Chapter 7
Considering Research Quality and Applicability Through the Eyes of Stakeholders

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Quality in educational research and practice has come under considerable scrutiny by policy makers in the United States. This scrutiny is due, in part, to a desire to develop and implement efficient and effective interventions based on scientific evidence and, in part, by concerns that investment in practices that lack adequate empirical support may drain limited resources. Consequently, there has been a move toward the adoption of the evidence-based practice (EBP) model and accompanying evidence hierarchies from medicine by policy makers and funding agencies as a means to evaluate the quality of education research and to allocate research funding. It is imperative for any discussion of the EBP model in education to know the model as it was conceptualized and implemented in medicine. Sackett, Rosenberg, Gray, Haynes, and Richardson (1996) described EBP in medicine as "the conscientious, explicit and judicious use of best current evidence in making decisions about the care of individual patients" (p. 71). Implementation of an EBP model in medicine involves five essential steps:

1. Convert information needs into answerable questions (formulate the problem).
2. Track down, with maximum efficiency, the best evidence with which to answer these questions—evidence may come from clinical examination, the diagnostic laboratory, published literature, or other sources.
3. Appraise the evidence critically (weigh up) to assess its validity (closeness to the truth) and usefulness (clinical applicability).
4. Implement the results of the appraisal in clinical practice.
5. Evaluate performance. (Greenhalgh, 2006, p. 2)

Adopting and implementing EBP requires that practitioners not only read research but also read the research at the right time and alter their clinical behaviors and the behavior of others in light of what they have found (Greenhalgh). Hierarchies have been developed to support practitioners' critical appraisal and trustworthiness of the research evidence. In evidence hierarchies that evaluate quantitative research designs, studies that conduct systematic reviews of randomized controlled trials (RCTs) and studies utilizing RCTs are at the pinnacle (Greenhalgh). Thus, the EBP model is appealing because it appears to offer objective criteria to determine

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best practice (Horner et al., 2005) since it allows for types and strengths of *evidence* to be differentiated.

There is considerable debate regarding the appropriateness and applicability of adopting EBP and the accompanying evidence hierarchies from medicine to education. Participants at the 2nd Island Conference discussed many of these issues, and the authors of Part I of this book discuss the implementation of EBP from a variety of perspectives. Our goal in this chapter is to highlight and discuss important concepts and issues raised by these authors as they relate to various stakeholders.

7.1 Evidence-based Practice—What Counts as Evidence?

Yore and Boscolo (see Chap. 2) began by situating the issues that are discussed in each chapter within the broader context of the shift toward EBP and legislation—Gold Standards in Education Research (Bush, 2002); No Child Left Behind Act of 2001 (NCLB, 2002)—for education research. This shift is described by the authors as a result of (a) ideological and political agendas to improve educational outcomes for all students and (b) skepticism regarding the quality, rigor, and effects of research effectiveness on student outcomes. Yore and Boscolo discuss the challenges that have resulted from misunderstandings or misinterpretations in the translation of legislation that has privileged quantitative methodologies and evidence hierarchies, in particular RCTs, rather than focusing on research designs (quantitative, qualitative, mixed methods) that are appropriate to answer particular research questions. Stakeholders at different levels of the implementation process will have differing but important perspectives regarding EBP that other stakeholders need to consider, address, and incorporate.

7.1.1 Educators, Employers, and Professional Bodies

Many of these stakeholders rightfully question whether EBP, like so many other practices of the past, is just the latest fad. Upon hearing that EBP challenges them to consider questions such as *How do you know that what you do works?* many teachers indicate that they regularly ask such questions because it is part of what constitutes good teaching practice. However, proponents of EBP state that what sets EBP apart is the emphasis on using scientific evidence to answer such questions rather than relying on expert opinion or past practice (Greenhalgh, 2006; Reilly, 2004). Proponents argue that by adopting an EBP model educators will be more able to critically appraise the benefits and risks associated with particular instructional methods, interventions in classrooms, and individual student contexts.

Problematic to the claims made by EBP proponents is the lack of consensus for the EBP model across any discipline, including medicine (see Beecham, 2004;

Greenhalgh, 2006; Odom, Brantlinger, Gersten, Horner, Thompson, & Harris, 2005). For many nonmedical disciplines, the conceptualization and underlying assumptions of the evidence-based medicine model are at odds with the conceptualization and reality of their practitioner–patient or teacher–student relationships. Beecham spoke to this issue as it relates to the discipline of speech–language pathology. She argued that speech–language pathologists (SLPs) understand their practice differently from that of medical practitioners. For SLPs, the establishment of equitable and collaborative practitioner–patient relationships is viewed as central to, and an important component of, the success of therapeutic goals. Thus, the EBP model adopted from medicine, where evidence focuses only on external, measurable variables, is problematic. Many of the variables that support success in a collaborative treatment context are neither external nor easily measured. Given that a large proportion of speech–language pathology practice occurs within educational contexts, Beecham's arguments are informative and insightful for educators.

Recommendations made by EBP proponents, however, are often presented as though there is consensus as to what counts as evidence and what sorts of evidence are better than other evidence (Johnston, 2005). Johnston noted that amidst the enthusiasm for EBP it is easy to lose sight of the fact that these assumptions are virtually untested when adopted by other disciplines, often left unstated, and most definitely arguable, as shown by Beecham (2004). With the existence of considerable and substantial debate within and across disciplines, it is reasonable for educators, employers, and professional bodies to be confused about why EBP should be adopted—given that the costs of such change are substantial for this particular set of stakeholders.

7.1.2 Policy Makers and Funding Agencies

In their zeal to be fiscally responsible, policy makers and funding agencies' stakeholders need to carefully weigh the available evidence that exists in the research literature across a number of disciplines that have attempted to adopt EBP from medicine. Legislation of a practice model that will have substantive human and financial costs requires a priori knowledge of known problems in the conceptualization of the particular model. It is clear from a variety of publications (see Graham, 2005), however, that conceptual clarity has not been achieved; unfortunately, practitioners and researchers with the least power to affect change in ill-conceived and poorly articulated policies are left to face the consequences.

7.2 Uptake of Research Evidence

Millar and Osborne (see Chap. 3) begin by citing comments made by Hargreaves (1996) that educational research has offered little to inform teaching practice over the past 50 years because research studies are noncumulative, produce inconclusive

and contestable findings, and are of little practical relevance. This position appears to have some support amongst practitioners (e.g., Lijnse, 2000) who have expressed dissatisfaction with the lack of research evidence to support teaching. Millar and Osborne devote the remainder of their chapter to examining this research-to-practice issue within the context of EBP. Three actual examples of instructional approaches in the teaching of science that are cumulative and conclusive—and have substantive practical relevance—are presented. Although all three studies had significant impact for the schools in which the research was conducted, broader application in science teaching has not occurred for at least two of these approaches. EBP proponents would argue that the lack of broad impact relates to the weakness of the evidence these studies offer because none were conducted using RCT designs. However, Millar and Osborne examined such a claim and concluded that it would be difficult to justify the expense in human and material resources to achieve the same findings using a RCT methodology for the three examples cited.

The reluctance to engage in, indifference toward, or ignorance of research evidence for purposes of uptake is of considerable importance for all stakeholders. Although Millar and Osborne demonstrate that it is clearly not simply a void in the availability and accumulation of quality research evidence, as suggested by Hargreaves (1996), there is limited expectation on the part of practitioners and policy makers that relevant research exists and an even lower expectation that research is to inform policy and practice. Such perceptions persist at all stakeholder levels and must be addressed if we are to make advances.

7.2.1 Educators

Sweeping statements, such as those made by Hargreaves (1996), denigrating the relevance of education research have serious consequences. First, such comments permit educators and others to dismiss relevant research findings out of hand. Second, such comments diminish the significant advances made in literacy and science education research. Finally, once such disregard is permissible, it becomes even more difficult to convince educators that any model, including EBP, will improve circumstances. Many authors throughout this book have reported on, referred to, and mentioned relevant and important research in literacy and science education that has left each of us with a greater appreciation of how our individual research fits within the larger picture of education—a picture that differs little from other areas in the social sciences and humanities.

If, as proponents suggest, the EBP model holds promise in bridging the gap between research evidence and practitioner uptake for the field of education, then the question remains as to how educators are to develop the skills necessary to implement an EBP model in classrooms in order to take advantage of research-based evidence to teach particular content, grade, and developmental levels. Many articles, chapters, and books (e.g., Greenhalgh, 2006; Johnston, 2005; Reilly, 2004; Silagy & Haines, 2001) are devoted to outlining the skills practitioners across a variety of

disciplines need to develop in order to implement EBP. For example, the following skills are offered by Reilly: (1) completing a course or online tutorial on EBP, (2) developing critical appraisal skills when reading research papers, (3) becoming skilled users of research to enable the application of scientific information in their day-to-day practice, and (4) developing questions related to day-to-day practice that can be answered using evidence-based research. Unfortunately, educators often find themselves having to undertake learning skill sets such as those described with minimal or no support from employers, professional bodies, or the government agencies mandating practice changes. Many educators question whether the time needed to learn new skills, often at their own expense, is worth it, if EBP will likely be replaced in an ever-changing political agenda.

7.2.2 Employers, Professional Bodies, Preservice Education Programs, Funding Agencies, and Policy Makers

EBP proponents advocate and purport that research conducted using RCT will improve research uptake in education practice; however, evidence from medicine and other health professions does not support this contention. Many examples exist where evidence from RCTs demonstrated that particular interventions are not beneficial and may even be detrimental, yet these interventions continue to be widely used (see Gillam, Crofford, Gale, & Hoffman, 2001, for *Fast ForWord* language intervention; Greenhalgh, 2006, for back pain; Phillips, Norris, & Steffler, 2007, for *Meaningful Applied Phonics* reading instruction). Odom et al. (2005) suggested that EBP proponents have ignored the issue of whether or not results from RCTs are positive.

Further, there is evidence showing that, while health care practitioners consider research to be important, research findings have little impact on their day-to-day practice (Brener, Vallino-Napoli, Reid, & Reilly, 2003; Metcalfe et al., 2001). Reilly (2004) found that practitioners tend to read the abstract, introduction, and discussion sections of research articles but feel much less confident about understanding methods and results sections. Yet, to conduct critical appraisals of the research literature, these are the very sections that educators need to understand. If such is the modus operandi amongst the health profession that have implemented EBP for a much longer period of time, then we must question whether we realistically can expect a different outcome in education.

Logemann (2004) pointed to yet another issue that impacts uptake of research evidence, that is, the focus on productivity in health care and educational institutions. A productivity model is at odds with EBP, which requires time to develop expert skills, acquire new knowledge, and read and apply evidence. Currently, the cost of developing expert skills is not included in funding models in health care (Reilly, 2004) or education, but is an important issue for these stakeholders to consider if the EBP model is to be adopted in education consistently and successfully.

7.2.3 Researchers

Uptake of research evidence by educators is a significant concern for researchers. Researchers can support not only practitioners but also audiences across all levels if, according to Johnston (2005), there is a concerted effort to (a) situate the research within the larger context of the problem being studied, (b) provide clear indications for educational practice, and (c) clearly explain the extent of any limitations or generalizability issues. Logemann (2004) also suggested that researchers take the lead by conducting systematic reviews of assessment and intervention strategies as a means to critically appraise and synthesize the research literature for specific issues. Such syntheses, according to Logemann, would be helpful to practitioners who have limited time and resources to access and examine the available research. However, this recommendation would mean examining studies across a much broader range of methodologies than is the current practice (Johnston). We would add that, unless issues of why practitioners do not use research in practice contexts are addressed by all stakeholders, no improvement in uptake of research information is likely to occur no matter how exhaustive or clearly written the information.

7.3 Misinterpretation of Evidence Hierarchies

Two chapters in Part II focus on demonstrating the limitations of the wholesale adoption of evidence hierarchies developed for medicine to determine strengths of evidence in educational research and the allocation of research funds. Alvermann and Mallozzi (see Chap. 4) highlight the contributions of qualitative and quantitative research perspectives to teaching and learning, while Tytler (see Chap. 5) presents evidence from longitudinal studies showing that RCTs can neither duplicate nor supplant important insights yielded by these designs. The important issue raised by these authors relates to policy implementation, where misinterpretations of particular research methodologies are sanctioned whilst others are discouraged and denied funding for research programs. The consequence of misinterpretation narrows not only the range of questions that can be researched but the type of information that will be available to educators to support teaching and learning.

7.3.1 Policy Makers and Funding Agencies

The appeal of RCT design is that it reduces bias and increases generalizability of results because treatment groups are equivalent and representative of the larger group with the exception of the intervention received. Even in medicine, where RCTs are considered the Gold Standard, problems exist in optimal implementation. Due to the expensive, time-consuming nature of RCTs, many studies are conducted with inadequate numbers of participants or too short a time frame (Greenhalgh, 2006).

She added that there are often hidden biases in RCTs that result from imperfect randomization, failure to randomize all applicable individuals, and failure to blind examiners to the randomization status of study participants. Exclusion and inclusion biases also limit generalizability of RCT findings. In education, individuals with learning or reading disabilities, low socioeconomic status, behavioral or attention difficulties, or from minority populations are often excluded. The *normal* participants in many RCT study samples will likely differ in important ways from students within a particular school or community thus confounding results and limiting generalizability (Montgomery & Turkstra, 2003). The heterogeneity of participant characteristics and individuals with low-prevalence disorders and disabilities—as is common in educational contexts—poses a significant challenge to RCT research designs, which are based on establishing equivalent groups and where relatively large numbers of participants are needed to achieve analytical power (Greenhalgh).

These are all important considerations that have been overlooked in the shift of emphasis to RCT designs to the exclusion of other designs in education. However, by far the most significant problem overlooked by the RCT shift in funding allocation is that RCT designs are *only* applicable to questions regarding intervention. RCTs are not appropriate to answer questions related to diagnosis, prognosis, motivation, preferences, or beliefs; examination of these important issues requires quantitative, qualitative, and mixed-method designs (Greenhalgh, 2006). Excluding or limiting the pursuit of these critically important issues goes directly against the purpose of the legislation.

7.4 High-quality Research Requires Adequate Funding Support

The penultimate chapter in Part II (see Chap. 6) offers a review of mechanisms used to evaluate quality in education research across seven nations: Australia (AU), Brazil (BR), New Zealand (NZ), Singapore (SG), South Africa (ZA), Taiwan (TW), and the United Kingdom (UK). The authors found that mechanisms were dependent on the overarching aim of education for each nation; these included: (a) accountability of public funds (AU, NZ, UK), (b) improvement in economic performance and quality of life (NZ, SG, ZA, TW), and (c) making educational institutions comparable to institutions internationally (BR). Aims across nations were similar to those in the USA; however, no particular research methodology was privileged by any of the seven nations.

All countries identified constraints in developing and conducting high-quality research programs. The range of constraints included: (a) lack of government-level financial support resulting in numerous high-quality projects failing to be funded, administrative burden, and legislative demands (AU, BR, NZ, ZA, TW, UK); (b) lack of expertise and human resources to conduct research (SG); (c) cultural and racial issues related to the apartheid regime (ZA); and (d) reluctance by schools to be involved in educational research (BR).

The international survey revealed a clear commitment to quality in educational research but a consistent lack of funding to support high-quality research programs. These issues require the attention of policy makers and funding agencies.

7.4.1 Policy Makers and Funding Agencies

Chapter 6 by Coll and colleagues speaks to an international commitment to the application of quality indicators that represents rigorous application of research methodologies appropriate to answer the particular questions. Such indicators serve as guidelines for (a) researchers designing and conducting research, (b) policy makers and funding agencies evaluating the believability of research findings, and (c) educators determining the usability of research findings (Horner et al., 2005).

All seven nations achieve high-quality research without an emphasis on particular methodologies. In fact, Coll and colleagues show that relatively few countries are even in a position to conduct large-scale projects that might lend themselves to RCT research designs. Additionally, the expense of such studies would be problematic for the majority of nations. It is clear across all nations that the lack of financial resources available from government and funding agencies impacts both development and implementation of high-quality research programs. If policy makers and funding agencies are serious about committing to improving educational outcomes for all students, then increased financial support for research programs, including RCTs, is needed.

7.5 Conclusions and Implications

Berliner (2002) proposed that scientific research in education is not a hard science—such as medicine, chemistry, and biology—but it is the hardest-to-do science. Educational researchers conduct scientific research under conditions that physical scientists would find intolerable. They face particular problems and must deal with local conditions that limit generalizations and theory building—problems that are different from those faced by the easier-to-do sciences of chemistry, biology, and medicine. Mandating EBP has a significant impact on stakeholders at all levels. When there is less than optimum understanding and acceptance of new practice models, consistent and successful implementation is seriously challenged.

One of the two prominent issues raised by the authors in Part II is the appropriateness of the wholesale adoption of an EBP model and accompanying evidence hierarchies developed for medical practice to educational practice. The assumptions of the EBP model are virtually untested when adopted by other disciplines, frequently left unstated, and most definitely arguable (Johnston, 2005). The potential danger of focusing more or less solely on EBP is that it leads to disproportionate emphasis

on the tools of experimental design rather than the specific questions that need to be answered (Montgomery & Turkstra, 2003). Greenhalgh (2006) concurred, stating:

> [W]hen applied in a vacuum (that is, in the absence of common sense and without regard to the individual circumstances and priorities of the person being offered treatment) the evidence-based approach to patient care is a reductionist process with a real potential for harm. (p. xiii)

A unidimensional focus on funding RCTs in intervention research in education is misinformed. By adopting such a position, the implication is that only intervention studies are needed to support teaching and learning. Studies engaged in diagnosis, screening, prognosis, and motivation—all of which most stakeholders consider imperative to the success of both teaching and learning—could not be conducted since RCT is an inappropriate methodological choice. We propose that if policy makers and funding agencies had enacted the five essential steps to implement evidence-based practice then many of the problems in adopting the model in education may have been preempted.

The other prominent issue concerns lack of uptake of research evidence in educational practice. This is a complex issue with a variety of reasons posited, including: (a) practitioners claim that there is a lack of any research to support practice, (b) research participants or treatments do not represent the reality in everyday practice, and (c) lack of time to access research evidence. The acknowledgment that educational practice functions primarily as a productivity model, which is at odds with the EBP model, is a significant consideration for all stakeholders since the development of these EBP skills is not included in funding models. We suggest that government policy is also more closely aligned to a productivity model, which is also at odds with the mandated legislation.

Despite the initial difficulties, we strongly believe that stakeholders in education have the opportunity to be leaders in developing an evidence model and accompanying hierarchies. Such developments within education that adequately address the types of research that best take account of the complexities of conducting educational research and the numerous challenges faced by educators in the uptake of research evidence are necessary for and fundamental to the education of our nations' children.

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