Educational Research in Educational Practice: Predictors of Use

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Abstract

This study investigates the predictors of school practitioners' (N = 2,425) use of educational research. The suggested model explained significantly but modestly the infrequent use of educational research by practitioners. Of the four factors in the study, "opinions about research" had the most explanatory power. The results are discussed in connection with existing knowledge about school practitioners' use of educational research and implications for further research and practice.

Keywords: factor analysis, multiple regression, predictors of use, school practice, use of research-based information (RBI)

Résumé

Cette étude examine les facteurs prédictifs de l'utilisation des connaissances issues de la recherches éducatives par les praticiens scolaires (N = 2425). Le modèle proposé a expliqué de façon significative, mais modestement, l'utilisation peu fréquente de la recherche éducative par les praticiens. Des quatre facteurs "opinions sur la recherché" est celui qui est le plus corrélé à l'utilisation des recherches éducatives par les praticiens scolaires. Les résultats sont analysés en relation avec les connaissances actuelles sur l'usage scolaire de la recherche éducative par les praticiens. Les implications pour les recherches futures et pour la pratique sont également explicités.

Mots-clés: analyse factorielle, facteurs prédictifs de l'utilisation, pratiques scolaires, regression multiple, utilisation des connaissances issues de la recherches

Introduction

The first decade of the 21st century has been marked by renewed calls for educational practice that is based on the results of educational research. In one notable example of many such efforts, Hattie (2009) summarized more than 800 research syntheses of educational research and pointed to effective strategies and techniques for teaching and learning. Despite considerable efforts of many, the unsystematic use or non-use of educational research to inform educational practice continues to deter the progress and success of educational ventures (e.g., OECD, 2000, 2007, 2010).

Much has been written about the issues that account for the disconnect between educational research and practice. First, ever-changing and ambiguous goals and expectations with regard to educational standards favour the use of practical wisdom (Lortie, 1975). Second, the evidence accumulated through decades of educational research largely exists in a disassembled state, making it difficult for practitioners' to access it, to consolidate it, and to use it (OECD, 2000). Third, practitioners perceive their educational problems as extremely complex and unsolvable by research, due to the insufficiency of existing theories of learning, child development, and so on. Fourth, the ongoing qualitative–quantitative methodological debate makes it difficult for school practitioners to decide on the best-quality evidence (Kennedy, 1997). Finally, there is a widespread and time-honoured tradition of privileging knowledge generated in academia over evidence coming from practical contexts, which deepens the gap between research and practice. Professional judgement based on the practitioners' "soft" data or tacit knowledge is often denied a place in actionable knowledge, consequently narrowing the practitioners' role to only that of a consumer of externally produced knowledge (Hammersley, 2004).

Numerous proposals have been formulated in an attempt to bridge the gap between research and practice. For instance, Landry, Amara, and Lamari (2001) and Nutley, Percy-Smith, and Solesbury (2003) provide summaries of conceptual models, ranging from those where practitioners are consumers of research, to those where practitioners co-own the research process. However, most of these models have not been generated on the basis of empirical evidence (Hemsley-Brown & Sharp, 2003; Levin, 2011; Rickinson, 2005). There has been little empirical data over the last few decades showing how educators perceive, value, and use research in understanding what factors are important for research to inform teaching practice. The following section briefly summarizes empirical studies of the use of research by educational practitioners and factors affecting this use.

Use of Research by School Practitioners

There are a few studies that report low uses of research findings by school practitioners, including teachers, administrators, and school professionals. Green and Kvidahl (1990) surveyed U.S. schoolteachers and found that respondents generally examined the research literature only once a year. Bérubé (2005) reported that six to nine out of 10 Quebec teachers consulted academic research between "never" and "sometimes." Cousins and Walker (2000) found that Ontario schoolteachers seldom read research papers. Williams and Coles (2007) reported that between 60% and 80% of respondents from U.K. schools used research from "never" to "occasionally." While 96% of educators that Everton, Galton, and Pell (2000) sampled by survey had considered research findings since first qualifying as teachers, more than a quarter of them were not able to produce a single example of research that had influenced their practice.

A few studies relate how practitioners use research primarily to increase teaching effectiveness (McNamara, 2002), reflect on their professionalism, or experiment with new methods (Bérubé, 2005). It has also been reported that U.S. and Australian school principals use research to learn about effective teaching practices (Biddle & Saha, 2002; Saha, Biddle, & Anderson, 1995), and Everton et al. (2000) provided some evidence that teachers and deputy principals do the same. Their self-reports showed that engagement in research use, however infrequent, helped them question their current opinions, which led to improvements in their practice. Deputy principals expressed the highest interest in research, whereas teachers' interest was the lowest. Nevertheless, it was the teachers who valued their personal involvement in research more than the others.

In one respect or another, empirical studies yield a range of factors that are likely to affect practitioners' use of research to inform their practice. Roger's model of innovation diffusion (1995) allows the grouping of these factors along the levels of the system from which they emerge. Influences emerging at the individual level pertain to qualities of research findings as perceived by the practitioner (opinions) and the practitioner's capacity to use this information for a variety of ends (expertise). At the school level, these factors evolve from school context and culture (organizational factors) and have an impact on the practitioners' openness for learning and engagement with research generated in academia or locally in school-based projects. Finally, strategies providing communication between the levels of the system and its actors, including practitioners and researchers (awareness activities), affect visibility and, consequently, the practical utility of research findings.

Opinions about Educational Research

Opinions are the most frequently referred to and oftentimes constitute the only measure employed to represent research use. Practitioners' attitudes vary from mild optimism about the use of research (Biddle & Saha, 2002; Cousins & Walker, 2000; Green & Kivdahl, 1990; Saha et al., 1995; Williams & Coles, 2007), to skepticism (Hultman & Hörberg, 1998; Shkedi, 1998; Vanderlinde & van Braak, 2010; Zeuli & Tiezzi, 1993), and to outright cynicism (Nicholson-Goodman & Garman, 2007). The empirical evidence also highlights the qualities of research that practitioners consider mandatory for subsequent use. These include clarity, timeliness, practical relevance, and amenability to action (Gore & Gitlin, 2004; Hultman & Hörberg, 1998; Louis, 1996; Ratcliffe et al., 2005; Shkedi, 1998; Simons, Kushner, Jones, & James, 2003; Vanderlinde & van Braak, 2010). Teachers value research more if it matches their personal experience (Zeuli, 1994), tackles specific aspects of teaching (Everton et al., 2000), and can be directly applied to their teaching (Hultman & Hörberg, 1998; Ratcliffe et al., 2005; Shkedi, 1998). Evidence of clear school benefits is a decisive factor for school principals (Vanderlinde & van Braak, 2010). Williams and Coles (2007) found that despite increased online access to research evidence, accessibility continues to be an issue. Minimal investment of time to search for the information and basic skills to understand and apply it to practice are the qualities that practitioners seek from educational research.

Individual Expertise

Practitioners' research-related competencies influence the way they perceive and use research-based information. These include the ability to formulate research questions about their practice, to find solutions by locating and critically appraising research, and to apply it in practice. Competencies are also involved in choosing between contradictory research information and conducting school-based research projects intended to solve local problems (Hultman & Hörberg, 1998; Williams & Coles, 2007). Research suggests that practitioners' expertise with research is associated with individual qualities and dispositions, such as self-efficacy (Cousins & Walker, 2000), and the commitment and individual willingness to innovate (Saha et al., 1995). Evidence also shows that practitioners' experience with educational research increases the probability of their practical engagement with research. Training in research methods and participating in research

(Bérubé, 2005; Saha et al., 1995), including involvement in research projects during training programs and in the workplace (Cousins & Walker, 2000; Green & Kvidahl, 1990; Lafleur, 1995), have been identified as important issues for developing research use skills and accumulating experience.

Awareness Activities

Louis (1996) argues that the ongoing dialogue between educators and researchers may help personalize and contextualize interventions by making research user-friendly thereby increasing the likelihood of its use. Sustainability of the contacts after the completion of a research project further encourages the use of the research (Huberman, 1990). Researcher–practitioner partnerships appear to enhance transfer (Bérubé, 2005; Ratcliffe et al., 2005; Simons et al., 2003). Wiliam (2002) describes the process of creating locally relevant knowledge where practitioners are full-fledged participants at all stages of the research process and become the owners of the research product. Practitioners' direct involvement with the research process has also been recognized as a means of increasing the use of research (Cousins & Walker, 2000; Lafleur, 1995). Day, Whitaker, and Johnston (1990) report that teachers acting as researchers in school-based curriculum development projects encouraged other teachers to use results in their own practice.

Organizational Factors

School setting and context (Hultman & Hörberg, 1998), educational norms, and professional culture (Cousins & Walker, 2000; Louis, 1996; Ratcliffe et al., 2005) are factors that affect a school's readiness and capacity to support individual practitioners' learning efforts. For instance, schools may provide time and opportunities for teachers to read research and to link the understanding of research to teaching practices. A critical role in this process is educational leadership and administrative styles that promote organizational learning and change (Biddle & Saha, 2002; Cousins & Walker, 2000; Lafleur, 1995; Ratcliffe et al., 2005; Saha et al., 1995). Embedded in a larger system, the research and innovation activity of a school is, in turn, affected by a number of external factors, including political argument, public opinion, available funding, and the presence of lobbyists and support groups (Wikeley, 1998). For instance, Vanderlinde and van Braak (2010) point out that government pressure to use specific research to change practice

affects adoption rates. According to Cooper (2014), research-brokering organizations, as intermediaries between research producers and users, are catalysts for research use by virtue of their capacity-building functions, implementation support, organizational development, and policy influence.

In conclusion, it is important to note that while the rationale for school practitioners' engagement in research is rather strong, the body of empirical studies reporting some form of outcome data on research utilization continues to be thin (e.g., Hemsley-Brown & Sharp, 2003; Nutley et al., 2003; Rickinson, 2005). According to Dagenais, Janosz, Abrami, Bernard, and Lysenko (2012), from an extensive list of potential factors only some were measured for their power to determine practitioners' engagement with research. Given the lack of complete empirical data, the aim of the present study is to learn comprehensively which factors predict practitioners' use of research-based information and the strength of the relationships between the predictors and research usage in various forms. Finally, we wondered whether the use of research-based information by educators would be higher than previously estimated because of the new emphasis on knowledge mobilization among researchers and the evidence-based practice among practitioners.

Method

Study Context

The data presented in this study were collected as a research strand evaluating a governmental initiative put in place in Quebec, Canada, to foster the success of secondary-school students in disadvantaged areas. Schools were expected to establish ongoing mechanisms for planning, implementing, and monitoring their intervention strategies and to improve their implementation on the basis of evaluation data and research findings. Indeed, research-based information was supposed to serve a three-fold purpose: (1) to understand and evaluate school needs; (2) to choose solutions/intervention models and tools that would lead to the expected impact; and (3) to enable the mechanisms and processes needed to implement the planned actions. Agencies supporting the initiative consolidated research evidence about student success, including summaries of research findings, tools to facilitate school action, and examples of promising practices and experiences. The agencies then communicated the evidence to the participating schools.

Monitoring data reports were also communicated systematically to implementation agents at all levels of the education system, including the schools, to enable them to adjust their actions continuously. These reports contained school evaluation data (presented as graphs and tables without any interpretation) on students' reading achievement, motivation, and perceptions of the school environment, as well as teachers' satisfaction with professional practice and their perceptions of the school environment.

Participants

Sixty-six secondary public schools of various sizes (small schools with fewer than 150 students [n = 11], medium schools [n = 16], and large schools with more than 500 students [n = 39]) located in three socio-geographical zones (rural [n = 14], urban [n = 37], and metropolitan [n =15]) in the Province of Quebec, Canada, were the sites for the data collection. Fifty-seven schools were French speaking and nine were English speaking. The paper questionnaires were distributed in the language of instruction to school practitioners, including teachers, administrators, and professionals. The latter category was quite broad and comprised psychoeducators, student life animators, psychologists, nurses, special education technicians, and so on. With 2,734 questionnaires returned anonymously, the average participation rate was 58.7%.

Instrument

Instrument development

The *Questionnaire about the Use of Research-Based Information* (QURBI) was developed to assess factors that affect the extent of research use by educational practitioners (Dagenais, Janosz, Abrami, Bernard, & Lysenko, 2008). The process of questionnaire development was iterative and included five major steps. First, the available research literature identifying factors affecting use was used to build the initial questionnaire framework. A focus group of schoolteachers informed the development process and confirmed the structure of the questionnaire. Second, the authors undertook a thematic review of the available empirical research and survey instruments, investigating factors affecting research use. Third, three focus groups of teachers and professionals from urban, suburban, and rural English- and French-speaking schools were held to assess the relevance of the items and

their validity. Fourth, to reconcile all comments and suggestions stemming from the focus groups, an education expert from the government was invited to comment on the sections of the questionnaire with respect to content validity, comprehensibility, and comprehensiveness. Finally, after the feedback had been incorporated, the revised version of the questionnaire was pilot tested by 103 school practitioners from secondary schools, and further refined. The internal consistency reliability of the whole scale was .93.

Study variables

"Use of sources of research-based information" was the first set of 10 outcome variables and was measured on a 4-point scale from 0 (*never*) to 3 (*five or more times*). It asked practitioners about how frequently in the past year they had used research-based information. Research-based information (RBI) is produced by professional researchers such as research teams from universities (e.g., scientific publications) external evaluation teams, or by practitioners conducting research in collaboration with researchers (e.g., evaluations of school programs), produced locally and intended for local use. RBI also appears in a variety of sources, including scholarly documents; professional publications; evaluation reports; the Internet (websites); multimedia (videos and DVDs); mass media (TV, radio, newspapers, magazines); pre-service training; university courses; in-service training; workshops and professional conferences; and experts and resource staff (e.g., pedagogical consultants, resource teachers, librarians).

Dimensions of use

The second set of seven outcome variables was measured on a 4-point scale from 0 (*never*) to 3 (*always*) and asked participants about the frequency with which they used RBI in the past year for a particular end. Items such as "to improve professional practice," "to develop new activities, programs," and "to resolve problems in daily practice" asked about the use of research findings to change concrete practices and implied instrumental use of RBI. The items "to achieve better understanding of practical issues," "to satisfy intellectual curiosity," and "to reflect on one's attitudes and practices" inferred conceptual use, that is, changes to individual insights and ways of looking at the world. The item "to justify or validate decisions" measured symbolic use of RBI to confirm practices or actions.

Potential factors in RBI use

The 26 items were measured on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). They were provisionally organized into four sections: (1) *opinions about RBI* pertained to relevance, timeliness, and reliability of RBI, as well as its usefulness, ease of access and understanding, and transferability to practice; (2) *individual expertise* addressed the importance practitioners attached to the skills needed to access, appraise, and translate RBI; (3) *awareness activities* included items about practitioners' involvement in research, contact with researchers and research brokers, as well as the way research findings were presented to practitioners; and (4) *organizational factors* asked about school culture (supportive environment, importance of professional development, opportunities to challenge habits and traditions), available resources (qualified staff, facilities and technology, time, incentives), and external influences on individual practices (governmental policies, organized groups such as, unions, granting agencies, etc.).

Practitioners' school experience and school characteristics such as size, language of teaching, and socio-geographical location were controlled for as potentially related to practitioners' engagement with the use of RBI. The following section describes the results of the major implementation of the instrument with three groups of practitioners—teachers, administrators, and professionals.

Analyses

SPSS standard procedures were applied to screen the data from 2,734 surveys. After deleting 302 cases where 75% and more responses were missing, the remaining missing data were imputed by expectation maximization. No univariate outliers were detected, whereas seven multivariate outliers were removed, leaving 2,425 cases for analysis. For all measures, descriptive analyses were run. Analyses of variance (ANOVAs) and independent sample *t*-tests were used to compare data by groups of practitioners. Effect size coefficients (Cohen's *d*), were calculated to identify the magnitude of differences/similarities between groups' reports using the following formula:

$$d = \frac{\overline{X}_E - \overline{X}_C}{SD_{Pooled}}$$

Principal component analysis with oblique rotation revealed the internal structure of the 26 individual variables by identifying linear combinations of these variables into factors. Their predictive power on the use of RBI and its dimensions was analyzed via hierarchical multiple regression.

Results

The respondents were 1,979 teachers, 125 school administrators, and 321 professionals. Among them, 23.6% possessed fewer than three years of experience, whereas 11.6% had been professionals for more than 20 years. The sample consisted of 88% French speakers and 12% English speakers. About 81 % (81.5%) of practitioners worked in large schools, 14.5% worked in medium-sized schools, and 4% worked in small schools. Depending on the administrative area where schools were located, respondents were from city schools (59.5%), metropolitan schools (29.9%), and rural schools (11%).

Use of Research-Based Information

Table 1 summarizes the descriptive (i.e., means and standard deviations) and comparison statistics of teachers', school administrators', and practitioners' use of RBI from different sources. Overall, the respondents positioned their use of RBI at the low end of the scale, between "never" and "once or twice" during the past year. Internet and mass media were reported as the most common outlets, whereas pre-service training was the least frequently used. Furthermore, the reported use of RBI remained infrequent regardless of whether respondents were teachers, administrators, or professionals.

Nevertheless, multivariate and univariate tests revealed significant variations in groups' self-reports about their use of RBI, implying a divide between school administrators, on the one hand, and teachers and professionals, on the other. School administrators were more likely to use traditional sources, such as scholarly documents, professional publications, school evaluations, pre-service and in-service training, conferences, and the advice of experts. The magnitude of the differences between administrators and the other two groups varied from small ($d = –0.25$) to large ($d = –0.85$), with the largest being –1.4 for the use of school evaluations. This range suggests 15% to 50% of non-overlap of the administrators' scores with those of teachers or professionals. Teachers did report higher uses of technology-mediated sources such as the Internet ($d = 0.33$) and multimedia ($d = 0.44$) than administrators, implying 23% to 29% non-overlap.

Table 1: Use of RBI sources by groups of school practitioners. Descriptive statistics and group comparisons, including ANOVA F omnibus, *t*-test, and effect sizes

Sources		Total (N = 2,425)	Teachers (N = 1,979)	Administrators (N = 125)	Professionals (N = 321)	F-ratio
Scholarly documents	M(SD)	1.10(1.10)	1.10(1.10) t^1 = -2.5*; d^1 = -0.25	1.35(1.04)	1.01(1.15) t^2 = 3.0**; d^2 = 0.43	4.13*
Professional publications	M(SD)	0.97(0.98)	0.93(0.95) t^1 = -7.7***; d^1 = -0.78	1.66(1.03)	0.96(1.06) t^2 = 6.4***; d^2 = 0.76	33.1***
School evaluations	M(SD)	0.72(0.84)	0.66(0.80) t^1 = -13.3***; d^1 = -1.40	1.79(0.93)	0.68(0.80) t^2 = 11.8***; d^2 = 1.38	116.1***
Internet, websites	M(SD)	1.90(1.19)	1.98(1.18) t^1 = 3.4**; d^1 = 0.30	1.63(1.11)	1.69(1.28) t^2 = -0.42; d^2 = 0.00	12.4***
Multimedia: video, DVD	M(SD)	1.31(1.16)	1.42(1.18) t^1 = 6.1***; d^1 = 0.44	0.91(0.88)	0.81(0.98) t^2 = 1.1; d^2 = 0.00	46.6***
Mass media: TV, radio, newspapers	M(SD)	1.60(1.12)	1.66(1.12) t^1 = 1.2; d^1 = 0.00	1.54(1.09)	1.32(1.16) t^2 = 1.8; d^2 = 0.00	12.9***
Pre-service training	M(SD)	0.45(0.90)	0.42(0.89) t^1 = -5.3***; d^1 = -0.65	1.01(1.24)	0.41(0.83) t^2 = 5.0***; d^2 = 0.65	25.5***
In-service training, workshops	M(SD)	0.83(1.00)	0.78(0.98) t^1 = -6.7***; d^1 = -0.68	1.45(1.08)	0.93(1.07) t^2 = 4.6***; d^2 = 0.56	28.6***
Conferences, presentations	M(SD)	0.85(0.83)	0.78(0.79) t^1 = -8.2***; d^1 = -0.84	1.45(0.88)	1.06(0.93) t^2 = 4.1***; d^2 = 0.52	51.9***
Experts, resource people	M(SD)	1.06(0.93)	1.00(0.90) t^1 = -7.9***; d^1 = -0.77	1.70(0.96)	1.18(1.02) t^2 = 5.1***; d^2 = 0.57	36.7***

*p < .05; **p < .01; ***p < .001; [1]teachers and administrators are compared; [2]administrators and professionals are compared

Table 2: Dimensions of RBI use by groups of school practitioners. Descriptive statistics and group comparisons, including ANOVA F omnibus, *t*-test, and effect sizes

Dimensions		Total (N = 2,425)	Teachers (N = 1,979)	Administrators (N = 125)	Professionals (N = 321)	F-ratio
Instrumental use						
To develop new activities, programs, guidelines	M(SD)	1.64(0.94)	1.50(0.90) t^1 = -10.2***; d1 = -0.92	2.31(0.85)	2.21(0.92) t^2 = 1.12; d2 = 0.11	119.6***
To improve your professional practice	M(SD)	1.74(0.96)	1.57(0.87) t^1 = -16.5***; d1 = -1.44	2.82(0.82)	2.41(0.95) t^2 = 4.49***; d2 = 0.45	227.4***
To resolve problems in your daily practice	M(SD)	1.41(0.94)	1.22(0.84) t^1 = -16.7***; d1 = -1.48	2.46(0.81)	2.20(0.88) t^2 = 3.06**; d2 = 0.30	286.2***
Conceptual use						
To achieve a better understanding of issues in your practice	M(SD)	1.29(0.93)	1.08(0.82) t^1 = -18.7***; d1 = -1.64	2.42(0.77)	2.15(0.88) t^2 = 3.20**; d2 = 0.32	356.9***
To satisfy intellectual curiosity	M(SD)	1.68(0.95)	1.53(0.91) t^1 = -12.9***; d1 = -1.03	2.46(0.78)	2.31(0.88) t^2 = 1.84; d2 = 0.18	154.8***
To reflect on your attitudes and practices	M(SD)	1.64(0.94)	1.45(0.84) t^1 = -18.3***; d1 = -1.59	2.78(0.78)	2.35(0.92) t^2 = 4.99***; d2 = 0.49	270.8***
Symbolic use						
To justify or validate your decisions	M(SD)	1.45(0.96)	1.26(0.86) t^1 = -18.2***; d1 = -1.58	2.61(0.80)	2.23(0.91) t^2 = 4.28***; d2 = 0.43	294.7***

*p < .05; **p < .01; ***p < .001; 1teachers and administrators are compared; 2administrators and professionals are compared

Table 2 summarizes practitioners' self-reports along the dimensions of use of RBI. Overall, average responses fell between "sometimes" and "often."

Among the three groups, teachers reported the lowest use, with responses gravitating around "sometimes," implying sporadic use of research to inform their practice, whereas administrators and professionals' reported more regular use. Differences in teachers' self-reports compared with the administrators' and professionals' were significant. With the values of Cohen's *d* ranging between 0.79 and 1.64, these differences were substantial, suggesting a non-overlap of 48% to 74% between the responses of teachers and the other two groups.

Predictors of Use of Research-Based Information

Table 3 summarizes school practitioners' attitudes toward factors that may have affected their decision to engage in the use of RBI. Although the bulk of responses were distributed around the neutral midpoint, some factors were judged to be more important. For instance, among the methods to communicate research findings, clear and explicit recommendations were given preference, whereas regular contacts with research intermediaries and personal involvement in research projects were least valued. The more important factors that respondents identified in their daily practice were supportive environment, availability of support staff, professional development opportunities, as well as time provided to practitioners to read research and apply it to solve practical issues. The less important factors were unions, granting agencies, and the media. Respondents valued research more if it was reliable and trustworthy and demonstrated potential to guide and improve their practice.

On the premise that the three groups' self-reports consistently indicated low uses of RBI from the range of sources, and neutral attitudes toward RBI and potential factors of RBI use, the planned multivariate analyses were performed for the entire sample.

The principal component analysis of the 26 items revealed a simple four-factor structure accounting for 62.9% of variance, including the practitioners' opinions about RBI (9.5%) and their attitudes toward awareness activities (34.6%), expertise (6.4%), and organizational factors (12.1%). Individual factor loadings were satisfactory and ranged from .58 to .84.

Table 3: Factors of use of research-based information by three groups of school practitioners (means and standard deviations, variance explained, factor loadings)

Factor Names and Items		**Teachers (*N* = 1,979)**	**Administrators (*N* = 125)**	**Professionals (*N* = 321)**
	Factor Loadings	**M(SD)**	**M(SD)**	**M(SD)**
Factor 1: Awareness activities (34.6% of variance explained)				
Opportunities to discuss research results with the research team	.84	3.61(0.91)	3.17(0.98)	3.16(0.96)
Demonstrations about how to apply research	.84	3.62(0.88)	3.30(1.01)	3.32(1.00)
Regular contacts with people who distribute research-based information	.81	3.40(0.86)	3.09(0.94)	3.13(0.99)
Research results accompanied by clear and explicit recommendations	.79	3.93(0.79)	3.47(0.93)	3.50(0.91)
Discussions of research-based information with colleagues	.77	3.72(0.83)	3.37(0.94)	3.31(0.98)
Your involvement in a research project	.71	3.49(0.83)	3.17(0.93)	3.09(0.93)
Presentation of research findings tailored to your needs	.66	3.63(0.77)	3.26(0.91)	3.36(0.86)
Factor 2: Organizational factors (12.1% of variance explained)				
A supportive environment	.81	4.03(0.76)	3.78(0.93)	3.69(0.95)
Human resources, such as the availability of qualified staff	.80	3.97(0.86)	3.77(0.92)	3.63(0.90)
Organizational importance for professional development	.78	4.01(0.68)	3.64(0.94)	3.62(0.94)
Incentives, such as remuneration, honoraria, lessening of the work-load, etc.	.72	3.22(1.14)	3.63(1.07)	3.30(1.03)
Opportunities to challenge established habits and traditions	.70	3.76(0.76)	3.53(0.93)	3.42(0.89)

Factor Names and Items		**Teachers (*N* = 1,979)**	**Administrators (*N* = 125)**	**Professionals (*N* = 321)**
	Factor Loadings	**M(SD)**	**M(SD)**	**M(SD)**
Available facilities and technology	.60	3.43(.99)	3.64(1.05)	3.38(1.02)
Organized groups, such as unions, granting agencies and media	.59	2.96(0.96)	3.17(0.96)	3.14(0.87)
Available time to read a journal, to apply a new technique, etc.	.58	3.91(0.98)	3.71(1.02)	3.62(1.00)
Factor 3: Opinions about research (9.5% of variance explained)				
Is relevant to your reality	.78	3.59(0.80)	3.15(0.89)	3.22(0.86)
Offers timely information	.77	3.16(0.78)	3.02(0.80)	3.02(0.84)
Is easy to transfer into your practice	.76	3.17(0.71)	2.92(0.83)	3.00(0.79)
Is useful to guide or improve your professional practice	.76	3.88(0.70)	3.36(0.83)	3.40(0.88)
Is easy to understand	.72	3.32(0.78)	3.22(0.89)	3.17(0.83)
Is easy to find	.69	3.32(0.86)	3.09(0.96)	2.97(0.94)
Is reliable and trustworthy	.65	3.72(0.76)	3.37(0.80)	3.36(0.79)
Factor 4: Individual expertise (6.7% of variance explained)				
Ability to assess the quality of research-based information	.84	3.94(0.82)	3.83(0.89)	3.76(0.89)
Skills to use information technology such as Internet, databases	.80	4.02(0.82)	4.00(0.89)	3.93(0.91)
Ability to read and understand the research publications	.79	3.98(0.81)	3.91(0.93)	3.87(0.91)
Expertise to translate research findings into practice	.79	3.93(0.84)	3.83(0.89)	3.76(0.89)

Four sets of hierarchical multiple regressions were run to evaluate the impact of these four factors on the criterion variables while controlling for the effects of language

of instruction, school size, socio-geographical region, and amount of professional experience. Because the use scores were low and not highly variable, a composite score was calculated to form the first criterion variable: use of RBI. Dimensions of use formed the second set of criterion variables where items were summed into three composites: conceptual, instrumental, and symbolic use. The criterion composites were modestly skewed (< 3) but not transformed. Pearson correlation coefficients between the composites were significant ($p < .01$), positive, and less than .56, implying that the sets measure different aspects of use.

Table 4 summarizes the predictive potential of the model. In Step 1, the bivariate relationship between school characteristics and the four criterion variables varies from .08 to .13, accounting for 1% or 2% of the variance. After Step 2, with both school characteristics and practitioners' experience in the equation, coefficients were raised to range between .17 and .20, explaining from 1% to 4% of the variance in the criterion variables. With the addition of the four latent factors, the explanatory power increased at least sixfold.

Table 4: Predictors of the use of research-based information and the dimensions of use: beta-coefficients and variance explained (hierarchical MLR)

Predictors	Use of RBI	Dimensions of use		
		Conceptual	Instrumental	Symbolic
Step 1				
School characteristics:				
Language	.11***	.06*	.05*	.03
Size	-.07**	-.07**	-.08**	-.06*
Location	.03	.06*	.06*	.03
ΔR^2	.02**	.01***	.01***	.01**
Step 2				
Practitioner's characteristics:				
Experience	-.12***	-.014***	-.17***	-.14***
ΔR^2	.01***	.02***	.03***	.02***
Step 3				
Practitioner's attitudes toward:				
Awareness activities	.12***	.17***	.15***	.16***
Organizational factors	.11***	.10***	.10***	.09***
Opinions about RBI	.27***	.30***	.30***	.27***
Individual expertise	.23***	.19***	.18***	.14***

Predictors	Use of RBI	Dimensions of use		
		Conceptual	Instrumental	Symbolic
ΔR^2	.15***	.16***	.15***	.12***
R^2	.18	.19	.20	.15
Adjusted R^2	.18	.19	.19	.15
R	.43	.44	.44	.39

*$p < .05$; **$p < .01$; ***$p < .001$

Among the factors, it is the practitioners' opinions about research that contribute the most to explain the use of RBI and its dimensions (7% to 9%). Practitioners' expertise at finding and reading, and translating it into practice accounted for 5% in RBI use and between 4% and 2% in its dimensions. One percent of RBI use and between 3% and 2% of the three dimensions were explained by the activities targeting practitioners' awareness about research. Organizational factors accounted for about 1% of variance in the four criterion variables.

Discussion

Several findings were gleaned from this study with regard to the use of RBI and factors that bring this information to bear on educational practice.

Practitioners' Engagement with Research-Based Information

The results reveal that school practitioners' engagement with RBI was rather low and infrequent, even considering some of the modest variation among sources. On average, practitioners reported using research of any sort only once or twice in the past year. Overall, this discouraging finding quite closely echoes the results of a number of earlier studies reporting infrequent use of research by educational practitioners (Bérubé, 2005; Cousins & Walker, 2000; Green & Kvidahl, 1990; Williams & Coles, 2007). This low use occurred despite renewed calls for knowledge mobilization by researchers and evidence-based practice by educators.

Predictors of Use

The four factors, including practitioners' opinions about RBI, their attitudes toward awareness activities, expertise, and organizational factors, consistently but modestly explain the frequency of RBI use and its dimensions. Among these factors, practitioners' attitudes toward research were the largest predictors of RBI use. An increase of one-standard deviation in practitioners' opinions about RBI led to an increase of up to 0.30 in the predicted RBI use and its dimensions. Educators who shared a more positive view of RBI were likely to report more frequent use of research in their practice, albeit not to any great extent.

Linked to attitudes about research is research expertise, the second most important determinant of use. It includes the ability to read, understand, and assess the quality of research, to use information technology to access research, and to translate research into practice. Cousins and Walker (2000) found a significant association between self-perceived ability and research use by teachers, suggesting that developing practitioners' capacity to appraise research evidence would help use by rendering evidence more understandable and potentially easier to use.

Activities that increased practitioners' awareness of research findings were many and reflected the nature of the relationship between research production and use. On the one hand, based on the premise that research is external to the field of practice, dissemination strategies encourage researchers to interest practitioners in their research outcomes by demonstrating the relevance of their findings to practice (Behrstock, Drill, & Miller, 2009). On the other hand, partnerships with researchers encourage practitioners' involvement in the research process. As a result of such collaborations, practitioners develop a sense of ownership and value in their own research (Wilson & Easton, 2003). Participants in this study, however, indicated their preference for the traditional model of dissemination—they preferred clear and explicit recommendations to accompany research results.

The extent to which the respondents perceived themselves as belonging to an organization that supported learning, especially a supportive school environment, emerged as a predictor of use, although it was the weakest. The preferences reported by practitioners echo the results of the literature, revealing a number of components that contribute to a school's capacity to support the learning of its teaching staff. These factors refer first and foremost to leadership and administrative styles, including openness to change initiatives (Cousins & Walker 2000; Ratcliffe et al., 2005), support for

collaboration and collegiality (Simons et al., 2003), providing time (Vanderlinde & van Braak, 2010) and appropriate resources, including technology (Hultman & Hörgberg, 1998; William & Coles, 2007), as well as prioritizing professional development (Wilson & Easton, 2003; Shkedi, 1998).

In a meta-analysis of 128 studies examining factors that influence the extent to which attitudes shape behaviour, Glasman and Albarracín (2006) concluded that attitude-behaviour association was strongest when participants formed their attitude on the basis of behaviour-relevant information. Therefore, building their knowledge of educational research, supporting their involvement with research, and creating opportunities for direct experience could strengthen practitioners' attitudes toward educational research. Indeed, teacher education, both pre- and in-service, is best positioned to support the process of attitude formation. Literature indicates that engagement in research-related activities has an impact on practitioners' opinions about educational research and their perceived ability to conduct it (Cousins & Walker, 2000; Green & Kivdahl, 1990). Although few participants in these studies had taken research coursework, when they did, they expressed more favourable attitudes toward research. Bartels (2003) argues that involving pre-service teachers in systematic inquiry activities should be mandatory. Papanastasiou (2005) reports that undergraduate students' perceived usefulness of research and its relevance to their professional development was highly correlated with their positive attitudes toward research. In Cousins and Walker's (2000) study, the practitioners' prior involvement in research increased their propensity to participate in and positively value school-based inquiry.

Because little evidence exists about how teachers learn about research (Birbili, 2002) and what effects such learning experiences have in shaping their views of themselves as inquiring practitioners, further research needs to investigate whether pedagogical strategies designed to enhance teacher knowledge and skills in research are likely to be productive. Specifically, these should transcend the framework of formal research-related courses and include practice-oriented classes, such as teacher practicums and courses focused on teaching methods. In addition, it is important to learn to what extent these attitudes, knowledge, and skills are transferrable to and sustainable in school contexts. The extent to which the transformational potential of the school, including predispositions to collaborative activities, is able to bring practitioners' individual capacities to scale in order to contribute to communal action needs to be examined. Research suggests

that to encourage and maintain individual practitioners' aspirations to change practice, the school system should be building a support capacity encompassing ongoing professional-development activities explicitly grounded in research evidence; creating physical opportunities and stimulating intellectual needs for collegial networks to share experience; and putting in place administrative and managerial controls for the time and energy required. Although school initiative has to play a crucial role in these processes, ministries of education and educational authorities should have their say in helping schools build the capacity structure to use RBI routinely.

However, for these bodies to adjudicate for systemic action, the benefits of using RBI should be further demonstrated. Moreover, they themselves should have the willingness and capacity to base their decisions and actions on the best available knowledge rather than on opinions and preferences.

In sum, increasing the use of research-based evidence begins with developing positive attitudes among educators toward the utility of research, enhancing their expertise to use it wisely and effortlessly, prompting their awareness of research, and creating an organization structure that supports evidence-based practice. Wozney, Venkatesh, and Abrami (2006) used expectancy theory to explain the adaptation and sustained use of educational technology, but it may be applicable in a wider context. First, educators must expect to succeed as they innovate practice—an expectation based largely on expertise. Second, educators must value the innovative practice in terms of its potential to improve teaching and learning—a value based on the attitudes of educators. And, finally, educators must see the costs of changing as being worth more than maintaining the status quo—surely a factor influenced not only by personal beliefs but also by a nurturing and approving school context.

Another aspect of cost is associated with a larger, as yet unmentioned aspect of evidence-based practice. What are the costs and consequences of not using evidence to improve practice? Where does educator wisdom need to give way to research findings? And, ultimately, what is the balance between the art and science of teaching? What can the public demand of educators and educational researchers? And what is the demand of the educational sciences compared to other human sciences, medical sciences, and the physical sciences?

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