International Journal of
Education Policy & Leadership

IJEPL
Volume 18(2)
2022

Achieving Research-Informed Practice Amongst Teachers in Madrid and Catalonia: Findings From a Quantitative Analysis

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Abstract

Background: In Spain, as in many other countries, educational administrators are calling for schools and teachers to engage with research-informed teaching (RIT) to improve the quality of teaching and student outcomes. Despite this interest, schools' and teachers' engagement with research evidence is inconsistent, and studies exploring the factors affecting teachers' and schools' commitment to RIT, in the Spanish context, are undeveloped.

Analysis: The authors analyzed a survey sample of 462 teachers in 204 Spanish schools to identify teacher and school characteristics that determine teachers' likelihood of engaging in evidence-informed educational practice (EIP). This analysis explores variables such as teachers' concepts of research, their self-efficacy to understand and conduct educational research, and the influence of school organizational variables.

Findings: Teachers seem reluctant to use research in class practice. Whether research is seen as relevant to their immediate or short-term needs, combined with the capacity to use data research evidence, appears to be a decisive factor for those engaged with research.

Résumé

Contexte : En Espagne, comme dans plusieurs autres pays, les administrateurs sco-

Georgeta Ion, Chris Brown, & Ernest López-Sirvent. (2022). Achieving Research-Informed Practice Amongst Teachers in Madrid and Catalonia: Findings From a Quantitative Analysis. *International Journal of Education Policy & Leadership 18*(2). URL: http://journals.sfu.ca/ijepl/index.php/ijepl/article/view/1123 doi:10.22230/ijepl.2022v18n2a1123

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laires demandent aux écoles et aux enseignants de s'inspirer de l'enseignement fondé sur la recherche afin d'améliorer la qualité de l'enseignement et les résultats des élèves. Malgré cette demande, l'engagement des écoles et des enseignants à l'égard des résultats de recherche n'est pas des plus forts. D'autre part, dans le contexte espagnol, les études explorant les facteurs qui influent sur l'engagement des enseignants et des écoles envers l'enseignement fondé sur la recherche sont peu développées.

Analyse : Les auteurs ont analysé un échantillon d'enquête de 462 enseignants dans 204 écoles espagnoles pour identifier les caractéristiques des écoles et des enseignants qui déterminent la probabilité que ceux-ci s'engagent dans l'éducation fondée sur les preuves (EFP). Dans leur analyse, les auteurs explorent des variables telles que la manière dont les enseignants perçoivent la recherche, l'efficacité de ces derniers à comprendre et à mener la recherche en éducation, et l'organisation de l'école.

Conclusion : En général, les enseignants semblent réticents à recourir à la recherche dans leurs salles de classe. Pour ceux qui le font, le fait qu'ils la considèrent comme pertinente pour leurs besoins immédiats ou à court terme ainsi que leur habileté à utiliser des données issues de la recherche semblent être des facteurs décisifs.

Keywords / Mots clés : research-informed teaching, evidence-informed educational practice, educational research / enseignement fondé sur la recherche, éducation fondée sur les preuves, recherche en éducation

Introduction

This article considers engagement by teachers in Madrid and Catalonia in research-informed teaching (RIT) practices. For the purposes of this article, we define RIT as the use of academic research by educators to improve aspects of their teaching, decision making, leadership, or ongoing professional learning (Brown, 2020). There are strong reasons to encourage RIT. For instance, there is nascent but growing evidence base indicating that if educators engage with research evidence to make or change decisions, embark on new courses of action, or develop new practices then this engagement could have a positive impact on both teaching and learning (Cain, 2015a; Ion et al., 2020; Mincu, 2014; Perines, 2018). There is also a range of social and moral imperatives that support educators' engagement with research evidence. This argument is encapsulated by Oakley, who argued 20 years ago that "those who intervene in other people's lives [should] do so with the utmost benefit and least harm" (2000, p. 3). Oakley contends that there is a moral imperative for practitioners to only make decisions or act when armed with the best available evidence. Oakley observes, "we [all] share an interest in being able to live our lives as well as we can, free from ill-informed intervention and in the best knowledge we can gather of what is likely to make all of us most healthy, most productive, most happy and most able to contribute to the common good" (2000, p. 323). Nonetheless, despite this growing body of evidence and imperatives, and despite the dedicated efforts of a range of organizations, movements, and academics to foster research-informed practices, RIT has yet to take hold in the vast majority of schools, in Spain and elsewhere.

The successful implementation of RIT in schools requires several factors that provide teachers with new opportunities to develop their abilities and expertise, thus enabling them to develop, adopt, and use pedagogic strategies based on research (Cain et al., 2019). This article accepts that such RIT strategies should have a positive impact in the classroom. Although this assumption is open to challenge, there is sufficient evidence to indicate that RIT can make a positive difference when implemented correctly (Brown & Flood, 2018). It is important for teachers to understand that student results are not automatically attributable to external factors, such as the students' level of achievement when they enter the school or their social and economic status or family backgrounds: reasons that do not typically require teachers to change their practice (Datnow & Park, 2018). Rather, "internal attribution" and subsequent reflection enable teachers to examine their own functioning, challenge (often long-held) assumptions and beliefs about student learning, and look to the quality of teaching for improvements in outcomes (Schildkamp & Datnow, 2020; Schildkamp et al., 2016). There are various factors that affect teachers' engagement with research evidence (Gorard et al., 2020). Teachers can have biases about research evidence (Finnigan et al., 2013; Cook, 2015); even high-quality research will make no difference unless potential users are receptive to new knowledge (Brownson, 2017). Likewise, to use research evidence, teachers and school leaders are likely to need a wide range of skills, knowledge, and attitudes favourable to the use of research (Jackson et al., 2018).

In addition to these teacher-level factors, previous work (Ion & López, in press) has shown that for a school to engage with research evidence, specific organizational factors must be in place. These factors include a trusting environment and shared or distributed leadership, motivating teachers to become involved in decision making (Brown, 2020). However, although these factors are crucial, teachers' individual traits and professional competencies and motivations, especially in more traditional school environments, come into play.

For these reasons, the present study focuses on the personal characteristics of teachers who are willing to use the results of research in their classes. Our study investigates how teachers' vision has an impact on the use of educational research, and how teachers' faith in their own abilities to understand and conduct research can subsequently influence their teaching decisions. We consider the individual characteristics of the teacher, their concept of research, and their capacity to use this information in practice. We also examine these individual factors in relation to the support that teachers perceive that they receive from peers and leaders, and teachers' preferred sources of information used to inform their practice. We examine these factors as predictors of teachers' engagement with research, considering that this engagement requires a combination of individual predispositions and support.

Teachers and the capacity to engage with research

According to Cain (2015a; 2015b; 2017), teachers are generally reluctant to use research to inform their practice. Teachers filter research knowledge through experiential knowledge, which is itself derived from practice and usually produced by teachers' own experiences or those of their colleagues (Olmos & Pattier, 2021). Quoting a vast

literature, Raths McAninch (1993) describes teachers' epistemology as a clinical awareness, which is characterized by having faith in their own professional experience in order to make quick decisions as opposed to second-hand knowledge gained through research (conclusions also reached by Mintrop & Zumpe, 2019).

Teachers who consider research as irrelevant for their specific class context engage sporadically with scientific knowledge and have a low capacity and willingness to engage with research findings and to conduct studies to inform teaching practice (Pendry & Husbands, 2000). Teachers do not usually conduct research about their practice and do not frequently engage in others' research; this attitude derives from them not finding research especially useful for their everyday needs (Joram, 2007; Perines, 2017).

The use of research in practice is influenced not only by teachers' views of research but also by their ability to understand research language, decode research data, and make sense of and adapt data to their class context (Cain et al., 2019; Flores, 2018; Lysenko et al., 2014). Literature suggests that teachers' expertise with research is associated with their skills and dispositions, such as self-efficacy (Cousins & Walker, 2000). Previous studies on teacher self-efficacy—defined as "individual teachers' beliefs in their own ability to plan, organize, and carry out activities that are required to attain given educational goals" (Skaalvik & Skaalvik, 2014, p. 69)—showed that teachers' self-efficacy is related to beneficial outcomes for both teachers and students (Zee & Koomen, 2016). In addition, teachers' experience with educational research increases the likelihood of their practical engagement with research (Brown, 2020) and the commitment and individual willingness to innovate (Saha, Biddle, & Anderson, 1995). Research training also appears to be a factor influencing teachers' engagement with research for teaching (Flores, 2018), and studies such as Williams and Coles (2007) have focused on information literacy as "a factor in limiting the use of research information, exacerbating the perceived challenges of lack of time" (p. 3) and barriers to accessing information sources. The idea was explored nearly four decades ago, when studies such as De Landsheere (1975) claimed that "most European primary and secondary school teachers do not enjoy basic training in research and hence are unable to read research reports and comprehend the statistics in them" (p. 110). Lysenko et al. (2014) (reinforcing earlier findings by Cousins & Walker, 2000) identified the importance of teachers' research capacity as one of the most important determinants of use, second only to conception of research, noting a significant association between the self-perceived ability to use research and the actual use of it by teachers.

Teachers' engagement with research is also socially mediated via the support received from peers and leaders and by the perception that research is being used by immediate colleagues, for instance (Brown & Flood, 2018; Brown & Greany 2018; Brown & Zhang, 2017).

Based on the premise that engaging teachers in RIT practices benefits their professional development and, ultimately, impacts on student learning, the authors launched the project PBE-Tools[1] in Spain, with the aim of 1) analyzing the factors that make teachers engage with research evidence in their educational practice, and 2) developing teachers' capacity to adopt research evidence-informed behaviour in their teaching. To address the first aim, a survey-based study was used. The purpose

of the survey was to explore three key areas of relevance: 1) teachers' concepts of research, 2) teachers' perceptions of their abilities to use research, and 3) the perceived support teachers receive from peers in relation to RIT.

Methods

To address these research questions, a quantitative study was designed based on research conducted in England by Brown, Daly, and Liou (2016). The purpose of the study was to analyze the various perceived factors thought to facilitate or limit the uptake of research evidence by schools and teachers. The survey was translated into Catalan and Spanish and some of the items were adapted to better suit a Spanish educational context. During the process of translation and adaptation, the survey was tested with a small sample of schoolteachers and experts to ensure its comprehension, consistency, and coherence. New variables were added, derived from a literature review on how teachers' characteristics linked to the effective use of research evidence into practice and considered as relevant to identify the teachers' engagement with evidence-informed educational practice (EIP).

Data collection occurred during the 2019–2020 school year and the sample was formed by primary and early childhood education teachers in Spain. The survey included both perception scales and demographic variables. Each variable is composed of several items on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The survey captured results related to the following five dimensions:

1. Self-efficacy (SE): This dimension refers to the belief in one's capabilities to succeed in particular professional situations (Bandura, 1997). The survey included four items referring to the self-confidence that teachers need to use research in their class teaching, as well as teachers' beliefs regarding their ability to actually employ research effectively. This survey section measured teachers' perceptions of their capacity and preparation to use research and to produce research on their practice.
2. Research relevance (RR): This dimension refers to teachers' perception of research in terms of its relevance for their profession, its broader benefits for society (Åkerlind, 2008), and how knowledge can be used conceptually, instrumentally, or symbolically (Cain, 2015b). The RR section was composed of nine items on the five-point Likert-type scale and measured teachers' view of research as support for teaching improvement and improved academic outcomes, and as a way to inspire societal change or political decisions.
3. Trust and use of research (TU): This section included three items that examined trust in colleagues (see Brown et al., 2016) and the value placed on research at the school level.
4. Sources of inspiration (SI): This section covered the different sources of information used to support teaching practice, including experiential sources (i.e., teachers' own practice, as well as that of their colleagues) and theoretical sources (research papers, books, data reports). The scale was an adapted version of the scale used by Walker et al. (2019) to explore the range of sources that teachers employ to improve their practice.

5. External support (ES): This section was composed of three items measuring participants' perceptions on whether they are encouraged to use research, both in terms of whether teachers felt encouraged by the head of the school and their peers to use research in their practice and to innovate their teaching.
6. Sociodemographic variables: Other survey items covered ownership, autonomous community, and level of studies.

Participants

The instrument was administered to a sample of N = 462 teachers in 204 primary and early childhood education schools in Madrid (222 teachers in 110 schools) and Catalonia (235 teachers in 94 schools); there were five invalid entries for this item. Sixty percent of the teachers worked in public schools, 38% worked in public/private schools, and 81.05% were women. A total of 29.5% of the sample was 31 to 40 years old, and 67% had more than ten years of experience. Sixty percent worked as teachers, while the rest combined their teaching tasks with leadership positions. Eighty percent had a bachelor's degree or equivalent, and 20% had master's degrees, postgraduate studies, or doctorate degree. Table 1 summarizes the main sample characteristics.

Table 1: Sociodemographic variables

Variable		Full sample	
		n	%
Type of school	Childhood education	105	22.78
	Primary	291	63.21
	Childhood and primary	65	14.1
Funded	Public	277	60.75
	Private-public	179	39.25
Study level	Bachelor's degree	353	80.78
	Master's degree or doctorate	84	19.22
School position	Teacher	271	62.01
	Middle management	71	16.25
	Upper management	95	21.74
Teaching experience	Less than 5 years	82	17.94
	6-10 years	68	14.88
	11-20 years	146	31.95
	More than 21 years	161	35.23
Teaching experience in the school	Less than 5 years	143	31.36
	6-10 years	99	21.71
	11-20 years	126	27.63
	More than 21 years	88	19.3
Age	20-30 years	75	16.63
	31-40 years	134	29.71
	41-50 years	131	29.05
	51-60 years	111	24.61
Gender	Female	372	81.05
	Male	87	18.95

Data analysis

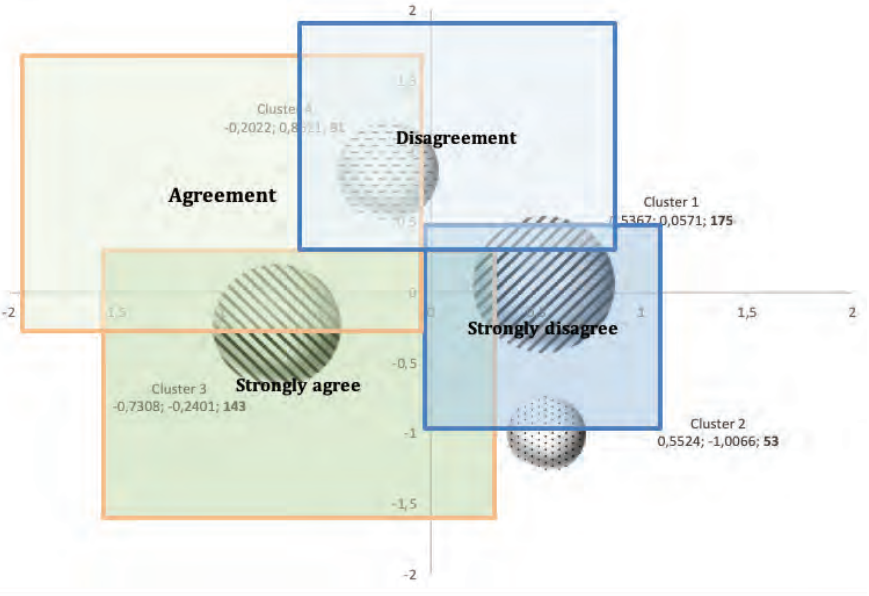
In order to explore our three key areas of relevance (teachers' concepts of research, teachers' perceptions of their abilities to use research, and the perceived support teachers receive from peers in relation to RIT), we examined different clusters of teachers according to their commitment to the use of research in teaching. To do this we used the participants' answers to the item "I use the information derived from research to inform my teaching practice" as a means of grouping teachers. To do so, we employed a multiple correspondence analysis (MCA) followed by a latent class analysis (LCA).

The MCA is a form of factor analysis that studies the relations of association between variables. 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 & Fachelli, 2016). We applied the MCA to a total of 26 items divided into five survey dimensions (see Table 3), plus the sociodemographic variables.

After an MCA is performed, 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 is lost.

Finally, contingency tables were created using 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 analysis of variance (ANOVA).

Figure 1: Cluster distribution



As illustrated in Figure 1, cluster 1 represents participants who "disagree" or "strongly disagree" with all the items. Cluster 2 falls between the two response extremes, "strongly disagree" and "strongly agree," but with more tendency toward "strongly agree." Cluster 3 represents participants who "agree" and "strongly agree" with the items. Cluster 4 falls between "agree" and "disagree."

Figure 1 shows the position of the clusters within the two dimensions created in the MCA. We emphasize that groups 2 and 3 have a greater dispersion of cases than in the other two groups. This suggests that the composition of the clusters may be less homogeneous in these two groups. The distribution of the clusters is made

through the midpoint of the X, Y axes of each cluster. Thus, the separation and distinction of the groups is observed more clearly.

We discuss these findings first by providing a description of each cluster followed by a comparison between the two antagonistic clusters. It is important to emphasize that the ChiSQ and VCramer or DSomers statistics have been applied and in no case is there a statistically significant relationship or interaction between the groups and the identifying variables.

According to MCA and with a total of 80% of explained variation, through the use of Benzécri[2] equation two dimensions have been selected. The first dimension is formed by a total of 52.9% variance and the second dimension a total of 27.28%. In addition, the statistical value of Cronbach Alpha is higher than 0.8 in both dimensions, which guarantees the homogeneity interdimensional. An ANOVA test was conducted to confirm the position of each item once the categories were distributed. An LCA analysis demonstrated the existence of these four clusters as shown in Table 2.

Table 2: Frequencies and percentage of each cluster

	Cluster	
	n	%
Cluster 1	175	37.9
Cluster 2	53	11.5
Cluster 3	143	31.1
Cluster 4	91	19.7
Total	**462**	**100**

Findings

Description of teachers' profiles

The data analysis process revealed four clusters of teachers according to their perceptions of adopting research evidence in their practice (see Table 3).

Cluster 1 was the largest group, formed by 175 teachers, 63.4% of whom were public school teachers, while 67% worked only in primary schools. In addition, it had the highest percentage of female participants at 83.2%, and contained the second fewest senior positions (15.2%: behind cluster 2). It was also the cluster with the second lowest level of training: 81.7% had degree training, and the remainder were educated at the postgraduate/doctorate level. More than 67% had 11 years or more of teaching experience. In terms of age, cluster 1 had the highest percentage of middle-aged teachers, with 61.8% aged between 31 and 50 years old.

This group scored lowest on external support (M = 3.01; SD = 0.582) and self-efficacy (M = 2.46; SD = 0.571). In other words, this group—with cluster 4—indicated being the least motivated to implement new practices in the classroom (M = 3.34; SD = 0.718) and scored lowest in terms of support from management to use information derived from research to improve teaching practice (M = 2.9; SD = 0.803). In the self-efficacy dimension, cluster 1 scored lowest for knowing how to use research for teaching practice (M = 2.49; SD = 0.643) and feeling prepared to perform research on teaching practice itself (M = 2.45; SD = 0.843). Perhaps because of these low scores, cluster 1 uses less research-derived information to support teaching innovations (M = 2.53; SD = 0.681) However, trust between teachers (M = 3.09; SD = 0.899) was high, and there was also a perceived confidence that research can be used to improve students' outcomes (M = 3.4; SD = 0.844).

Regarding the relevance of research, it is believed that research represents a learning opportunity (M = 3.39; SD = 0.681) and that it generates knowledge to under-

stand reality (M = 3.3; SD = 0.711) and to improve society (M = 3.21; SD = 0.752). At the same time, however (unlike clusters 2 and 3, which were more favourable to the use of scientific evidence), cluster 1 scored higher on the "negative" items about scientific evidence. For example, members of this group believe that research is not used to make day-to-day decisions (M = 2.33; SD = 0.752) or that it is an academic product detached from reality that is only useful for researchers (M = 1.72; SD = 0.8).

Finally, cluster 1 scored lowest for both theoretical and experiential sources of inspiration (all less than M = 2.6). As such, this group uses the fewest scientific papers (M = 1.89; SD = 0.837) and books (M = 2.31; SD = 0.918). For the most part, this group uses web pages related to the educational field (M = 3.06; SD = 0.787).

Cluster 2 was the smallest group, with 53 cases (representing 11.5% of the full sample) and had a higher percentage of teachers working in public schools, at almost 65%. Furthermore, 66% of teachers taught in primary schools. The group was 80.80% female, which is close to the average of the sample of 81%. In terms of hierarchical position, 75% performed only teacher functions, meaning that this cluster contained the lowest percentage of intermediate management positions (16.3%) and higher management positions (8.2%). In addition, they were the most educated, youngest, and inexperienced: 26% had a master's or doctoral degree, approximately 20% were between 20 and 30 years old, and 41% had fewer than five years of teaching experience in a school.

In terms of items related to external support and self-efficacy, cluster 2 scored similar to, but consistently higher than, clusters 1 and 4. For example, cluster 2 indicated being very motivated to implement new practices in the classroom (M = 3.64; SD = 0.816) and confident in its capacity to use research results to improve its teaching practice (M = 2.83; SD = 0.858). It was also the second highest scoring group for the use of research to inform practices in the classroom (M = 2.85; SD = 0.987). For the conception of research, cluster 2 had a positive opinion of it, slightly less than that of cluster 3. It is noteworthy that this group agreed most that research serves to justify decisions made at the political and practical levels in education (M = 2.87; SD = 1.031). Similarly, this cluster disagreed most that research is an academic product detached from reality (M = 1.46; SD = 0.8). However, scores related to the use of scientific papers (M = 1.94; SD = 1.2) or books (M = 2.53; SD = 1.229) contradicted this positive view of the use of research.

Cluster 3 was the second largest group with 143 cases and represented 31.1% of the full sample. More than 61% of the cluster consisted of teachers in public schools and was the largest group with primary and childhood education teachers (17.5%). Nevertheless, 65% of the cluster were primary school teachers only. Cluster 3 was 81.1% female and had the highest percentage of high management positions at 22.3% and the second smallest number of middle management positions at 17.3%. Conversely, 21.5% had engaged in master's or doctoral studies. Finally, it was the oldest and most experienced group. Almost 60% of the group was between 41 and 60 years old, and 70% had more than 11 years of experience.

Cluster 3 scored highest in all dimensions and items. In the global indices of the dimensions of external support (M = 3.55; SD = 0.449) and self-efficacy (M = 3.35; SD = 0.446), scores were always greater than 3 on the Likert scale (agree); moreover, it was the only group that exceeded 3 in the dimension of self-efficacy.

In more detail, this group indicated being most motivated to implement innovative practices in the classroom (M = 3.77; SD = 0.493), and not only did members of this cluster report feeling more supported by the management team (M = 3.59; SD = 0.64) and supported by leaders to adopt teaching practices (M = 3.70; SD = 0.586), but this group also reported experiencing higher levels of support from peers (M = 3.31; SD = 0.797) and a high climate of trust (M = 3.25; SD = 0.836). Teachers in this group clearly stated that they knew how to use research results for teaching practice (M = 3.42; SD = 0.586) and felt prepared to perform research on teaching practice itself (M = 3.40; SD = 0.756).

For cluster 3, of the attitudes towards research were very positive, with values between M = 3.77 (SD = 0.455) and M = 3.54 (SD = 0.642). These characteristics impact the sources of inspiration and information that teachers use to inform teaching practice. Participants in this cluster were inspired by previous experiences in the classroom (M = 3.11; SD = 1.017) and from ideas introduced by colleagues from other schools (M = 3.11; SD = 0.846) or through received training (M = 3.09; SD = 0.977). Like the other clusters, the most commonly used source of information in cluster 3 was educational websites (M = 3.48; SD = 0.734). However, in accordance with the characteristics described above, the use of books (M = 3.26; SD = 0.712) and scientific articles (M = 3.04; SD = 0.827) was also significant.

Cluster 4 consisted of a total of 91 cases. It was the group with the highest percentage of male teachers (43.7% of cases); in addition, 23.1% of its members taught in charter schools, and a third taught exclusively in primary schools. In addition, it was the group with the lowest percentage of master's or doctoral graduates (57% and 13.6%, respectively). It was also the youngest group, with 52.3% between 20 and 40 years old, but not the least experienced since it was slightly more experienced than cluster 2; 22.2% had less than five years of experience.

Cluster 4 scored slightly lower than cluster 2 on the dimensions of external support (M = 3.07; SD = 0.372) and self-efficacy (M = 2.65; SD = 0.368). However, this cluster indicated being less motivated to implement new practices in the classroom (M = 3.33; SD = 0.524). Knowledge of how to use research results in teaching practice (M = 2.74; SD = 0.468) and motivations to conduct research into teaching practice (M = 2.62; SD = 0.608) were low and similar to those of clusters 1 and 2. Thus, it was the second lowest scoring group in terms of using information derived from research to inform teaching practice (M = 2.67; SD = 0.524). Consequently, the concept of research amongst members of this group, although positive, occupied the lowest values of all of the groups (followed closely by cluster 1). Nevertheless, cluster 4 scored highest on negative items about research. For example, items such as "research is useful in the long run but not for making day-to-day decisions in school" scored high (M = 2.42; SD = 0.847), as did "it serves to justify academics' activity in the university" (M = 2.09; SD = 0.86). Surprisingly, the cluster scored high on items related to sources of inspiration or information: previous experiences in class (M = 2.99; SD = 0.741); ideas generated by colleagues (M = 2.93; SD = 0.659); use of web pages related to the educational field (M = 3.32; SD = 0.551); and books (M = 2.98; SD = 0.632). It is important to note that this group scored similarly on use of scientific articles (M = 2.70; SD = 0.656) and social media networks (M = 2.67; SD = 0.846). This cluster reported using social media networks the most.

Table 3: Factor mean for each cluster and ANOVA

Factor	Cluster 1		Cluster 2		Cluster 3		Cluster 4		Full sample		F	Welch
	M[a]	*SD*[b]	*M*[a]	*SD*[b]	*M*[a]	*SD*[b]	*M*[a]	*SD*[b]	*M*[a]	*SD*[b]		
External support												
Global	3.01	0.582	3.16	0.772	3.55	0.449	3.07	0.372	3.21	0.585	29.769***	
I feel that my school head supports the use of research to improve teaching	2.90	0.803	2.94	1.201	3.59	0.640	3.08	0.529	3.15	0.826	22.046***	
I feel supported by my peers to use research to improve teaching	2.84	0.787	2.75	1.091	3.31	0.797	2.81	0.607	2.97	0.829	12.805***	
I feel motivated to innovate in my teaching	3.34	0.718	3.64	0.816	3.77	0.493	3.33	0.524	3.50	0.660	15.601***	
Self-efficacy												
Global	2.46	0.571	2.79	0.852	3.35	0.446	2.65	0.368	2.81	0.657	72.852***	
I feel prepared to use research on my practice	2.45	0.843	2.77	1.241	3.40	0.756	2.62	0.608	2.82	0.918	37.19***	
I know where I can find information from research that is relevant to improve my teaching	2.44	0.723	2.77	0.937	3.23	0.647	2.59	0.543	2.75	0.770	34.966***	
I know how to make use of research in my teaching	2.49	0.643	2.83	0.858	3.42	0.586	2.74	0.468	2.87	0.738	57.618***	
Concept of research												
Educational research supports decision making and solves specific teaching problems	2.94	0.792	3.40	0.784	3.54	0.642	3.04	0.556	3.20	0.747	21.736***	
Educational research contributes to our own perceptions of teaching	3.11	0.779	3.36	0.779	3.57	0.677	3.08	0.587	3.27	0.741	13.928***	
Educational research is an academic outcome unlinked to the real life	1.72	0.8	1.46	0.800	1.62	0.989	1.82	0.848	1.68	0.866		179.286
Educational research represents a learning opportunity	3.39	0.681	3.69	0.568	3.77	0.455	3.36	0.621	3.54	0.618	15.164***	
Educational research produces knowledge needed to help the comprehension of the society	3.3	0.711	3.55	0.762	3.69	0.546	3.27	0.617	3.44	0.675	12.578***	
Educational research generates knowledge to improve society	3.21	0.752	3.55	0.731	3.67	0.546	3.18	0.726	3.39	0.722	16.127***	

Table 3 (continued)

Factor	Cluster 1		Cluster 2		Cluster 3		Cluster 4		Full sample		F	Welch
	M[a]	*SD*[b]	*M*[a]	*SD*[b]	*M*[a]	*SD*[b]	*M*[a]	*SD*[b]	*M*[a]	*SD*[b]		
Concept of reseach (continued)												
Educational research serves to support the decisions made at practice and policymaking level	2.5	0.988	2.87	1.031	2.60	1.094	2.47	0.853	2.57	1.004	2.214	
Educational research is only an academic task with no real impact	1.88	0.940	1.85	0.937	1.83	1.038	2.09	0.860	1.90	0.958		177.077
Educational research has long-term impacts, but not for daily decision-making in class	2.33	0.876	2.25	0.876	1.97	0.955	2.42	0.847	2.22	0.917		176.697**
Trust and use												
I use research to inform my teaching practice	2.53	0.681	2.85	0.987	3.41	0.637	2.67	0.524	2.86	0.785	45.345***	
In my school, the use of research is well valued	3.40	0.844	3.28	0.844	3.70	0.586	3.43	0.739	3.48	0.790	5.653**	
In my school, we trust each other	3.09	0.899	2.75	0.899	3.25	0.836	2.99	0.806	3.08	0.891	4.551**	
Source of inspiration (experiential): when I implement a new practice …												
I usually rely on my previous experiences	2.68	1.016	2.45	1.016	3.11	1.017	2.99	0.741	2.85	1.043	8.145***	
I usually rely on ideas of colleagues from other schools	2.60	0.9815	2.49	1.336	3.11	0.846	2.87	0.564	2.79	0.944	10.120***	
I usually rely on ideas of colleagues from my school	2.63	1.016	2.04	1.293	2.99	0.907	2.93	0.659	2.73	0.995	14.650***	
I usually rely on ideas derived from training activities	2.50	0.969	2.12	1.338	3.09	0.977	2.90	0.707	2.72	1.027	16.851***	
Sources of inspiration (theoretical): when I implement a new practice, I usually use …												
Web pages	3.06	0.787	2.79	1.268	3.48	0.734	3.32	0.551	3.21	0.831	12.459***	
Books	2.31	0.918	2.53	1.229	3.26	0.712	2.98	0.632	2.76	0.939	34.757***	
Scientific papers	1.89	0.837	1.94	1.200	3.04	0.827	2.70	0.656	2.41	0.992	54.947***	
Social networks	2.2	1.023	1.63	1.023	2.46	1.024	2.67	0.846	2.31	1.030	13.619***	

Notes: ***$p < .001$; **$p < .05$; [a] Mean of response for each item; [b] Standard deviation for each item

Comparison between clusters

Data in the contingency table (Table 4) show the existence of significant interactions in the degree of research use in teaching practice between the four clusters. In general terms, teachers show a favourable attitude towards the research use in class. However, clusters 3 (92.3% total and partial agreement) and 4 (67% total and partial agreement) were the most oriented towards using research in teaching. In contrast, clusters 1 and 3 were less committed to using research in practice. In addition, a clear dichotomy between clusters can be observed, especially between clusters 1 and 3. The differences between clusters and variables are presented in detail in Table 4 (ANOVA analysis). Because clusters 1 and 3 were the largest, this study focuses the analysis on the comparation of these two.

Table 4: Responses to "I use research to inform my teaching practice"

Cluster	Cluster 1		Cluster 2		Cluster 3		Cluster 4		Full sample		Chi SQ	V Cramer
	n	%	*n*	%	*n*	%	*n*	%	*n*	%		
Strongly disagree	10	5.7	6	11.3	0	0.0	1	1.1	17	3.7	154.583 *	0.335 *
Disagree	72	41.1	15	28.3	11	7.7	28	31.8	126	27.5		
Agree	84	48.0	13	24.5	63	44.1	58	65.9	218	47.5		
Strongly agree	9	5.1	19	35.8	69	48.3	1	1.1	98	21.4		

Note: $*p < .001$

Between clusters 1 and 3, a total of 22 items had a statistically significant mean difference. To emphasise the most significant aspects, this study explains the differences higher than 0.6. To begin with, clusters 1 and 3 had a considerable difference (up to 0.9 points) in the use of research to inform practice with a mean of 2.53 and 3.41, respectively.

Secondly, all the external support items and its global index indicated significant differences between clusters 1 and 3. For instance, teachers from cluster 3 reported feeling more prepared to conduct research ($M = 3.40$; $SD = 0.756$), possessing greater knowledge about the use of research data (M = 3.42; $SD = 0.586$), and knowing where to find information from research that is relevant to improve their teaching ($M = 3.23$; $SD = 0.647$) compared with teachers from cluster 1 ($M = 2.45$; $SD = 0.843$; $M = 2.49$; $SD = 0.643$; $M = 2.44$; $SD = 0.723$).

Teachers from cluster 3 displayed a more proactive attitude towards research than those in cluster 1. For example, responses from members of cluster 3 suggest that research produces knowledge needed to help the comprehension of the society ($M = 3.69$; SD = 0.546) and also that research generates knowledge to improve society ($M = 3.67$; SD = 0.546). However, while this cluster agreed that research can have a long-term impact, they did not agree it can impact daily decisions made in class ($M = 1.97$; $SD = 0.955$). For these same items, cluster 1 scored M = 3.3 ($SD = 0.711$), $M = 3.21$ ($SD = 0.752$), and $M = 2.33$ ($SD = 0.876$), respectively. Furthermore, cluster 3 ($M = 3.59$; $SD = 0.640$) appeared to receive more leadership support to use research in practice compared with cluster 1 ($M = 2.9$; $SD = 0.803$).

There were significant differences between these two groups regarding sources of knowledge. Cluster 3 indicated making use of books and scientific papers (M = 3.26; SD = 0.712 and M = 3.04; SD = 0.827, respectively) compared with cluster 1 (M = 2.31; SD = 0.918 and M = 1.89; SD = 0.837, respectively).

It is notable that like cluster 3, cluster 2 exhibited less confidence in research than cluster 1. For example, cluster 2 agreed research represents a learning opportunity (M = 3.69; SD = 0.568), generates knowledge to improve society (M = 3.55; SD = 0.731), and produces knowledge needed to help the comprehension of society (M = 3.55; SD = 0.762). However, these perspectives were not subsequently reflected in sources of inspiration (theoretical and experiential). This is because cluster 2 reported using fewer sources of inspiration than clusters 1 and 3. In particular, cluster 2 reported using mostly educational websites (M = 2.79; SD = 1.268), compared with clusters 1 and 3 which had mean values of M = 3.06 (SD = 0.787) and M = 3.48 (SD = 0.734), respectively.

Discussion and conclusions

This study analyzed how teachers in primary and childhood education schools perceive their engagement with research to inform their practice. Four groups of teachers were identified according to their perceived use of research in their teaching. Each of these groups of teachers possesses a specific configuration of characteristics, which allows us to understand the factors potentially predicting research use in practice. The study focused on teachers' inner aspects, such as their concepts of research and self-efficacy about their teaching. The study explored how experience in education, preferences towards using different sources of information, and relationships with colleagues shape teachers' perceptions of research use.

The data show that the largest group of teachers is less committed to the use of research in teaching; teachers with mid-level experience, most of whom have bachelor's degrees only and show low self-efficacy regarding their research capacity. These teachers consider research relevant and an opportunity for professional learning; however, they trust research less as a support for changing teaching and decision making. They also feel less supported by their schools to use research, and among all of the groups, use scientific papers least as a source of information.

In contrast, the third group is formed by teachers who are more engaged with research. These teachers are the most experienced compared with the rest of the groups, and most of them are school leaders. They show a proactive attitude towards research and are most confident in their capacity to understand and conduct research (the highest score in self-efficacy). Although they perceive research as an opportunity to improve their learning, like the rest of the groups, they also associate research with producing changes in society or creating knowledge. Their primary source of information is the Internet, as in the other groups. However, they showed a stronger predisposition towards the use of other sources, such as scientific papers or books. In addition, this predisposition towards research use is underscored by an environment of trust in school and leadership support.

Although group two was the smallest of the four groups, it displayed some interesting characteristics. It is the group with the youngest teachers and a large pro-

portion of postgraduates. As expected, the group does not rely on experience to inspire their practice; however, it strongly considers research relevant to supporting the decisions made in practice and policymaking.

The findings corroborate previous studies in the Spanish context and internationally, showing that research use is not generalised among teachers (Cousins & Walker, 2000; Ion & Iucu, 2014; Perines, 2018, Vanderlinde & Van Braak, 2010; Williams & Coles, 2007). Despite this, our data reveal more information about the teachers' profiles and how these profiles shape teachers' engagement with research.

Although most responses were distributed around the midpoint, and there were no categorical differences between teachers' predilections towards specific determinants of research use, some factors were judged to be more critical. For instance, the consideration that research is relevant for making decisions in class, combined with the capacity to use research data and initiate research, appears to be a decisive factor for those more engaged with research. The findings show that teachers' experience is essential for developing research use skills and confidence, which could shape their concept of research (Cousins & Walker, 2000). Experience brings confidence, and research literacy acquired, for instance, during postgraduate studies increases the likelihood that research evidence will be implemented in practice (Flores, 2018; Williams & Coles, 2007; Böttcher-Oschmann et al., 2021).

Despite the perceived relevance of research and strong research skills, belonging to a supportive school environment and counting on leaders' trust and colleagues' support emerged as facilitators of research use. The reported teachers' perceptions echo the literature, revealing several aspects that contribute to a school's capacity to stimulate and support teachers' use of research, such as a trusting climate (Gaussel et al., 2021) and an environment supporting collaboration and collegiality (Simons et al., 2003).

The study has several implications. At the decision-making level, the use of research in schools should be encouraged through programs that highlight the relevance and benefits of research use. Considering that the concept of research and the ability to use it are grounded in training programs, the findings support the importance of reliable teacher learning and research capacity. This capacity should involve robust in-service training, which can overcome possible deficits in research during initial stage of teacher's education. It should also include strategies designed to enhance teachers' knowledge and skills in research, transcend the formal contexts, take advantage of informal learning opportunities, and pay attention to the transference of these skills to the class context. At the school level, the transformational potential of the schools' and teachers' predispositions to collaborate in activities represents a facilitating factor for the use of research. Our findings suggest that to encourage motivated teachers' to use research in practice, the school system should be building a support capacity around teachers' professional development based on research evidence. Supporting teachers' involvement with research and creating opportunities for direct experience could strengthen practitioners' attitudes towards educational research and enhance its use in practice.

Notes

1. Evidence-based Educational Practices (PBE-Tools) is funded by the Spanish Ministry of Economy and Competitiveness under the grant EDU2017-88711-R.
2. Benzécri equation: $I_t^c = \frac{p}{p-1} x \left(I(B) - \frac{m-p}{p^2}\right)$ (López-Roldán & Fachellil, 2016).

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