

Chapter 26. Principles of Effective Research in Continuing Professional Development in the Health Professions

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Case

As you review the annual report of your unit – outlining the year’s achievements relative to the number of programs, their attendees, the scope and breadth of topics covered, summaries of the countless evaluations, results of accreditation processes – several thoughts occur to you. What was the impact of your program overall? How might you evaluate its effect on each attendee? These questions, and many others, lead naturally to a discussion of research, something not in your comfort zone. In these changing times, evidence of the presence or effect of lifelong learning is critical/important.

Questions

What are the core principles of effective educational research? How can those principles be used to guide learners who attend your programs? Are needs being met at the patient, provider, and system levels?

Introduction

This case scenario provides an instructive example of the relevance of research to educational practice. A primary focus of research efforts in the field of continuing professional development (CPD) is producing knowledge, theories, and heuristics that increase our understanding of learning, teaching and education and give guidance to our efforts to help others learn. Many research skills can be directly applied to outcomes evaluation as well.

It has been said that developing an effective educational program is often less like engineering a superhighway than finding one’s way through a swamp, a step at a time. [1] Oxman et al.’s [2] review of 102 studies on the effectiveness of various types of educational

interventions led them to a similar conclusion: there is no *magic bullet*--no single intervention or combination of interventions that will be effective in all situations. Subsequent reviews of the literature (for example, Cervero and Gaines' 2014 review of literature reviews of CPD effectiveness [3]) has supported this conclusion.

Thought leaders in medical education research have attributed this inability to identify proven, reproducible educational interventions that succeed independent of context to variability--differences in how a given intervention is implemented across sites, differences in learners, and the inherent complexity of the social context. [4] There are many variables associated with an educational intervention and the environment in which it is implemented and interaction of these variables can produce different effects. [5] Traynor and Eva put it this way:

“The fact that my workshop yielded beneficial learning outcomes cannot be expected to have a great impact on other educators, as it will be virtually impossible for me to explain and explore every specific aspect of the educational experience. Relevant variables include the content covered, the way it was delivered, my enthusiasm as the instructor, the motivation and emotions of the students, the link between each of those factors and the students' previous experiences with me and with other educational activities.” [6, p. 213]

This is especially true in situations characterized by high complexity, [7] such as efforts to directly improve clinical practice using an interprofessional education interventions. When the subject matter is straightforward, the intended educational outcome is modest (eg, knowledge gain), and we have a high degree of control over the key factors in the learning environment (as would be the case for a computer-based educational designed to teach individuals basic concepts

of quality improvement), the level of complexity is relatively low. Under these circumstances, the research evidence [8] and resources such as instructional design models [9] provide us with useful guidance. However, as the complexity of the educational problem increases (e.g., as the emphasis shifts to how to get clinicians to complete a computer-based educational program or to how to empower clinical teams to change their practice), the evidence base provides less clear guidance. [9]

As educators, in complex situations we can draw on the available research evidence and integrate that information with best practice, model programs, theory, expert advice, and our own experience to develop an intervention. However, in the end we must be empiricists and learn to combine science and evaluation, *evidence-based practice* and *practice-based evidence*. That is, we need to design the intervention, put it to the test, examine the results, learn what we can, and make adjustments to the intervention and the mental schema that guide our practice. However, our capacity to obtain and use evaluation data to determine if an intervention is working the way it is supposed to--a critical component in an empirical approach--is underdeveloped. It is difficult to learn from experience and make progress if we lack good information telling us if we have fallen face-first into the swamp or are standing on solid ground. As models such Shewhart's Plan/Do/Check/Act cycle [10] or Kolb's experiential learning cycle [11] abundantly demonstrate, evaluation plays critical role in the process of learning how to make educational interventions more effective.

The implication is that to optimize the value of CPD as a means of improving clinical practice and patient outcomes, there is a pressing need to expand our capacity to conduct targeted and useful evaluations of educational interventions. We need a cadre of experienced, skilled people who, working as part of a team, can develop evaluations tailored to the specific context.

They must be able to define evaluation questions, collect and analyze data, interpret and report the results, and consider the implications for future practice. *The critical point is that these evaluation activities comprise a core set of skills that are common to doing research.*

This analysis has two major implications. First, the overlap between evaluation and research shows that developing research capacity and improving educational practice are deeply intertwined. We would argue that improving one's research skills and using them to conduct better evaluations of educational interventions is a uniquely valuable form of professional development for researchers and practitioners alike. The program planning cycle—developing an intervention, implementing it, evaluating progress, and making course corrections—is at its heart a learning cycle, and the better the evaluation, the greater the potential for learning. Second, it means doing research need not be something done apart from practice; it can be an integral part of practice. A single investigation can meet the information needs of evaluation stakeholders, and at the same time contribute to the field's knowledge base, thereby greatly increasing the potential impact of our work. To accomplish this, we need “scholarly practitioners”. [12]

This chapter on principles for effective research is intended, therefore, as much for practitioners in continuing education of health professionals as for those who consider themselves researchers. Indeed, it seeks to blur the traditional distinction between the producers of knowledge (researchers) and the users of knowledge (practitioners). Our ultimate goal is to encourage CPD professionals to be practitioner-researchers who can contribute to research and other forms of scholarship while fulfilling their other responsibilities. We would like to see members of the CPD field acquire an enhanced capacity to apply concepts and methods from the domain of educational research, whether for evaluating an educational program, advancing the field, or both. We also hope to persuade department heads, CEOs, administrators, and managers

that developing increased research capacity--whether through hiring, collaboration, or professional development of members of existing CPD staff—is fundamental to changing clinical practice.

In this chapter we draw on our experience as researchers, authors, reviewers and editors to offer ten guiding principles for effective research in the field of continuing professional development for health professionals, which for our purposes includes medicine, nursing, allied health, dentistry and pharmacy. [13] Several of the principles are corrective, reflecting common problem areas in CPD research. Others suggest future directions, pointing toward knowledge gaps and methods of inquiry we believe deserve greater attention.

Basic Assumptions

As authors, we come to this task with a particular interest, a point of view that stems from our beliefs about the goals of CPD research. As scholars working in the field, we are part of a diverse scientific community, an eclectic group that espouses varying definitions of what counts as real research. [14] It can be difficult at times to find common ground on fundamental assumptions and goals, much less reach consensus. Therefore, we want to make our basic assumptions clear. Our views on how to conduct effective educational research and even our conception of what it means for research to be effective are intimately linked to these foundational beliefs.

We begin this discussion by focusing on two dualisms: *research and evaluation*, and *applied and basic research*. In the process, we raise issues such as what should be considered research in the CPD field and what criteria should be used to assess effectiveness of that research. We then use a framework developed by Albert [15] to describe a continuum of

perspectives held by medical education researchers on these issues [16] and identify where we land on that spectrum. This discussion provides an essential prelude to our discussion of the ten principles. We believe lack of understanding or disagreement about the relationship of research to evaluation and basic to applied research is at the root of many common problems in the design, conduct, and reporting of research and evaluation alike.

How does Research Differ from Evaluation?

As implied above, this perennial question has no definitive answer. One difficulty in marking the differences between research and evaluation is the significant overlap between them. Distinguishing between them based on methodology is difficult. Both make extensive use of social science methods and many evaluation studies are done to research standards. In our view, the two most important differences are: 1) the primary *source of the problems and questions* addressed and 2) and the standards used to determine the *quality and value of the evidence* produced.

1) Source of problems and questions. The National Academy of Science definition states that the object of research is to “extend human knowledge of the physical, biological, or social world beyond what is already known.” [17] In other words, research addresses gaps or problems in our knowledge. Conducting a study requires an understanding of what is known and not known. Gaps in knowledge and theory, as recorded in the scholarly literature, are a primary source of research problems and questions. The importance of grounding research in the scholarly literature is evidenced in the introduction to many research reports, which includes a review of the relevant literature providing an argument that a gap exists and defining its contours. The results of research may provide useful guidance to educational practice, but that is a secondary concern.

Evaluation, on the other hand, gives priority to the needs of the evaluation stakeholders. For example, stakeholders may face important decisions about an educational program or want information about how to improve a program. An evaluation is done to get the answers they need for their intended purpose. An evaluation may just happen to speak to a gap in our knowledge base or it may focus on an area that has already been heavily researched, but these are secondary considerations when focusing and designing the evaluation. Not surprisingly, this is a major reason why many program evaluations submitted to education journals as original research go unpublished. Evaluations can in many cases be designed to serve both purposes; however, this seldom happens without careful advance planning. To paraphrase Norman [18], the statement “This was a great project. We should write this up and publish it” often leads to an exercise in futility.

2) *Quality and value.* Research and evaluation are governed by different quality standards. Michael Quinn Patton argued that differences in quality standards for research and evaluation derive from their different purposes and whose interests are served by the standards. In Patton’s view, the primary purpose of research is to enhance understanding. [19] Research standards are set by peer reviewers, granting agencies, authoritative methodological sources, editors, and so on. Quantitative research is judged on criteria such as validity, reliability, attention to causality, and generalizability. Similar criteria such as credibility, verifiability, and reflexivity (attention to researcher bias) apply to qualitative research. [19] The value of research rests not only on its quality but also the importance of the contribution it makes to knowledge and theory.

On the other hand, argued Patton, the primary purpose of evaluation is usually defined by the how the stakeholders intend to use the results. This focus on stakeholder needs is nearly universal and is widely considered a distinguishing feature of evaluation. [20] Like research,

evaluation standards are set by peer reviewers, granting agencies, authoritative methodological sources, editors, and so on. And, according to Patton, the quality of an evaluation is judged on many of the same criteria as research. The Program Evaluation Standards, [19] for example, address five key attributes of evaluation quality (see Table 26.1). The attribute *Accuracy* includes standards for validity, reliability, and reduction of error and bias. However, as this table shows, evaluation quality is also assessed by examining other attributes: *Utility, Feasibility, Propriety, and Accountability*. Each of these four attributes is closely tied to the evaluator's responsibility to be responsive to stakeholder needs and the larger evaluation context. The overall quality of an evaluation is heavily influenced by its practical value.

Basic versus Applied Research

Some, including the authors, would argue against Patton's view that research is aimed primarily at understanding and enlightenment and instead make a distinction between basic and applied research. [21] In this view, the role of basic research is increasing our understanding of the world. It is considered highly autonomous in the sense that research problems are determined internally by the investigators.[22] Conversely, the goal of *applied research* is to solve practical problems. Like evaluation, its role is instrumental. The investigators may be accomplished scientists but the state of scientific knowledge does not determine the choice of questions or problems. In Roll-Hansen's words,

It is an instrument in the service of its patron. Applied research helps interpret and refine the patron's problems to make them researchable, and then investigates possible solutions. The practical problems of the patron set the frame for the activity. Applied research is in this sense subordinate to social, economic and political aims. [16]

Although applied research shares evaluation's focus on the needs of stakeholders, applied research is not, however, synonymous with what Patton means by "evaluation". Not all evaluation is done, or needs to be done, to research standards.

Where We Stand

Our discussion of research versus evaluation and basic versus applied research frames the issue of where we stand on the nature and purpose of CPD research, the appropriate balance between science and service to stakeholders, and how our views compare with other researchers in the field. We explain and situate our views using a conceptual framework developed by Albert [22, p. 5]. Albert developed a continuum representing the range of opinions in medical education research on the types of research that bring the most value to the field (Figure 26.1). One end of the continuum is the pole of production for producers. Researchers at this end argue that research should, above all else, advance knowledge and in particular, enhance understanding and be governed by strict scientific criteria of excellence. They assert that researchers should be allowed a high degree of autonomy in the face of external demands. The right to participate in the field rests exclusively on scientific competence. Excluded are those who want to influence research to serve other ends, such as educational practice. The drive to understand medical education, rather than solve practical education problems, is the primary and proximal motivational force.

At the other end are researchers who support production for users, giving greater weight to relevance and utility. Their goal is the production of knowledge that responds to the problems and needs of the users. They argue that criteria for judging excellence of research should include "the utility of the research, its capacity to identify solutions to a real world problem, and its potential conversion into an innovation. . ." [15]

We understand CPD as an applied field, and strongly believe that CPD research should be tied to problems of educational practice. But ours is a soft rather than a hard view of what “tied to problems of practice” means. This perspective allows for a short-term focus on building knowledge (production for producers), provided there are good reasons to expect an effect on practice in the longer term. Consider the example of the seminal study by Fox et al. of learning and change among physicians. [16, p. 106] As described by the authors, the goal of this study was to build a richer, empirically-grounded foundation for the field and provide a theoretical framework that could guide subsequent studies to determine why some educational interventions are more successful in changing clinical practice than others. It was not, in other words, designed to solve a specific practical problem.

It was agreed that rather than looking toward education as a cause, and change as an effect, an alternative approach was necessary. [Our] research efforts should focus on how and why different changes occurred. This would enable an identification of relationships that could explain change in terms of its causes, and describe the role of learning in the change process. [23]

The authors offered no detailed account of how the study would enhance educational practice. However, understanding the phenomenology of learning has long been accepted as fundamental to improving educational practice. Accordingly, this study would meet our criterion of “tied to problems of educational practice”.

In effect, our perspective encompasses the entire continuum in Figure 26.1; it can do this because we believe that, in practice, even basic science *cannot be completely autonomous*. Although scientists leaning toward production for producers seek autonomy for the field, social

needs and the public good must inevitably enter into the choice of research questions lest the field undermine its claim for public support. Furthermore, we believe that the goals of basic and applied research are not diametrically opposed but can be combined in a single study. As Stokes observed, the annals of science are

“... rich with cases of research that is [sic] guided both by understanding and by use, confounding the view of basic and applied science as inherently separate realms” [23, p. 2].

In short, our foundational assumptions are that evaluation and research serve different, but not incommensurable purposes, that there is substantial overlap between the knowledge and skills required for research and evaluation; that both effective research and evaluation are cornerstones for progress in CPD practice; and that the value of educational research, whether basic or applied, ultimately rests on its contribution to educational practice. With that as background, we now turn to the ten principles.

Ten Principles for Effective CPD Research in the Health Professions

A list of the ten principles can be found in Table 26.2. These principles can be used to improve the quality and usefulness of CPD research. Although they are numbered, the reader should not infer that their ordering implies that some are inherently more important than others. Space constraints do not allow us to discuss the principles in depth, much less describe in detail how to implement them. Accordingly, this list is best used as a stimulus to reflection and further learning; several resources for that purpose have been compiled in Appendix C. Finally, use of

the principles requires flexibility, adaptation and interpretation. Discussing them with peers and mentors and exploring how they apply in specific contexts will greatly enhance their value.

Gaining Entry/Moving Forward

1. Learning to conduct effective research in CPD should be seen as a purposeful, ongoing process of professional development. One's professional development in research is a lifelong project. Research is a broad and rich domain that is continually evolving; new problems, new ways of conceptualizing old problems, and methodological advances all contribute to change. Doing research and staying abreast of ongoing changes make it a field with special appeal to people who are avid lifelong learners and enjoy investigating challenging problems.

A good starting point for novices and seasoned investigators alike is to take stock of their current research knowledge, skills, and experience and build on that foundation. We have included a self-efficacy tool for assessing one's research skills (Figure 26.2). This tool, adapted from a validated instrument for clinical research developed by Bakken and colleagues [24, , p. 25] at the University of Wisconsin-Madison, lists key competencies involved in both quantitative and qualitative research.

Taking stock serves several purposes; among them are identifying existing areas of relevant experience and training, prioritizing goals for personal professional development, and even identifying the skills needed to ensure a well-rounded research team.

Combined with the information in this chapter, the results of this assessment can be used to develop a personal professional development plan that includes a rationale that links growth in specific research skills to organizational or departmental priorities (eg, demonstrating to internal organizational stakeholders that your programming is effective and worth supporting). Having a plan can aid in enlisting the support of managers, directors, or chairs.

Identifying areas for further development provides direction to a search for learning opportunities. Several universities offer degree or certificate programs that address educational research, many of which are specific to one or more health professions (see, for example, Tekian's 2014 article on doctoral programs in health professions education[25]). Professional societies and major conferences focusing on education of health professionals often offer educational opportunities that include workshops, mentoring, and fellowships. We refer you again to Appendix C for specific resources.

The local environment or community often provides many options. Those who work in an academic environment, especially research institutions with well-developed research infrastructures, typically have access to training in topics such as recruitment of subjects, navigating the human subjects review process, procedures for protecting human subjects, grant writing, specific research methodologies. Research interest groups are also common. Because many of these topics are relevant across multiple discipline and institutions, they are often available online, as is access to interest groups.

Many research competencies, such as learning how to conduct a semistructured interview or to “think like a researcher” are best learned in a staged process of observation and supervised practice. One especially valuable professional development activity is working on a more senior investigator's study, provided it is understood that the primary goal is to learn. This allows a more junior researcher to be a “legitimate peripheral participant”, doing work on the project that someone needs to do and yet offers the opportunity for learning. [26] A useful concept is “zone of proximal development”. To paraphrase Vygotsky, the ZPD is the distance between what a learner can do without assistance and what he or she can do with assistance. [27] Learning from the experience will be much diminished if the learner is assigned tasks they already know how to

do or are too far over their head.

Even novices will likely discover they have relevant knowledge and skills, some of which might be at the level of a more experienced researcher. For example, several years of experience recruiting community-based job placement sites for dental hygienists could be of high value in recruiting clinical practices to take part in a CPD effectiveness study. The self-assessment tool in the appendix mentioned earlier can help identify these areas.

Apprenticeship modes of learning must, however, be supplemented by other activities that promote a deeper understanding of the purpose of study such as and reading and discussing articles and other resources relevant to the task. Educational research requires flexibility and adaptation. If one can perform a research task sufficiently well for the present study but does not know why the task is structured as it is, what alternative approaches exist, and what criteria for research quality apply, it becomes much more difficult to transfer what is learned into a different context.

The lack of a clinical background or training in educational research need not be barrier. In fact, a background in communications, psychology, public health or engineering is considered an asset by many. Norman [28] argued that a noteworthy strength of medical education research is that it brings together various disciplinary perspectives. Only in recent years have research training program graduates prepared to work in health professions education begun entering the field. Historically, nearly all came from other disciplines. That experience demonstrated the relevance and value of perspectives and procedures from many different fields of study to medical education research.

2. Education researchers should strive to develop a program of research. At some point in their careers, many researchers will want to develop a program of research, rather than do an

aggregation of studies on largely unrelated topics. This is a lesser concern for people who are just beginning their research careers and are actively working on developing a solid base of knowledge and skills, but it is worth exploring options even early on. Holzemer defines a program of research as

“ . . . a coherent expression of a researcher’s area of interest that has public health significance, builds from the published research literature in the field, has relevance for clinical . . . practice, and captures the passion and commitment of the researcher.” [29]

It is typically organized around a central theme (the researcher’s area of interest) and shows a logical progression of inquiry. Defining a program of research give investigators the opportunity to consider what they want to be known for and find an area about which they are curious, intrigued, or passionate; and in so doing, find a niche that allows them to become a recognized expert. It also affords them the efficiencies that come from building on one’s own work and opportunity to develop a high degree of proficiency using the research methodologies best suited for the questions being investigated. The research published by Joan Sargeant at Dalhousie University in Halifax provides an example (Table 26.3)

Research Design

3. *Educational research should address an important gap in the field’s knowledge base or develop new knowledge.* The decision to undertake a study and the choice of a research question to guide that study is influenced by several factors (Figure 26.3). However, careful consideration should be given to how a study builds upon and adds to knowledge and theory. The idea for a research project might originate from somewhere other than the literature. The process can be thought of as a dialogue between research interests and capabilities, one’s professional

development goals, the opportunities that exist in the environment, gaps in the literature, and funding priorities. The ideal is to find the area where these factors overlap.

Wherever the process begins, engaging the literature early on yields many benefits. Research needs and priorities are often identified in systematic reviews, editorials, society publications, and conference proceedings. A review of existing research around a topic of interest provides valuable information not only about what is already known, but also about the methodologies used, how research questions have been framed, and tools such as tests and surveys that are available. Articles also help to identify potential collaborators and other information that can aid in your project.

It is also important to consider early in the planning stage which journals might publish one's work. A review of the literature can help identify journals with an interest in the topic and identify the target audience. An excellent resource is the regularly updated and comprehensive list published by the American Association of Medical Colleges of journals that publish scholarly works in education. [30, p. 1]

4. Educational research should also contribute to understanding and solving important problems of educational practice. As indicated above, we strongly believe that whether research is considered basic or applied, the justification for the research and argument for its significance ultimately requires a plausible connection to problems of educational practice. Problems can arise from many sources including one's own experience but the argument for the existence and importance of the problem must draw on the scholarly literature.

Another and often taken for granted aspect of this principle concerns the nature of educational problems. Deciding what is an educational problem as opposed to a clinical, organizational, or personnel management problem is something some investigators find difficult

or give too little attention. For example, a study examining the impact of an innovative shift scheduling approach on the quality of care provided by the Emergency Department or an examination of the impact of patient education on shared-decision making in the primary care setting does not speak directly to problems of CPD practice. Additional guidance on this topic can be found in a 2016 JCEHP editorial. [31]

It is also important to establish that the educational problem is an *important* one. Reviews of the literature typically yield studies, analyses, and opinion pieces describing the problem of interest and its consequences, and calling for further study.

5. *Educational research should be informed by theory or a clearly articulated conceptual framework.* Studies in the CPD field are generally undertheorized, making little or no mention of theory. Among those that do mention a theory, many give it only lip service. [32] They describe a theory and then neglect to explain how it guided construction of the research questions, development of the intervention, analysis of the results, and so on.

“Theory” need not be a formal theory such as the theory of planned behavior or social cognitive theory. It can also take the form of logic model or program theory clarifying linkages between components of the educational intervention and the intended outcomes. A good basic resource is the guide developed by the Kellogg foundation [33] A more advanced treatment may be found in Huey Chen’s work on theory-driven evaluation. [34]

Also common is the lack of clarity about the meaning of key concepts and supposed relationships between them because the study lacks a clearly defined conceptual framework. For example, some research reports use education and learning interchangeably as if there was no important distinction to be made between them, leading to laments such as the following:

“I fear that this may get worse; what I call here non-theoretical grabbing at data. Conceptual confusion drives me crazy: distributed learning, flexible learning, open learning, e-learning Have you ever been to a conference on learning and then half the people were talking about teaching?” [35,36]

Another common example is authors who describe their educational intervention as “interprofessional” without clarifying how they are using the term and providing evidence that the intervention meets the criteria their definition entails.

We agree with Georges Bordage who has argued that, whether the investigators are aware or not, every study has a conceptual framework or theory behind it. [37, p. 452] What varies is how explicitly that framework is described and how well-grounded it is in theory, established models, or evidence-based practices. We further agree with Bordage’s assertion that

“We all have assumptions, explicit or implicit, about the way things are and how they work. It is the researchers’ and authors’ responsibility to make those assumptions explicit to the readers and to connect their work to the literature in the field.” [38]

Bordage’s essay provides an excellent explanation of conceptual frameworks and how they relate to theory; he also provides three case examples, including one drawn from CPD, showing how conceptual frameworks can be used to frame, understand, and create solutions for educational problems.

6. *Educational research should employ recognized methodologies and meet the quality standards associated with those methodologies.* This principle address several common problems associated with the research methods used in CPD research and how their use is

justified. Too often, we see studies that make little or no effort to justify the methodology used, describe the steps taken to enhance the credibility and trustworthiness of the results, or acknowledge important major limitations of the methodology employed (eg, self-reported changes in practice, pre-test post-test design). Another problem is researchers who report using a methodology (eg, Delphi), an analytical procedure (eg, constant comparison), or an outcome measure (eg, multiple choice test of knowledge) and neglect to demonstrate that their approach meets the quality standards for these methods. Another problem is failure to recognize that some research methods come in variations. In grounded theory for example, there are the classic, Straussian, and constructivist approaches, each built on different assumptions about the nature of theory and role of the investigator. [38, p. 313] The procedures for each vary in significant ways and they employ different strategies for ensuring quality. Specifying the type of grounded theory employed in a study is essential if reviewers and editors are to know how to properly evaluate the study.

7. Reports of intervention studies should clearly and accurately describe the constituent elements of the educational intervention, the rationale for key program design decisions, and the salient aspects of the context of the intervention. A common observation made by authors of published systematic reviews of the CPD effectiveness literature is that the components of educational interventions are often poorly described and the terminology used to identify those components (eg, audit and feedback, peer detailing) is not clearly defined making it difficult to draw conclusions about the relationship between the educational methods used and observed outcomes.

Another issue is weak or missing descriptions of the *context* of the educational intervention. As Pawson and Tilley noted,

“Programs are always introduced into pre-existing social contexts and . . . these prevailing social conditions are of crucial importance when it comes to explaining the successes and failures of social programs.” [39]

However, deciding which aspects of the context are relevant is a challenging task, even for seasoned investigators. There is a lack of consensus around what context is and how it should be described. A theory or conceptual framework may identify relevant aspects of the environment. There is also an emerging literature focused squarely on this topic that can provide guidance. [40] [41] For example the problem of describing the context of interventions not unique to education; it is also an issue for the quality improvement field. The SQUIRE guideline (Standards for QUality Improvement Reporting Excellence), developed for reporting quality improvement projects, can be useful in deciding what to include and where in a research report the issue of context might be addressed. [42] Although developed primarily for studies of clinical interventions, the TIDieR guideline (Template for Intervention Description and Replication) [43] provides a useful guide that calls attention to key elements comprising a detailed and balanced description of an educational intervention.

Looking Forward

To this point, the seven principles we have described are largely corrective in their intent. They address common gaps and shortcomings in the design and reporting of education research in the CPD field. Researchers who follow these principles can not only greatly enhance the value of research to the CPD field, but will also distinguish their research from much of the work currently being done. We now turn to three principles that chart future directions for the CPD research enterprise.

8. *Researchers should be responsible stewards of research resources.* This principle allows us to emphasize three specific ethical obligations of researchers that deserve special attention as CPD moves forward. The first concerns responsible use of a finite resource: survey populations. A JCEHP editorial [44] argued that the populations we survey in our studies should be considered a commons--that is, a resource shared within a community--with a finite capacity for carrying a survey burden (defined here simply as the number of surveys received by an individual). As a shared resource, we need to consider the impact of our research practices not on just our own self-interests, but those of the research community at large. The survey burden for virtually all populations has increased dramatically, driven by factors such as widespread access to online survey tools. Some factors are more specific to the education domain, such as accrediting bodies that regard routine surveys (think *evaluation forms*) as a *prima facie* indicator of continuous quality improvement and responsiveness to learner needs. We can abuse this shared resource in many ways including doing a census survey when sampling could be used and conducting unnecessary surveys (the data are already available or the data collected serve no valuable purpose). We believe that all researchers have an obligation to survey populations and the research community to

“... preserve and protect the resource that is arguably the most important component of successful educational research and evaluation surveys— the goodwill and cooperation of the people comprising the populations we seek to understand.” [45]

Another important obligation is to our human subjects. Most if not all journals in the health professions education field require either 1) human subjects review and approval by a recognized body or 2) a formal exemption from human subjects review issued by a recognized

body (ie, authors are not permitted to decide for themselves that their study is exempt). It should be standard research practice to get either an approval or exemption from the appropriate authority. However, even when a study qualifies for an exemption (eg, involves interviewing participants in a CPD activity as part of a program evaluation), we are obliged to consider potential harms to our informants and take appropriate steps to minimize the risks. All research has the potential to harm subjects. Even a seemingly benign investigation can result in a someone being ostracized, ridiculed, or even dismissed from their position. We can inadvertently coerce subjects into participating. We can fail to respect their autonomy and volition by not providing them with the information needed to give their informed consent.

The third obligation is to disseminate research, making it accessible to other investigators and practitioners in the field. Doing effective research is resource intensive. We should not only be judicious about how those resources are deployed but acting to increase the potential for return on investment by presenting at conferences, preparing and submitting a manuscript for publication, self-archiving a report of the research online, and so on. Although we consider dissemination an important obligation, it is also important to attend to copyright issues. Authors' rights to distribute their published works vary by publisher. Some publishers allow authors to put the accepted version of the manuscript (after it has been reviewed, edited, and accepted but before the publisher has formatted, copyedited and typeset the manuscript for distribution) on a personal website or their organization's intranet. Detailed copyright information for specific journals can be obtained from RoMEO, which is a "searchable database of publisher's policies regarding the self-archiving of journal articles on the web and in Open Access repositories" (<http://www.sherpa.ac.uk/romeo/index.php>).

9. *Future research should give greater attention to understanding and facilitating team learning and change.* The shift toward interdisciplinary clinical practice and team-based care creates new needs and opportunities for researchers in the CPD field. Among other things, it can require a shift in the unit of analysis from an individual to a group or a practice. As we become more aware of constructs such as collective competence [45, p. 94] and transactive memory [46], it becomes clearer that we need a deeper understanding of team learning and change. If our aim is to facilitate group learning, we clearly need a much richer understanding of what it is and how it occurs by conducting studies at the group level.

10. *Research on the effectiveness of educational interventions should give less attention to “does it work?” and more to “when does it work and how?”* Several thought leaders in medical education research have argued it is time to shift our emphasis away from effectiveness and outcomes studies and give more attention to questions about how and why educational interventions work. [47] One approach to studying the “black box” between the intervention and the observed outcomes is to include a component that looks at the mechanisms by which the intervention led to the observed outcomes and the contextual factors that influenced the process. At present, the CPD research field lacks widely used and tested methodologies for achieving this goal. Pawson and Tilley’s realistic evaluation approach [3,4,5,6,13] is one candidate. Although no known studies have applied this approach in the CPD context, we can benefit from the examples provided by undergraduate and graduate health professions. These early experiences have stimulated an active discourse about how it can be adapted and used, from which we can also benefit.

Another approach is Success Case Method (SCM) [40]. For example, Olson and colleagues [48] used SCM to study how and why several practice-based educational

interventions yielded significant changes in tobacco cessation counseling in primary care settings. Although developed as an evaluation method to assess the impact of training in organizations, it can be viewed as a form of qualitative research and conducted to research standards by, for example, treating each instance of success as a case study and using cross-case analytical methods to strengthen the trustworthiness of the findings.

A third approach is theory-based evaluation or one of its variants such as logic model-based evaluation. [49] Put simply, this approach is based on a theory or model of how the intervention is expected to produce the intended results. This program-specific theory guides an evaluation to determine if and how the intervention contributed to any observed results.

Regehr's analysis of the state of medical education research [36] led him to a different perspective on getting beyond the "did it work" question. He suggests we shift the main emphasis of education research to basic research and away from the applied model of solving problems of educational practice. His analysis touches on several concerns but of particular relevance is the problem of context specificity of educational interventions: that is, a study that shows a workshop was effective in one setting is often of little import for those working in other settings. The problem is the relentless complexity and dynamism of the environments in which educational interventions (and research on those interventions) are conducted. As a result, cross-context predictions become meaningless. His analysis led to a thought-provoking conclusion, which is worth quoting at length:

"I would like to suggest that the science of education is not about creating and sharing better *generalisable solutions* to common problems, but about creating and sharing *better ways of thinking* about the problems we face... Thus, the value of our scientific discourse (our talks and papers) will arise not from our ability to create a general solution

that will apply to everyone's problems or even our ability to solve each other's problems, but rather from our ability to help each other think better about our own versions of the problems. Likewise, the value of reading the literature will not depend on our finding a solution that we can blindly adopt, but, rather, on reflecting on how to incorporate others' interpretations of a problem into our own context, on what needs to be adapted to make those interpretations relevant to our context, and on why that adaptation is necessary." [5]

There are many ways to "use the research" [5] and in this passage Regehr emphasizes but one: its instrumental use. He also does not address the varying levels of complexity and reproducibility associated with different educational interventions and the contexts in which they are deployed. However, we believe his provocative suggestion deserves further discussion among the CPD research community.

Future Directions

We have described ten principles we consider most important given the current state of the CPD field and the problems and opportunities that lie ahead. Going forward, we need to continuously strive to improve research in the field, recognize progress, and identify areas for improvement. If we have been successful in writing this chapter, the principles we have described will aid in that effort.

At the same time, we recognize this list is by no means complete and reflects our assumptions, experience, and judgments. We have undoubtedly omitted principles that others would consider essential. If this chapter prompts self-reflection and a rigorous and critical debate over the contents of the list or the contribution research makes to educational practice, we will consider that a success as well.

Nevertheless, we strongly believe the impact of implementing these principles on CPD research and practice can be positive and substantial. They point the way toward deeper understanding and increased effectiveness in the continuing professional development of health professionals. As Donald Schon famously wrote:

“In the varied topography of professional practice, there is a high, hard ground where practitioners can make effective use of research-based theory and technique, and there is a swampy lowland where situations are confusing “messes” incapable of technical solution. The difficulty is that the problems of the high ground, however great their technical interest, are often relatively unimportant to clients or to the larger society, while in the swamp are the problems of the greatest human concern.” [50]

In other words, the greatest progress in CPD requires not only building superhighways but also finding our way across uncertain ground, taking a step at a time, using research and evaluation to both guide and monitor our progress. We hope these ten principles will aid in that endeavor.

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Figure 26.1: Two poles of research in the field of medical education [51]

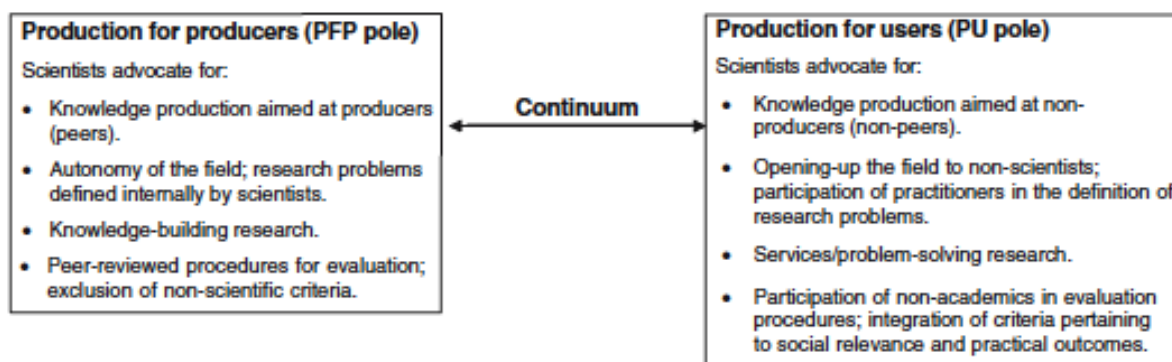


Figure 26.2: Assessment of Self-Efficacy in Education Research

(adapted from Mullikin, Bakken, and Betz, 1991)[16, p. 105]

Education Research Self-Efficacy Assessment

INSTRUCTIONS: The following items are tasks related to performing education research.

Please rate your ability to successfully perform each task by selecting a single number from zero to ten that best describes your **level of confidence**. Please indicate how confident you are in successfully performing each task today. Rate your degree of confidence by recording a number from 0 to 10 where 0 = “I cannot do this task at all” and 10 = “I am highly confident I can do this task”.

	Current Confidence Level (0-10)
1. Content Knowledge: Reading the Research Literature	
a. Read the research literature critically	
b. Identify an area of interest within a given body of literature	
c. Understand theory and findings in your area of interest	
d. Explain in a general way the importance of theory to research	
e. Recognize the classic studies, traditional designs, common forms of measurement, common variables, and common methodological problems related to one's own research area	
f. Critically synthesize the literature relevant to your research question	

2. Methodological Skills: Research Purpose, Hypotheses, Variables, Operational Definitions	
a. Identify and describe a clear focus, problem, or general question to investigate	
b. Refine the problem so it can be investigated	
c. Establish a clear purpose for the research	
d. For quantitative studies, translate the general question in specific hypotheses, operationalize variables and terms, determine how each variable will be measured, evaluate the validity and reliability of a given measurement.	
3. Methodological Skills: Research Design and Procedures (descriptive, explanatory, or exploratory studies)	
a. Identify appropriate theories, conceptual frameworks, and/or inquiry paradigms to guide the inquiry	
b. Categorize research designs (e.g., prospective versus retrospective)	
c. State the purpose, strengths, and limitations of different research paradigms and designs	
d. Compare major types of studies such as case reports, case controls, cross-sectional, longitudinal, and epidemiological studies, survey studies, field research, and evaluation studies.	
e. Explain important threats to validity and reliability or trustworthiness for various designs.	
f. State the relationship between the chosen research design, the type of	

data collected, and the data analysis approach.	
g. Prepare for and use consultation from design specialists	
h. Thoroughly analyze the dominant research designs used in your area of study	
i. Recognize sources of error and bias in one's study and approaches to minimize error	
4. Methodological Skills: Data Collection and Analysis (Quantitative)	
a. Distinguish inferential from descriptive statistics	
b. Determine the universe, population, appropriate sample, sample size, and sampling technique for a study	
c. Understand basic statistical concepts (e.g., statistical significance, p-values)	
d. Understand commonly used statistical tests (e.g., t-tests, Chi square)	
e. Construct a plan for managing data files and for analyzing those data	
f. Interpret printouts on common analyses from statistical packages for one's research area	
g. Develop graphs, diagrams, and other graphics to summarize and communicate data	
h. Report results correctly and be able to cite strengths and limitations of the study	
i. Prepare for and use consultation from computer analysts and statisticians	

j. Understand more advanced statistical tests used in one's research area (e.g., discriminant analysis)	
5. Methodological Skills: Data Collection and Analysis (Qualitative)	
a. Determine from where and whom data will be collected	
b. Determine key phases of the inquiry	
c. Select/develop appropriate instrumentation (e.g., inquiry team composition, training)	
d. Plan data collection and recording modes	
e. Plan data analysis procedures	
f. Plan logistical procedures for project, field excursions, and post-excursion activities	
g. Plan to enhance trustworthiness of inquiry (credibility, transferability, dependability, confirmability)	
h. Conduct interviews, observation, and documentary review as appropriate to area of inquiry	
6. Methodological Skills: Data Evaluation and Discussion	
a. Explain the outcome of an analysis	
b. Conduct additional literature review as needed to elaborate upon findings and their implications for a given body of research	
c. Integrate findings into existing literature	
d. Express appropriate cautions about interpreting results	
e. Place one's study in the context of existing research and justify how it	

contributes to important questions in the area	
7. Leadership/Project Management Skills:	
a. Develop plans for implementing a study, including timeline, budget, requirements for personnel, facilities and supplies	
b. Identify collaborators within and outside of the discipline who can offer guidance to the project	
c. Hire, manage, and evaluate personnel involved with a study	
d. Prepare and submit required reports, budget requests, and other administrative documents	
e. Implement and direct a research project	
8. Ethics/Human Subjects Protection	
a. Secure permission from human subjects, research, and other institutional review committees and boards	
b. Understand and apply the process of obtaining informed consent	
c. Identify issues relating to research integrity	
d. Know institutional and governmental policies concerning the ethical conduct of research	
e. Seek and utilize institutional sources of support when faced with an ethical dilemma	
f. Write a consent form for human subjects research	
9. Reporting on Research	
a. Prepare and deliver poster or oral presentations for professional	

audiences	
b. Deliver and focused and well-organized lecture	
c. Write journal articles, research proposals, and grant applications according to general and specific format guidelines	
d. Employ appropriate English usage, style, grammar, and composition in professional writing	
10. Grant Writing	
a. Identify appropriate funding sources	
b. Prepare a research proposal suitable for submission in your research area	
11. Technology Tools: Using Appropriate Hardware and Software	
a. Use computer technology for presentations (e.g., PowerPoint, LCD projector, PDA)	
b. Use technological tools for data collection (e.g., smartphones, audio recording equipment, Web-based surveys) as appropriate for area of inquiry	
c. Use data analysis software (e.g., SPSS, Minitab, NVIVO, Atlas.ti)	
d. Use reference management tools (e.g., EndNote) to manage bibliographies	
e. Use word processing software to produce grants, journal publications, and other scientific documents	
f. Use survey design software (e.g., SurveyPro, Qualtrics)	

g. Conduct searches of the literature using common interfaces (e.g., PubMed, ERIC)	
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Figure 26.3: Selected factors influencing the choice of research question



Table 26.1: Overview of *The Program Evaluation Standards* [26]

Attribute	Description
<i>Accuracy</i>	The accuracy standards are intended to increase the dependability and truthfulness of evaluation representations, propositions, and findings, especially those that support interpretations and judgments about quality.
<i>Utility</i>	The utility standards address the extent to which program stakeholders find evaluation processes and products valuable in meeting their needs.
<i>Feasibility</i>	The feasibility standards are intended to increase evaluation effectiveness and efficiency.
<i>Propriety</i>	The propriety standards support what is proper, fair, legal, right and just in evaluations.
<i>Accountability</i>	The evaluation accountability standards encourage adequate documentation of evaluations and a metaevaluative perspective focused on improvement and accountability for evaluation processes and products.

Table 26.2: Ten Principles for Effective Research in Continuing Professional Development in the Health Professions

Gaining Entry/Moving Forward

1. Learning to conduct effective research in CPD should be seen as a purposeful, ongoing process of professional development.
2. Education researchers should endeavor to develop a program of research.

Research Design

3. Educational research should address an important gap in the field's knowledge base or develop new knowledge.
4. Educational research should contribute to understanding and solving important problems of educational practice.
5. Educational research should be informed by theory or a clearly articulated conceptual framework.
6. Educational research should employ recognized methodologies and meet the quality standards associated with those methodologies.

Dissemination

7. Reports of intervention studies should clearly and accurately describe the constituent elements of the educational intervention, the rationale for key program design decisions, and the salient aspects of the context of the intervention.
8. Researchers should be responsible stewards of research resources.

Looking Forward

9. Future research should give greater attention to understanding and facilitating team learning and change.

10. Future research on the effectiveness of educational interventions should give less attention to “does it work?” and more to “when does it work and how?”

Table 26.3: Example of Publications Comprising a Program of Research

- Sargeant, J. et al. (2005). Exploring family physicians' reactions to **multisource feedback**: perceptions of credibility and usefulness. *Medical Education*
- Sargeant, J. et al. (2007). Challenges in **multisource feedback**: intended and unintended outcomes. *Medical Education*
- Sargeant, J. (2008). 'To call or not to call': making informed **self-assessment**. *Medical Education*
- Sargeant, J. et al. (2011). How do **physicians assess their family physician colleagues' performance**? Creating a rubric to inform assessment and feedback. *J Contin Educ Health Prof*
- Sargeant, J. (2012). How external performance standards inform **self-assessment**. *Medical Teacher*