

Preprint of a chapter on open access in educational research for Sage Companion to Educational Research, Ed. Connie Russell et al. (London: Sage)

THE NEW OPENNESS IN EDUCATIONAL RESEARCH

John Willinsky

This companion to educational research turns to the theme of “representing educational research,” following sections on “conceptualizing educational research” and “contextualizing educational research.” The act of representing research would seem to entail writing up the work, placing it within the context of research in the area, describing the design and methodological choices made, analyzing the findings and drawing conclusions on the results of the research. Representing the research would also seem to involve making the work public, perhaps by initially presenting it in a conference setting and then selecting a suitable publication vehicle for it, most likely a peer-reviewed journal. It might also involve, less commonly, submitting a summary of the research to a professional/trade magazine, or an op-ed piece for the newspapers or, in very recent times, a blog posting.

All of this representational work forms a significant aspect of doing research, one that is taking on a particular importance as more people are asking about the contribution research makes to education and as evidence-based policy initiatives in education, such as the No Child Left Behind Act in the United States, identify research as a necessary basis for program support. Educational researchers would seem to face an increased responsibility for the reach and “impact” of their work. While traditionally scholars have tended to minimize such responsibilities – it is enough to publish and then perish – changes are afoot in scholarly publishing that enable researchers today to have their work reach out further, beyond the circle (and citations) of the researcher community. My aim is to ensure that readers of this chapter are in a better position to take advantage of these new developments as a means of increasing the impact and value of the work they do, not only for researchers world-wide, but for education professionals and interested members of the public.

The first thing to note is that there is more to making research public than is conveyed by the sense of *representing research* as an act of representation. It may even be somewhat misleading to think of the article as representing research. To set out to represent a given act of research suggests, after all, that what is involved is a decidedly two-step sequence. First, one plans and conducts the research and then one decides how best to represent the research, perhaps beginning with a conference presentation. Representation, in this sense, stands at a remove from the original act. A representative, to take another example, stands in for and acts on behalf of someone else, typically in a public way.

To suggest that researchers at some point in the research process decide it is time to represent the research also suggests how the actual research is thought to take place in a closed and private (anonymous) way. While educational research may rarely be a thing of secured-access laboratories, the educational researcher in the public school or in other educational settings, whether with video camera or a notebook and a pencil, can still be thought of as engaging in a private professional act within a public space. There are exceptions, of course, in which teachers and even students may take an active hand in the research process, but this forms its own subfield within educational research known as action research or participatory research (Eliot, 1991). Otherwise, only when it comes to representing the research in published form is the work shared and typically in a limited way with a narrow audience of other researchers

working in the same area. My intent is to convince researchers that this is not the only way to think of their work, given the emergence of a new openness in scholarly work afforded by the internet. This new openness not well served, however, if the idea of “representing research” is taken to suggest a gap between the act of research and the subsequent manner of its representation.

In an effort to increase the public quality of research, I want to move beyond this representative approach. It tends to reinforce the idea that the real work of research takes place prior to the attempt to represent what took place and what it means. Thus I find the sense that one is now *writing up the research* something of a misnomer, as it suggests one is simply reporting on what happened. The act of writing is just as integral to the research as any other aspect, whether the design of the study, negotiating access to the school and assembling of the sample. This is to say, the act of writing turns all that took place into a coherent, comprehensible act of research. It is not simply a process of transcribing (or representing) what took place in the name of a research project. Rather, the writing does more than assemble, as it actively constructs an integral whole out of the series of steps undertaken in pursuit of a research question. More than that, the soundness and strength of the study’s claims and contribution – that is, what makes it a work of research – is realized only others’ analysis and review of this writing. The significance of this writing begins with the research proposal, whether for a grant, research ethics clearance and/or thesis. Here again, one may be tempted to say that the proposal represents what is going to happen and to a degree (often less than expected) it does this, but it just as surely formulates and works out what is the logic of inquiry that will qualify the proposed activities as *research*.

Let me consider the implications of this more-than-representation approach for a moment. It lends a different weight to how the research is written and how it is shared and made public. After all is said and done (recorded and transcribed, measured and scored), the research no more or less than the resulting article, chapter or book which alone forms the research’s public record. It’s true that for every set of lines quoted from an interview in the published study, there lies a transcript, as well as the recording of the interview locked up in a filing cabinet or more likely today, stored away on a hard drive. Yet the act of selecting and citing lines from the complete transcript, framing them with commentary that highlights and interprets their meaning, necessarily shapes the meaning of those lines, turning them into part of a research study. This act of writing turns a limited number of the subject’s words from data into the evidence and warrants for a particular set of conclusions.

How many of us, on reading through a transcript of an interview that we have conducted, have noticed something of great significance to the study we are working on, even though those very words and sentences flew right by us in the course of conducting and recording the interview without attracting a second thought at the time. The sort of reflection that follows in citing the transcript for the study is what educational research is all about, you might say. In writing, one reflects on what people said and did in the course of the study. Yet there really is no study until the study is written, revised, shared with others, revised again and then made public. The study needs an author, not a representative; it needs an author and an audience to make it part of the world.

This is no less the case in educational research that entails working with large data sets. The summary tables of scores and measures that appears in the final paper, along with a careful interpretation of those numbers, stands as the study. What is going to be *reported* on in the study shapes the steps taken and calculations made. The very claims of the research as *knowledge* are found in this public aspect. The written artifact is what bears critical scrutiny, beginning with a

peer review process that is intended to ensure that the published version can stand on its own, not just in representing what took place in the course of the study, but in fully making sense of the results and identifying their significance. This takes nothing from the quality and integrity of the other elements that go into the research. It is, rather, to bring the act of writing into alignment with these other elements as necessarily integral to giving the research its claims to making a contribution to what we know.

Now it needs to be acknowledged and caution readers that the educational research community tends to treat the act of publication as a matter of *reporting* on research in just this representative sense. For example, in 2006 the AERA formed a “Task Force on Reporting of Research Methods in AERA Publications,” led by Pamela A. Moss. The task force published the *Standards for Reporting on Empirical Social Science Research in AERA Publications* (2006).¹ The AERA’s setting of publication standards comes at a time when concerns about the scientific quality of educational research has been much examined, most notably with the *Scientific Research in Education* report published by the National Academic Press (Shavelson and Towne, 2002).² The hope is that by addressing such issues as the minority student gap in achievement, the impact and significance of educational research can be considerably enhanced, in relation to other research fields, as well as in terms of influencing educational policies and practices.

The AERA guidelines describe how “reports of empirical research should be *transparent*,”]which is a way of vividly suggesting that the goal is to be able to look through the report to the research itself, with the research, in turn, holding up a window to the actual educational event in question (AERA, 2006, p. 33, emphasis in original). In a similar vein, the guidelines speak of how the “reporting should make explicit the logic of inquiry and activities that led from the development of the initial interest, topic, problem, or research question; through the definition, collection, and analysis of data or empirical evidence; to the articulated outcomes of the study” (ibid.). What I am arguing is that this representational and reporting approach to research diverts attention from the degree to which the research is carefully crafted all along to form a public argument – from the choice of the research question to the method of analysis – intended to move minds and hearts.

As well, the transparency metaphor, along with injunction to make explicit “the articulated outcomes of the study,” suggest that the outcomes were articulated prior to the writing that goes into creating a presentation or article. The so-called act of reporting is, in effect, a time of thoughtful creation, reflection and revision of research outcomes and the logic of inquiry and other aspects of the study (despite whatever initial and excited hunches emerged during the data gathering or preliminary analysis). Where the AERA’s guidelines state that “reporting should make clear how the study is a contribution to knowledge” (34), I feel compelled to point out that the study is not in the least a contribution to knowledge until the articulation of the research is completed, reviewed and made public. One implication of my somewhat perverse stance – that we need to acknowledge, rather than overlook, the degree to which constituted by the act of writing and publishing – is the attention it calls to how this work

¹ The AERA committee that prepared the standards statement consisted of Richard P. Duran, Margaret A. Eisenhart, Frederick D. Erickson, Carl A. Grant, Judith L. Green, Larry V. Hedges, Felice J. Levine (ex officio), Pamela A. Moss (Chair), James W. Pellegrino, and Barbara L. Schneider.

² *Scientific Research in Education* includes principles of “pose significant questions that can be investigated empirically” and “link research to relevant theory” and “use methods that permit direct investigations of the question” (Shavelson and Towne, 2002, p. 3). My focus in this chapter, however, falls within the scope of the sixth scientific principle, namely “disclose research to encourage professional scrutiny and critique”; p. 5), which in the context of this report I have written about directly elsewhere (Willinsky, 2004).

is made public. In addition to the current wave of concern over improving the scientific quality of educational research, there are new opportunities for increasing the public quality and impact of this work.

Before exploring these new opportunities for extending the public status of educational research, however, there is another aspect of this representation metaphor to consider when it comes to educational research and the larger knowledge questions raised about representation by pragmatist and postmodern philosophers. To suggest that the research paper or article *represents* some act of research is analogous to treating research as representing, in turn, some aspect of a reality that exists beyond these efforts at representing it.³ Current efforts to elevate the scientific quality of educational research tend toward representational (or correspondence) theories of knowledge. If only we improve the scientific quality of our research, the argument goes, we will increase the accuracy and reliability with which we are able to represent some aspect of reality. This seems like little more than common sense at one level. You measure a child's "performance" on test at two points, one before and one after they engage in a related educational program, and thereby establish the degree to which the child learned from that program. Yet at the same time, one can no longer simply abide by this logic of inquiry without acknowledging the formidable and persuasive questioning of it by post-modern philosophers, such as Richard Rorty.

Rorty has considerable trouble, we might say, with claims about the accuracy and fairness of a given representation. For him, such claims are clearly based on an assumption that we are somehow able to compare our best representation of the child's learning with the *actual reality* apart from those representations. It is a powerful point and it suggests that we are, at best, comparing representations of that learning. Some representations are still better than others, in terms of, for example, representing poorly designed tests or a confusion and confounding of factors that went into the child's score. But if there is only representation, then, the concept of representation – as a correspondence theory between research and reality – does not make a lot of epistemological sense. Rather, research is better treated as an argument, a justification for certain claims about education. The strength of that argument will very much depend on the rigorous application of research standards, which are themselves justifications that depend on the internal consistency, coherence and logic that defines the particular genre of research. This is not about making anything up any more than it is about the precise representation of a reality. Yet if that seems all too much like philosophers themselves operating at a distinct remove from reality, especially the reality of daily classroom life, we would do well to consider an early educational turn to this postmodern stance.

No less an educational figure than John Dewey took exception to the idea that to engage in research is to represent the reality of this or that phenomenon. Rorty draws on Dewey, as well as Wittgenstein and Heidegger, in explaining why it no longer makes sense to regard science as

³ For example, as Shavelson and Towne explain in *Scientific Research in Education*, "these [mid-range physical and social science] theories are representations or abstractions of some aspect of reality that one can only approximate by such models" (2002, p. 60). Yet in this important research statement, there is at work both a representative or "spectator theory" of knowledge, as Dewey called it (1988, p. 19), and place reserved for a more socially constructed approach: "Indeed, science is not only an effort to produce representations (models) of real-world phenomena by going from nature to abstract signs. Embedded in their practice, scientists also engage in the development of objects (e.g., instruments or practices); thus, scientific knowledge is a by-product of both technological activities and analytical activities" (p. 57).

holding up a mirror to nature (Rorty 1979).⁴ The quality of a given study in education, for Dewey, is to be judged by how well the resulting ideas help achieve valued educational goals. In Dewey's "Quest for Certainty," a series of lectures given in 1929, he directs our attention to understanding and testing the implications of our ideas and practices: "The test of ideas, of thinking generally, is found in the consequences of the acts to which the ideas lead, that is in the new arrangements of things which are brought into existence" (1988, p. 109). Critically attending to what comes of the research is all about "creating a world in which the springs of thinking will be clear and ever-flowing" (ibid.). The knowledge question for Dewey and other pragmatists, including postmodern ones like Rorty, is not about reducing distortion in the reflection or representation of the world, it is about moving the world. By the same token, research does much more than represent our knowledge of the world. Research is the force of knowledge on the world. Thus, for Dewey it very much matters that we put our ideas about the schools to the most rigorously designed tests and that we make those tests as publicly available as possible, as a way of working on education. Can we increase the degree to which research contributes to the social (and public) justifications and meanings that can be said to be improving schools?⁵

The focus of pragmatist philosophy on consequences bears an interesting parallel with the What Works Clearinghouse (WWC) run by the U.S. federal government's Institute of Education Sciences. The WWC, established in 2002, is indeed focused on the consequences of individual program interventions, and as such presents the equivalent of research report cards for beginning reading and school drop-outs, among other topics. It ranks specific school programs in terms of scientifically valid evaluation studies results, which are used to determine whether a program as a whole has positive, negative or mixed effects in terms of its claims. The WWC provides detailed background reports on all of the programs with summaries of the evaluation studies. The WWC represents a substantial public increase in access to a narrow band of research, which is based almost entirely on the use of standardized test results achieved to compare and assess educational programs. It can be seen as both part of, and a limit on, Dewey's "springs of thinking." The limit comes from how the WWC imagines that "what works" (and thus what counts as education) is about the use of largely commercialized educational programs, which can be assessed through experimental and quasi-experimental methods. The WWC is part of the opening of the world that Dewey envisioned, as it makes systematic reviews of research on educational programs part of the public and democratic realm. Research on educational programs. Its particular representation of research, however, amounts to a narrowing and closing off of all that research has to offer on the full spectrum of children's and teachers' experiences.

The WWC does not let the public in on how, for example, the emphasis on programs that increase test scores in literacy and math – as dictated by the No Child Left Behind legislation – is leading to increased allotments of time both for these two areas and for test preparation (McMurrer, 2007). What also goes missing in the WWC's particular representation of research is how differences in achievement test scores need to be understood in light of additional research on such things as: (a) the limited efficacy of current large-scale testing programs as a basis for

⁴ Given Dewey's pragmatism, "the notion of 'accurate representation' is simply" as Rorty explains, "an automatic and empty compliment which we pay to those beliefs which are successful in helping us to do what we want to do" (1979, p. 10).

⁵ For Rorty, knowledge is concerned with "when we understand the social justification of belief, and thus have no need to view it as accuracy of representation" (1979, p. 170); instead, we need to place the emphasis on making our work speak to others, on having it contribute to "this project of finding new, better, more interesting, more fruitful ways of speaking" (p. 360). This sense of responsibility might otherwise be lost if the research (prior to the writing process) is treated as the important thing that needs to be represented.

managing education systems (Linn, 2000); (b) the effect of growing economic disparities among communities on the availability of educational resources, such as skilled teachers (Hammond, 2007); and (c) the continuing historical struggle to understand and overcome racial, cultural and socio-economic disenfranchisement in education and other settings (Banks, 1995).

This is not a matter of scientifically based research versus otherwise-motivated inquiry. What in this case determines what research is heard and supported is not the accuracy of representation, the scientific precision of measurement, or the undistorted mirroring of a reality. The degree to which one body of studies form part of the powerful discourse around education, while other forms of research remain at a distinct remove from public and political deliberations on education – although they may lauded and cited among researchers (see, for example, Hammond 2007) – is to a certain degree out of the researchers' hands. Yet the researchers' decisions to test certain assumptions, to strengthen and extend the promise of certain claims, contributes to the justifications and deliberations that determine critical aspects of how education is managed and directed. Thus, the relevance of the question that this chapter raises: are there ways of making the work of the educational research community more readily available for circulation and use among those engaged in this education discourse and practice?

A new opportunity for changing the public status of educational research has fallen into researchers hands and has done so with the very idea of representing research in the sense of choosing how to make it public. New developments promise to move educational research far more fully into the public sphere and yet there is no guarantees that any given study will receive a new level of notice. Although it is obviously too early to surmise the historic significance of this new openness I am perhaps too easily tempted to rank the current potential increase in access with such leaps forward over the last four centuries as the introduction of the printing press in the fifteen century, periodical literature in the seventeenth century, and the penny post and public libraries in the nineteenth century. Suffice it to say that I believe researchers need to give serious consideration to the possibilities of new technologies, especially in light of the amount of educational research that we have to contribute to the public sphere.

At the close of 2007, Ulrich's *Periodical Directory* listed 1,300 refereed journals in the area of education. The U.S. Education Resources Information Center (ERIC) indexes more than 600 education journals, based on its own, screened list of titles.⁶ In addition, there are the more than 6,000 doctoral dissertations in education produced annually in the United States alone. As things now stand, all of this work is reviewed and revised prior to being published or deposited in libraries (in the case of dissertations). As a first step in increasing availability on a global scale, the journals and dissertations have moved online.

Yet what remains critical to whether a given research study is fully part of this public arena is the basis on which the work can be accessed. That is, the vast majority of research studies in education are accessible only to members of a subscribing research library or by direct purchase of the article from the publisher. There may be, according to the Technorati online search engine, close to 600 blogs that identify themselves as dealing with educational research, yet the quality of those blogs is severely limited in my estimation by the inability of the bloggers to link back to the vast majority of the original research studies, if the bloggers themselves happen to have access. Fortunately, a small but growing number of journals now publish an

⁶ The ISI Web of Science assesses the impact factor for only 127 journals in education, and the articles in the top-ranked *Journal of the Learning Sciences* are cited an average of three times within the course of a two-year period. The journal published by Taylor and Francis (having acquired it on acquiring the publisher Lawrence Erlbaum) costs libraries \$645 a year for four issues or \$612 for online only, while individual subscriptions are \$64.00.

online edition that is “open access,” which means that they make their contents freely available to readers everywhere. The Directory of Open Access Journals, operated by the University of Lund, lists 211 peer-reviewed journals in education that are open to the public and freely available.⁷

Now it is fortunate that many publishers, including Sage, the publisher of this book, as well as all of AERA’s journals, have policies that allow authors to archive their final, refereed copy of their journal article on their own website or in a library repository (12 months after its original publication, in the case of Sage) where the work can be found, for example, through Google and downloaded from the repository. Even for publishers that refuse to allow authors to post their work in this way – and they are in the minority – as well as with publishers that request a delay in open access, authors are still able to list their work in such a repository immediately on publication with a “request copy” link, emulating the old method by which interested readers would request authors to send off-prints to colleagues (Harnad, 2006).

Suddenly, one might say, researchers have in their hands the ability to greatly increase the quality and quantity of information available that might inform educational questions and discussions. All that research can bring to the current state of understanding what the schools can do need not be left up to the What Work’s Clearinghouse or the brief abstracts carried in ERIC. Researchers can ensure that when people are looking for more information on an educational topic, they will be able to find original and complete studies from a variety of perspectives and vantage points – in terms of school districts and individual children – rather than the selective representation of that research as determined by one governing body. Certainly, were all of this research to be made available, readers will encounter contradictory and inconclusive findings, disagreements about validity, changing interpretations, but that in itself has great educational value about the nature of knowledge (in which the studies neither add up to a single finding nor do they simply cancel each other out). It would be clear, as well, that people still have to come together to make the difficult decisions rather than expecting them to be dictated by the research.

All that researchers need do, to effect this considerable increase in the degree to which research is represented in the public sphere and available to all interested parties, is to take greater responsibility for the public status of their own work. They need to look into archiving copies of their work (with no limit on how far back they are able to go into their earliest work). They need to work with the journals they *patronize* – truly, as they freely donate their work to these publications – to ensure that the journals possess as liberal an archiving policy as possible in enabling authors to post copies of their work online. They need to encourage the journals of their scholarly societies to consider the proven economic viability of increased access through a variety of models, from reduced costs through free publishing software to making journal content freely available after, say, six months (Willinsky, 2006). They could lend their support, as well, by sending the occasional paper to those journals that have immediate open access policies for all of their content.

⁷ While new open access journals in education continue to appear, some of the field’s venerable titles, having experimented with open access, are going the other way. The online edition of the American Educational Research Association’s *Educational Researcher*, for example, was free for a number of years, until in 2007 the AERA moved its journals to Sage Publishers, at which point, access to individual articles in the *Educational Researcher* could be purchased for \$25.00. *Teachers College Record*, one of the field’s oldest titles, was also one of the earliest to try a form of delayed open access, making articles freely available six months of publication, usually leading to a huge increase in readership at that point. It has since reduced the degree of open access to a sampling of older articles, although it has instituted a very reasonably priced point of access for those seeking to read more recent work

The new standard for making public what is in the public interest today, whether we are talking about governments, public institutions or corporations, is to make it freely available online. This surely seems an entirely reasonable standard for research that is publicly funded and produced under the auspices of an educational institution (whether publicly supported or private and tax-exempt). But there is also an element of researcher self-interest (and vanity, for some) in this as well: there is a growing body of evidence that authors who make their work freely available are read and cited more often as a result of the increased accessibility of their work (Hitchcock, 2007).

As if asking researchers to make their work public in this way weren't enough, a further exciting aspect of this new openness involves research data and sources. As I have said, the published research work stands as the published record, with scholarly journals referred to many times as "keeping the minutes of science" (Veltrop, 1996). Print journals tend to limit the space available for each article, and as a result the data on which the research is based and which represented a considerable investment for the researcher (and funder) was often kept from the public record. Researchers carefully lock away the data and eventually dispose of it after a certain period of time (if only on researcher's retirement). Certainly in terms of research ethics, the identity of the participants in a study needs to be protected but locking up the files is not the only way of preserving the anonymity of a research subject and then there may be source documents (e.g., policies, directives, lesson plans) and research instruments whose inclusion in the public record would only serve to improve the "minutes of science." The ability for researchers and readers to consult the data, sources and instruments can serve to strengthen a study's claims and increase its contribution to other studies, through replication and re-analysis, as well as lead to better alignment of measures across related studies and a greater efficiency of data gathering and use.

While it has always been possible for researchers to write to other researchers requesting copies of their data, this new standard of public availability is one of the more scientifically promising developments in online publishing. At the same time, it needs to be recognized that this openness and sharing is part of a long-standing first principle of science and scholarship, which is now being taken to a new level, involving, for example, access for researchers around the world (David, 2007). That is not to say that this spirit of greater openness is bound to run headlong into the competitive and possessive nature of today's academic research culture. But even here, new online research ventures such as the Dataverse Network, which is dedicated to facilitating the online storage of research data sets, make it possible for researchers to not only easily create a secure archive for data, but to index it, license it (protecting attribution) and enable others to access it as easily as the related research, while gaining credit for sharing one's data and contributing to other's research by capturing how often it is cited and used (King, 2007).

What it means, then, to make one's research public is changing conceptually as well as technologically. A researcher constructs and crafts a study out of many elements, not least of which is the process of turning a study into a published work that forms part of the public record of educational research. The emphasis I am placing on this particular phase in the research process is not, it should be noted, about reducing any of the scholarly concerns with creating a thorough account of what research is about and would address, in all of the methodological and technical concerns that this can entail. What researchers have trained long and hard to do is to contribute to scholarly discourse, as it bears, in our case, on educational questions. It is a specialized discourse, yet at such, it has something new and fresh to add to the public circulation

of information and it is suddenly in a position, at this historic juncture, to increase the degree to which it is available, as scholarly work and not popular science, to democratic deliberations, as well as to professional decision-making among educators.

Will such exposure and use of research among a wider public change or alter it, will it open this work to misuse and misunderstanding, will it still leave most research un-read, will it attract seemingly undue attention to some research, will it result in researchers having to face new and more frequent questions about their work? Undoubtedly. But none of that strikes me, at least, as reason enough to ignore both the possibility and responsibility for making as much of this scholarly work as public as possible. Literacy in a democracy has this way of leading to unintended lessons and unexpected interests among new groups of readers. The working-classes in Great Britain responded keenly during the nineteenth century to the wealth of published work that was made available through lending libraries and cheap editions, reading well above what was assumed to be their literate station and doing so in unexpected ways (Rose 2001).

Something would seem terribly amiss, then, for educational researchers to be too busy researching education to notice that how their work remains unnecessarily isolated within its own little corner of the academy, effectively cut off from this newly revitalized public sphere by the toll-gate barriers of article or subscription costs (even when those costs support scholarly societies intended to represent their interests in the public sphere). As we hold to how much we care about the issues, the students and the teachers that we write about, it does not make a lot of sense to watch others selectively cull aspects of this work and represent it as the whole of the relevant educational research that bears on the schools today. We need to look to the consequences of the knowledge that we seek to contribute to education, consequences that have a lot to do with the logic of inquiry and the scientific scrutiny that the study receives, but consequences bound also to be affected by the sheer availability of the study. And to substantially increase that availability, all that we need do is fall into the habit of archiving our published work, occasionally publishing in open access journals and seriously considering the value of sharing our data sets. There appears no easier, more immediate way, at this point, to improve the scholarly and public standing of the work that we do and in that sense, to better represent full potential value of educational research.

References

- American Educational Research Association (AERA). (2006). Standards for Reporting on Empirical Social Science Research in AERA Publications. *Educational Researcher*, 35(6), 33-40.
- Banks, James. (1995). The Historical Reconstruction of Knowledge: Implications for Transformative Teaching. *Educational Researcher*, 24(2): 15-25
- Coombs, Jerrold R. (1997). Rorty, Critical Thought, and Philosophy of Education. *Philosophy of Education Society Yearbook*. http://www.ed.uiuc.edu/eps/PES-Yearbook/97_docs/coombs.html
- David, P. A. (2007). *The historical origins of "open science": An essay on patronage, reputation and common agency contracting in the scientific revolution*. Working paper, Stanford University.
- Dewey, J. (1988). The quest for certainty. In *The Later Works, 1925-1953*, Vol 4, 1929. Ed J. A. Boydston. Carbondale, IL: Southern Illinois University Press.
- Eliot, J. (1991). *Action research for educational change*. Philadelphia, Open University Press.

- Hammond, L. D. (2007). The Flat Earth and Education: How America's Commitment to Equity Will Determine Our Future, *Educational Researcher*, 36, 318-334.
- Harnad, S. (2006 September 27). Optimizing OA Self-Archiving Mandates: What? Where? When? Why? How? *Open Access Archivangelism* (Blog).
<http://openaccess.eprints.org/index.php?/archives/136-Optimizing-OA-Self-Archiving-Mandates-What-Where-When-Why-How.html>
- Hitchcock, Stephen (2007). The effect of open access and downloads ('hits') on citation impact: a bibliography of studies. Open Citation Project. <http://opcit.eprints.org/oacitation-biblio.html>
- King, Gary. (2007). An Introduction to the Dataverse Network as an Infrastructure for Data Sharing," *Sociological Methods and Research*, (32), 2: 173-199
<http://gking.harvard.edu/files/abs/dvn-abs.shtml>.
- Linn, Robert (2000). "Assessments and Accountability." *Educational Researcher*, 29(2): 4-16.
- McMurrer, Jennifer. (2007). "Choices, Changes and Challenges: Curriculum and Instruction in the NCLB Era." Washington, DC: Center on Education Policy.
<http://www.ecs.org/html/Document.asp?chouseid=7511>
- Rorty, R. (1979). *Philosophy and the mirror of nature*. Princeton, NJ: Princeton University Press.
- Rose, J. (2001). *The Intellectual Life of the British Working Classes*. New Haven, CN: Yale University Press.
- Shavelson, R. J., & Towne, L. (Eds.). (2002). *Scientific research in education*. Washington, DC: National Research Council, National Academy Press.
- Velterop, J. "Keeping the Minutes of Science" in Proceedings of Electronic Libraries and Visual Information Research (ELVIRA) Conference, Aslib, London, No. 2-14 May 1995.
- Willinsky, J. (2006). *The access principle: The case for open access to research and scholarship*. Cambridge, MA: MIT Press.