Democracy & Education

Scientifically Based Research and Teacher Agency

Combating "Conspiracies of Certainty"

Kurt Stemhagen (Virginia Commonwealth University),
Brionna C. Nomi (Virginia Commonwealth University)

Abstract

This project considers how certain types of educational research position teachers as problems to be managed or worked around. We start with a discussion of scientifically based research (SBR), particularly how the quest for generalization/objectivity are often pursued at the expense of relevance. We use the way teachers are positioned in the growing field of Implementation Science as an example of what's wrong with SBR. A fundamental tension emerges—researchers' need for scientific control is inescapably at odds with the idea of teacher as professional. Finally, we provide an example of an approach that has potential to counter the SBR-influenced idea that compliance is at the core of good teaching.

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With this philosophical/conceptual project, we consider how certain parts of the educational research world, particularly scientifically based research (SBR), are built in ways that tend to position teachers as problems to be managed or worked around. After considering this problem and some of its philosophical roots, we attempt to reframe educational research in a way that recognizes professional teachers' key role in teaching, learning, and research about teaching and learning. We start with a discussion of SBR, particularly of how its quest for generalization and objectivity are often pursued at the expense of relevance. We are building on existing critiques of SBR (e.g., Baez & Boyles, 2011) and the call for philosophical reconceptualization of teaching and teachers (Biesta & Stengel, 2016). We argue that moving away from relevance is an unacceptable price to pay in the quest for scientific rigor, specifically in the realm of educational research. We consider how some in the burgeoning field of implementation science (IS) contend with the messy contexts of classrooms and teachers' work, ultimately finding that this work largely falls short as a way to contend with our specific concerns about teacher agency. We describe a fundamental tension that emerges from this inquiry—the need for scientific control by researchers is inescapably at odds with the idea of teacher as agentic professional. Scientific control often prevents teachers from meaningfully participating in education, even (particularly) in the classroom. In essence, SBR makes democratic participation by teachers less likely,

Kurt Stemhagen is professor of education at Virginia Commonwealth University. He is a former middle school mathematics teacher and his primary areas of scholarship are democratic theory, mathematics education, and teacher empowerment. Brionna C. Nomi is a doctoral student at Virginia Commonwealth University.

often rendering them mere instruments of researchers. We introduce McDonald's notion of teaching as craft and Dewey's location of science within teacher work as alternative frames for understanding the teacher-researcher relationship. The final part of the paper provides an example of educational research that helps to depict agency as central to teaching and that has potential to counter the SBR-influenced idea that compliance is at the core of good teaching. Taken in its entirety, our project seeks to make a case for and point toward educational research that fosters participation and shared authority for teachers and other stakeholders.

Educational Research Under the Microscope

Labaree (2003) calls the products of education research "a peculiar form of knowledge" (p. 14). He explained that knowledge can be thought of as falling along two continua, from "hard" to "soft" and from pure to applied.[1] Labaree (2003) has claimed that knowledge generated by educational research tends to be both "very soft and very applied" (p. 13). Its "softness" is the result of the fact that educational research "is an effort to make sense of the collective consequences of the actions of large numbers of willful individuals who are making decisions about teaching and learning within a complex and overlapping array of social systems in response to multiple and conflicting purposes" (p. 13). He went on to note that, due to the context of educational research's "great complexity, vast scale, uncertain purpose, and open choice" (p. 14), causal claims are nearly impossible to demonstrate. The result is that "research claims in education tend to be mushy, highly contingent, and heavily qualified, and the focus is frequently more on description and interpretation than on causation" (p. 14). Labaree also described the applied nature of educational knowledge—it tends to originate from needs of those in the field and not from the interests of those working in the theoretical domain: "Educational researchers are pressed to develop understandings of problems from the field that are most urgent at a particular time, even if this means studying aspects of education that are more difficult to analyze effectively with the available research tools" (p. 13).

We have taken Labaree's description of the nature of educational knowledge and created a graphic depiction (see Figure 1). By placing his continua on an x/y axis, it is easy to see that the kind of objective, generalizable knowledge that is prized in science is in the upper right Quadrant I (e.g., much of the natural sciences). Educational research, on the other hand, exists in the marshy terrain of the context-dependent and applied Quadrant III.

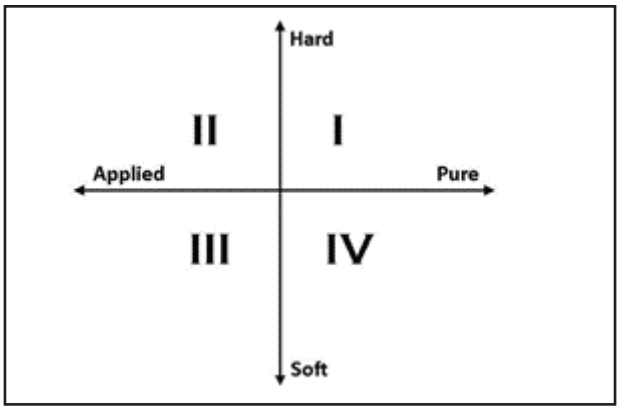

Figure 1 Labaree-Inspired Four Quadrants of Knowledge

Smith (2003) described what it means for an educational practice to be grounded in SBR: "For example, to obtain reliable evidence about a reading strategy or instructional practice, an experimental study may be done that involves using an experimental/control group design to see if the method is effective in teaching children to read" (p. 126). It is our contention that much educational research, particularly most SBR, seeks to move from the third to the first quadrant or, at the very least, to move as close to the first quadrant as possible. This movement from Quadrant III to I represents a belief that the knowledge generated in a particular disciplinary domain is becoming more certain, stable, generalizable and possibly even more "knowable." It is also generally true that the move from Quadrant III to I comes with higher status in the university (Sarangapani, 2011).

Instead of viewing educational research (and others working in and around Quadrant III) as lesser versions of those working in, or nearer to, Quadrant I, perhaps it is more useful to think about how important it is to do good work in the admittedly murky realm of Quadrant III. This work is complicated for all the reasons Labaree detailed, and the solutions/knowledge that come from research in this area are largely contextual and somewhat contingent. This does not mean, however, that educational research's products are less important than knowledge derived in the natural/"hard" sciences. One could argue that the high relevance factor means that the work is at least as (if not more) important than much Quadrant I work. Regardless, the difficulties and potential importance of this "soft" and applied work led Berliner (2002) to cleverly refer to educational research as "the hardest science of all" (p. 21). Indeed, there have been many efforts from a variety of angles designed not just to improve the status of educational research (largely a public relations project) but to reorient it away from the question of the certainty/generalizability of its knowledge and toward the utility of the knowledge generated (e.g., Gutiérrez & Penuel, 2014).

Thus far, we have been mostly talking about the tenets of the "harder" side of educational research. Labaree was presented as a frame to help understand this broad context of the realities of how educational research is conceptualized as well as a few implications of these conceptualizations. It needs to be noted that there is much educational research that is, at worst, relatively neutral to the question of teacher agency and some that actually helps to

1 We have opted to use quotation marks around the terms "hard" and "soft." This somewhat inelegant construction is designed to acknowledge and call attention to the problematic nature of the metaphor, particularly its gendered connotations. We initially sought to replace the terms but ultimately decided to include them to point to the deep roots to the problems with how we think about the nature of knowledge and the research endeavor. See Cassell (2002) for a nuanced discussion of the problems of the metaphor and also of how enmeshed it is in common conceptualizations of research.

strengthen the argument that any reasonable understanding of teaching must allow for understandings of teaching that include the necessity of freedom for teachers to use their professional judgment to do their job well. Much quantitative work that does not seek to suggest causality/certainty and most qualitative work, to our minds, does not, by design, make teacher agency less likely. Our concern here is with the ways in which SBR is a particularly bad fit for studying teacher work. Specifically, we look at how the quest for certain, generalizable knowledge often leads to a need for researchers to control the actions of those involved in that which they study, creating a situation where in many cases, SBR projects are set up to consider teachers' professional judgment as a problem to be overcome, mitigated, or at least downplayed.

The foregrounding of "what works" in educational research (Biesta, 2007) raises questions about whether some SBR might be oriented toward developing knowledge that tends more toward Quadrant II than Quadrant I. In other words, the focus is on producing knowledge that is "harder" than much educational research but more applied than pure. As far as this inquiry is concerned, the "what works" approach to educational research, since it requires measuring intervention effectiveness, tends to treat teacher agency in ways that are similarly restrictive to those seeking Quadrant I knowledge. The trouble for teacher agency seems to be more with the need for "objective" knowledge than it does with moving from applied to pure knowledge.

The Art and Science of Teaching: A Tired Old Dualism Hidden in a Tired Old Trope

For teachers or others who have thought hard about teaching, the "teaching is an art and a science" trope is familiar, and the tidy categories likely offer some help in coming to understand teaching as an activity. We are not quibbling with the distinction between teaching as art and as science as it is used in everyday thinking about teaching. Certainly, good teachers engage in activities that could rightly be thought of as more nearly artistic or as tending toward the technical. The trouble we wish to highlight here is that, when looking at teaching from the perspective of the educational research world, all too often the science of teaching is seen as what is produced at the university, and the art is whatever free range of motion is left for teachers once the scientists have decreed how best to do the job. This division of labor goes back to the beginnings of the psychologists' efforts to bring science to teaching. At the outset of *Talks to Teachers on Psychology and to Students on Some of Life's Ideals*, James (1899/1983) clearly articulated this troubling way of thinking—researcher (psychologists, in this case) as scientists and teachers as artists (in how they choose to implement the science):

> *You make a great, a very great mistake, if you think that psychology, being the science of the mind's laws, is something from which you can deduce definite programmes and schemes and methods of instruction for immediate school-room use. Psychology is a science, and teaching is an art; and sciences never generate arts directly out of themselves. An intermediate inventive mind must make that application, by using its originality. (p. 15)*

While James did go on to warn psychologists that they can't just tell teachers what to do (advice, we argue, that they would do well to heed), one can see his claims as setting the tone for the dysfunctional relationship that we argue has continued to exist between educational psychology/SBR and teaching.

Working through the implications of using art and science as frames for teacher work certainly needs to be done. Here, we restrict these efforts to the specific question of thinking through where the art and science of teaching might reasonably be in today's SBR-dominated world of educational research. In what follows, we look at how SBR requires fidelity from those implementing interventions to be able to have strong causal claims. We see fidelity as a clear manifestation of the inappropriate application of natural science/medical models to education, specifically to teaching.

SBR, Fidelity, and the Need to Control Teachers

Recall that when we use the term *SBR*, we are referring to a family of approaches to research that focuses on the creation of generalizable knowledge.[2] Often this is done via the measurement of the relationship between an intervention and the change in some variable (often student learning as represented by test scores). Control/comparison groups are often employed, and research designs that mimic the medical model of testing treatment (interventions) efficacy in alleviating adverse conditions tend to be venerated.

The simplest way to describe the SBR project from our point of view is: educational researchers, through a variety of means, create, test, and redesign interventions to improve some aspect of education (again, most often test score improvement). Once the intervention is deemed ready to deploy, resources are distributed, teachers and other relevant players are trained in its implementation, and the intervention is carried out.[3] Relevant changes in performance are measured. If there is improvement in relevant performance and all other aspects of the context are sufficiently controlled, then a statistical case can be made that the intervention led to (dare we say it caused) the change in performance. So, in sum, the closer a researcher can get to experimental conditions (i.e., control of the environment), the more likely that the intervention will be able to be deemed a success. When stated in such terms, it seems clear that the possibilities for teachers to have much freedom to carry out their work as they see fit is seriously imperiled

2 Some versions of SBR have shifted their focus from generalizable knowledge to using SBR to determine which practices, programs, etc., can be scientifically verified to work. This shift can be seen as mirroring the philosophical movement from positivism to post-positivism and, as noted previously, one could see this effort as moving educational research toward Quadrant II ("hard" and "applied" knowledge, according to Labaree [2003]).

3 In these early stages, SB researchers can certainly have practitioners participate meaningfully in the development of the intervention. Indeed, thoughtful researchers do this. The fact remains, though, that at some point prior to deployment, the practitioners' participation ends and they become obligated to carry out the project as determined by those in charge.

by SBR models. Control of classroom variables by non-teachers almost certainly means curtailing teachers' work.[4]

Teachers and Implementation Science

We have already discussed the nature and context of educational research and how its location in Quadrant III raises questions about the applicability of the SBR model to some educational questions. Thoughtful SBR adherents also acknowledge some of these difficulties. Partially as a response to these difficulties, the relatively young field of Implementation Science (IS) has appeared.[5] The word *implementation* here foregrounds the parts of SBR that exist in the field once the treatment has been designed by researchers and is now deployed or implemented in a real world educational context. Unfortunately, rather than embracing the human, social dimensions of this work, the general tone in IS seems to be to try to attempt to re-create or simulate the sterility of the laboratory out in the field. Kelly (2012) made clear where IS comes down on these tensions between the lab and the classroom, the researcher and the teacher, and indeed, between controlling teachers and acknowledging their professional autonomy when she stated: "Much of the evidence from implementation science places practitioners at the centre of intervention, particularly their preparation and training to apply interventions" (p. 462). This is a strange way to think about what it might mean to be at the center of a research project. From our vantage point, the teacher sounds like the means to the researcher's ends, existing primarily to deploy the researcher-created intervention. Indeed, the success of an intervention cannot be claimed unless researchers can be sure that the teachers carried out the intervention faithfully. The term they favor is *with fidelity*.

The IS literature is rife with examples of language and research designs that make clear that teachers need to be controlled and their interests must be brought in line with those of the researchers—that is, teachers must exhibit fidelity to researchers' mandated protocols. Let us consider two such examples.[6] First, at the conclusion of the *Handbook for Implementation Science for Psychology in Education*, Kelly (2012) described a passage from earlier in the book: "In Chapter 22, for example, different types of training are considered in relation to their effectiveness in ensuring that the required skills for successful implementation are embedded" (p. 463). "Embedding" skills into teachers evokes robot imagery. It must be acknowledged that showing the effectiveness of interventions in SBR would be a considerably easier task if teachers were not able to think on their own and if, instead of using their practical wisdom as they interact with their students, they simply implemented the intervention as preferred by those who created it. Robots are not yet available (although prefabbed online learning modules increasingly are). We need to briefly note here that underqualified, or nonqualified, teachers are probably the easiest to control, as they lack whatever autonomy accompanies professional status. This relates in interesting and disturbing ways to some broader trends in education, politics, and the economy (see, for example, Ravitch, 2010; Eisenhart & Town, 2003).

The second example is offered to show how different the perspective of the researcher seems to be from those possessing teacher or student-oriented perspectives. In a handbook chapter specifically about fidelity, Rudnick et al. (2012), discussed a math teacher "who is teaching a new mathematics program without the benefit of any professional development" (p. 358). This teacher "decides to look at his own practice in-depth to figure out if he is on the right track" (p. 358). Interestingly, the right track here is not about student learning but is instead about adherence to the researcher's agenda and resulting set of procedures:

> *Because he is not sure that he has all the pieces and materials from the program . . . he is going to look at both the structures of the program side and the instructional side of the program. After coming across our initial FOI framework, he decides the instruments could help him. His research question is, then: To what extent am I implementing the program structures and instructional strategies in a manner consistent with the intended program. (p. 359)*

This provides a window into the perspective of the SB researcher—the research is foregrounded, and the classroom and teacher seem to be viewed primarily through the lens of the research project. It strikes us as very unlikely that, in the field, a teacher would think that being on the "right track" was primarily related to implementation fidelity. Wouldn't they be more likely to ask questions more directly related to their students and whether they are meeting their obligations to teach them well, given their needs, interests, etc.?

Rudnick et al. (2012) provide reasonably detailed description and discussion about the nature of fidelity. There is acknowledgment that when implementing SBR in actual classrooms, teachers do need to have some latitude to deploy the intervention in a way that fits the immediate local context. A subcategory of fidelity called *competence* has been created to accommodate this realization. While not specifically created to increase teacher autonomy, this construct does seem potentially promising from the perspective of those with an interest in acknowledging the need for research designs to be flexible enough to allow teachers some freedom to act. That said, there is little detail about this new subcategory, and it seems likely that the reason to widen what can count as acceptable behavior from the teacher is more to make it easier to check the fidelity box—thus overcoming one obstacle on the pathway to cause—than it is to acknowledge or actually foster teacher or student agency.

4 Baez and Boyles (2011) forcefully made this point: "For monopolizing knowledge, any knowledge but particularly scientific knowledge, restricts opportunities for others to think, in effect ensuring a large class of 'unskilled' workers (which is all that teachers and other mere practitioners will become)" (p. 30).

5 Implementation science is one high-profile way to account for the messiness of the educational context without giving up on post-positivist scientific approaches. Design-based implementation research is another (e.g, McKay, 2017).

6 Examples we selected were taken from the IS literature, the part of the SBR world that focuses on how SBR plays out in real world contexts and, hence, where we are likely to find projects that attempt to meaningfully contend with what it means to work in the applied world of Quadrant III and not the sterilely predictable laboratory.

Moving Beyond Controlling Teachers: Locating the Science in Teaching

We have argued that the SBR approach to educational improvement has the unfortunate and unacceptable side effect of disempowering and de-professionalizing teachers. The sharp split between teacher and researcher, and the locus of control existing almost entirely on the researcher side of the divide, is, in the end, not likely to be good for teachers or for the likelihood that SBR projects will lead to meaningful and sustained progress. Next, we consider how focus on the craft of teaching is one way to help reposition the teacher more centrally and provide a more nuanced way to think about teacher work in the context of science and art. Following this focus on teaching as craft, we use Dewey's ideas about teaching, art, and science to suggest a more productive relationship between teaching and educational research.

McDonald's Craft: "Out of Uncertainty, Craft Emerges"

McDonald's (1992) *Teaching: Making Sense of an Uncertain Craft* describes teaching, while requiring many specific skills, as also needing recognition of the central role that uncertainty plays. After McDonald's first time teaching, an observer told him that he "taught as if speaking from the next room through a tube" (p. 1). McDonald's takeaway was the importance of "when teaching, to do it in person with kids you dare to be among, and keep relations live" (p. 1). This way of thinking about teaching feels roughly opposite to that which is described in the IS literature.

McDonald (1992) claimed that teaching:

> *happens inside a wild triangle of relations—among teacher, students and subject . . . Inside the triangle, clear evidence is very rare. Snarls and smiles mix disconcertingly. Right answers fade to wrong and vice versa. The matter of interpretation of how one construes a gesture or an attitude, of whether one thinks the moment demands more criticism or encouragement of how much energy one has to believe in teaching's effectiveness. (p. 1)*

This passage renders clear the trouble lurking behind attempts to operationalize and categorize each discrete phenomenon at play in the classroom in order to develop generalizable knowledge, techniques and/or programs. McDonald worked to describe teaching in a way that will combat his claim that "most people think . . . that teaching is much simpler than it is" (p. 2). Instead of a simple understanding or an obvious division between science and art, McDonald turned to the idea of teaching as craft. He explained: "The wildness of the triangle (teacher, student, and subject) provokes it. Although I never learned exactly where to stand in relation to my students, I develop a reliable sense of what is too close and what is too far. Within these limits, I craft a workable relationship for the moment—now here, now there" (p. 1).

Interestingly, while he did include many researchers in the list whom he referred to as "conspirators of certainty," McDonald (1992) seemed to be writing in a time largely prior to the SBR push. Still, his critique of research is powerful. He started by claiming that researchers are particularly dangerous to the idea of craft, "especially when the research they conduct fails to see beyond its own *apriori* assumptions" (p. 3). Even more prescient to the contemporary setting, McDonald declared that some researchers "are notorious for assuming the entire role of knowledge creator, leaving no part of it for teachers—cheating teachers of their chance to know the messy side of theoretical development, cheating themselves of acquaintance with practical knowledge" (p. 3).

McDonald (1992) recounted his experience reading a researcher's "list of questions 'we still have not figured out' with regard to teaching" (p. 3). He noted that the researcher's "we" did not include teachers: "since the questions were entirely ones that teachers answer every day teaching simply because they have to"—questions like how kids' thinking in schools is affected by the backgrounds they bring to school and what teachers can do about that; or how teachers can best combine caring for kids with teaching them how to think" (pp. 3–4). McDonald's concluding point about this researcher both brings the discussion back around to why researchers need to rethink the nature of the knowledge they seek and also serves as a bridge to the ways in which Dewey's ideas about science and teaching can help: "From this researcher's tacit point of view, the answers that teachers continuously construct for such questions are inadequate because they are provisional rather than certain" (p. 4).

Dewey and the Sources of a Science of Education

From *My Pedagogic Creed* (1897) to *The Quest for Certainty* (1929a), and many sources in between, there are numerous places in Dewey's voluminous writing where he addressed issues related to how research affects how we think about what it means to be a teacher. Here, we primarily draw on his Kappa Delta Pi Honor Society lecture, published as *The Sources of a Science of Education* (1929b). In it, Dewey made a strong and prescient argument about the need to help educational researchers recognize that educational problems are the ultimate source of a science of education and that researchers must look to educational practices to solve these problems. Dewey (1929b) dissolved the sharp boundary between science and art, arguing that teaching ought to be considered both. Regarding science, its detractors (those in the teaching-is-an-art camp) worry that establishing teaching as a science will lead to constraint and routinization—what he calls "uniformity of procedure" (Dewey, 1929b, p. 12). Dewey (1929b) made the case that a robust conceptualization of science will lead to the opposite: "In the subjects best developed from the scientific point of view . . . command of scientific methods and systematized subject-matter liberators individuals; it enables them to see new problems, devise new procedures, and, in general, makes for diversification rather than for set uniformity" (p. 12). Regarding art, Dewey saw no conflict affirming that in addition to being a science, teaching is also an art. Dewey identified a distinction, not an opposition, between science and art in this context. He used engineering as an example of an endeavor that possesses both art and science. He said it is an art: "precisely because of a content of scientific subject matter which guides its practical operation. There is room for the original and daring projects of exceptional individuals" (Dewey, 1929b, p. 13). Dewey saw the practical artist in education as one

who doesn't ignore science in order to be unconstrained. Instead, they: "make new integrations of scientific material and turn it into new and previously unfamiliar and unforeseen uses" (pp. 13–14).

Dewey recognized the allure of what he saw as the wrong way to think about science. Prospective teachers in his day, as in ours,[7] often are desperate for surefire teaching methods:

> *Put baldly, they want recipes. Now, to such persons science is of value because it puts a stamp of final approval upon this and that specific procedure. It is very easy for science to be regarded as a guarantee that goes with the sale of goods rather than as a light to the eyes and lamp to the feet. It is prized for its prestige value rather than as an organ of personal illumination and liberation . . . it is thought to give unquestionable authenticity and authority to a specific procedure to be carried out in the school room. So conceived, science* is *antagonistic to education as an art. (Dewey, 1929b, po. 15–16)*

At this point, Dewey's wrong way to think about science should sound familiar—it is basically the way that most SBR proponents approach the research-practice dyad. If Dewey was right, SBR generates unnecessary and damaging constraints for teachers. In addition to this fundamental insight, the lecture developed the notion of teacher as investigator, admonished researchers to never lose sight of how their work needs to be tethered to practice and practitioners, and extended treatment of the nature of the kinds of knowledge generated by educational research. The lecture's conclusion is worth quoting at length, as, in addition to summarizing the lecture, it also serves to link much of what has been discussed throughout this paper:

> *The sources of educational science are any portions of ascertained knowledge that enter into the heart, head and hands of educators, and which, by entering in, render the performance of the educational functions more enlightened, more human, more truly educational than it was before. But there is no way to discover what is "more truly educational" except by the continuation of the educational act itself. The discovery is never made; it is always making. It may conduce to immediate ease of momentary efficiency to seek an answer for questions outside of education, in some material which already has scientific prestige. But such a seeking is an abdication, a surrender. In the end, it only lessens the chances that education in actual operation will provide the materials for an improved science. It arrests growth; it prevents the thinking that is the final source of all progress. (Dewey, 1929b, pp. 76–77)*

Certainly, it is open to debate as to whether any SBR project would be guilty of seeking "answers for questions outside of education." That said, it is our hope that this exploration has made it clear that SBR in spirit violates Dewey's vision of educational science needing to come from "the heart, head and hands of educators."

Dewey's (1922) belief that teacher work is, in many ways, scientific and that everyday thinking possesses scientific elements is augmented by his recognition of the interconnectedness of the means-ends dichotomy: "Consequently, ends arise and function within action. They are not, as current theories too often imply, things lying beyond activity at which the latter is directed" (p. 223). This is important, as the SBR model of educational research tends to cordon off consideration of aims—they are appropriately a sole focus for researchers but not teachers, as means are the appropriate concern for teachers in this model. Santoro (2016) has rightly focused on the SBR concern with fidelity as a major problem for teachers. Recall that fidelity is a feature of intervention studies (SBR) that seek to understand to what degree the teacher followed the researcher-created protocol. If teachers vary from the script, it creates a problem for researchers who are looking to ascribe cause to the treatment. In this way, fidelity virtually assures that teachers do not have access to the realm of aims. Their job is to carry out the prescribed means. This harkens back to Baez and Boyles's (2011) argument that SBR tends to position teachers as unskilled labor. It is also worth noting that while we used the art-science dichotomy to consider Dewey's ideas, Baez and Boyles have focused on how proponents of scientific educational research often use misreadings of Dewey's ideas in support of SBR. These misreadings trumpet Dewey's use of the term *science* while propagating a modern narrow notion of science and ignoring the ways in which Dewey's science is human-focused and context-rich—in many ways the opposite of the SBR version.

Rethinking Teaching from the Educational Research Perspective: Making Educational Research Safe for Democracy (and Democratic Teachers)

Dewey's version of educational research, buttressed by thinking of teaching explicitly as a craft, sets us up to fully appreciate Biesta's (2007) claim that, at root, the problem with SBR—and specifically the "what works" facet of SBR—is that it tends to be antidemocratic:

> *The problem with evidence-based education, therefore, is not only that it is not sufficiently aware of the role of norms and values in educational decision making; the problem is that it also limits opportunities for educational professionals to exert their judgment about what is educationally desirable in particular situations. (p. 20)*

One vein of scholarship and practice that shows an alternative way to think about the role of teachers and how to do research involving teaching is the growing movement toward participatory action research (PAR) for teachers. Certainly, we acknowledge that there are other approaches to educational research that can help create active roles for teachers to participate in knowledge creation and that encourage opportunities for teachers to be free to exercise their judgment as professionals in the classroom. We have chosen to highlight PAR here because its employment is increasing and there is much enthusiasm for it (MacDonald, 2012; Ritchie et al., 2014). Furthermore, PAR is particularly promising as a way to blur the teacher-researcher/artist-scientist distinctions

7 While not all prospective and novice teachers want simple recipes to follow, the rigors of the job are such that early career teachers are thrust into complex and difficult situations and the desire for clear methods, classroom management plans etc., are certainly understandable (Louws, et al., 2018).

(Campbell, 2013; Cochran-Smith & Lytle, 1993; MacDonald, 2012; Morales, 2016).

Teachers as Knowledge-makers, an Example: Participatory Action Research

PAR tends to prioritize research participation by individuals directly interested in the improvement of the context being studied, whereas SBR requires stability/control of all variables in the study's context other than the specifically identified independent variables. As a result, PAR is sometimes seen as lacking rigor and scientific objectivity (Campbell, 2013). PAR proponents, however, highlight the ways in which its implementation can lead to material improvements in and around the phenomena under study. Morales (2016) has suggested that "the aim of PAR is to produce knowledge and action directly useful to a group of people through research, adult education or socio-political action" (p. 158). There are several tenets of PAR that set it apart from conventional research and justify its use in this inquiry as a potential alternative to educational SBR.

First, PAR's focus is on research that enables action, particularly by participants as they engage in an iterative cycle of collecting and analyzing data, reflecting, and determining next steps throughout the research project. Participants can reflect on data through a nuanced lens, informed by their personal experience with the context of the study taking place. Practitioner experience and deep understanding is vital to the success of a PAR project. Second, ideally throughout the course of a PAR study, the distinction between the researcher and researched (for the purpose of this exploration, often the teacher) becomes blurred as a means of attending to power imbalances inherent in research studies. SBR tends to create a hierarchy of knowledge power that reifies this relationship via the process, as teachers are required to implement interventions with fidelity while researchers observe their ability to do so. Third, positivist research assumes that reality can be objectively measured by an outside researcher so long as all variables can be controlled. While most SBR is more post-positivist in nature, some assumptions about what can be measured and who should be measuring them are consistent with a positivist paradigm. SB researchers would likely cringe at the thought of teachers controlling every aspect of a study for fear of their affinity to nuanced and contextual adaptation.

Perhaps there is some potential for a PAR approach to be somewhat palatable to mainstream educational researchers as it adheres to several of the key components in a Quadrant III project. For example, PAR operates similarly to SBR by engaging in rigorous processes as a means of determining results. According to MacDonald (2012), "[a] common framework for PAR encompasses a cyclical process of fact finding, action, reflection, [which leads] to further inquiry and action for change" (p. 37). However, while PAR maintains a certain procedural rigor that might appease SB researchers, scholars present advantages that participatory research has over other forms of research (Kemmis et al., 2013). Essentially, these advantages support our argument that PAR can serve as an approach to research that embodies more democratic principles (Morales, 2016). Kemmis et al. (2013) have argued that PAR can create conditions for teachers to develop practices informed by their professional orientations, speak a shared language amongst colleagues, participate in the development of relationships within their communities of practice, and participate in action to impact their practice in ways that responds to the changing educational context (p. 5). Anderson (2017) has described PAR's potential to democratically disrupt the current power-over-relations trend in education. As PAR is a methodology existing "across a continuum of more functionalist to more emancipatory" (p. 445), we utilize the possibility for more emancipatory inquiries to be based in relevancy as well as to legitimize teacher knowledge. Involved in every facet of the inquiry process, rather than simply during the implementation phase, teachers in a PAR model are better positioned to employ their professional expertise to inform the research process. Anderson (2017) went on to explain how: "PAR proponents also believe that the research process can produce both action and knowledge simultaneously and that the two are synergistic" (p. 444). By placing practitioners and researchers in community with one another, in addition to designating teachers as researchers, we argue that PAR is a process of empowerment whereby teachers are able to act as agents of change.

Of course, PAR is just one example of the kinds of research that do not unduly constrain teachers. Almost all nonscientific approaches, while not necessarily forwarding the teacher-as-agent idea, also do not work against the possibility of it. PAR and other democratic research approaches point to the fact that there are all sorts of relevant and potentially important topics in education that just cannot be adequately addressed via scientifically, or even quasi-scientifically based research projects. They help make the case that there need to be other forms of educational research that position teachers more centrally in the process.

Conclusion

This inquiry provides a critique of SBR. Toward the paper's end we began to think about research that can counter the threat SBR presents to the very idea of teacher-as-professional. We positioned PAR as one particularly promising alternative that, by its very design, fosters the idea of teachers as knowledge creators. Reframing teachers' active, reasoned judgments as forms of science in their own right has great potential to help educational research to become more relevant and to raise awareness about teachers' work. Beyond the scientific status of knowledge generated by this kind of research, existentially, PAR and related research approaches are able to position teacher judgment and classroom relationships as the heart and soul of teaching and learning rather than as something to be controlled for or routed out. In the end, we are calling for forms of educational research that do not start from the position that teachers are a problem to be managed. Blurring the means-ends dualism is a start, as teachers cannot do their job if they are not participating in aims talk—teaching requires thinking about and adjusting goals and purposes in light of actual teaching. Teacher engagement in aims talk also has potential to enrich public discourse about wider educational issues. This democratizing of teaching, only a small part of which is considered in this paper, has promise to position teachers as

important voices in discourse/policy discussions in broader spheres. The broader educational research community could also benefit from taking democracy seriously. In a world where SBR and related types of research tend to wield most of the power, some reconstruction is in order. Elevating teacher voice in the world of research can help to increase the possibility for deliberative democracy to exist in the educational research community, helping it to become a forum where different kinds of researchers make their argument and participate in a community of educational inquiries.

In the "soft" and applied Quadrant III, researchers need to possess the humility to recognize that the quest for generalizability often causes more problems than it solves and that more immediately useful and contextualized knowledges can exist. PAR and related approaches show that these nonuniversal small-*k* knowledges are needed and have a place even though they are currently systematically discouraged from being generated by our SBR culture.

Educational researchers need to find ways to produce knowledge that makes meaningful teaching and learning more possible. In this paper, we have focused specifically on the ways in which SBR distorts the school context via its need to ignore or, at least, downplay the role that teachers' agency and relationships plays in productive learning environments. What we have described is a fundamental clash between principles: scientific generalizability/control versus teacher-as-professional. The first seeks to impose order on the messy world of classrooms and schools to make a case that natural science can be meaningfully applied there. The second features the relational aspects of learning and leans into the messy, socially contingent quality of life in schools. On one side is the veneration of control manifest in the SBR generalizability focus and the related notion of treatment fidelity/integrity as explicit modes of controlling teachers. On the other side is the principle of professional autonomy; teachers need to be able to act as they see fit because they are uniquely qualified to do so. It seems that SBR tends toward an antidemocratic stance as it undermines the possibility of teachers to be considered professionals. Furthermore, if pursued aggressively, it has potential to render the very idea of teacher-as-professional nonsensical.

This inquiry strengthens the case for a repositioning of the location of authority in the research-practice relationship. We argue for shared authority between researchers and teachers. Depending on the nature of the research activities, the authority might even primarily reside on the teacher side of the teacher-researcher divide. Research paradigms, designs, and methodologies need to continue to be developed that allow for this distributed authority.

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