunders et al., 2009) - Stable school-based settings (Saunders et al., 2009) - Coherent and aligned district policies and practices (Saunders et al., 2009) - Transformational leadership (Truijen et al., 2013) 	<ul style="list-style-type: none"> - Training (pre- and inservice) (Main, 2007) - Giving feedback (team members) (Truijen et al., 2013) - Team support over an extended period of time (for team development) (Cheng & Ko, 2009)

(continued on next page)

Table 6 (continued)

(a) Team					
Personal characteristics	Structural characteristics	Group characteristics	Process characteristics	Organisational characteristics	Guidance
			<ul style="list-style-type: none"> - Work content: supported goal and team product; clear team structure and tasks (Smetser, 2007) - Communication: open exchange of information, open discussion of problems (Smetser, 2007) - Performance: sense of equity; balance between contribution and revenues (Smetser, 2007) - Interests: balance between team and individual interests; holding each other responsible; expectations of success (Smetser, 2007) - Role of the team leader: coordinator/chairman, inspiration; work in the team (Smetser, 2007) - Development of teacher teams into work communities (mutual engagement, shared repertoire and joint enterprise): directed towards developing group goals, developing group norms, organising group roles, developing a critical-reflective attitude, improving trust, improving perceived reciprocal dependency, improving ownership and organising a collective memory (Brouwer, 2011) 		
Innovation					
	<ul style="list-style-type: none"> - Planned time for teacher collaboration (Meirink et al., 2010) 	<ul style="list-style-type: none"> - Leadership which focuses on student-centred planning and accountability (Meirink et al., 2010) 	<ul style="list-style-type: none"> - Interdependence (Meirink et al., 2010) - Structured and focused collaboration time which is spent improving instruction and student performances (Meirink et al., 2010) 		
Learning					
	<ul style="list-style-type: none"> - Time (Fulton & Britton, 2011) 	<ul style="list-style-type: none"> - Teachers of a single school subject (Fulton & Britton, 2011) 	<ul style="list-style-type: none"> - Shared values and goals (Fulton & Britton, 2011) - Use of student data and work (Fulton & Britton, 2011) - Collective responsibility (Fulton & Britton, 2011) - Trust (Fulton & Britton, 2011) 	<ul style="list-style-type: none"> - Leadership support (Fulton & Britton, 2011) - Good facilitation (Fulton & Britton, 2011) 	
General factors (task of the team unclear)					
	<ul style="list-style-type: none"> - Team and individual planning time (Hackmann et al., 2002) 	<ul style="list-style-type: none"> - Heterogeneous student placements (Hackmann et al., 2002) (teams seen as a group of teachers and the students they commonly instruct) - Gender and functional heterogeneity (positive for team support and effectiveness) (Drach-Zahavy & Somech, 2002) - Team size (Hackmann et al., 2002) - Functional heterogeneity (influences team innovation) and frequency of meetings (influence team performance and team innovation) (Somech & Drach-Zahavy, 2007) - Teamwork skills (team orientation, team leadership and backup behaviour) as significant predictors of teacher team commitment (Park et al., 2005) 	<ul style="list-style-type: none"> - Study classroom practice (Hackmann et al., 2002) - Make sure that curriculum and instruction method enhance student learning (Hackmann et al., 2002) - Productive team meetings characterised by teacher leadership, planning and organisation, and focused topics (Dickinson, 2009) - Empowerment: high personal and high team empowerment or high/low combination is important for team performance; high/low combination is important for professional commitment (Somech, 2005) - Integrating conflict management style (team performance) (Somech, 2008) 	<ul style="list-style-type: none"> - Empowering school scheduling model (Hackmann et al., 2002) 	

(continued on next page)

Table 6 (continued)

(b) P(L)C		
Group characteristics	Process characteristics	Organisational characteristics
<ul style="list-style-type: none"> - Shared leadership (Williams, 2010) - Transformational leadership (Voelkel, 2011) 	<ul style="list-style-type: none"> - Structured approach that focuses on learning outcomes (enhances teacher self-efficacy) (Williams, 2010) - Professional autonomy (Scribner et al., 2002) - Attention for individual teacher needs (Scribner et al., 2002) - Focus on reflective dialogue, collaboration, shared vision and student performance (departments) (successful schools and higher student achievement) (Lomos et al., 2011) - Conflict (Lima, 2001) - Focus on improving instructional quality (Visscher & Witziers, 2004) - Shared goals, collaborative decision-making, shared responsibilities, mutual consultation and giving advice and a translation into activities that focus on improving instructional quality (Visscher & Witziers, 2004) 	<ul style="list-style-type: none"> - Principal: plays an important part in balancing the individual needs and the organisational needs and facilitating professional community (Scribner et al., 2002)
(c) Collaboration		
Personal characteristics	Structural characteristics	Organisational characteristics
<ul style="list-style-type: none"> - Teacher commitment (Stephenson et al., 2008) - Teacher attitude towards the subjects (Stephenson et al., 2008) 	<ul style="list-style-type: none"> - Scheduling adequate time for collaboration (Berry et al., 2009) - Aligning collaboration structures for horizontal and vertical collaboration (Berry et al., 2009) - Structuring collaboration meetings formally (Berry et al., 2009) - Close proximity of facilities (Stephenson et al., 2008) - Frequent professional interaction (Stephenson et al., 2008) 	<ul style="list-style-type: none"> - Leader support in different areas: time for collaboration, offering flexibility, encouraging feedback, giving guidance (Datnow, 2011) - Monitoring collaboration to make sure it does not lead to contrived collegiality (Datnow, 2011) - Creating an atmosphere of mutual trust (Berry et al., 2009) - Administrator support (Stephenson et al., 2008)

A next category includes structural characteristics that are related to structural components of the collaborative process, mainly related to time issues (e.g., individual and common planning time) (e.g., Hackmann et al., 2002; Meirink et al., 2010; Rone, 2009). Other important factors mentioned here include staff continuity, physical structures or close proximity of facilities, regulation possibilities of the team, and frequent professional interaction that is formalised (Main, 2007; Smetser, 2007; Stephenson et al., 2008). Overall, group and process characteristics showed the largest share of facilitators. Group characteristics are features that are specific to the particular team or community and include teaming skills (on team level), team size and tenure, a supportive atmosphere, (shared and transformational) leadership and group efficacy (e.g., Drach-Zahavy & Somech, 2002; Park, Henkin, & Egley, 2005; Truijen, Slegers, Meelissen, & Nieuwenhuis, 2013; Yisrael, 2008). Concerning the need for heterogeneity or homogeneity, there appeared to be a lack of agreement. Some authors pointed at the need for functional heterogeneity and diversity in educational level and gender (Brouwer, 2011; Somech & Drach-Zahavy, 2007). Other authors point at the need for collaboration on a single school subject, homogeneity in educational view, and motivation (Fulton & Britton, 2011; Truijen et al., 2013). Process characteristics are related to the process of working together, for example, flexibility, relationship building, conflict, task emphasis, interdependence, a structured approach with a focus on learning outcomes, professional autonomy, etc. (e.g., Crow & Pounder, 2000; Meirink et al., 2010; Somech, 2008; Visscher & Witziers, 2004). They differ from group characteristics because the latter are features concerning the team or community as such, while process characteristics reside in the collaborative process and thus are more dynamic in nature. As teacher groups are always embedded in a specific context, the next category consisted of organisational characteristics: features of the school as an organisation that influences the functioning of the collaborative grouping. The organisational characteristics found include, for example, cultural issues, creating an atmosphere of mutual trust and monitoring of collaboration so it will not lead to contrived collegiality, and school governance structures and leadership (e.g., Datnow, 2011; Fulton & Britton, 2011; Saunders, Goldenberg, & Gallimore, 2009). Finally, the category of guidance includes training, feedback from team members, and team support (e.g., Cheng & Ko, 2009).

6.4.2. *Hindering factors for teacher collaboration*

Teacher collaboration appears to be a challenge to accomplish as it is confronted with different forms of resistance. Especially collaboration containing a certain level of depth in content is hard to realise and uncommon in the educational sector (see section 5.2). Leonard and Leonard (2001a) and Leonard (2002) found that the extent of collaboration occurring in schools was below the level the teachers would like it to be and teachers perceived their school as containing a greater degree of competition and individualism than desired. Teacher collaboration is thus often not realised to the degree that is proclaimed to be desired. In this subsection factors hindering collaboration are discussed and can be found in Table 7.

A lot of the hindering factors retrieved included personal and especially group characteristics. Important impeding personal characteristics of teachers include: the need to invest an effort, a lack of skills or training, unwillingness to collaborate, confrontations with conflicts that could be avoided before, and mismatched personalities or pedagogical philosophies (e.g., Main, 2007; Rone, 2009; Somech, 2008). Hindering group characteristics include, for example, balkanisation, a lack of clarity or disagreements about group goals, strong heterogeneity, ineffective leadership, poor communication, a lack of staff continuity, conflict that it is not managed properly, contrived collegiality and team size (either too small or too large) (e.g., Grossman, Wineburg, & Woolworth, 2001; Smetser, 2007; Westheimer, 2008). The most important hindering structural characteristics are a lack of time, work pressure and pressure of standardisation (e.g., Smetser, 2007; Westheimer, 2008). Impeding organisational characteristics include strong rooted isolation and individualism in school culture, norms of professional autonomy, independence and privacy, and school architecture (e.g., Gajda & Koliba, 2008; Goddard et al., 2007; Helstad & Lund, 2012).

6.5. *Effective collaboration*

In the previous subsections facilitating and hindering factors for teacher collaboration were listed. This revealed a question for effectiveness, investigating what is aimed for. Therefore, the fifth and final aim of this review was clarifying what *successful teacher collaboration* actually is; this will be discussed below.

Different studies appeared to refer to different aspects of effectiveness. A distinction was made here to criteria related to process and outcome. First of all, certain process criteria were mentioned in the context of effective collaboration that referred to what is needed in an effective collaborative process. Conley, Fauske, and Pounder (2004) mentioned three of these, which they call intermediate or process effectiveness criteria. The first one, effort, means that team members put an adequate amount of effort into the work at hand. Secondly, team members should apply a sufficient amount of knowledge and skills to the work. A final criterion includes the use of task performance strategies that are appropriate to the work and the organisational setting. Moreover, not only do individual team members have to use adequate competences, but an effective team also has the responsibility to use the expertise of all team members to realise the possible student outcomes (Main & Bryer, 2005). Furthermore, the possession of clear individual roles with a definite purpose in the team for each team member as well as the creation and use of team roles and productive collaborative roles is seen as a sign of effectiveness (Main & Bryer, 2005; Slavit et al., 2011). Related to this role-taking, Main and Bryer (2005) mentioned a fair distribution of responsibilities among team members and flexibility of team members and their ability to adapt to changes in pedagogy and curriculum. Next to adaptability to changes, team innovation or actively keeping track of educational developments was described as a characteristic of effective teams (Truijen et al., 2013). Furthermore, regular open and honest communication

Table 7
Factors hindering teacher collaboration.

Team			
Personal characteristics	Group characteristics	Organisational characteristics	Structural characteristics
<ul style="list-style-type: none"> - Need of a commitment over an extended period of time, effort (Cheng & Ko, 2009) - Inexperience in teaming practices (Main, 2007) - Lack of necessary training and support thereof of the administrators (Rone, 2009); lack of pre- or in-service training of teaming skills (Main, 2007) - Collaboration as a threat to teacher autonomy (Somech, 2008) - Confrontation with conflicts that could be avoided before (Somech, 2008) - Poor conflict management (skills) (Main, 2007; Rone, 2009) - Vulnerability of teachers and low self-efficacy (Smith, 2009) - Insufficient buy-in (unwillingness to cooperate) (Main, 2007; Rone, 2009) - Negative attitude to teaming (Main, 2007) - Senior teachers question benefits of teamwork (Støvring, 2004, in Bovbjerg, 2006) - Differences in/mismatched personalities and pedagogical philosophies (Main, 2007) - Lack of knowledge of team processes such as goal setting (Main, 2007) 	<ul style="list-style-type: none"> - Balkanisation (Main, 2007) - Differences in personalities and pedagogical philosophies (Main, 2007) - Lack of clarity or disagreement about the goals (Rone, 2009) - Failure to work towards the same goals (Rone, 2009) - Strong heterogeneity in tenure (Drach-Zahavy & Somech, 2002) - Lack of structure (Rone, 2009) - Ineffective leadership (Rone, 2009) - Poor communication (Rone, 2009) - High turnover and adding of new members (Egodawatte et al., 2011); lack of staff continuity (Main, 2007) - Lack of continuity of core team members (Main, 2007) - Conflict (if it is not managed properly) (Main, 2007) - Contrived collegiality (Main, 2007) - Work content: unsupported goal and team product; lack of clarity about the tasks (Smetser, 2007) - Communication: little attention for information-exchange; suspicion, misleading communication (Smetser, 2007) - Performance: sense of iniquity; no balance between contributions and revenues (Smetser, 2007) - Interests: directed towards self-interests; not holding each other responsible; no expectations of success (Smetser, 2007) - Role of the team leader: boss in the team, no inspiration; no work in the team (Smetser, 2007) - Group task: team task is no complete whole; the result is not easily measurable; no clear boundaries (Smetser, 2007) - Interdependency: insufficient control options and powers; group task cannot be executed independently (Smetser, 2007) - No interdependence of the team tasks (Smetser, 2007) - Team size: is so that the team cannot deliver a recognisable contribution; the team is vulnerable (Smetser, 2007) - The team members are limited or not employable for different team tasks; the team is vulnerable (Smetser, 2007) - Leadership: no contact for internal and external coordination (Smetser, 2007) 	<ul style="list-style-type: none"> - Strong rooted isolation and individualism in school culture, tradition (Gajda & Koliba, 2008; Saunders et al., 2009) - Institutional traditions and discipline-specific concerns (Helstad & Lund, 2012) - Lack of school policies and structures (Smith, 2009) - Management and governance systems are not or insufficiently tuned into the independency and responsibility of the team (Smetser, 2007) 	<ul style="list-style-type: none"> - Lack of time (Rone, 2009) - Lack of complete block scheduling (Crow & Pounder, 2000) - Resources, communication: no own working space, difficult to reach each other (Smetser, 2007) - The level of reward is not linked to the width of the employability of the individual team members (Smetser, 2007)
P(L)C			
Personal characteristics	Group characteristics	Organisational characteristics	Structural characteristics
<ul style="list-style-type: none"> - Collaborative skills of teachers need to be developed (Leonard & Leonard, 2001b) - Teachers' fear of exposure (Westheimer, 2008) 	<ul style="list-style-type: none"> - Tension between professional development that is directed towards learning new pedagogical practices and the one that is directed towards deepening the content knowledge of teachers in their area (Grossman et al., 2001) - Conservation of diverse perspectives in a group (Grossman et al., 2001) - Fault lines (Grossman et al., 2001) - Tension between community or constitutive values and liberal inclusiveness (Westheimer, 2008) - Reluctance to engage competing ideologies (Westheimer, 2008) 	<ul style="list-style-type: none"> - School architecture, isolation and culture of privacy (Westheimer, 2008) - Norms of autonomy and privacy (Westheimer, 2008) 	<ul style="list-style-type: none"> - Time and pressure of standardisation (Westheimer, 2008)
Collaboration			
Personal characteristics	Group characteristics	Organisational characteristics	Structural characteristics
<ul style="list-style-type: none"> - Collaboration is usually not taught nor modelled in university coursework (Goddard et al., 2007) - Negative mindsets concerning the desirability of shared work (Leonard & Leonard, 2003) - Resistance towards surpassing traditional models of teacher relations (Leonard & Leonard, 2003) - Conflict between norms of collegiality and the power of decision-making (when teachers take roles of a managerial nature) (Cameron, 2005) 		<ul style="list-style-type: none"> - Tradition of isolation (Goddard et al., 2007) - Collegial structures in the school support teacher autonomy (Cameron, 2005) - Tension between proclaimed norms of equal status and positional power of the principal (in the case of teachers participating in the school decision-making process) (Cameron, 2005) 	<ul style="list-style-type: none"> - Enlarged work pressure and less time (Leonard & Leonard, 2003) - Time pressure (Cameron, 2005)

among team members is important (Main & Bryer, 2005; Slavit et al., 2011). The focus and more specifically the use of data to determine a precise and mutually agreed upon content focus and collaborative analysis and discussion of various student learning data appeared to be important in effective teacher collaboration (Slavit et al., 2011). Finally, an external factor of support includes affective, structural, informational and instructional support from the school principal and was mentioned by Slavit et al. (2011) as a characteristic of effective collaboration.

Besides these process criteria, several outcome-related criteria were mentioned. Effective teacher collaboration should realise certain outcomes as Drach-Zahavy and Somech (2002) defined team effectiveness as “the production of designated products or the delivery of contracted services per specification” (Shea & Guzzo, 1987, in Drach-Zahavy & Somech, 2002, p. 52). The team needs to possess clear and attainable goals (Main & Bryer, 2005) and Truijten et al. (2013) broadly referred to team performance. This may include an increase of the knowledge base of the team and amelioration of their practice (Rone, 2009). The latter is related to the fact that the collaborative work needs to be translated into actual changes in the classroom practice (Slavit et al., 2011). Finally, there is also a future perspective as Truijten et al. (2013) referred to team viability, or the capability of the team members to work together in the future.

It became clear that effective collaboration can be understood in different ways and different elements were included in terms of process and outcome. Depending upon the goal and context of collaboration, different outcomes will be preferred and different interpretations of effectiveness will be considered important.

7. Conclusions and discussion

The overarching aim of this review was to give a systematic overview of literature on teacher collaboration. The review focused on five aspects of collaboration, that is, terminology used, focus and depth of collaboration, positive and negative consequences, facilitating and hindering factors, and effective collaboration. In the following, the results pertaining to the five areas of investigation are shortly summarised and corresponding points of discussion are raised.

The first aim of this review was to provide an overview of how teacher collaboration was described in previous research. During analyses, it became clear that different terms were used to refer to teacher collaboration, they were often vaguely defined and used interchangeably. It can be questioned whether the terms refer to the same or different forms of teacher collaboration, making it difficult to draw warranted conclusions from current literature. In order to partially cope for this deficiency, this review stressed the correct and clarified use of terminology and distinguished between the different terms that are used in literature. In the next step, this review aimed to take the first step towards a clarified terminological framework by disentangling and defining different forms of collaboration, providing insight on the structure of collaboration, and proposing a collaborative continuum, described by the degree of team entitativity. The generic term entitativity originates from research on peoples’ perceptions of groups. The latter has worked mostly in isolation, both theoretically and empirically, from the stream of team dynamics research (Lickel et al., 2000). Thus while entitativity has a long history in group perception research, including it in this domain of research on (teacher) collaboration and teamwork is relatively novel. Team entitativity proposes a continuum-based conceptualisation of a team: a collaborative unit can be placed on different parts of the continuum depending on the degree to which certain criteria that define a team are met. As teacher collaboration is diverse and often does not fully possess the quality of being a team, this continuum provides a frame for conceptualising different forms of teacher collaboration as a continuum. Collaborative forms on different places of the continuum have different characteristics and may provide different opportunities for deep-level collaboration.

The second aim related to the focus and depth of teacher collaboration. Our overview showed that the focus of teacher collaboration can be diverse and can show different depths, ranging from mere superficial to deep-level collaboration. The long-standing culture of teacher isolation and individualism, together with teachers’ preference to preserve their individual autonomy, may hinder deep-level collaboration to occur (Gajda & Koliba, 2008; Somech, 2008). Critical reflection on and discussion of teaching practice seems to be rare which hampers the possibilities for teachers’ collaborative learning. The depth of collaboration is related to the degree of team entitativity in the sense that deep levels of collaboration require a higher degree of team entitativity. This assumption was partially affirmed by Meneses, Ortega, Navarro, and de Quijano (2008) who mentioned that not all tasks require the same level of group development – which they described in a similar way as how team entitativity was conceptualised here – and that the execution of some tasks might not benefit from group work at all. In studying teacher collaboration, it thus matters whether it pertains to mere practical arrangements or whether there is room for a deeper discussion on classroom practice. Both entail different forms and depths of collaboration and accordingly, different degrees of team entitativity. Thus constructs such as team entitativity should not be interpreted normatively in the sense that high degrees thereof are essential. Whether or not strong degrees of team entitativity are required depends on the content of the collaboration.

Thirdly, this review aimed to provide an overview of possible positive and negative consequences of teacher collaboration. The results showed that teacher collaboration pays off on students, teachers as well as the whole school level, affirming the importance of stimulating (research on) teacher collaboration. For example, our overview showed that when teachers collaborate, the educational performances of students progress. Schools undergo cultural changes, are more innovative and become characterised by a flattened power structure. But in the end, it showed that the teachers appear to profit most from collaboration. Apparently they do not only progress with regard to job performance, but on a personal level teachers seem to benefit as well (e.g., feeling less isolated, more motivated, improved morale). These positive consequences relate to a growth-mindset perspective on teacher collaboration – collaboration is desired as the performance of students and teachers increases

– and can act as *pull*-factors stimulating collaboration. At the same time, there is a definite need for teachers to collaborate; not collaborating is no longer an option. Different educational innovations *push* towards teacher collaboration; for example, competence-based education (Truijten et al., 2013). In reality, it may often be the need to collaborate that pushes teachers towards collaborative work instead of an intrinsic desire residing from awareness that students as well as teachers benefit from collaboration. When teacher collaboration mainly resides from top down initiatives and definitions of needs, this might lead to contrived collegiality and superficial rather than deep-level collaboration. This feeling of being obliged to collaborate can encourage teachers' recalcitrant and apprehensive attitude towards collaboration.

At the same time, teacher collaboration should not be seen as a magic solution that solves all problems as it can entail negative consequences. Our overview showed that the teacher and the group of teachers appear to be most vulnerable as most negative consequences derived from literature were formulated on these levels. For teachers an important drawback is related to a threat towards their strongly appreciated individual autonomy and independence. Furthermore, literature shows that teacher groups may not always function as they are supposed to and when teacher collaboration is implemented in schools, it should be supervised so it will not lead to forms of contrived collegiality by making sure various preconditions are met.

This brings us to the fourth aim of our review: the identification of preconditions or factors facilitating and hindering teacher collaboration. Our overview listed a diverse array of factors that influence teacher collaboration. There are thus ample points of action for interventions focused at making teacher collaboration successful. On the one hand, facilitating factors can help create the conditions supporting teacher collaboration. Most facilitating factors found are situated on the level of the process of collaborating. This means that in order to make teacher collaboration successful, a lot of actions can be undertaken to support the aspects of the collaborative process (e.g., realising task interdependence, developing clear roles for the members, a defined focus for collaboration). Also structural support (e.g., providing meeting time) and group level interventions (mainly focused at group composition) seem to be important points of action in order to facilitate teacher collaboration. On the other hand, creating conditions facilitating collaboration does not suffice, as potential hindrances need to be addressed. Most hindering factors mentioned were situated on the teacher and group levels. We assume that the structural and organisational context is of great importance for making teacher collaboration possible, but removing hindrances in the context is not enough. Even when a supportive atmosphere and structure are provided, teachers and groups need to be convinced to collaborate and obstacles on these levels need to be overcome. This can provide opportunities for intervention, as it is more difficult to change the whole school culture and structure than it is to create interventions for teachers and groups of teachers. A difficulty concerning these obstacles includes that a lot of hindering factors are related to cultural aspects and elements related to the mind-set of teachers. A strong-rooted culture of individualism, autonomy, and independence appears to be profound in education. There is thus a need for a change of mentality in the case of teachers and education in general. Without an essential amount of openness to collaborate, every effort pushing teachers towards collaboration may become lost in a culture of contrived collegiality.

An important issue regarding the preconditions of teacher collaboration includes to what degree certain preconditions should be met in order to facilitate teacher collaboration. This often remains unclear and dependent upon the context of teacher collaboration, the collaborative task, desired outcomes, characteristics of the teachers involved, etc. Some factors were even found to be facilitating and hindering at the same time (e.g., autonomy) and for others there existed disagreement concerning whether they foster or hamper collaboration (e.g., heterogeneity of the group). Conditions may be beneficial when they occur to a certain extent, but may impede collaboration when high levels are present (e.g., curvilinear relationships). Little research provides guidelines in this regard, probably partially caused by the fact that this depends on various characteristics of the collaborative endeavour. This review did not aim to provide the reader with clear-cut and straightforward answers and recommendations in this regard. It aimed to provide an explorative overview of aspects mentioned in previous research and in this way presented starting points for further research in more specific areas.

Our fifth and final aim addressed what we actually aim to facilitate, what effective collaboration is. Different authors referred to different aspects of effectiveness. A distinction was made here between process and outcome related criteria. A variety of aspects were mentioned with respect to what is needed in an effective collaborative process. These range from more individual-oriented criteria such as possessing appropriate knowledge and skills and having clear individual roles to collaborative-oriented aspects such as a fair distribution of responsibilities, team innovation and communication. Effective collaboration can also be described in relation to certain outcome related criteria. Not only does the team need to perform well and reach its goals, but it is also of essential importance that this eventually leads to an amelioration of teaching practice.

Thus summarised, education is a challenging context with regard to collaborative opportunities. A large array of obstacles needs to be overcome and pitfalls need to be avoided, but at the same time there is an ample amount of points of action and a diverse array of reasons for teachers to collaborate because all parties involved in education benefit. Moreover, teacher collaboration can never be seen as separated from its context. The educational context and culture and characteristics of the teaching profession strongly influence the implementation and sustainment of teacher collaboration.

8. Limitations and recommendations for future research

Although valuable conclusions can be drawn, the current review has a few limitations of which one needs to be aware. First, this review primarily focused on *teacher teams* and *teacher collaboration* and related terms and not explicitly searched for *communities* (communities of practice or professional learning communities); these thus mainly fell outside of the scope

of this review. This choice was made because studies discussing communities often speak of a school-wide community entailing all teachers of the school and it can be questioned to what extent such communities actually collaborate. By using the search terms mentioned in subsection 5.1, only those studies pertaining to community also focusing on collaboration were included in the study. Further research could extend the search terms to this area of teacher collaboration in order to get an even broader picture. Furthermore, the search was limited in time (only including studies from 2000 onwards); thus there may be older relevant studies that were not selected.

Another possible limitation resides in the narrative review approach. Because this is less objective than mathematical analyses, it may be possible that our own views have coloured the interpretation of the literature. For example, maybe other important themes could be selected. However, one way to cope with this consisted of creating a table including the key findings of all studies to make sure that the essential conclusions were included and making clear the aims and focus of this study.

Furthermore, a valuable issue that could not be fully addressed in this review includes further clarifying the exact form of teacher collaboration each of the selected studies referred to. As argued before, it often remained unclear what different authors actually referred to when they use different terms to describe teacher collaboration. As definitions of different forms of teacher collaboration often lack in literature, it was not clear to what extent different authors referred to different or the same things when discussing teacher collaboration. Although it would be of great importance to disentangle this apparent lack of clarity, this goal was not completely fulfilled in this review. The reason for this limitation is twofold. On the one hand, the lack of clear descriptions and definitions provided in previous studies made it difficult to gain insight on what the terms used actually mean. On the other hand, the interchangeable use of different terms within the same study made it difficult to clearly distinguish and delineate different terms. For this reason, this review focused on the first step towards terminological clarification: drawing attention to the lack of clarity and providing an overview and description of the forms of collaboration discussed and the terms used. It thus provided a terminological framework for future research to build on. Future research should thus provide a clearer picture of the sort of teacher collaboration under study by following the proposed terminological framework and avoiding the use of different terms to refer to the same thing. Building and consistently using a common language concerning the topic are of utmost importance for strengthening future research.

Another recommendation for further research resides from the fact that there appears to be a lack of clear and empirical insight into the characteristics of teacher teams. Literature on teacher collaboration mainly appeared to focus on effects of teacher collaboration, why teachers should collaborate, what is needed to collaborate, etc. Thus the step of gaining insight in the phenomenon of teacher collaboration in itself was mostly neglected. This review aimed at partially focusing on this part, gaining insight in the form and structure of teacher collaboration. It would be interesting for future research to perform an exploratory empirical study on teacher teams, looking at the characteristics of these teams, their structure, their degree of team entitativity, to what extent they actually differ from teams in other organisations, etc.

This leads to our next advice, crossing the boundaries of different research traditions. Research on collaboration in different contexts (education, manufacturing, management, healthcare, etc.) can learn a lot from each other and research in the field can only progress when boundaries of disciplines are crossed. Despite the fact that education forms a specific and challenging context for realising collaboration, other organisations implementing teamwork and collaboration are confronted with similar difficulties. This makes looking at more generic models of teamwork (e.g., Decuyper et al., 2010; Edmondson, 2002; Sessa & London, 2006) and applying them in the context of teacher collaboration important for future research to gain insight on the dynamics of teacher teamwork. Including team entitativity in this stream of research makes it possible to conceptualise and compare teamwork in different contexts, to see how team entitativity varies in these teams with different tasks, and how that influences collaborative functioning. As the latter is still influenced by various context characteristics future research on collaboration should cross boundaries, still bearing the characteristics of the specific context of interest in mind.

A final recommendation for future research on teacher collaboration includes expanding its range concerning the educational context in which it is investigated. As shown in Appendix S1, literature appeared to be limited to collaboration in primary and secondary education, rarely incorporating the context of higher education. However, higher education is also confronted with an increasing amount of challenges that push towards a renewed work organisation. These include for example increased flexibility and mergers with other institutions, leading to a rise in work pressure and associated stress, psychological exhaustion and lowered wellbeing (Hadewych, 2004). As each level of education has certain specific characteristics, future research should pay attention to further exploring collaboration between lecturers in higher education.

Appendix. Supplementary material

Supplementary data to this article can be found online at doi:10.1016/j.edurev.2015.04.002.

References

- Achinstein, B. (2002). Conflict amid community: The micropolitics of teacher collaboration. *Teachers College Record*, 104, 421–455. doi:10.1111/1467-9620.00168.
- Arai, L., Britten, N., Popay, J., Roberts, H., Petticrew, M., Rodgers, M., et al. (2007). Testing methodological developments in the conduct of narrative synthesis: A demonstration review of research on the implementation of smoke alarm interventions. *Evidence & Policy*, 3, 361–383. doi:10.1332/174426407781738029.
- Berry, B., Daughtry, A., & Wieder, A. (2009). *Collaboration: Closing the effective teaching gap*. Retrieved from Centre for Teaching Quality website: <http://www.teachingquality.org/content/collaboration-closing-effective-teaching-gap>.

- Bertrand, L., Roberts, R. A., & Buchanan, R. (2006). Striving for success: Teacher perspectives of a vertical team initiative. *National Forum of Teacher Education Journal-Electronic*, 16, 1–10. Retrieved from <<http://www.nationalforum.com/Journals/NFTEJ/NFTEJ.htm>>.
- Birenbaum, M., Kimron, H., & Shilton, H. (2011). Nested contexts that shape assessment for learning: School-based professional learning community and classroom culture. *Studies in Educational Evaluation*, 37, 35–48. doi:10.1016/j.stueduc.2011.04.001.
- Bovbjerg, K. M. (2006). Teams and collegiality in educational culture. *European Educational Research Journal*, 5, 244–253. doi:10.2304/eej.2006.5.3.244.
- Brouwer, P. (2011). *Collaboration in teacher teams* (Doctoral dissertation). <<http://dspace.library.uu.nl/>>.
- Brouwer, P., Brekelmans, M., Nieuwenhuis, L., & Simons, R. J. (2011). Community development in the school workplace. *International Journal of Educational Management*, 26, 403–418. doi:10.1108/09513541211227809.
- Brouwer, P., Brekelmans, M., Nieuwenhuis, L., & Simons, R. J. (2012). Fostering teacher community development: A review of design principles and a case study of an innovative interdisciplinary team. *Learning Environments Research*, 15, 319–344. doi:10.1007/s10984-012-9119-1.
- Cameron, D. H. (2005). Teachers working in collaborative structures: A case study of a secondary school in the USA. *Educational Management Administration & Leadership*, 33, 311–330. doi:10.1177/1741143205054012.
- Campbell, D. T. (1958). Common fate, similarity, and other indices of the status of aggregates of persons as social entities. *Behavioral Science*, 3, 14–25.
- Carpenter, S., Fortune, J. L., Delugach, H. S., Etzkorn, L. H., Utley, D. R., Farrington, P. A., et al. (2008). Studying team shared mental models. 3rd International Conference on the Pragmatic Web, September 28–30, Sweden: Uppsala.
- Carroll, T. G., & Foster, E. (2008). *Learning teams: Creating what's next*. Retrieved from National Commission on Teaching and America's Future website: <<http://nctaf.org/wp-content/uploads/2012/01/NCTAFLearningTeams408REG2.pdf>>.
- Chance, P. L., & Segura, S. N. (2009). A rural high school's collaborative approach to school improvement. *Journal of Research in Rural Education*, 24, 1–12. <<http://jrre.psu.edu/>>.
- Cheng, L. P., & Ko, H. (2009). Teacher-team development in a school-based professional development program. *The Mathematics Educator*, 19, 8–17. <<http://eric.ed.gov/>>.
- Clement, M., & Van den Berghe, R. (2000). Teachers' professional development: A solitary or collegial (ad)venture? *Teaching and Teacher Education*, 16, 81–101. doi:10.1016/S0742-051X(99)00051-7.
- Cohen, S. G., & Bailey, D. E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management*, 23, 239–290. doi:10.1177/014920639702300303.
- Coke, P. K. (2005). Practicing what we preach: An argument for cooperative learning opportunities for elementary and secondary educators. *Education*, 126, 392–398. <<http://search.proquest.com/docview/196441472?accountid=17215>>.
- Conley, S., Fauske, J., & Pounder, D. G. (2004). Teacher work group effectiveness. *Educational Administration Quarterly*, 40, 663–703. doi:10.1177/0013161X04268841.
- Crow, M. G., & Pounder, D. G. (2000). Interdisciplinary teacher teams: Context, design, and process. *Educational Administration Quarterly*, 36, 216–254. doi:10.1177/0013161X00362004.
- Curry, M. (2008). Critical friends groups: The possibilities and limitations embedded in teacher professional communities aimed at instructional improvement and school reform. *Teachers College Record*, 110, 733–774. <<http://www.tcrecord.org>>.
- Datnow, A. (2011). Collaboration and contrived collegiality: Revisiting Hargreaves in the age of accountability. *Journal of Educational Change*, 12, 147–158. doi:10.1007/s10833-011-9154-1.
- De Rijdt, C., Stes, A., van der Vleuten, C., & Dochy, F. (2013). Influencing variables and moderators of transfer of learning to the workplace within the area of staff development in higher education: Research review. *Educational Research Review*, 8, 48–74. doi:10.1016/j.edurev.2012.05.007.
- Decuyper, S., Dochy, F., & Van den Bossche, P. (2010). Grasping the dynamic complexity of team learning: An integrative model for effective team learning in organizations. *Educational Research Review*, 5, 111–133. doi:10.1016/j.edurev.2010.02.002.
- Dickinson, E. B. (2009). The impact of collaborative teacher teaming on teacher learning (Master's thesis). <http://digitalcommons.wku.edu/>.
- Dochy, F., Segers, M., Van den Bossche, P., & Gijbels, D. (2003). Effects of problem-based learning: A meta-analysis. *Learning and Instruction*, 5, 533–568. doi:10.1016/S0959-4752(02)00025-7.
- Doppenberg, J. J., Bakx, A. W. E. A., & den Brok, P. J. (2012). Collaborative teacher learning in different primary school settings. *Teachers and Teaching: Theory and Practice*, 18, 547–566. doi:10.1080/13540602.2012.709731.
- Doppenberg, J. J., den Brok, P. J., & Bakx, A. W. E. A. (2012). Collaborative teacher learning across foci of collaboration: Perceived activities and outcomes. *Teachers and Teacher Education*, 28, 899–910. doi:10.1016/j.tate.2012.04.007.
- Drach-Zahavy, A., & Somech, A. (2002). Team heterogeneity and its relationship with team support and team effectiveness. *Journal of Educational Administration*, 40, 44–66. doi:10.1108/09578230210415643.
- Edmondson, A. C. (2002). The local and variegated nature of learning in organizations: A group-level perspective. *Organization Science*, 13, 128–146. doi:10.1287/orsc.13.2.128.530.
- Edmondson, A. C. (2013). *Teaming to innovate*. San Francisco, CA: Jossey-Bass.
- Egodawatte, G., McDougall, D., & Stoilescu, D. (2011). The effects of teacher collaboration in Grade 9 applied mathematics. *Educational Research for Policy and Practice*, 10, 189–209. doi:10.1007/s10671-011-9104-y.
- European Commission (2013). The Teaching and Learning International Survey (TALIS) 2013: Main findings from the survey and implications for education and training policies in Europe. <http://ec.europa.eu/education/library/reports/2014/talis_en.pdf>.
- Euwema, M., & Van der Waals, J. (2007). *Teams in scholen: Samen werkt het beter* [Teams in schools: It works better together]. Leusden: BMC.
- Flowers, N., Mertens, S. B., & Mulhall, P. F. (2000). What makes interdisciplinary teams effective? Research on middle school renewal. *Middle School Journal*, 31, 53–56. Retrieved from <<http://www.amle.org/ServicesEvents/MiddleSchoolJournal>>.
- Fulton, K., & Britton, T. (2011). *STEM teachers in professional learning communities: From good teachers to great teaching*. Retrieved from National Commission on Teaching and America's Future website: <http://www.wested.org/online_pubs/1098-executive-summary.pdf>.
- Gajda, R., & Koliba, C. J. (2008). Evaluating and improving the quality of teacher collaboration: A field-tested framework for secondary school leaders. *NASSP Bulletin*, 92, 133–153. doi:10.1177/0192636508320990.
- Goddard, Y. L., Goddard, R. D., & Tschannen-Moran, M. (2007). A theoretical and empirical investigation of teacher collaboration for school improvement and student achievement in public elementary schools. *Teachers College Record*, 109, 877–896. <<http://tcrecord.com>>.
- Graham, P. (2007). Improving teacher effectiveness through structured collaboration: A case study of a professional learning community. *Research on Middle Level Education Online*, 31, 1–17. Retrieved from <<http://www.amle.org/servicesevents/researchinmiddleleveleducationonline>>.
- Green, B. N., Johnson, C. D., & Adams, A. (2011). Writing narrative literature reviews for peer-reviewed journals: Secrets of the trade. *Journal of Chiropractic Medicine*, 5, 101–117. doi:10.1016/S0899-3467(07)60142-6.
- Gregory, A. (2010). Teacher learning on problem-solving teams. *Teaching and Teacher Education*, 26, 608–615. doi:10.1016/j.tate.2009.09.007.
- Grossman, P., Wineburg, S., & Woolworth, S. (2001). Toward a theory of teacher community. *Teachers College Record*, 103, 942–1012. <<http://tcrecord.org>>.
- Gunn, J. H., & King, M. B. (2003). Trouble in paradise: Power, conflict and community in an interdisciplinary teacher team. *Urban Education*, 38, 173–195. doi:10.1177/0042085902250466.
- Hackmann, D. G., Petzko, V. N., Valentine, J. W., Clark, D. C., Nori, J. R., & Lucas, S. E. (2002). Beyond interdisciplinary teaming: Findings and implications of the NASSP National Middle Level Study. *NASSP Bulletin*, 86, 33–47. doi:10.1177/019263650208663204.
- Hadewych, B. (2004). *Informatiedossier: Werkdruk en stress in Vlaamse hogescholen* [Information file: Work pressure and stress in Flemish colleges for higher vocational education]. Brussel: SERV-STV Innovatie & Arbeid.
- Hamilton, D. L., Sherman, S. J., & Castelli, L. (2002). A group by any other name – The role of entitativity in group perception. *European Review of Social Psychology*, 12, 139–166. doi:10.1080/14792772143000049.

- Hargreaves, A. (2001). The emotional geographies of teachers' relations with colleagues. *International Journal of Educational Research*, 35, 503–527. doi:10.1016/S0883-0355(02)00006-X.
- Havnes, A. (2009). Talk, planning and decision-making in interdisciplinary teacher teams: A case study. *Teachers and Teaching: Theory and Practice*, 15, 155–176. doi:10.1080/13540600802661360.
- Heck, D., & Minner, D. (2010). Technical report: Standards of evidence for empirical research. <http://www.relcentral.org/resource-download/?id=2056&post_id=2055>.
- Helstad, K., & Lund, A. (2012). Teachers' talk on students' writing: Negotiating students' texts in interdisciplinary teacher teams. *Teaching and Teacher Education*, 28, 599–608. doi:10.1016/j.tate.2012.01.004.
- Hindin, A., Morocco, C., Mott, E. A., & Aguilar, C. M. (2007). More than just a group: Teacher collaboration and learning in the workplace. *Teachers and Teaching: Theory and Practice*, 13, 349–376. doi:10.1080/13540600701391911.
- James, C. R., Dunning, G., Connolly, M., & Elliott, T. (2007). Collaborative practice: A model of successful working in schools. *Journal of Educational Administration*, 45, 541–555. doi:10.1108/09578230710778187.
- Johnson, B. (2003). Teacher collaboration: Good for some, not so good for others. *Educational Studies*, 29, 337–350. doi:10.1080/0305569032000159651.
- Katzenbach, J. R., & Smith, D. K. (2005). The discipline of teams. *Harvard Business Review*, 83, 152–170. <<https://hbr.org>>.
- Kelchtermans, G. (2006). Teacher collaboration and collegiality as workplace conditions: A review. *Zeitschrift für Pädagogik*, 52, 220–237. <<http://pedocs.de>>.
- Kougioumtzis, K., & Patriksson, G. (2009). School-based teacher collaboration in Sweden and Greece: Formal cooperation, deprivatized practices and personalized interaction in primary and lower secondary schools. *Teachers and Teaching: Theory and Practice*, 15, 131–154. doi:10.1080/13540600802661352.
- Lave, J., & Wenger, E. (1991). Legitimate peripheral participation in communities of practice. In J. Lave & E. Wenger (Eds.), *Situated learning: Legitimate peripheral participation* (pp. 90–117). Cambridge, United Kingdom: Cambridge University Press.
- Leonard, L. (2002). Schools as professional communities: Addressing the collaborative challenge. *International Electronic Journal For Leadership in Learning*, 6, <<http://iejll.journalhosting.ucalgary.ca>>.
- Leonard, L., & Leonard, P. (2003). The continuing problem with collaboration: Teachers talk. *Current Issues in Education*, 6, <<http://cie.asu.edu/>>.
- Leonard, P., & Leonard, L. (2001a). Assessing aspects of professional collaboration in schools: Beliefs versus practices. *Alberta Journal of Educational Research*, 47, 4–23. <<http://ajer.ca>>.
- Leonard, P., & Leonard, L. (2001b). The collaborative prescription: Remedy or reverie? *International Journal of Leadership Education*, 4, 383–399. doi:10.1080/13603120110078016.
- Levine, A. H., & Marcus, A. S. (2007). Closing the achievement gap through teacher collaboration: Facilitating multiple trajectories of teacher learning. *Journal of Advanced Academics*, 19, 116–138. doi:10.4219/jaa-2007-707.
- Levine, A. H., & Marcus, A. S. (2010). How the structure and focus of teachers' collaborative activities facilitate and constrain teacher learning. *Teaching and Teacher Education*, 26, 389–398. doi:10.1016/j.tate.2009.03.001.
- Lickel, B., Hamilton, D. L., Wierzchowska, G., Lewis, A., Sherman, S. J., & Uhles, A. N. (2000). Varieties of groups and the perception of group entitativity. *Journal of Personality and Social Psychology*, 78, 223–246. doi:10.1037/0022-3514.78.2.223.
- Lima, J. A. (2001). Forgetting about friendship: Using conflict in teacher communities as a catalyst for school change. *Journal of Educational Change*, 2, 97–122. doi:10.1023/A:1017509325276.
- Little, J. W. (1990). The persistence of privacy: Autonomy and initiative in teacher's professional relations. *Teachers College Record*, 91, 509–536.
- Little, J. W. (2002). Locating learning in teachers' communities of practice: Opening up problems of analysis in records of everyday work. *Teaching and Teacher Education*, 18, 917–946. doi:10.1016/S0742-051X(02)00052-5.
- Lomos, C., Hofman, R. H., & Bosker, R. J. (2011a). Professional communities and student achievement – a meta-analysis. *School Effectiveness and School Improvement*, 22, 121–148. doi:10.1080/09243453.2010.550467.
- Lomos, C., Hofman, R. H., & Bosker, R. J. (2011b). The relationship between departments as professional learning communities and student achievement in secondary schools. *Teaching and Teacher Education*, 27, 722–731. doi:10.1016/j.tate.2010.12.003.
- Main, K. (2007). A year long study of the formation and development of middle school teaching teams (Doctoral dissertation). <<http://griffith.edu.au>>.
- Main, K. (2012). Effective middle school teacher teams: A ternary model of interdependency rather than a catch phrase. *Teachers and Teaching: Theory and Practice*, 18, 75–88. doi:10.1080/13540602.2011.622556.
- Main, K., & Bryer, F. (2005). What does a 'good' teaching team look like in a middle school classroom? In B. Bartlett, F. Bryer, & D. Roebouck (Eds.), *Stimulating the "action" as participants in participatory research: Proceedings of the 3rd International Conference on Cognition, Language, and Special Education*. <<http://www98.griffith.edu.au/dspace/handle/10072/2538>>.
- Markow, D., & Pieters, A. (2010). The MetLife survey of the American teacher. Retrieved from MetLife Foundation website: <https://www.metlife.com/metlife-foundation/about/survey-american-teacher.html?WT.mc_id=vu1101>.
- Meirink, J. A. (2007). Individual teacher learning in a context of collaboration in teams (Doctoral dissertation). <<https://openaccess.leidenuniv.nl/>>.
- Meirink, J. A., Imants, J., Meijer, P. C., & Verloop, N. (2010). Teacher learning and collaboration in innovative teams. *Cambridge Journal of Education*, 40, 161–181. doi:10.1080/0305764X.2010.481256.
- Meneses, R., Ortega, R., Navarro, J., & de Quijano, S. D. (2008). Criteria for assessing the level of group development (LGD) of work groups: Groupness, entitativity, and groupality as theoretical perspectives. *Small Group Research*, 39, 492–514. doi:10.1177/1046496408319787.
- Mertens, S. B., & Flowers, N. (2004). Research summary: Interdisciplinary teaming. Retrieved from North Carolina Association for Middle Level Education website: <<http://www.ncmlc.org/research%20summaries/ressum21.html>>.
- Moolenaar, N. M. (2010). Ties with potential: Nature, antecedents, and consequences of social networks in school teams (Doctoral dissertation). <<http://dare.uva.nl>>.
- Moolenaar, N. M., Slegers, P. J. C., & Daly, A. J. (2011). 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.
- Ohlsson, J. (2013). Team learning: Collective reflection processes in teacher teams. *The Journal of Workplace Learning*, 25, 296–309. doi:10.1108/JWL-Feb-2012-0011.
- Park, S., Henkin, A. B., & Egly, R. (2005). Teacher team commitment, teamwork and trust: Exploring associations. *Journal of Educational Administration*, 43, 462–479. doi:10.1108/09578230510615233.
- Plauborg, H. (2009). Opportunities and limitations of learning within teachers' collaboration in teams: Perspectives from action learning. *Action Learning: Research and Practice*, 6, 25–34. doi:10.1080/14767330902731293.
- Prytula, M. P., Hellsten, M. L., & McIntyre, L. J. (2010). Perceptions of teacher planning time: An epistemological challenge. *Current Issues in Education*, 13, 1–30. <<http://cie.asu.edu>>.
- Raes, E., Kyndt, E., Decuyper, S., Van den Bossche, P., & Dochy, F. (2015). An exploratory study of group development and team learning. *Human Resource Development Quarterly*, doi:10.1002/hrdq.21201.
- Rone, B. C. (2009). The impact of the data team structure on collaborative teams and student achievement (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI NO. 3397293).
- Salas, E., Burke, S. C., & Cannon-Bowers, J. A. (2000). Teamwork: Emerging principles. *International Journal of Management Reviews*, 2, 339–356. doi:10.1111/1468-2370.00046.
- Saunders, W. M., Goldenberg, C. N., & Gallimore, R. (2009). Increasing achievement by focusing grade-level teams on improving classroom learning: A prospective, quasi-experimental study of title I schools. *American Educational Research Journal*, 46, 1006–1033. doi:10.3102/0002831209333185.
- Sawyer, R. K. (2006). *The Cambridge handbook of the learning sciences*. Cambridge: Cambridge University press.
- Scribner, J. P., Hager, D. R., & Warne, T. R. (2002). The paradox of professional community: Tales from two high schools. *Educational Administration Quarterly*, 38, 45–76. doi:10.1177/0013161X02381003.

- Scribner, J. P., Sawyer, R. K., Watson, S. T., & Myers, V. L. (2007). Teacher teams and distributed leadership: A study of group discourse and collaboration. *Educational Administration Quarterly*, 43, 67–100. doi:10.1177/0013161X06293631.
- Sessa, V. I., & London, M. (2006). *Continuous learning in organizations. Individual, group and organizational perspectives*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Shiple, W. W. (2009). Examining teacher collaboration in a kindergarten building: A case study (Doctoral dissertation). Retrieved from <<http://digital.library.duq.edu>>.
- Slavit, D., Kennedy, A., Lean, Z., Nelson, T., & Deuel, A. (2011). Support for professional collaboration in middle school mathematics: A complex web. *Teacher Education Quarterly*, 38, 113–131. Retrieved from <<http://www.teqjournal.org>>.
- Smetser, F. (2007). Samenwerken in teams, een vanzelfsprekendheid? Een onderzoek naar condities die het samenwerken van professionals in teams beïnvloeden [Cooperating in teams as taken for granted? Research into conditions that influence the cooperation of professionals in teams] (Doctoral dissertation). <<http://dare.ubn.kun.nl/>>.
- Smith, G. (2009). If teams are so good . . . Science teachers' conceptions of teams and teamwork (Doctoral dissertation). Queensland University of Technology. <http://eprints.qut.edu.au/31734/1/Gregory_Smith_Thesis.pdf>.
- Somech, A. (2005). Teachers' personal and team empowerment and their relations to organizational outcomes: Contradictory or compatible constructs? *Educational Administration Quarterly*, 41, 237–266. doi:10.1177/0013161X04269592.
- Somech, A. (2008). Managing conflict in school teams: The impact of task and goal interdependence on conflict management and team effectiveness. *Educational Administration Quarterly*, 44, 359–390. doi:10.1177/0013161X08318957.
- Somech, A., & Drach-Zahavy, A. (2007). Schools as team-based organizations: A structure–process–outcomes approach. *Group Dynamics: Theory, Research, and Practice*, 11, 305–320. doi:10.1037/1089-2699.11.4.305.
- Stephenson, L. G., Warnick, B. K., & Tarpley, R. S. (2008). Collaboration between science and agriculture teachers. *Journal of Agricultural Education*, 49, 106–119. doi:10.5032/jae.2008.04106.
- Supovitz, J. A. (2002). Developing communities of instructional practice. *Teachers College Record*, 104, 1591–1626. <<http://tcrecord.org>>.
- Tonso, K. L., Jung, M. L., & Colombo, M. (2006). "It's hard answering your calling": Teacher teams in a restructuring urban middle school. *Research in Middle Level Education*, 30, 1–22. Retrieved from <<http://www.amle.org/services/events/researchinmiddleleveleducationonline>>.
- Truijten, K. J. P., Slegers, P. J. C., Meelissen, M. R. M., & Nieuwenhuis, A. F. M. (2013). What makes teacher teams in a vocational education context effective? A qualitative study of managers' view on team working. *Journal of Workplace Learning*, 25, 58–73. doi:10.1108/13665621311288485.
- Van den Bossche, P., Gijssels, W. H., Segers, M., & Kirschner, P. A. (2006). Social and cognitive factors driving teamwork in collaborative learning environments: Team learning beliefs and behaviors. *Small Group Research*, 37, 490–521. doi:10.1177/1046496406292938.
- Van Maanen, J., & Barley, S. R. (1984). Occupational communities: Culture and control in organizations. *Research in Organizational Behaviour*, 6, 287–365.
- Vangrieken, K., Dochy, F., Raes, E., & Kyndt, E. (2013). Team entitativity and teacher teams in schools: Towards a typology. *Frontline Learning Research*, 1, 86–98. <<http://dx.doi.org/10.14786/flr.v1i2.23>>.
- Visscher, A. J., & Witziers, B. (2004). Subject departments as professional communities? *British Educational Research Journal*, 30, 785–800. doi:10.1080/0141192042000279503.
- Voelkel, R. H. (2011). A case study of the relationship between collective efficacy and professional learning communities (Doctoral dissertation). University of California & California State University. <<http://allthingsplc.info/pdf/articles/VoelkelDisser11.pdf>>.
- Vogels, R. (2009). *Gelukkig voor de klas? Leraren voortgezet onderwijs over hun werk [Happy in front of the classroom? Teachers in secondary education about their work]*. Den Haag: The Netherlands Institute for Social Research.
- Watson, S. T. (2005). Teacher collaboration and school reform: Distributing leadership through the use of professional learning teams (Doctoral dissertation). University of Toronto. <<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.91.8080&rep=rep1&type=pdf>>.
- Wenger, E. (1998). Chapter 2: Community. In E. Wenger (Ed.), *Communities of practice: Learning, meaning and identity* (pp. 72–85). Cambridge, United Kingdom: Cambridge University Press.
- Westheimer, J. (2008). Learning among colleagues: Teacher community and the shared enterprise of education. In M. Cochran-Smith, S. Feiman-Nemser, & J. McIntyre (Eds.), *Handbook of research on teacher education* (pp. 756–782). Reston, VA and Lanham, MD: Association of Teacher Educators and Rowman.
- Wigglesworth, M. (2011). The effects of teacher collaboration on students' understanding of high school earth science concepts (Master's thesis). <<http://etd.lib.montana.edu/>>.
- Williams, M. L. (2010). Teacher collaboration as professional development in a large, suburban high school (Doctoral dissertation). <<http://digitalcommons.unl.edu/>>.
- Yisrael, S. B. (2008). A qualitative case study: The positive impact interdisciplinary teaming has on teacher morale (Doctoral dissertation). <<http://etd.ohiolink.edu/>>.