Teachers' perception of the characteristics of an evidence-informed school: initiative, supportive culture and shared reflection

Georgeta Ion and Ernest López Sirvent

Department of Applied Pedagogy, Universitat Autònoma de Barcelona, Barcelona, Spain

Author note

Georgeta Ion, Department of Applied Pedagogy, Universitat Autònoma de Barcelona (http://orcid.org/0000-0001-9915-0698);

Ernest López Sirvent, Department of Applied Pedagogy, Universitat Autònoma de Barcelona (http://orcid.org/0000-0002-7233-3643).

Abstract

The article analyses the characteristics of schools according to the perception teachers have regarding their commitment to using research evidence within their practice.

A questionnaire focused on issues such as the use of research evidence to improve schools, as well as factors known to influence this practice, such as organizational culture, leadership style, interpersonal relationships and decision-making processes, was administered to a sample of 462 teachers from 204 primary schools in two Spanish autonomous regions. The questionnaire responses were analysed using a two-stage factor analysis.

Three clusters of schools were identified. Although teachers from a large number of schools were enthusiastic regarding the use of research evidence, others were sceptical, and most declared themselves undecided. In all cases, we observed that organizational commitment to the use of research evidence, leadership support and debate regarding decisions were significant characteristics of those schools oriented towards the use of research evidence.

Keywords: Evidence informed practice, primary teachers, primary schools, school culture

Introduction

In recent years, educational systems worldwide have experienced a sharp increase in educational initiatives aimed at improving educational practices, either in the classroom or through more general institutional transformations. In Spain and particularly in Catalonia, for instance, the evidence-informed practice (EIP) approach is strongly promoted by educational public administration, and teachers are invited to participate in a detailed programme including training, mentoring and implementation (Ion, Diaz & Suarez, 2021). The ultimate purpose of this is to contribute to the improvement of teaching practice and positively impact student outcomes. This increasing policy pressure to improve teaching practice using research evidence has led to the necessity to better understand the conditions enabling teachers to take up and use research in their practice and the mechanisms to foster this process at the school level.

In this context, we ask, what characteristics differentiate schools that embrace scientific-based evidence considering the teachers views? Do these schools have specific organizational characteristics or a specific leadership type?

To answer these questions, we conducted a study to establish the profile of schools that are perceived as most open to using research evidence to promote educational practices geared towards educational improvement. The constellation of factors that favour these EIPs is analysed in depth with the goal of offering those involved in the school's improvement programmes, guidelines and principles that will help them better promote informed and sustainable change in educational practices.

Research evidence- informed schools: why and how?

The use of evidence in practice involves considering the practical implications of scientific research and the transformation of its results (Oancea, 2010). In the field of education, EIPs are linked to the pursuit of innovation that emerged from bottom-up educational reform movements (led particularly by teachers). Such EIPs are internal and based on a wide range of evidence sources, both experiential and empirical (Earl, 2015). In their classroom practice, teachers should consider a variety of information sources to develop innovative practices adapted to real student needs in a specific context. In addition, it is considered that for such innovations to have long-term effects and be reflected in school improvement, a solid scientific basis and the commitment of all educational agents to their implementation are required (Coldwell et al., 2017, Flyvbjerg, 2001; Malouf &Taymans, 2016; Nutley, Walter & Davies 2007).

Research evidence is widely considered to improve professional practice (Davies, 1999; Kowalczuk-Walędziak & Underwood, 2021) and benefits students, teachers, and society (Palmer, 1999). Using research evidence to foster change or innovation, schools embark on a process of producing and utilizing various knowledge sources, beginning with the experiential knowledge of teachers based on successful practices, which result from a combination of trial-and-error exercise and methodological reflection.

EIPs are also related to improvement processes in the dynamics of work and teacher learning and, above all, improvements in student performance and learning. Proof of this relationship is provided by Cordingley (2015) and Mincu (2014), who explain that when research-informed evidence is part of the initial teacher training system and continues to be applied during teachers' professional development, it is associated with better teachers and schools and finally with the success of the educational system as a whole. In addition, research-informed practices

are highly associated with improvements in the learning processes of students (Godfrey, 2016; Rose et al., 2017).

Using evidence to inform teachers' practice is not straightforward, and robust studies are still needed to deepen our understanding of teachers' engagement with research evidence (Brown, Day & Liou, 2016; Cain, et al., 2019, Langer et al., 2016).

Although there is agreement about the benefits of schools adopting an EIP approach and teachers declare that they want and use research evidence (Penuel et al., 2017), in practice, only a few teachers incorporate evidence-led practices into their lesson plans or guidance for pupils (Wexler, 2019). The perceived barriers are multiple and related to the way and means that research is produced and communicated (Biesta, 2007; McKnight & Morgan, 2019) and to users' skills in meaningfully engaging with research and their research literacy (Hemsley-Brown & Sharp, 2003; Finnigan et al., 2013, among others), which are attributed to initial training for poor research competences or continued professional development plans (Jackson et al., 2018). For instance, Godfrey (2016:313) argues that for teachers to become research literate, enquiring professionals, they need to be "supported in developing the skills of research through in-house and externally supported expertise". The need for specific training in research literacy is explored in depth by Cain (2015, 2019), supporting the idea of research that might support teachers in redefining their conceptual understandings, refining issues, providing a vision of the achievable and motivating them to act.

In other studies, the spotlight has been placed on the meso and micro system variables that affect the research evidence active engagement. Factors such as: leadership practices, systemic factors, learning environments and professional outlooks emerged from interviews carried out by Godfrey (2016) as factors associated with a rich school research culture.

Variables that affect an evidence-informed school

Creating an evidence-informed environment (Godfrey, 2016) is influenced by several factors and agents, some systemic and others occurring internally at the school level. Often, attitudes and behaviour must be changed at the individual, team, organization and system levels for a new evidence-informed approach to take hold (Harvey & Kitson, 2015). The factors that can affect EIP implementation in schools generate a unique constellation in which one or another factor can take centre stage (Perines, 2018, among others). There are few studies that address all such factors at the school level and their implications (Graves & Moore, 2018).

If we examine the school level, the extant literature indicates a series of organizational elements that can be associated with schools "informed" by evidence, i.e., factors of organizational structure and leadership and variables derived from organizational development (Worrall, 2004). To these elements, Godfrey (2016) adds systemic factors, learning contexts, leadership practices and the learning environment. This list can be further lengthened with elements such as organizational learning, an innovative school culture (Brown & Zhang, 2017) and collaboration and the value of networks in promoting EIPs in schools (Armstrong, 2015; Chapman & Hadfield, 2010).

Among the noted factors, interpersonal relationships and intrapersonal characteristics play a prominent role. In this regard, several quantitative and qualitative studies have highlighted the role of motivation and interpersonal (social) networks as drivers of change (e.g., Brown et al., 2016, Brown & Zhang, 2017; Graves & Moore, 2018). In addition, trust among school community members and within the management team appears to be a critical value

(Finnigan & Daly, 2012) because the efficient use of evidence depends on the ability of teachers to identify and use different sources of knowledge in their practice, including the ability to communicate evidence and to inspire peers to do so, which requires a climate of trust and security (Coldwell et al., 2017, Finnigan & Daly, 2012).

However, among these organizational factors, the role of the leader and the leadership style stand out as fundamental elements for creating a school environment in which the use of evidence becomes a cultural norm. Effective leaders have the ability to influence in a variety of ways the "what to do" of the school, including the teaching-learning process and the academic success of students (Leithwood, 1994; Leithwood, Day, Sammons, Harris & Hopkins, 2006). Leadership is a determining factor of not only organizational dynamics but also teacher attitudes and motivation. Leaders with transformation skills result in increased teacher motivation and commitment to the task at hand (Gorard et al., 2020; Thomas et al., 2020).

Nevertheless, the creation of an environment favourable to the use of evidence is insufficient if the resources required to implement its use are lacking. Academic leaders must manage the effective use of teachers' time to enable their teachers to engage in reflection with peers while allocating logistic resources (such as proper spaces and time) and economic resources so that teachers can develop processes of collaborative knowledge exchange and access relevant information (Godfrey, 2016; Ion & Iucu, 2014). The leader acts as a mediator of formal and informal processes that stimulate teachers to engage in collaborative reflection on their practice, analysis of evidence and data and training focused on proposed areas of improvement (Datnow, Park & Lewis, 2013).

In summary, the literature review clearly indicates that a school in which evidence is used has several distinctive characteristics, such as a leadership culture open to change, and leaders

committed to providing adequate human and material resources. However, inquiring into the typology of schools perceived to be making effective use of evidence represents an under investigated research area. Therefore, this study aims to determine and analyse the factors that characterize those schools most open to the use of research evidence. To this end, we propose the following hypotheses:

(1). The perceived use of evidence in decision-making is positively associated with the existence of a working environment favourable to the exchange of ideas, to trust among peers and in research and to informed decision-making.

(2). The use of evidence is perceived to be better in schools in which leadership favours the exchange of ideas in a collaborative work environment through organizational structure and resources.

Method

The survey was designed considering the five areas vital to meaningful and effective research use, with each area encapsulating different elements, of which some are more likely to be effective in driving research use than others. Concretely, the authors of this paper aimed to understand, in relation to the factors included in the survey, where schools as organizations should focus their efforts to facilitate evidence use among their teachers. To do so, we analysed the findings of a survey focused on each of the five areas above (decision making and trust in research evidence, level of initiative, collaborative climate, trust among staff and management team, and organizational structures), and we added demographic variables allowing us to differentiate different school typologies and teachers' profiles.

The design of the survey started from the dimensions proposed by Brown et al. (2016) and Brown and Zhang (2017) and before it was distributed, the survey was piloted with teachers

from the primary schools (not involved in the project) to test the construct validity as well as the comprehension of the language used. Feedback from the pilot was then incorporated into the final questionnaire. The final survey questions for this aspect of the survey are listed below:

1) Decision-making and trust in research evidence

    a. In my school, research evidence is consulted to promote decisions.
    b. Decisions made in school are discussed with the faculty.
    c. The information derived from the research is undervalued.
    d. My school supports the use of research evidence to improve teaching practice.

2) Trust: In my school
    a. Teachers support one another.
    b. Teachers trust one another.
    c. Teachers mutually respect one another.
    d. Teachers trust in the management team.
    e. Teachers trust in communication between members.
    f. The school is a work environment that favours trust and debate.
3) Collaborative work: In my school
    a. Teachers usually use research evidence when an innovation is proposed.
    b. Faculty collaboratively analyse what works in their practice.
    c. Teachers use evidence in their teaching.
    d. Research evidence is discussed by teaching staff.
    e. Research evidence is used to improve practice.
    f. Faculty usually work in collaboration with researchers.

g. Collaboration with researchers is stimulated.

4) Initiative. In my school
    a. Experimentation and innovation in teaching are valued.
    b. Teachers are not motivated to implement innovations in their teaching practice.
    c. The management team values that teachers innovate in their practice.
    d. Implemented innovations are debated.
    e. The school community values innovations.
5) Structure and resources
    a. There are structures to support the informed decisions of teachers.
    b. No collaborative workspaces are offered.
    c. Research evidence is considered to represent a useful source of information.
    d. Different continuing training programmes for staff are offered.
6) Sociodemographic variables

Sample

The instrument was administered to a global sample of 462 teachers from 204 primary and childhood education schools in Madrid and Catalonia. After eliminating invalid responses, we obtained a final sample of 235 teachers (94 schools) in Catalonia and 227 teachers (110 schools) in Madrid. The participants have been approached by e-mail through the Department for Education databases ensuring that at least one member of the staff will answer the survey.

Data analysis

The data analysis addressed the characteristics of the selected variables and the objective of creating a typology based on the described dimensions of schools that successfully implemented EIPs using multiple correspondence analysis (MCA) followed by latent class

analysis (LCA). The dimensions were set according to the literature review considering those that impact positively on the adoption of EIP in schools. It is important to emphasize that "a classification is the breaking up of a single concept, while [a] typology is a set of concepts that combine" (López-Roldán & Fachelli, 2016:7).

Before initiating the MCA, we developed a series of contingency tables while adopting the variable "My school supports the use of research results to improve teaching practice" as a reference. Through the MCA, we intended to reaffirm the validity of the analysis variables or eliminate them depending on their degree of interaction with the reference variable.

The MCA is based on a concept of factor analysis that studies the relations of association between variables. In our case, we addressed several ordinal qualitative variables and one nominal variable. That is, the objective of this type of factor analysis is the scalar ordination of both individuals as well as the categories of variables analysed (López-Roldán and Fachelli, 2016). In addition, no variable has discretization in MCA development because there is no quantitative variable. In our case, there were a total of 79 dimensions resulting from m-p = 107-28, where 107 refers to the categories of analysis or scale and "28" refers to the active items or variables (Tables 1 and 2). The values are symmetric.

After an MCA, an LCA helps to create more homogeneous and consistent clusters. In the LCA, the Ward clustering method was adopted because of its widespread use in the social sciences and because the clusters are combined during the stage involving the lowest loss of variance (inertia) (López-Roldán & Fachelli, 2016). The quadratic Euclidean distance was used as the proximity measure that meets the requirements of this classificatory method. In the obtained clustering history, the second differences were calculated, which enabled us to identify the cases in that cluster in which the least explanatory power was lost.

Finally, to characterize the resulting clusters, contingency tables were created in the case of the nominal qualitative item. In contrast, the ordinal items were grouped by analysis factors and transformed into the mean of each factor, resulting in one variable for each factor. Thus, the means of the clusters for each factor were compared using one-way analysis of variance (ANOVA).

Results

The results are organized as follows. First, general perceptions regarding the use of EIPs for teacher improvement in school are presented. Second, we identify different school profiles based on their teachers' perceptions based on school characteristics and level of openness to EIPs. In developing the profiles, the following are considered: 1) those respondents who display a positive attitude/perception regarding research evidence use in school practices and agree that their schools work collaboratively, who believe there is a high level of trust among community members and who perceive that leadership motivates the use of evidence and supports organizational structure and resources that favour EIPs; 2) those respondents who have adopted an indecisive attitude regarding EIP use in schools and avoid positioning themselves as in full agreement with the previously described characteristics; and 3) those teachers who perceive that their schools do not rely on research evidence and tend to adopt a sceptical position regarding the characteristics most linked to EIPs.

Tables 1 and 2 show the set of factors, their items, the response percentages and the statistical association values obtained in the contingency tables. Thus, 62.33% of respondents believed their schools supported the use of research evidence to improve educational practices. In addition, all contingency tables show significant interactions (sig. ≤ 0.05) in the chi-squared

statistic and in the Cramér's V or Somers' D values according to the nature of the variable except when interaction occurs with the variables school ownership, gender, years of experience and years of experience in the school. Contextual variables that did not present a statistically significant interaction were eliminated from the analysis.

As shown in Table 1, the participants generally believed that in their schools, management teams supported informed innovation (63.58% of the respondents in total agreement) and that experimenting for teacher improvement was a practice valued at the faculty level (50.44% of the participants in total agreement). The studied schools also had a climate of mutual respect among their members and trust in the management team (49.56% and 46.10%, respectively, in total agreement).

However, only 15.27% of the respondents considered research evidence to be a source of information used when proposing an innovation. The same trend is found regarding using research evidence to improve practice (11.45% agreed completely) and regarding the discussion of research evidence (only 13.02% agreed completely).

[TABLE 1 INSERT HERE]

Before we explain the final results and the clusters resulting from the analysis, it is worth noting several outcomes that help to understand the analysis process and the clusters that were obtained. Therefore, the following paragraphs detail the primary results obtained in the first phase of the analysis, i.e., the MCA and LCA.

To analyse the data that explain the different school profiles, based on the teachers' responses to the items that configure the various organizational factors, we establish two axes. Two further dimensions (one negative and one positive) are created within each dimension. For

Dimension 1, the agreement and total agreement response categories are located at the positive pole (the latter category tends to frequently be placed at the negative pole of this dimension).

For Dimension 2, intermediate responses of agreement and disagreement tend to occupy the positive pole. At the negative pole, the "strongly disagree" responses are highly isolated from the remaining categories.

The dimension composition is detailed in Figure 1:

[FIGURE 1 INSERT HERE]

In the MCA (Table 2), we retain the first two dimensions (91.25% of the explained variance) after applying the Benzécri equation[1]. Thus, we work with a two-dimensional axis.

For the retention of the two dimensions, we rely on theoretical-conceptual relevance. In addition, an additional technical criterion is met, i.e., accumulating a minimum of 70% of the explained variance, which is already given in the first factor (López-Roldán & Fachelli, 2016). Of the 79 values (m-p), we apply the equation for those values over 0.035714 (1/p). Therefore, we apply the equation to the first 23 eigenvalues. Thus, the values provided by Cronbach's alpha (greater than 0.6) indicate that the items have a high association with their corresponding axis and that they are one-dimensional within the dimension itself.

[TABLE 2 INSERT HERE]

A total of 73.98% of the explained variance of the first dimension affects the values of the discriminant measures where the highest values belong to dimension 1. Importantly, the descriptive variables autonomous community and teacher training have a low level of contribution to the explanation of the different dimensions. Regarding the relationships

[1] Benzécri Equation, $I_t^c = \frac{p}{p-1} \times \left(I(B) - \frac{m-p}{p^2}\right)$ (López-Roldán and Fachellil, 2016).

established between the categories (or quantifications thereof) of the variables with retained dimensions, the following contributions are obtained to explain the axes.

To proceed to the analysis of the items in relation to these dimensions, the results obtained for the second differences are 111,502 and correspond to a total of three clusters. As shown in Table 3, these three clusters are divided, with 43.1% representativeness in the sample for Cluster 1, 47.2% for Cluster 2 and 9.7% for Cluster 3.

[TABLE 3 INSERT HERE]

Figure 2 shows the distribution of the 462 cases according to the cluster to which they belong based on the MCA score. There are three different clusters. Even so, between Clusters 1 and 2, a certain proximity is obtained at the central point where the axes intersect.

The clusters are shown in Figure 3 and Table 3 in a clearer, more differentiated manner. The mean point of each object is shown in the graph and represented as a function of the size of each cluster. In this sense, the largest cluster is Cluster 2, with $n = 218$. This cluster represents 47.2% of the sample and is located in Cluster 1. It consists of 199 cases (43; 1% of the sample). Cluster 3 is the least numerous, representing 9.7% of the sample (45 cases).

[FIGURE 2 INSERT HERE]

[FIGURE 3 INSERT HERE]

More specifically, and according to the locations of the dimensions based on the MCA and the grouping established through the LCA, we obtain the following characteristics for each cluster.[2]

From the characteristics of each cluster, we identify in Cluster 1 all those respondents who tended to completely agree with most of the analysed statements (for any analysed factor) and who strongly disagreed with those items placed in the negative axis. We term Cluster 1 the "enthusiastic" schools. In Cluster 2, we place those schools that are very close to the intersection of the axes. This cluster is termed "undecided" regarding EIPs. There is occasional agreement and occasional disagreement with the items, while intermediate opinion positions fluctuate. Finally, in Cluster 3, we place the participants who were more sceptical about the items that represent the school dimensions regarding the rationale of using research evidence. This cluster's scores barely surpass 2 (in disagreement), and therefore, we term this cluster the "nonconforming" cluster.

We now describe in more detail how these clusters are organized. If we consider the "enthusiastic" cluster (cluster 1), we can observe that it consists of schools in which teachers perceived that research evidence is used for improvement and had a positive attitude regarding organizational factors. These are schools characterized by an organizational culture open to the use of evidence and where teachers work collaboratively and enjoy leadership that encourages informed decision-making. Supporting this assessment are the positive scores (means ranging from $M = 3.2$ to $M = 3.7$) for various factors (Figure 4). These schools are distinguished by their high scores for initiative ($M = 3.7$; $SD = 0.29$) and trust ($M = 3.69$; SD

[2] It is important to note that in the means presented next, those items that were initially written as negative were recoded, reversing the sign of the response with the aim of keeping it in the same original dimension without affecting the obtained mean. For example, the response "Completely disagree" (1) becomes "Completely agree" (4) and is understood as being in a positive direction.

= 0.33). In contrast, the decision-making and structure and resources dimensions present means of $M = 3.57$ ($SD = 0.44$) and $M = 3.47$ (SD=0.37), respectively. However, for these schools, consistent with the overall assessments, we find slightly lower scores for trust in research evidence ($M = 3.36$; $SD = 0.61$) and collaborative work ($M = 3.22$; $SD = 0.26$).

As we can see in Table 4, "enthusiastic" schools occur with the highest incidence in Catalonia. Their teaching staff consist of teachers with university degrees (83.6% with masters/doctorates), and the majority are public institutions. Finally, the position of the teacher represents 57% of the cases, which is the lowest value in all clusters. Higher positions represent 22.9%, which is the highest percentage of all clusters.

Cluster 2, or "undecided", is the largest. Here, we find the "undecided" schools with respect to their teachers' view of EIPs. Clear evidence of this view is that in the dimensions of initiative, trust, structure-resources and decision-making, the mean scores are $M = 3.02$ ($SD = 0.49$), $M = 2.92$ ($SD = 0.55$), $M = 2.82$ ($SD = 0.44$) and $M = 2.74$ ($SD = 0.59$), respectively. These scores can be placed in the "agreement" category. In contrast, the dimensions of trust in research and collaborative work are more typical of the "disagree" category, with much lower means: $M = 2.33$ ($SD = 0.42$) and $M = 2.63$ ($SD = 0.59$), respectively. As shown in Figure 4, the scores of the different dimensions in the largest cluster follow the same trend as the mean score for each factor in the cluster's overall character.

The "undecided" schools are equally distributed between Madrid and Catalonia. The faculties of these schools consist of teachers with university degrees (81.1% with a master's degree/doctorate), and the schools include more subsidized schools (with 44% more

subsidized schools than the other clusters). Similarly, the intermediate positions, representing 21.3% of the category, have the greatest representation of the three clusters.

The third cluster, which is the smallest and most isolated, is termed "nonconforming" because its teachers tend to be particularly sceptical regarding collaborative work, with a low mean of $M = 1.61$ ($SD = 0.38$), and decision-making, with a low mean of $M = 1.79$ ($SD = 0.64$). For the remainder of the analysed dimensions, the scores of this cluster are M=2.21 ($SD = 0.53$) for structure and resources, $M = 2.11$ ($SD = 0.47$) for initiative, $M = 2.05$ ($SD = 0.64$) for trust in research evidence and $M = 2.03$ ($SD = 0.68$) for trust. The most nonconforming schools are primarily found in Madrid (75% of the sample). The faculties of these schools include teachers with university degrees (66.7%), and this cluster has the highest percentage of teachers with masters/doctorates (33.3%). Most schools in this cluster are publicly owned. However, the percentage of subsidized schools is higher than in the other clusters. In the distribution according to position, the teachers have the greatest role, representing 80% of the cluster.

The distribution of the various organizational factors among the three clusters of schools is represented in a more visual and complementary way in Figure 1.

Once the clusters have been described, it is important to understand the differences between them in terms of the analysis factors.

First, as shown in Table 5, the differences in means (DMs) for all the factors according to the cluster to which they belong are statistically significant at a level of 0.05. More specifically, between the "enthusiasts" and the "undecided", the DMs fluctuate between 0.6 and 0.8 points

according to factor. In this sense, the largest differences occur between the factors collaborative work and decision-making. Second, the differences between the "undecided" and the "nonconforming" clusters are accentuated and range between 0.5 and 0.9. Specifically, larger differences occur for initiative and decision-making. Finally, among the antagonistic clusters, the "enthusiasts" and "nonconforming" clusters exhibit DMs between 1.2 and 1.7.

If we focus on the global differences between the analysed factors without considering cluster affiliation, the factor collaborative work has the lowest score ($M = 2.64$; $SD = 0.68$), with large differences between clusters (Table 5 and Figure 4). A slightly higher score is shown by the schools for trust in research evidence ($M = 2.89$; $SD = 0.75$). The remaining factors present means on the "agreement" scale. Here, the factors decision-making, structure and resources, trust and initiative have averages of $M = 3.01$ ($SD = 0.76$), $M = 3.05$ ($SD = 0.59$), $M = 3.16$ ($SD = 0.71$) and $M = 3.23$ ($SD = 0.64$), respectively.

[FIGURE 4 INSERT HERE]

[TABLE 4 INSERT HERE]

[TABLE 5 INSERT HERE]

Discussion and conclusions

In this article, we analysed data collected from a sample of primary school teachers from the Autonomous Communities of Madrid and Catalonia. The data reflect perceptions regarding the use of research evidence and organizational factors that facilitate or hinder EIPs. The

results have four fundamental implications for the organizational development of schools and teachers.

First, we observed that teachers generally believe that their schools are open to the use of research evidence in decision-making and in the implementation of innovative practices. However, many teachers remain sceptical, and there are a series of explanatory factors associated with this situation that have been identified, such as initiative, decision-making style, and collaborative work climate.

Second, schools that are perceived as more open to research evidence have faculties that stand out for exhibiting proactive attitudes, initiative and courage with respect to experimenting and promoting innovative practices in their classes. In addition, these are schools where a climate of trust prevails among the members and where decisions are debated and based on evidence. The analysed data confirm the importance of personal and interpersonal factors in the development of an organizational culture favourable to the use of evidence and the importance of an organizational culture and of a climate oriented towards organizational development (Worrall, 2004). The role of trust is fundamental, as our data revealed, implying that to promote innovative practices, teachers must feel sufficiently secure and trustful to initiate experiments in their classroom practice and share their results with peers and the management team (Brown et al., 2016; Bryk & Schneider, 2002).

Third, the results of our analysis reinforce the role of leadership in promoting an organization that supports the use of an evidence-informed culture (Brown, 2020; Bush, 2017). A leadership style oriented towards debate and reflection on practice, with a clear disposition in favour of innovation and experimentation, encourages teachers to play an active role and is

favourable to change (Duyar, Gumus & Bellibas, 2013). Such leadership is distributed and transformative (Brown, 2020; Day & Sammons, 2013; Leithwood, 1994; Thomas, et al., 2020), which encourages personal initiative, collegial support, commitment to the profession and consensual and debated decisions, stimulating responsibility for defining, implementing and supervising a school's teaching and learning strategy (Duyar, Gumus & Bellibas, 2013; Khasawneh, Omari & Abu-Tineh, 2012). Based on our results, this vision of shared leadership is most prevalent in public schools where the educational project supports it.

Thus, we could observe how schools perceived as open to the use of research evidence are characterized by a culture in which members feel involved and where scientific evidence is part of routine organizational practice (Gorard et al., 2020).

However, most research participants recognized that these elements are not generalized at the school level and that how these factors interact may vary. The results reveal that most of the schools were in a state of ambivalence or indecision. This outcome is a clear sign that changes have not yet been implemented to create an organizational culture oriented towards the use of research evidence, as found in previous studies, at least in the Spanish context where the study was conducted (Perines, 2017, 2018).

Fourth, the study draws attention to other aspects that influence a school's openness towards the use of evidence. Organizational structures and resources that facilitate the exchange of ideas and collaborative work with researchers are not prominent factors and do not ensure that teachers make more widespread use of scientific evidence (Godfrey, 2016; Godfrey & Handscomb, 2019; Gorard et al., 2020). The availability of resources alone does not ensure that change will occur. Another interesting finding is that the strongest sceptics (a poorly

represented cluster) include those with graduate degrees. Thus, training in the application of research findings does not guarantee that such training will be used in practice, which supports the idea that organizational elements are more relevant than research training.

Although based on a limited sample, the study results have several implications for school leaders who desire to strengthen the organizational culture of their schools to empower teachers and encourage them to make courageous decisions. Such decisions include determining to improve one's teaching practices, to engage in well-grounded experimentation and to reduce those factors that limit the capacities of teachers. Our research outcomes also encourage the development of a distributed and transformative leadership that values the individual potential of each teacher and stimulates individual and collective reflection on teaching practices as fundamental steps towards creating a culture of trust. Such leadership values the personal potential and promotes the decision-making processes informed by scientific evidence. Finally, the study reveals views regarding scientific research and collaboration with researchers. Views that are positive in this regard seem to still be emerging. Thus, this finding corroborates that the gap between the educational actors belonging to two professional contexts which are epistemologically close still exists, but it can be overcome by engaging in strategic dialog along common priorities and for the common good.

References

Armstrong, P. (2015). *Effective school partnerships and collaboration for school improvement: a review of the evidence*. London: Department for Education.

Biesta, G. (2007). Why ''what works'' won't work: evidence-based practice and the democratic deficit in educational research. *Educational theory*, 57(1), 1-22.

Brown, C. (2020). *The Networked School Leader: How to Improve Teaching and Student Outcomes using Learning Networks*. Emerald Group Publishing.

Brown, C., Daly, A, & Liou, Y. (2016). Improving trust, improving schools: Findings from a social network analysis of 43 primary schools in England. *Journal of Professional Capital and Community*, 1(1), 69-91.

Brown, C. & Zhang, D. (2017). How can school leaders establish evidence-informed schools: An analysis of the effectiveness of potential school policy levers. *Educational Management Administration & Leadership,* 45(3), 382–401

Bryk, A. & Schneider, B. (2002*). Trust in schools: A core resource for improvement*. New York: Russell Sage Foundation.

Bush, T. (2017). The enduring power of transformational leadership. *Educational Management Administration & Leadership*, 45(4), 563–565.

Cain, T. (2015) Teachers' engagement with published research: addressing the knowledge problem. *The Curriculum Journal,* 26(3), 488–509.

Cain, T. (2019) Don't be a research fundamentalist, TES, 25/1/19. https://www.tes.com/news/tesmagazine/tes-magazine/dont-be-a-research-fundamentalist

Cain, T., Brindley, S., Brown, C., Jones, G., & Riga, F. (2019). Bounded decision-making, teachers' reflection and organisational learning: How research can inform teachers and teaching. *British Educational Research Journal* 45(5),1072–1087.

Chapman, C. & Hadfield, M. (2010). Realising the potential of school-based networks. *Educational Research* 52: 309–323.

Coldwell, M., Greany, T., Higgins, S., Brown, C., Maxwell, B., Stiell, B., Stoll, L., Willis, B. & Burns, H. (2017). *Evidence-informed teaching: an evaluation of progress in England.* London: Department of Education.

Cordingley, P. (2015). The contribution of research to teachers' professional learning and development. *Oxford Review of Education*, *41*(2), 234–252. https://doi.org/10.1080/03054985.2015.1020105

Datnow, A., Park, V. & Lewis, B. (2013). Affordances and constraints in the context of teacher collaboration for the purpose of data use. *Journal of Educational Administration*, *51* (3), 341-362.

Davies, P. (1999) What is evidence-based education?, *British Journal of Educational Studies,* 47(2), 108–121.

Day C. & Sammons, P. (2013) *Successful leadership: A review of the international literature*. Reading: CfBT Education Trust.

Duyar, I., Gumus, S. & Bellibas, MS. (2013). Multilevel analysis of teacher work attitudes: The influence of principal leadership and teacher collaboration. *International Journal of Educational Managemen*t, 27(7), 700–719.

Earl, L. (2015). Reflections on the challenges of leading research and evidence in schools, In: Brown C (eds.) *Leading the use of research & evidence in schools* (pp.146–152). London: IOE Press

Finnigan, K.S & Daly, AJ. (2012). Mind the gap: organizational learning and improvement in an underperforming urban system. *American Journal of Education, 119* (1), 41-71.

Finnigan, K., Daly, A. & Che, J. (2013) Systemwide reform in districts under pressure the role of social networks in defining, acquiring, using, and diffusing research evidence. *Journal of Educational Administration,* 51(4), 476–497.

Flyvbjerg, B. (2001). *Making Social Science Matter: Why social inquiry fails and how it can succeed again.* Cambridge University Press.

Godfrey, D. (2016). Leadership of schools as research-led organisations in the English educational environment: Cultivating a research-engaged school culture. *Educational Management Administration & Leadership*, *44*(2), 301-321.

Godfrey, D., & Handscomb, G. (2019). Evidence use, research-engaged schools and the concept of an ecosystem. In Godfrey, D & Brown, C. (eds) *An Ecosystem for Research-Engaged Schools* (pp. 4-21). Routledge.

Gorard, S., See, B. H., & Siddiqui, N. (2020). What is the evidence on the best way to get evidence into use in education?. *Review of Education*, *8*(2), 570-610.

Graves, S. & Moore, A. (2018). How do you know what works, works for you? An investigation into the attitudes of senior leaders to using research evidence to inform teaching and learning in schools. *School leadership and management, 38* (3), 259-277.

Harvey, G., & Kitson, A. (2015). *Implementing evidence-based practice in healthcare: a facilitation guide*. Routledge.

Hemsley-Brown J., & Sharp, C. (2003). The use of research to improve professional practice: a systematic review of the literature. *Oxford Review of Education, 29*(4), 449-470.

Ion, G. & Iucu, R. (2014). Professionals' perceptions about the use of research in educational practice. *European Journal of Higher Education, 4*(4), 334-347.

Ion, G., Suárez, C. I., & Vicario, A. D. (2021). Evidence-Informed Educational Practice in Catalan Education: From Public Agenda to Teachers' Practice. *Center for Educational Policy Studies Journal*, *11*(2), 37-57.

Jackson, E., Purnawati, E. & Shaxson, L. (2018) How and when do policymakers use evidence? Taking politics into account, In: A. Pellini, B. Prasetiamartati, K. Nugroho, E. Jackson

& F. Carden (Eds) *Knowledge, politics and policymaking in Indonesia (pp.4-15).* Singapore, Springer

Khasawneh, S., Omari, A. & Abu-Tineh, A. (2012). The relationship between transformational leadership and organizational commitment: The case for vocational teachers in Jordan. *Educational Management Administration and Leadership, 40*(4), 494–508.

Kowalczuk-Walędziak, M & Underwood, J. (2021). International communities of practice: what makes them successful vehicles for teachers' professional development? *Educational Studies.* https://www.tandfonline.com/doi/full/10.1080/03055698.2021.1927673?src=

Langer, L., Tripney, J. & Gough, D. (2016) *The science of using science: researching the use of research evidence in decision-making*. London, EPPI-Centre, UCL Institute of Education.

Leithwood, K. (1994). Leadership for school restructuring. *Educational Administration Quarterly, 30*(4), 498–518.

Leithwood, K., Day, C., Sammons, P., Harris, A. & Hopkins, D. (2006). *Successful school leadership: what it is and how it influences student learning.* Research report 800. London: DfES.

López-Roldán P., & Fachelli, S. (2016). Análisis Factorial [Factorial analysis] In López-Roldán P & Fachelli S (eds.) *Metodología de la Investigación Social Cuantitativa [Social reserach quantitative methods]*. (pp. 34-56). Bellaterra, Barcelona, España: Universidad Autónoma de Barcelona.

Malouf, D. & Taymans, J. (2016). Anatomy of An Evidence Base. *Educational Researcher, 45*(8), 454-459.

McKnight, L. & Morgan, A. (2019). *The problem with using scientific evidence in education, EduResearch Matters.* Available online at: https://www.aare.edu.au/blog/?p=3874

Mincu, M. (2014). Inquiry paper 6: teacher quality and school improvement – what is the role of research?. *The role of research in teacher education: Reviewing the evidence.* Available at: https://www.bera.ac.uk/wp-content/uploads/2014/02/BERA-RSA-Interim-Report.pdf (accessed 8 November 2014).

Nutley S.M., Walter I & Davies H.T.O. (2007). *Using evidence: How research can inform public services.* Bristol: The Policy Press.

Oancea, A. E. (2010). *The Accumulation, Mediation and Impact of Education Research Knowledge.* Strategic Forum for Research in Education. Available at: https://ora.ox.ac.uk/objects/uuid:993cd420-35b4-41f6-978b-ceeb86af3726

Palmer, J. (1999) Research matters: a call for the application of empirical evidence to the task of improving the quality and impact of environmental education. *Cambridge Journal of Education,* 29(3), 379–395

Penuel, W. R., Briggs, D. C., Davidson, K. L., Herlihy, C., Sherer, D., Hill, H. C., ... & Allen, A. R. (2017). How school and district leaders access, perceive, and use research. *AERA Open*, *3*(2), 2332858417705370.

Perines, H. (2017). Las murallas invisibles entre la investigación educativa y los docentes [The invisible walls between educational research and teachers]. *Ciencia y Educación,* 1(1), 11-21.

Perines, H. (2018). ¿Por qué la investigación educativa no impacta en la práctica docente? [Why Research Education no Impact on Teaching Practice?] *Estudios Sobre Educación*, 34, 9-27.

Rose, J., Thomas, S., Zhang, L., Edwards, A., Augero, A. & Rooney P (2017). Research Learning Communities: Evaluation Report and Executive Summary. *Educational Endowment Foundation.* (December 2017) Available at: https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation_Reports/Research_Learning_Communities.pdf.

Thomas, L, Tuytens, M, Devos, G, Kelchtermans, G. & Vanderlinde G. (2020). Transformational school leadership as a key factor for teachers' job attitudes during their first year in the profession. *Educational Management Administration & Leadership, 48*(1), 106–132.

Wexler, N. (2019) *Three reasons classroom practice conflicts with evidence*, Forbes. Available online at: https://www.forbes.com/sites/nataliewexler/2019/08/03/three-reasons-classroom-practice-conflicts-with-evidence-on-how-kids-learn/#71114cad7b0a

Worrall, (2004). Trying to Build a Research Culture in a School: trying to find the right questions to ask. *Teacher Development, 8* (2-3), 137-148.