

Educational constellations: a systematic review of macro-networks in education

Macro-
networks in
education

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259

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Abstract

Purpose – Nowadays, networks are the basic core of social organization and interaction; consequently, networking has become an indispensable requirement in today's societies. In education, the development of different types of collaborative networks has been observed, leading, in recent years, to the creation of educational macro-networks that generate links between schools and different types of institutions. Therefore, this study consists of a systematic review to examine the most relevant findings on this type of educational macro-networks. The authors' objectives were: to examine the main characteristics of this type of networks; to analyze the consequences they cause; and to determine which aspects contribute to or hinder their construction and development.

Design/methodology/approach – A bibliographic search was carried out in *Web of Science*, *SCOPUS* and *Education Resources Information Center*, which yielded a total of 29 studies that were analyzed thematically using Nvivo software.

Findings – Among the most noteworthy results are: the wide variety of existing structures; the benefits they generate in terms of learning outcomes, educational equity and the reduction of inequalities; and the influence exerted by the type of leadership and policies in the development of this macro-networks. Finally, future lines of research and policy implications for practice are highlighted.

Originality/value – In this society, networks have become the basic core of an organization and the new form of social interaction. As a result, networks have begun to play a fundamental role in today's societies, even permeating various spheres such as education. In this context, it is essential to analyse this type of relationship in the field of education in order to truly understand its implications in this sector as well as its development and structure.

Keywords Systematic review, Educational equity, Educational learning, Educational networks

Paper type Literature review

1. Introduction

Globalization, interconnection and technological progress, among other aspects, have contributed to the development of a network society (Castells, 2010). In this society, networks have become the basic core of an organization and the new form of social interaction. As a result, networks have begun to play a fundamental role in today's societies (Azorín, 2017), even permeating various spheres such as education.

However, regardless of the changes generated in societies, the main objective of any educational institution is always to achieve academic improvement. Such improvement should enhance the way in which teaching staff impact student learning and, indirectly, lead to a fairer society with greater values. To this end, a series of innovative changes have

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contributed to the use of collaborative networks and teamwork as the main tools for shaping educational improvement (Ainscow, 2016; Armstrong *et al.*, 2021). In this regard, the key appears to lie in increasing the social and professional capital of each school around a shared community project for learning (Hargreaves and Fullan, 2020).

UNESCO, in its latest report *Reimagining our futures together: A new social contract for education* (2021) argues for the need to co-create a social contract that provides answers to today's global challenges. A contract with transformative potential that generates a union around collective efforts to forge sustainable and peaceful futures for all, based on social, economic and environmental justice (p. 6). Among the proposals for pedagogical renewal on how teachers' transformative work should be, principles such as cooperation, collaboration and teamwork stand out:

Pedagogies based on participatory and cooperative approaches are developed not only through collaborative learning that takes place within the classroom, but through cooperative learning across classrooms and university learning communities. Some of the complex challenges faced by teachers cannot be solved individually, but can be addressed through networks of schools, partnerships with universities or professional communities supported by specialised educational agencies (p. 87).

This, coupled with the myriad benefits described in the literature on networking (European Commission, 2018), has resulted in a growing demand for the promotion of networking in education (Ainscow *et al.*, 2020; Armstrong *et al.*, 2021). As a result, a significant body of research has been generated on this topic in recent years (Griffiths *et al.*, 2021; Vangrieken *et al.*, 2015; Lomos *et al.*, 2011). In this context, the need arises to analyze and systematize the most relevant works on this type of networking and its impact on school improvement.

Of the various forms of educational collaboration developed over the years (Stoll and Louis, 2007; Brouwer *et al.*, 2012; Flecha, 2015), in this study we focus on a new form of such collaboration. The latter is characterized by educational networks with relational structures between teachers and different institutions beyond the schools themselves (Robinson *et al.*, 2020), which have an impact on improving learning and innovation in schools. We have named these networks "Educational Constellations".

2. Networking and education

A network can be defined as a set of elements (nodes) - interconnected people, systems, or organizations – that somehow relate to each other, exchange knowledge to support each other, increasing their learning (Borgatti and Halgin, 2011; Kools and Stoll, 2016). In the educational field, there has been a growing demand to promote this type of dynamic relationship between teachers, schools and other educational sectors to transform teaching practices, promote student development, improve learning, enhance the exchange of resources, or contribute to educational equity (Ainscow *et al.*, 2020; Armstrong *et al.*, 2021; Ruiz-Román *et al.*, 2019; Rincón-Gallardo and Fullan, 2016). One example is the network created by Ainscow *et al.* (2007) (ESRC Teaching and Learning Research Program Phase I Network 'Understanding and Developing Inclusive Practices in Schools') [1].

Fortunately, this innovative current of collaboration has undergone a certain evolution. In its beginnings, this type of network contributed to teachers' mutual support and help, giving rise to shared, consensual, committed and supportive learning, becoming an impulse for innovation and continuous teacher training (Vangrieken *et al.*, 2015). In this sense, the formative power of the use of social networks as a way of pedagogical updating (Marcelo and Marcelo, 2021), obtaining information and resources (Rehm and Notten, 2016), or generating spaces of affinity and collaboration (Carpenter *et al.*, 2020) is sufficiently documented.

Professional collaboration in schools has been evolving since the proposal of Professional Learning Communities (Stoll and Louis, 2007) or Communities of Practice (Brouwer *et al.*, 2012; Wenger, 1998). These are based on the joint learning of teachers and institutions and creating a common commitment to professional performance around a shared purpose. This model of

promotion and professional development enables the creation of an environment that supports teachers' learning, encourages dialogue, group work, reflection and improved learning for all and among all (Hargreaves and O'Connor, 2020; Bolivar, 2021). This new interactive professionalism aims to improve "together" the professional performance, the effectiveness of teaching and teaching practices. In short, this aims to build and promote joint spaces for reflection, self-revision of professional practices and co-responsible decision-making in order to address common challenges and purposes that enhance professional development and improve student learning.

There have even been specific initiatives, as in the case of Learning Communities in Spain, whose main purpose was to achieve social and cultural transformation through the connection with their environment, dialogic learning and educational participation of the entire educational community (Flecha, 2015). The current objective is to create Communities of Professional Practice extended to the community and professional and interinstitutional interrelation networks. Unfortunately, these proposals were neither sufficiently widespread in the educational system nor could they fully comply with their mission due to the individualistic nature of each experience, which limits collaboration solely and exclusively to its institution, restricting, as Bolivar (2021) states, its ability to "self-supply."

As numerous studies show, more and more schools are deciding to share experiences, practices and challenges to provide an adequate response to the demands and uncertainties of today's global and interconnected society to better respond to new educational demands (Hargreaves and O'Connor, 2020; Azorín *et al.*, 2020). "Fortunately, around the world we now have positive examples of school-to-school collaborations with a profound impact on improving practice" (Hargreaves and Fullan, 2014, p. 167).

Robinson *et al.* (2020) define this new form of collaboration as an educational network with relational structures between different institutions beyond the schools themselves. We understand these networks as "Educational Constellations," that is, macro-networks that generate links between schools and different types of institutions as an essential tool for educational improvement. All types of centers (private, public), educational levels (primary, secondary and university) or institutions (local, national and international) are connected by invisible ties that sustain the link, giving rise to a network of schools and synergies (Azorín and Muijs, 2017).

In the recent literature, numerous studies describe networks that go beyond those generated between educational centers. In this case, we speak of a crossing of borders that allows the generation of broader networks between educational institutions and various elements of the context (Blankstein and Noguera, 2016; Díaz-Gibson *et al.*, 2017). To a certain extent, this is an incipient type of network that not only places the focus on schools but also on external elements, thus contributing to generating "extended education" "beyond the school gates" (Cummings *et al.*, 2011; Bolivar, 2021).

The benefits of these constellations are innumerable. According to the European Commission (2018), they can help in horizontal decision making; the creation of links between stakeholders and mediation between educational levels; the resolution of complex problems; the acceleration of innovations; the professional development of teachers; the exchange of knowledge and the dissemination of practice. Such are the benefits that in recent years a significant body of research has been generated on this topic, including systematic reviews. In this regard, the meta-analysis by Lomos *et al.* (2011) explores the effect of professional learning communities on student performance. Griffiths *et al.*'s (2021) review analyses the association between conceptions of collaboration and difficulties in effective collaboration. And finally, the review by Vangrieken *et al.* (2015) examines the types of teacher collaboration, the consequences it generates and the elements that hinder or facilitate collaboration. However, despite these existing reviews, none have focused on analyzing such "Educational Constellations" in relation to school improvement.

Thus, the need arises for a systematic review of the literature to collect and systematize the most relevant findings on this type of work and joint learning in educational macro-networks and their impact on school improvement. To this end, the following research questions will be answered:

- RQ1. What are the main characteristics of studies in this field of research (geographical and temporal distribution, methodological approaches, instruments and contexts)?
- RQ2. What are the characteristics of networks that promote educational improvement (school improvement)?
- RQ3. What kind of consequences/improvements are associated with school networks?
- RQ4. What aspects contribute to the construction and development of this type of network?

To answer these questions, a systematic review of the recent literature was carried out to identify studies of interest, which were then subjected to a thematic analysis of their content (Braun and Clarke, 2006).

3. Methodology

To address the research questions posed, the present work constituted a Systematic Literature Review. The main objective of this type of review is to obtain a general overview of a given field of study, which in turn allows conclusions to be drawn based on scientific evidence that will promote the theoretical and practical development of the field in question (Gough *et al.*, 2012; Harari *et al.*, 2020). Specifically, of the 14 different types of Systematic Literature Review described by Grant and Booth (2009), the Systematic Review will be used. This is the most commonly used type of review and its main objective is to seek, evaluate and summarize the most significant findings in a given field of research, regardless of the method used (quantitative, qualitative, or mixed).

However, for the success of this type of study, the use of methodologies characterized by a high level of transparency and replicability is paramount. Therefore, this review used the PRISMA methodology, specifically the ReSiste-CHS framework (Codina, 2018). This consists of an adaptation of PRISMA proposed by Booth *et al.* (2012) and Grant and Booth (2009). The main feature of this framework is the systematization of the review through a process consisting of four phases: (1) selection of databases and specification of search equations, (2) formulation of inclusion/exclusion criteria, (3) selection of results and (4) analysis and synthesis of results. Likewise, the principles proposed by Alexander (2020) were followed to strengthen and optimize the review process.

The aim is to obtain the highest degree of quality through the greatest possible systematization and completeness of the research process, including the search, evaluation and synthesis of results (Grant and Booth, 2009; Booth *et al.*, 2012). Moreover, as stated by Moher *et al.* (2009), this systematization helps to reduce both bias in the selection of studies and minimizes the subjectivity of the review process. Therefore, the present work constitutes a Systematic Review of the international literature on macro-networks or “Educational Constellations”. The entire review and analysis process employed will be detailed below.

3.1 Selection of databases and specification of search equations

Three different databases were selected for this review. The WoS and Scopus databases were chosen for the following reasons: (1) the efficiency of their analytical techniques, (2) the quality of the studies indexed due peer review processes and (3) their importance worldwide. The ERIC database was selected because of its notability in education.

In these databases, keywords were used that were obtained after an exploratory review of the literature. Finally, different synonyms of the concept of the educational network were used and combined with the concept of school improvement. The resulting search equation was: (“school

network*" OR "learning network*") AND (school improvement). In addition, a search was also carried out using the terms ("networked learning communities") AND (school improvement).

3.2 Formulation of the inclusion/exclusion criteria

To comply with quality standards and obtain a manageable data set appropriate for our study topic, a series of inclusion/exclusion criteria were established based on the works of Booth *et al.* (2012) and Alexander (2020). Initially, we established inclusion criteria specific to the databases used: (1) studies published in article format; (2) studies in the Spanish, English and Portuguese languages; and (3) studies published in the last decade (2021). This last criterion was intended to obtain the most recent research on this topic of study. The choice of languages was based on the proposals of Ferreira *et al.* (2011), that is, to use the languages mastered by the researchers. As Stern and Kleijnen (2020) explain, including only English, despite this being one of the most common languages in science, may not contribute to providing a truly global picture of the object of study. Likewise, exclusion criteria were also applied, including (5) non-consideration of review articles. Subsequently, criteria based on the degree of adequacy with the subject matter, purpose, or research questions were used. Therefore, studies that (6) did not deal directly with educational networks were eliminated.

3.3 Selection of the results

After entering the search equation in the different databases and applying the inclusion/exclusion criteria (1, 2, 3, 4 and 5), 131 documents were obtained. These documents were subjected to three processes. First, duplicates were eliminated ($n = 36$). Second, a reading of titles and abstracts was carried out in which criterion 6 was applied, i.e. eliminating all documents that did not deal with learning communities/networks ($n = 54$). Third, the remaining 41 papers were read in full, according to criterion 6. Finally, 29 papers were selected for this systematic review. Figure 1 shows the search process and selection of the studies.

This search and selection process, as well as the subsequent process of analysis and synthesis of results, was carried out by two researchers to provide the research with the maximum degree of solidity, objectivity and coherence possible (Creswell, 1998). To this end, consensus processes were developed based on the discussion of each of the decisions made in the study.

3.4 Analysis and synthesis of the results

Once the 29 documents had been selected, the results were analyzed and systematized. First, the main characteristics of the studies were analyzed. To facilitate this analysis, information such as authors' names, date of publication, the purpose of the research, methodology, instruments and sample characteristics were collected in tables and systematized. Second, with the help of the qualitative analysis software Nvivo 12, a thematic analysis of the results was conducted (Braun and Clarke, 2006). This analysis followed the principles of grounded theory (Glaser and Strauss, 1967), which made it possible to identify emerging themes after reading and analyzing the various studies. To this end, three phases were followed. First, two researchers carried out a complete, independent and critical reading of the 29 selected documents, generating their own emerging themes. Then, a process of sharing, reflection and debate was carried out with the aim of reaching a consensus on the final common emerging themes. Next, once the themes had been selected and specified, the text was peer-coded according to the agreed themes. This process was carried out independently by the researchers in order to saturate the information (Sarhou, 2016). Finally, a third researcher supervised the entire process to provide a double-checking method (Creswell, 1998).

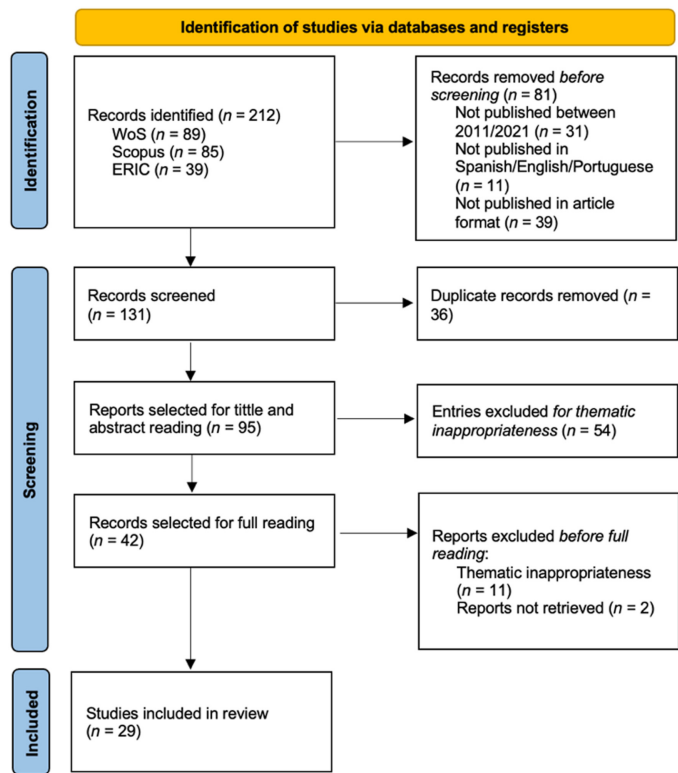


Figure 1.
PRISMA flow chart

Source(s): Author's own

3.5 Limitations

In general terms, this study has two major limitations. First, the decisions taken throughout the research to achieve scientific rigor may have led to the non-consideration of relevant studies. In this sense, we refer to the possible bias generated by the selected databases and filters. In relation to the filters, special mention should be made of the languages considered. Although this decision has been taken with the aim of including as much scientific production as possible, it may be biased as it does not offer a truly global image of the subject studied. Second, it was impossible to access certain documents. Therefore, it is recommended that these limitations be considered for future research.

3.6 Main characteristics of the selected studies

3.6.1 Temporal evolution of the studies. In the last decade (2011/2021) and applying the inclusion/exclusion criteria mentioned previously, we identified a total of 29 articles on networks and learning communities. In this decade, growth in the number of publications has been observed in the last five-year period (2017–2021), which accounts for 79.31% ($n = 23$) of the total production. The years 2020 and 2021 are particularly notable in this period, with 7 and 6 studies respectively.

3.6.2 Geographical distribution of the studies. Concerning the geographical distribution of the studies, it is evident that there are articles from all the world continents. However, there is

also a clear predominance of European output ($n = 16$) compared with other areas. The United Kingdom ($n = 7$) has the highest number of studies, followed by Spain, Chile and the USA, with three studies each. There are also two other countries with two studies each (Netherlands and New Zealand) and eight countries with only one study (Belgium, Australia, Kenya, Ukraine, India, Greece, Malta, Pakistan and China).

3.6.3 Research designs and samples. Finally, focusing on the research designs, we have classified the studies into qualitative, quantitative, or mixed approaches. Thus, 58.6% ($n = 17$) of the studies use a qualitative approach, 27.6% ($n = 8$) of the studies use a mixed design and only 13.8% ($n = 4$) use a quantitative approach. Therefore, there is a clear predominance of the qualitative approach over the other approaches. Therefore, this review indicates that qualitative methodology is the most widely used in studying networks.

Within the qualitative approach, there is a notable presence of case studies in which different research instruments are used as the main tool for triangulating information. In this regard, we can find a combination of semi-structured interviews, observations and documentary analysis (Mifsud, 2015; Peurach *et al.*, 2016; Glazer and Peurach, 2012; Anderson *et al.*, 2019; Azorín and Muijs, 2018); of observations, semi-structured interviews and reflective diaries (Kouvvara *et al.*, 2019); or of interviews, focus groups and reflective reports (Zahedi *et al.*, 2021). Likewise, some studies only use interviews (Liu, 2021; Brown and Flood, 2020a, b; Prenger *et al.*, 2020; González *et al.*, 2020; Kilpatrick and Fraser, 2018).

Regarding the quantitative approach, only different types of surveys are observed. Finally, articles using the mixed method predominantly include case studies in which questionnaires, semi-structured interviews and observations are combined (Raza *et al.*, 2021; Brown *et al.*, 2021; Hernández and Navarro, 2018; Pino-Yancovic and Ahumada, 2020; Coenen *et al.*, 2021), or in which both student achievement level data and interviews are used (Eddy-Spicer, 2017; Chapman and Muijs, 2013).

Regarding the samples of the studies, these are mainly composed of school principals, teachers, heads of educational administration, or leaders of the analyzed networks. However, some studies have a sample of different documents, including both schools and legislative norms.

4. Thematic analysis results

In this section, the two emerging themes resulting from the thematic analysis of the 29 studies will be analyzed.

4.1 Types of networks and consequences

The first emerging theme is the type of existing network. To facilitate their analysis, the networks found among the documents in this review were organized into four major groups: networks according to their structure, the resources used, their size, and, finally, their purpose.

First, concerning network structure, these are classified according to the skeleton or scaffolding of which they are composed. In this regard, the literature describes two fundamental types: vertical and horizontal networks (Azorín and Muijs, 2017). Vertical networks refer to those composed of institutions of different ranks or categories. In this group, numerous studies analyze networks composed of schools of different educational levels. For example, there are networks between primary and secondary schools (Mifsud, 2015; Kilpatrick and Fraser, 2018; Hernández and Navarro, 2018; Sinnema *et al.*, 2021; Pino-Yancovic and Luis Ahumada, 2020), of early childhood, primary and secondary education (González *et al.*, 2020) or even primary schools and universities (Azorín, 2021). In addition to these, the vertical structure also encompasses those networks composed of schools, the educational administration and the local community, relationships that contribute towards an extended education (Azorín, 2021). In this regard, the studies of Raza *et al.* (2021) and

Liu (2021) describe networks composed of schools and various elements of the community such as social educators, families, or educational policy managers. In this case, according to Pino-Yancovic *et al.* (2020), this type of network between schools and other public services makes it possible both to address complex socio-educational issues and to produce more significant and lasting improvements. Horizontal networks encompass those composed of institutions of an equivalent educational level, whether primary (Anderson *et al.*, 2019; Kouvara *et al.*, 2019; Kouvara *et al.*, 2019; Zahedi *et al.*, 2021; Azorín and Muijs, 2018) or secondary (Brown and Flood, 2020a, b; Prenger *et al.*, 2020; Peurach *et al.*, 2016; Tyshkevych and Obidniy, 2018).

Finally, it is important to mention that there are networks characterized by a bidirectional structure, i.e. that simultaneously contain vertical and horizontal relationships. This is the case, for example, in the studies by Liu (2021) and Azorín and Mujis (2017), which describe networks between schools of different educational levels, the educational administration and different elements of the local community.

Second, in the group of networks classified according to the resources used, the most notable are those that exchange intellectual and material resources. Concerning intellectual elements, this consists of the exchange of experiences, practices, or ideas (Eddy-Spicer, 2017; Hernández and Navarro, 2018; Azorín and Muijs, 2018). In this group, the exchange carried out among teaching staff is the most predominant (Kilpatrick and Fraser, 2018; Pino-Yancovic and Ahumada, 2020). In terms of material resources, Hargreaves *et al.* (2018) emphasize sharing physical materials, spaces and digital elements.

Third, according to their size, there are networks composed of a wide variety of institutions. While on the one hand, there is a core of research focused on analyzing networks composed of fewer than ten institutions (Zahedi *et al.*, 2021; Eddy-Spicer, 2017; Kouvara *et al.*, 2019; Peurach *et al.*, 2016; Raza *et al.*, 2021; Sinnema *et al.*, 2021; Liu, 2021; Piot and Kelchtermans, 2015); on the other hand, some studies analyze networks composed of fewer than 50 institutions (Anderson *et al.*, 2019; Hernández and Navarro, 2018; Chapman and Muijs, 2013; Pino-Yancovic and Ahumada, 2020) and more than 50 (González *et al.*, 2020). Likewise, a study analyzing a much larger network composed of 1,375 different institutions is also observed (Pino-Yancovic *et al.*, 2020). However, the studies in this review highlight that those large networks can lead to the isolation of some of the associated institutions. Along these lines, the study by Mifsud (2015) — which analyzes a network composed of numerous secondary schools and some elementary schools — shows how the primary schools were isolated within the network.

Finally, the literature analyzed underlines two fundamental purposes regarding the creation of networks: (1) to improve school outcomes (Eddy-Spicer, 2017; Liu, 2021; Azorín and Muijs, 2018); and (2) to increase educational equity and decrease inequalities (Azorín, 2021; Hargreaves *et al.*, 2018). Regarding the first of these, the study by Eddy-Spicer (2017) and Pino-Yancovic *et al.* (2020) highlight networks with a horizontal structure with different levels of performance according to the type of community that contributes most to the improvement of school outcomes. However, concerning the second of these, i.e. the improvement of educational equity, numerous studies point out that networks for the exchange of material resources are the most conducive to achieving this objective (Azorín and Muijs, 2017; Azorín, 2021). Despite all this, in general terms, all of the articles in this review agree that the exchange of experiences among teachers is the element that most contributes to the achievement of whatever objectives are set out by the network, whether academic (motivation, performance, improvement of the teaching-learning process, etc.) or social (inclusion, equity, attention to diversity, etc.) (Kouvara *et al.*, 2019; Hernández and Navarro, 2018) see Figure 2.

It is also important to highlight that the studies in the present review describe a series of benefits in other sectors of the educational community that go beyond those previously described in the student body. In this regard, reference is made to a series of positive outcomes of networking — regardless of the type of structure — concerning the development of the teaching staff and the community.

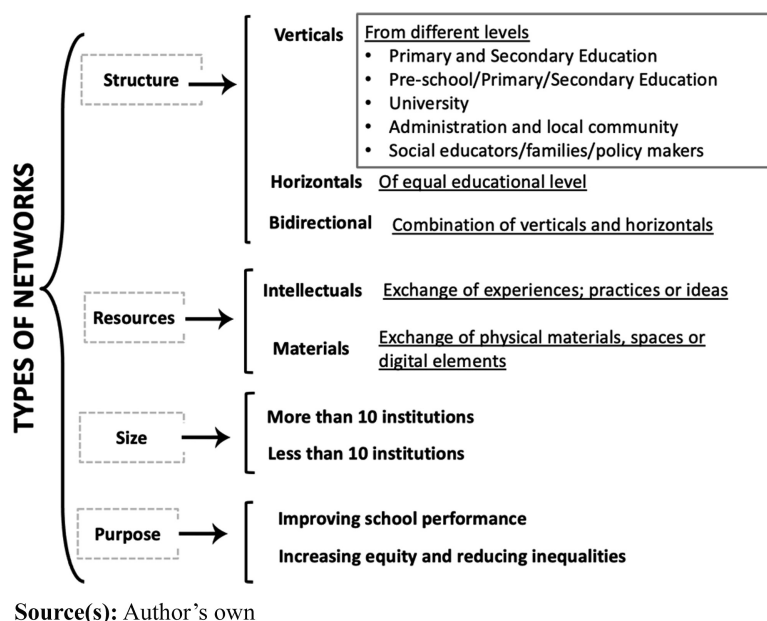


Figure 2.
Types of macro-
networks described
in the literature

Concerning teachers, networks favor problem-solving, exchanging ideas, experiences and effective practices (Mifsud, 2015; Azorín, 2021), which increases the quality of teaching and the opportunity for training and educational innovation (Azorín, 2021). In this sense, networking allows for collaboration to solve and promote improvement plans from innovation or the so-called transformation cycle for all design, development and involvement in innovations and improvements (Hernández and Navarro, 2018; Anderson *et al.*, 2019). Therefore, networks represent an opportunity for empowerment and leadership capabilities (Pino-Yancovic and Ahumada, 2020; Pino-Yancovic *et al.*, 2020; Coenen *et al.*, 2021).

Networking also leads to an increase in teacher satisfaction, a greater capacity for reflection and learning (Brown and Flood, 2020a, b), a greater acquisition of knowledge and skills (Prenger *et al.*, 2020) and a change in attitude due to collective motivation processes that increase confidence and a sense of belonging (Hernández and Montaña, 2018). In short, networking entails professional and personal growth for its participants (Anderson *et al.*, 2019; Pino-Yancovic and Ahumada, 2020; Coenen *et al.*, 2021), which has an influence on the teachers' professional identity (Kilpatrick and Fraser, 2018).

Regarding the benefits for the community, at a general level, networks allow the development of plans and programs that are more adapted to the context and characteristics of the school (Liu, 2021), making each school more accountable (Hernández and Navarro, 2018) and more aware of its pedagogical practices and those of the rest of the schools in the network (Pino-Yancovic and Ahumada, 2020).

4.2 Aspects that favor or hinder networking

The second emerging theme refers to the aspects that favor or hinder networking (see Table 1). Regarding the aspects that favor this type of work, it seems that creating a context with shared values and cultures is essential (Liu, 2021; Azorín, 2021) and this context should include the stakeholders, favoring the maintenance and creation of the network. Furthermore, within this

Table 1.
Aspects that hinder
or contribute to
networking

Hindering elements	Contributing elements
<ul style="list-style-type: none">– Linking institutions with very different characteristics (values, student populations, or practical approaches)– Negative conception of networking– Lack of common objectives– Lack of time– Lack of commitment on the part of network members– Presence of individuality and/or competitiveness in relationships– Pressure from the administration or political agents– Highly hierarchical and vertical structures– The existence of opposing leaderships	<ul style="list-style-type: none">– Creation of a context with shared values and cultures– Involvement of all stakeholders in both the creation and maintenance of the network– Meetings that encourage dialogue, debate and decision-making– Sharing a joint purpose and commitment– Support from the Education Administration– Inclusion of networking in improvement plans– Distributed, lateral, transformational, or pedagogical leadership– Creating positions of responsibility where duties are distributed on a rotational basis
Source(s): Authors' own	

context, it is key to hold meetings focused on Teaching and Learning in an environment that contributes to generating dialogue, discussions and decision making (Sinnema *et al.*, 2021; Brown and Flood, 2020a, b; Zahedi *et al.*, 2021), resulting in a shared purpose and joint commitment (Anderson *et al.*, 2019; Brown and Flood, 2020a, b; Coenen *et al.*, 2021). As Liu (2021) states, the more interaction among participants, the more likely the network is to succeed.

Moreover, the vision of the educational administration, the political and institutional support and accountability (Mifsud, 2015; Ehren and Godfrey, 2017; Zahedi *et al.*, 2021) are elements that strengthen the network and allow the full development of its potential. Similarly, the opinion of leaders on networking, the existence of strong links between them and the need for schools to participate in networks and include them in improvement plans are all fundamental to their success (Kouvara *et al.*, 2019; Brown and Flood, 2020a, b; Coenen *et al.*, 2021).

Likewise, the type of leadership employed is one of the aspects that most influences the success of networks, according to numerous studies in this review. In particular, distributed (Raza *et al.*, 2021), lateral (Hargreaves *et al.*, 2018; Brown *et al.*, 2021) and transformational or pedagogical (Brown and Flood, 2020a, b) leadership encourage member participation that contributes to success. In addition, leaders take actions to maintain the network, such as setting aside time for meetings, especially during the first year (Prenger *et al.*, 2020), creating rotating positions of responsibility, maintaining ongoing relationships with network members, or distributing responsibilities (Hargreaves *et al.*, 2015), all of which are essential elements for networking.

In addition to the leaders, the teaching staff also play an important role in promoting and maintaining the networks. Brown and Flood (2020a, b) consider it desirable to have active support from teachers and to promote practices linked to the network. Thus, people who motivate, who enhance collaboration between groups and subgroups (Prenger *et al.*, 2020), who make decisions from data collected from students (Zahedi *et al.*, 2021), or who work towards a specific focus or product (Prenger *et al.*, 2020) are considered as network-fostering traits. Anderson *et al.* (2019) further state that effective networking requires faculty to have a common purpose and collaborate, share, learn and problem-solve together. In addition, providing innovative ideas, continuous follow-up and giving time are aspects that benefit collaboration and thus the network (Hargreaves *et al.*, 2018).

By addressing the elements that harm or hinder the creation or maintenance of the network, we can highlight a multitude of examples, such as bringing together schools with different values, student populations and approaches to practice (Azorin, 2021); having a

negative view on networking or lacking a common long-term goal (Kouvvara *et al.*, 2019; Prenger *et al.*, 2020); shortage of time for network consolidation (Brown and Flood, 2020a, b); or lack of commitment on the part of teachers (Hernandez and Navarro, 2018).

The absence of more inclusive structures (Azorín and Muijs, 2017), the high levels of individuality and competitiveness within the network (Azorín, 2021), or the scarcity of social relationships between members of the different schools (Sinnema *et al.*, 2021) results in the network group becoming unstable, limiting collaboration, trust and reflective dialogue (Prenger *et al.*, 2020).

Finally, at the administrative level, several factors are detrimental to the development of networks and the transition to change, such as pressure from political agents (Mifsud, 2015); hierarchization and verticality (Prenger *et al.*, 2020; González *et al.*, 2020); or the existence of opposing leaderships (Mifsud, 2015).

5. Discussion

This review aimed to gather and systematize the most relevant findings on these types of educational macro-networks and their impact on school improvement. To this end, a systematic review of the literature was carried out using three different databases (WoS, Scopus and ERIC), which, after applying different inclusion/exclusion criteria, yielded 29 documents. First, these documents were analyzed according to their topographic characteristics; and second, they were subjected to a thematic analysis of their content. Several key insights gained from this review will be discussed below.

Regarding the geographical distribution of the studies, there is a clear predominance of output from the UK, followed by Spain and the USA, in terms of the highest number of publications. According to Muijs (2015), this is due to the numerous policy initiatives developed by different governments to enhance cooperative work between institutions. In this sense, Feys and Devos (2014) speak of the term “incentivized collaboration,” which consists of financially incentivizing centers to encourage them to take part in this type of networking.

As a result — and evidenced by the temporal evolution of the studies in this review — there has been a boom in the development of these types of macro-networks (Azorín *et al.*, 2020) materializing in a wide range of different forms and structures. This review highlights different types of macro-networks depending on their size (number of institutions involved) or the elements involved (educational centers, local institutions, administration and families). However, the most characteristic element is the crossing of borders beyond the educational center itself, i.e. the configuration of collaborations “outside their community of practice” (Bolivar, 2021). This aspect contributes in two ways: on the one hand, it helps to expand the possibilities and resources of networks; and, on the other hand, it favors the development of continuing education beyond the school walls (Cummings *et al.*, 2011). Regardless of the structure or approach, these macro-networks produce a space for shared learning and knowledge creation that allow for mobilizing and creating a range of resources and solutions that are far more effective than anything a single teacher or school could create (Harris *et al.*, 2017; Chapman, 2019).

In this sense, the present review highlights an innumerable number of benefits for students, teachers and the community itself. In general terms, our analysis highlights how this type of collaboration contributes to the autonomous learning of organizations, increasing their capacity for action and conflict resolution; favors the sense of belonging to the community and eradicates individual isolation and competitiveness; promotes the improvement and innovation of the school demanded by the new century; and transmits this new way of working across society, making it fairer and more equitable. Likewise, the effectiveness of this type of network for the development of centers in vulnerable and challenging contexts is also highlighted, an aspect that

coincides with the study by Ruiz-Román *et al.* (2019) and that of Tyshkevych and Obidniy (2018), with the latter focused on rural contexts.

In short, as Brown *et al.* (2021) point out, macro-networks contribute to educational improvement in all aspects. However, some studies in this review agree with Azorín (2021) in stressing the importance of these macro-networks for survival in turbulent or uncertain times. In this sense, the study by Lucena *et al.* (2021) describes how networking contributed to mitigating the enormous academic, personal and social consequences of COVID-19 in a primary school in Spain.

Such is the importance of this type of network for improvement that in recent years there has been an increase in experiences and research on this type of practice, as evidenced by the temporal evolution of the research presented in this review and described in other previous studies (Brown and Poortman, 2018; Hargreaves and O'Connor, 2020). However, the success of this type of work depends on the approach and its correct application, as evidenced by Hargreaves and Fullan (2014). In this sense, our study highlights the importance of the type of leadership developed, an aspect considered key to the success of educational networks (Brown *et al.*, 2021). However, as Harris (2014) pointed out, some leadership styles are more effective than others for this type of network practice. In the case of the present review, the studies point to distributed leadership as the most positive for the construction and development of these macro-networks. This type of leadership allows for transforming the existing organizational culture towards a common culture in terms of expectations (Elmore, 2010), collaboration that fosters a climate of trust (Bryk and Schneider, 2002) where shared responsibility is encouraged (Bolívar, 2021), supporting the development of a culture of joint learning (Timperley *et al.*, 2020). Therefore, a style of leadership that fosters the creation of networks contributes to increased innovation and educational improvement (Bolívar, 2021).

6. Policy implications

The main challenge for policymakers and education professionals is to harness the potential in all schools, working both inside and outside organizational boundaries, thus ensuring the creation of educational macro-networks that facilitate collaboration and contribute to a real transformation of the education system (Chapman and Muijs, 2013). To this end, administrative and policy support become indispensable.

In this regard, Zahedi *et al.* (2021) and Liu (2021) argue for the importance of eliminating the positive and controlling nature of educational policies in exchange for developing recommendations based on empirical evidence or successful experiences that support and facilitate collaboration. Moreover, several authors mention the administration's development of incentives (socioeconomic improvements, increased resources and time) as the main policy tool for promoting this type of network (Azorín and Muijs, 2017).

Other authors speak of the importance of decentralization processes of the educational system towards a more horizontal and less hierarchical conception in which collaboration between schools is the essential element to promote autonomy and professionalism (Eddy-Spicer, 2017). In this sense, Azorín (2021) recommends encouraging greater local autonomy by supporting an important central political foundation that allows for consolidating common bases on which to move forward. To this, Liu (2021) adds the great importance of improving coordination between local and national policies for the success of the networks.

However, for all this to succeed, genuine stakeholder involvement is essential, including administrators, politicians, local and educational community and philanthropists (Azorín and Muijs, 2017; Glazer and Peurach, 2012). There is a clear need for cultural change that reinforces shared values and fosters collaboration from within, between and beyond schools and such change is crucial for the success of Educational Constellations (Azorín and Muijs, 2017; Liu, 2021). One example can be found in Portugal with the National Program for

the Promotion of School Success (Verdasca, 2020). This initiative has provided a space for educational centers and local institutions to create partnerships and networks that allow for better responses and solutions to the specific problems and demands of the context.

7. Recommendations for practice

Based on the results of our review and so that they can be used as a guide for the improvement of future practices, we present a series of recommendations that favor and enhance the creation and maintenance of networks.

First and foremost, we focus on the main actors in the network: the teachers. They must feel that they are an active part of the organization, sharing a common purpose and commitment —based on shared values and culture— in which debate, dialogue and joint decision-making are the main lines along which they operate (Anderson *et al.*, 2019; Brown and Flood, 2020a, b; Liu, 2021; Azorín, 2021). Furthermore, it is essential to have committed leaders who motivate and generate innovative ideas, foster collaboration and create strong links through distributed, transformational and pedagogical leadership, which ensures the existence of commitments and improvement plans and the durability of the network (Raza *et al.*, 2021). Finally, the Education Administrations must oversee and support all the initiatives promoted by the centers without exerting excessive pressure (Ehren and Godfrey, 2017; Zahedi *et al.*, 2021).

8. Future lines of research

Despite the numerous studies on the subject, the present systematic review reveals several possible future lines of research. First, a core of studies emphasizes the importance of systematizing the evaluation of these types of educational macro-networks (Peurach *et al.*, 2016; Azorín, 2021). Moreover, other authors argue for the need to include variables such as challenging areas of performance or organizations with little collaborative tradition (Zahedi *et al.*, 2021); or the development of longitudinal studies to analyze the evolution of these networks (Zahedi *et al.*, 2021). Likewise, other researchers advocate for analyzing the existing relationships between educational macro-networks and the political and administrative context (Azorín and Muis, 2017). Finally, Sinnema *et al.* (2021) stress the importance of delving into understanding the social relationships established within and between educational macro-networks as one of the essential keys to understanding these educational constellations.

9. Conclusions

Networks, teams and collaborative work play an essential role in today's societies (Azorín, 2017). In the case of education, the creation of collaborative networks has become a catalyst for change understood as innovation, educational improvement and professional development (Muijs, 2015) and an essential factor for survival in crises (Azorín, 2021). A clear example has been the pandemic situation we have experienced, in which it has been proven that those contexts that have exercised educational ecosystems or networks have worked better than those that have not developed this way of working (Bolívar, 2021). Therefore, we suggest that this type of network facilitates the exchange and coordination between the agents involved in a way that goes beyond the traditional walls of schools, allowing the ideal synergy of all the actors involved (schools, leaders, teachers, families, administrators, social and local agents).

The results also indicate that it is possible to provide contextualized responses to the problems of each school, in conjunction with the local community and within networks of other actors and schools (Hargreaves and Shirley, 2020). This requires new democratic

governance of socio-educational networks (Díaz-Gibson *et al.*, 2017) and new models of leadership (Hargreaves *et al.*, 2018; Fullan, 2015; Leithwood *et al.*, 2020). Such leadership should come from the middle and be a shared and inter-relational type of leadership that fosters relational trust, connects and produces effective work within these constellations. This middle leadership refers not so much to a strategic position or position in the institution, nor to traditional technical leadership roles, but to a role that is cultural and transformative (Rincón, 2019). The role of this type of leader is three-fold: to support and liberate downwards by creating the necessary conditions, to connect and collaborate and to seize and identify opportunities offered by the context and the wider community.

Therefore, we want this review to serve as empirical support for endorsing the importance of networking as an essential element for educational improvement, while encouraging the development of new empirical studies to further our knowledge of this field of study. Likewise, we hope that this study serves as a wake-up call regarding the importance of collaboration. Networking and collaborative work should not be postponed any longer and should be considered one of the cardinal points around which education systems worldwide should orbit. Therefore, the training of future teachers and educational policies should be directed towards developing networks that promote school improvement and thus contribute to making our world more sustainable (in its various forms). For example, if we suppose that our future society is created from sharing responsibilities and tasks, then it is imperative that our schools teach students to collaborate and practice (Coke, 2005).

Note

1. This network, part of the ESRC's Teaching and Learning Research Program, involved teams of researchers from three higher education institutions (Manchester and Newcastle Universities and Canterbury Christ Church University College) in working with 25 schools, in three Local Education Authorities (LEAs).

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