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## SCHOOL IMPROVEMENT

### Semantic network analysis of the literature

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#### Introduction

School Improvement (SI) is crucial for policymakers with different educational systems across countries (OECD, 2019; Greatbatch & Tate, 2019). In many Western countries SI is associated with neo-liberal policies (Wrigley, 2008) that emphasize decentralization (e.g., Nurkolis & Sulisworo, 2018) and embrace a quasi-market logic in the educational systems by opening schools to competition, privatization, and accountability. These measures demand educators strive to find and employ practices that are significant for improving students' achievements (Azkiyah, 2017; Hallinger, 2018; Pashiardis & Brauckmann, 2019). It should be noted that these efforts have been ongoing since the well-known Coleman Report (Coleman et al., 1966). Nowadays the research literature on SI is highly prolific, comprehensive, and addresses various actors (e.g., school principals, teachers, students, policymakers), processes, and outcomes situated within diverse social and organizational contexts.

The diverse literature reviews in the field (Kovačević & Hallinger, 2019, bibliometric analysis; Gumus et al., 2018; Tian & Huber, 2019, bibliometric and content analyses) show that SI is one of the themes that has preoccupied research. Yet the focus of these studies has been mainly in the forms of leadership in schools. In the present study, we focus specifically on SI, attempting to identify and map the general themes in the current literature (during the five years between 2014 and 2018) that cover issues beyond leadership. Particularly, we look at whether the current literature addresses the need for reforms and calls for educational response to the changes of the 21st century, including the growing globalization and international competition, and the development of digital technologies (Cheng, 2011).

In this chapter, we first introduce the conceptual relationship between school effectiveness (SE) and SI. As the literature in the field is extensive, we further

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employ the semantic network analysis to identify reoccurring themes and topics related to SI as emerging in current research articles. Semantic network analysis (Segev, 2020) enables to map the relationships and identify patterns within the knowledge regarding SI in scientific publications. We collected 215 research articles that mentioned both terms (SE and SI) from the last five years, produced a list of relevant frequent words, and conducted semantic network analysis to identify the main clusters and themes discussed in the literature. While semantic network analysis enables us to map the overall topics and their relationships, we further “dive-in” and employ a thematic qualitative analysis of a sample articles to better understand the context and inter-connectedness between topics. To conclude, we identify gaps in the literature and suggest some directions for future research.

### **The concepts of school effectiveness and improvement**

School improvement frequently comes along with school effectiveness. These two concepts have been extensively discussed and examined in the research literature (e.g., Stoll & Fink, 1994). Broadly speaking, school effectiveness refers to the school, classroom, and student factors that are empirically proven to be related to achievements (e.g., Creemers et al., 2000). More precisely, school effectiveness is defined as understanding educational processes, and explaining their outcomes in terms of concrete causes and effects (Hopkins et al., 1994) or as the means–end relationship between educational processes and students’ outcomes as knowledge and skills in several domains (Creemers et al., 2000). As for school improvement, it focuses mainly on school change. According to Louis et al. (1999), improvement is interchangeable with implementation, reform, or change. They indicated that these terms reflect “altering the behavior of school employees or the performance of the school on any set of pre- or post-determined indicators ...” (p. 251). School improvement emphasizes the practices that could be modified and changed for contributing to higher school achievements (e.g., teachers’ instruction and training). School improvement and school effectiveness are related, with improvement being part of the effort for schools’ effectiveness (Hopkins et al., 2014) and rooted in the essential components of effective schools (Preston et al., 2017). According to Reynolds et al. (2014) “school effectiveness researchers [are] in close intellectual proximity to school improvement researchers and practitioners”. They point to the benefit of merging the two approaches as

many SE researchers became more comfortable with SI’s typical qualitative methodology, its commitment to more cultural views of school processes instead of the formal organizational factors that had been the SE commitment, and its commitment to the importance of seeing teachers as something other than mere “empirical/rational” educational actors

*(p. 199)*

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### The overtime landscape in SE and SI research

Several scholars tracked the changes that occurred in the field of SI, while emphasizing different stages in its development since the mid-20th century (e.g., Cheng, 2011, three waves; Hargreave, 2012, four ways; or Hopkins et al., 2014, five phases). Within this context, Hargreaves (2012) pointed out that from World War II until the 1970s, professionals within the educational sector led various innovations and new social initiatives that were informed by intuition and ideology. More systematic research has been conducted within the framework of school effects' research beginning with the Coleman Report (Coleman et al., 1966) that looked for components, factors, and practices that decoded the "black box" of school characteristics and internal processes that were associated with SI (Reynolds et al., 2014). Further on, during the 1980s and 1990s, there was a shift from centralized school systems and centric school approaches to decentralized school systems and wide efforts for improvement (Hopkins et al., 2014). In the school centric approach, school principals focused mainly on internal school processes and actions for achieving planned goals and tasks in learning, teaching, and schooling. Accordingly, the research examined the correlations between schools' organizational conditions and the quality of education they provided to students. Less consideration was given to the diversities and the influences of the external environment and stakeholders. In contrast, the move to system-level efforts for improvement was associated with the decentralization of the educational systems, incorporation of market principles in education, greater competition among schools, and more pressure for high standards accountability demands (Hargreaves, 2012; Cheng, 2011; Fullan, 2009).

As presented by Hargreaves (2012), schools are thus turning into a setting for collective actions, such as building capacity, shared leadership, enhanced professional development, and cultivation of school culture and climate that support teachers' work and students' learning and outcomes (e.g., Higham & Booth, 2018). In this phase, the school is the unit of change and improvement, along with the multiple dimensional contexts in which it is situated (see also Hallinger, 2018), including exposure to global trends of standards (e.g., knowledge based on PISA, TIMMS) that enhance competition between nations and educational systems. For improving schools, studies showed that school leaders were considered as pivotal figures for improving schools through diverse types of leadership, such as instructional, transformational, or distributive leadership (Leithwood et al., 1999; Spillane, 2012). In addition, teachers' instruction and teaching quality were found to have a dominant and direct influence on students' outcomes compared to other factors (Hopkins et al., 2014; Azkiyah, 2017).

Moving into the 21st century, according to Cheng (2011), schools are exposed to the impact of rapid globalization, information technology, and international economic and social competition. Hence, current effectiveness and improvement trends of education, enhance the need to maximize the learning outcomes of the younger generation, and prepare them for the growing demands of the 21st

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century. Thus, there was a paradigm shift in learning and teaching to ensure their relevance for the future in the context of multiple intelligence, globalization, localization, and individualization. Further, schools are perceived not as independent units (Keddie, 2014), but rather as part of a broader education system. They are required to develop a more flexible and heterarchical structure based on establishing extended social networks and collaboration with diverse internal and external school stakeholders (e.g., parents, NGOs, teachers, Local Educational Authorities, students, school networks) (Addi-Racah et al., 2018; Hallinger, 2018; Ni et al., 2017) in order to maximize learning opportunities for students (Hopkins et al., 2014; Cheng, 2011).

This leads to new modes of governance and bottom-up perceptions that focus on school processes through teachers' professional learning communities, lateral collaboration within schools, and networking (Hargreaves, 2012). As indicated by Muijs (2010), there is an association between networking and collaboration for school improvement. Apparently, at the present time the field of SI is situated in multi-dimensional contexts, attempting to facilitate collaboration and networking within schools and between schools and other institutions, and navigating between the axis of local and global trends and between bottom-up and top-down approaches. Further, while the research focused mainly on students' achievement, there is a consensus upon the need to measure diverse educational outcomes (e.g., the dynamic model). This direction is further enhanced with the emphasis on 21st-century skills, and the efforts to advance soft skills and socio-emotional learning (Chernyshenko et al., 2018). This goes along with Hill and Guthrie's (1999) notion that on the eve of the 21st century, there is a need to develop a new school paradigm that is based on school productivity and improvement (Louis et al., 1999). If so, in view of the current trends of SI, our aims are to explore what is the narrative emerging from the current SI literature by revealing the central players (actors) who are involved in the process of SI and the domains and themes that underline SI research.

### Methods

#### *Sample*

Our analysis is based on peer-reviewed articles. The process of obtaining the sample of articles included several stages. First, we used Clarivate Analytics JCR journal citation reports to obtain a list of all the journals in the field of education with any impact factors. Out of all these journals, we chose only those in the top two-quarters of the list. Second, we defined relevant search queries that could be used to retrieve articles that dealt with school improvement. The chosen search queries that yielded relevant results were: "effective schools" or "effective school research" or (school and success), "School effectiveness", and "school improvement". Searches were conducted in four databases (PsycNET, Education Source, ERIC, and Web of Science) in the fields of title, summary, and keywords for each

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of the chosen journals that we defined for the five years between 2014 and 2018. To conclude, we manually scanned all the articles for relevancy. Out of more than 300 articles retrieved, we omitted those focusing on special education schools, psychological learning disorders, physical disabilities, and duplication of articles. In total, this search process returned 215 relevant articles that explicitly dealt with school improvement.

### *Procedure*

Our analysis was conducted in two stages. We employed semantic network analysis to identify the main themes around which the academic discussion on success in schools revolved. Once we identified central terms and clusters of words related to the field, we conducted a qualitative analysis to better understand the context in which these words and themes were discussed in the literature.

For the semantic network analysis, we first constructed a list of the most frequent words in the text with a frequency of at least 0.01% of the total number of words ( $N = 2,299,185$ ). We then manually inspected this list, removed stop-words and irrelevant words, and merged words with a similar derivation (such as singular and plural). We ended up with a list of 229 frequent words that appeared at least 139 times in the corpus. We also identified frequent phrases in the literature (such as “professional development” and “transformational leadership”), which were crucial in the context of our study. Next, we constructed an undirected weighted network of words that co-occurred in the same sentence. We also explored the option of looking at words appearing together in the same paragraph but found that the window of one sentence was more accurate in our corpus, keeping the tight proximity between words (see also Danowski, 1993). Finally, we conducted several analyses, including measuring the network centrality of words, a cluster analysis to extract the main themes and topics, and, based on the semantic map, an in-depth qualitative analysis to better understand the context of SI research.

For the following analysis, due to the high density of the network, we focused on two network resolutions: a network of word pairs that were mentioned in at least 200 sentences (for visualizing the network’s overall structure and main themes in Figures 9.1), and another network of word pairs that appeared in at least 100 sentences (around one of the particular keywords in Figures 9.2). In addition, articles that were selected for further qualitative analysis were based on a proportional stratified sampling of about a quarter (23%;  $N = 50$ ) of the articles published in each year (2014 to 2018) (e.g., for an example of a random selection of articles in conducting a literature review, see McInerney et al., 2004). These articles were randomly selected from all the articles that emerged from our search in order to provide a diverse scope of articles, and not necessarily an influential one (prior reviews conducted content analyses of the most cited articles; Tian & Huber, 2019). For each article, two of the researchers conducted a content analysis generated by the following codes: research main topic or aims, participants, research methods, main findings, and conclusion based on the findings. For the current



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managers are responsible for enabling the work of teachers and students, and more generally to SI. Moreover, the three players connect to the cluster of school improvement that includes the words “capacity”, “networks”, and “policies”.

The link of all these words to improvement is not surprising as our search was initially focused on school improvement as a keyword. Yet, although the initial search included the word “effective”, it was more marginal in the network. Hence, the research literature seems to emphasize the school processes—of improvement—rather than its outcomes. Moreover, the narrative that emerges from the analysis revealed two important foci: one is the triangle between teachers, school leaders, and school improvement. The other is on the triangle of teachers, students, and school improvement. Leadership seems to be indirectly linked to students through teachers and through school improvement processes. Interestingly, the parents, who are significant actors in the field of education, appeared to be minor in the SI/SE literature, as parents are mostly mentioned in relation to the students, with no prominent ties to the teachers or school leadership.

Based on our sample of 50 articles, we found that there was indeed a centrality to teachers (as mentioned above); 27 articles examined teachers or teachers with other participants (see below for more details). Further, students were dominant in Figure 9.1 and most of the articles addressed the implications of the educational process for improving students’ outcomes, but in practice only five articles examined students as their primary subject. Four of these studies referred to efforts and programs for improving students’ achievements (in math or literacy) (Gorard et al., 2015, 2017; Kelcey & Shen, 2016, Valenzuela et al., 2016; Bellei et al., 2016), and one for decreasing school bullying (Kyriakides et al., 2014). It was also found that seven of the articles addressed schools’ leadership specifically. These studies reflected a wide range of topics: school leaders’ strategies and practices for improving schools under accountability demands and competition (Jabbar, 2015; Galdames et al., 2018; Ehren & Shackleton, 2016); leadership and practices for school improvement in different school contexts (Hallinger, 2018; Reed & Swaminathan, 2016); school leaders and inclusive values for improving schools (Reed & Swaminathan, 2016), or a critical view regarding low performing schools that change rapidly, known as “quick win” schools (Meyers & Hitt, 2018).

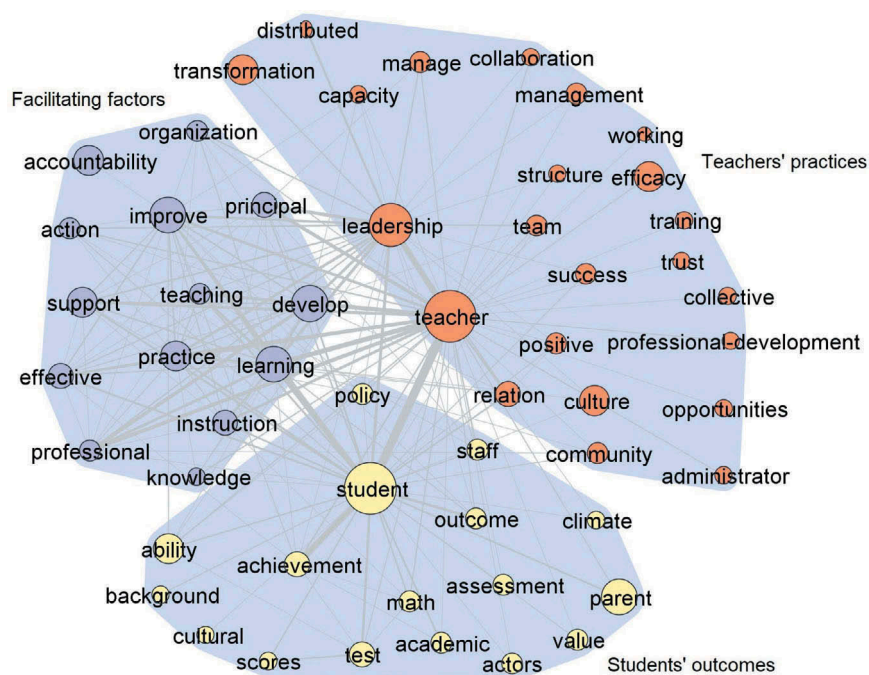
The research on SI is linked not only to students, teachers, and leaders, but also to their interactions and collaboration with diverse external agencies. Articles focused on the relations between school leaders and policymakers (Daly et al., 2014; Dunaway et al., 2014) and examined leaders’ responses and challenges in facing diverse policies (Frankenberg, 2015; Gaertner et al., 2014; Liou, 2016) or professionals from out of school (Swaffield, 2015). Other articles focused on promoting effective partnership between schools for school improvement as between high and low achieving schools (Muijs, 2015), collaboration between schools in a divided society in Ireland (Duffy & Gallagher, 2015), and collaboration between schools, which is a challenge under policies that favor accountability and competition between schools (Ehren & Perryman, 2018; Frankenberg et al., 2015). Armstrong and Ainscow (2018), stressed trust as an essential factor for between schools’ collaborations. An additional two

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articles looked at the partnership between practitioners and researchers/academia (Ainscow et al., 2016; Sheard & Sharples, 2016). Four articles were related to diverse subjects that were less attached to the main narratives revealed in Figure 9.1, such as measuring school climate (Bradshaw et al., 2014) or trust (Romero & Mitchell, 2018); addressing health issues (Rasberry et al., 2015) or analyzing SI policies in Trinidad and Tobago by adopting a historical perspective (James, 2014). These studies seem to reflect the current approaches that regard schools as not working alone, but rather collaborating with diverse external agencies while developing a consolidation within the school community. Since teachers, as noted above, were found to be at the center of the narrative on SI, we further focus on their specific sub-network in greater detail.

Figure 9.2 illustrates the main topics related to teachers. The top-right cluster, labeled as “facilitating factors”, includes many words that represent the conditions for teachers’ work. In this cluster, two research foci are mentioned: one is teachers’ work relations with other teachers represented with words such as “trust”, “community”, and “professional development”. In this case, teachers may hold leadership roles by participating in the core functions of teaching and learning (York-Barr & Duke, 2004). Teachers thus, develop their expertise together with their peers, and generate new ideas for the development of schools (Leithwood & Jantzi, 2000).



**FIGURE 9.2** Semantic network of words related to “teachers”.

*Note.* The network resolution is 100 sentences and above. Network visualization and calculations were performed with Visone (Brandes & Wagner, 2004).



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The other focus is related to their relationship with the school leadership or the management. It refers to school principals who enhance teachers' role in schools by means of transformational or distributive leadership and capacity to manage change, as found in prior studies (Leithwood & Jantzi, 2006). The relations between the different enabling factors were found to be weak, indicating that studies often choose only one of these foci, and do not offer a comprehensive analysis of the different elements that support teachers' work.

On the top-left, labeled "teachers' practices", is a cluster of general school practices and processes of SI, including words such as "learning", "teaching", "support", and "development". This cluster reflects teachers' practices that are related to students' learning processes. At the bottom of the network, the cluster labeled "students' outcomes" focuses on cognitive outcomes such as "achievement", "scores", "test", and "assessment". Here too, the relations between the terms in this cluster are relatively weak, indicating that studies employed different factors to examine students' outcomes. Apparently, the narrative emerging from Figure 9.2 reflects the view that teachers are responsible for students' outcomes, as confirmed by numerous studies (e.g., Kyriakides & Creemers, 2009). Further, as already indicated, the relationship between school leaders and students is indirectly mediated through the teachers. Here too, parents seem to be a marginal factor in schools, associated mainly with students.

### Discussion

In this chapter, we employed semantic network analysis to map the literature on SI during the five years between 2014 and 2018. We found that the main narrative on SI is a conservative one. The responsibility for school improvement lies in the hands of the school staff: teachers, and school leaders, through the process of development, learning, or teaching. The students are presented as more passive in this process with emphasis on their academic achievements or test scores. Still, it appears that schools do not operate as independent units but are rather presented as part of a larger network that is composed of diverse agencies. Further, a relatively weak relationship exists between leaders and students compared to teachers and leaders or teachers and students. These findings corroborate with prior studies showing that the impact of school leaders on students' outcomes (mainly achievements) is mediated through teachers (Tian & Huber, 2019) and their improvement's practices. More specifically, when looking at the sub-network of teachers, we identify three dimensions as responsible for SI (see also Mincu, 2015).

### *Factors contributing to teachers' work*

Our semantic networks identified two groups of factors that contributed to teachers' work: One was their relationship and cooperation with other teachers, and the other was their relationship with the management.

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In terms of the relationship with the school principals, the literature on SI stresses the importance of teachers' training and competencies (Snoek & Volman, 2014) as well as school leaders' training. Orphanos and Orr (2014), for instance, show the importance of investment in leadership preparation, which improves their practices and yields more positive teachers' work conditions that are essential for improving students' learning. Other studies similarly focused on the role of the school leader: Minckler (2014) stressed the importance of transformational leadership (e.g., encouraging high performance, providing vision and inspiration, and providing intellectual stimulation) in developing and establishing a physical and cultural environment for SI. Liljenberg (2015) focused on the implications of distributive leadership in Swedish schools for organizational development and learning as experienced by teachers' leadership. The study revealed the tensions raised by distributive leadership along with expanded collaboration and trust. School leaders were also found to contribute to teachers' work through the development of collective innovation, as an additional measure of school climate (Buske, 2018) or through enhancing collegial and collaborative relations in schools (e.g., through programs in schools, Ford & Youngs, 2018). Finally, Sebastian et al. (2017) showed that principal leadership' pathway to improve school climate learning is mediated by teacher leadership. Thus, principals may prioritize their efforts in improving learning climate, and enable teachers to assist in these efforts by increasing their leadership capacity toward climate-related processes.

In terms of the relationship between the teachers themselves, studies show that SI is related to teachers' involvement in setting their school culture and collaborative climate. For example, Bragg & Manchester (2017) referred to the Creative Partnerships program for building school ethos from a grassroots approach by learning from all members of the school community (e.g., teachers and students). This study emphasized the process of sharing and integrating different perspectives for enabling SI from within rather than from outside of school. The significance of internal or bottom-up processes was in accordance with Gaertner et al. (2014), showing that in Germany principals' and teachers' perceptions of school improvement was cultivated by the school staff rather than external inspections.

Another aspect of teachers' agency was related to teachers' leadership. On this issue, Snoek and Volman (2014) showed that teachers who were engaged in active dialogues with their supervisors and teams about their roles in developing the school could change the school culture and improve teaching and learning. While school leaders were both colleagues and mentors (Holloway et al., 2018), it was found that teachers engaged in more reflective dialogues and felt collectively responsible when the leadership held a group-oriented approach (Vanblaere & Devos, 2018).

### *Teachers' practices and learning processes*

Another body of knowledge that emerged from the semantic network analysis focused on teachers' diverse practices that were assumed to be related to students' outcomes. Following the "third wave" of the school improvement initiative,

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which emphasized teaching and learning standards, Hadfield and Jopling (2016) refer to professional learning processes for improving students' achievements. Other studies addressed the importance of professional learning communities and collaboration between teachers as a core component that contributes to school improvement, enables pedagogical discussions, avoids hierarchical relations (Jäppinen et al., 2016), and decreases bullying (Kyriakides et al., 2014). Even though Watson (2014) criticized the role of professional learning communities, Voelkel and Chrispeels (2017) found that it helped teachers' collective efficacy and further improved students' achievements. Similarly, Mitchell and Sackney (2016) examined teachers' practices in a "living system", which were found to support authentic teaching and learning for students' wellbeing. Studies also emphasized practices such as data use to understand students' needs within the context of accountability demands (Beaver & Weinbaum, 2015; van Geel et al., 2016; Schildkamp et al., 2017). This goes along with Lancer (2015), who stressed the importance of basing professional development and learning on design principles and theory in contrast to relying on conventional wisdom.

### ***Assessments and students' outcomes***

The underlying assumption of most studies on SI is that improvement could be quantitatively measured through regular assessments and tests of the students. Our analysis showed that the theme of students' tests, assessments, and scores was very dominant in the narrative. Looking in-depth at the articles, however, we did not find many articles that actually measured students' outcomes and also referred to teachers (data used in van Geel et al., 2016 and in Kyriakides et al., 2014).

### **Conclusions and future directions**

Based on the semantic network analysis of recent research and the in-depth illustration of a sample of articles, some conclusions could be drawn. First, within the research on SI, teachers hold the most prominent role. As shown above, studies examined various dimensions of teachers' work, with an emphasis on their extended role as team leaders and colleagues. In this regard, we exemplify through the content analysis of the articles the efforts of the educational system to improve teachers' work through professional development and establishing professional learning communities that characterize 21st-century schools. Hence SI literature mainly focuses on the perspective of schools as a setting for collective actions and centers on system-level efforts for improvement (Hargreaves, 2012; Cheng, 2011; Hopkins et al., 2014). Second, emphasis was given to the internal processes within the schools, pointing to the relationships between school principals and teachers. Yet, new directions seem to be emerging in the SI literature with the growing realization of school networks and collaboration with external agencies for school improvement (Hargreaves, 2012), suggesting heterarchical organizational patterns in schools. While research on SI addresses both external and internal practices, there is still the need for a comprehensive understanding of the relationships between

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the diverse practices. Further, in the studies included in our sample, only a few studies actually measured students' educational outcomes, and when doing so they mainly focused on achievements. More importantly, there is hardly any emphasis on life skills, social capital, or social and universal values. While achievements are significant, there is also a need to address the students' wellbeing, social, and emotional outcomes, which are essential for their future success (Alzahrani et al., 2019; Kanopka et al., 2020). Apparently, new directions of research on SI may be needed in order to encompass the changes occurring in schools and in teachers' work. Future studies should take into account more broadly the relations between teachers and school principals, expand the investigation of external actors, including parents, and address diverse cognitive and non-cognitive students' outcomes.

### Tips and lessons for the use of semantic network analysis

1. Semantic network analysis that is based on a large body of articles yields a very large volume of words. As the decision on which words are to be included in the analysis is crucial, experts in the field have to be active in this stage. Except for their frequency and conceptual criteria for the word inclusion, it is advised that at least two experts in the topic being examined will be involved in this process. Each expert will evaluate the words to be included in the analysis and then the two evaluations can be compared. For reaching reliability in the final list of words to be included in the network analysis, it is suggested to examine the context of the chosen words within the text.
2. It is important to define the central dimensions of semantic networks. In our case, we address three dimensions: actors, school processes, and school outcomes. These dimensions were based on a simple and general model related to school improvement. Having such a model in mind helps to disclose the dominant focal points related to the topic of school improvement, while leaving room for diverse aspects and expressions to be included under these dimensions. In this way we could, for example, identify the central actors related to school improvement (teachers versus school principals), further explore the dynamic between them, and in addition, point on gaps in the literature (e.g., in terms of school outcomes) along with emerging factors related with school improvement.
3. As our semantic network analysis was based on articles, a meaningful interpretation of the networks was achieved by a complementary qualitative content analysis of a sample of articles. We chose a random sample of articles to exemplify and provide an in-depth insight into the words and relations between words emerging from the networks. A complementary content analysis enabled to contextualize the topics that emerged in the networks and offered an added value to the entire study.

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