100 Years of Curriculum History, Theory, and Research

Alan H. Schoenfeld[1]

This article reviews a collection of papers written by the American Educational Research Association's first 50 presidents that deal specifically with curricular issues. It characterizes the ways in which curricula were conceptualized, implemented, and assessed, with an eye toward the epistemological and methodological framings that the authors brought to bear. The analysis reveals interesting lines of continuity as well as significant changes from 1916 until now, the Association's centennial anniversary.

Keywords: curriculum; historical analysis; mathematics education; reading; social studies education; testing

I want to begin with a note of thanks to the editors for their invitation to stroll down history lane. It's not something I might have done on my own; save for being informed by the history I've lived through, I tend to look forward rather than back. My assignment was to explore a collection of presidential and other papers that were related to the progress and challenges of education research in general and curriculum history in particular. American Educational Research Association (AERA) staff nominated candidate papers, all of which were written between 1916 and 1960, for my analysis. I decided to take a hermeneutic approach, focusing on the texts and what they revealed.

It may be trite but it is still true that what we see and what we write is a function of our epistemological world view—and that, more or less, is a function of the times in which we live. The "oldies but goodies" I reviewed all reflected the spirit of their times in clear ways. The ways in which the articles demonstrate similarities to current perspectives and/or run counter to them (sometimes in the same article!) reveal both continuity and change.

My hermeneutic exercise was fascinating in what it revealed and what it left unsaid or unaddressed. Although the papers were selected for their curricular import, there was no mention of curricular theory or of scholars, such as Dewey or Judd, who played fundamental roles in shaping mathematical curricula. And, needless to say, a lot has happened since 1960. I address these issues, albeit briefly, in a concluding discussion.

In the Beginning . . .

In many ways, the archived papers by AERA's very first two presidents, Frank Ballou (1916) and Walter S. Monroe (1917), establish the curricular, methodological, and epistemological parameters that run through the history of American education research.

Titled "Improving Instruction Through Educational Measurement," Ballou's (1916) paper is based on the following premise: "The ultimate purpose of all educational measurement is to increase the effectiveness of the instruction which the child achieves" (p. 354). Ballou posited three steps in the improvement process: (1) Measure current quality by the "best available standard tests," (2) make suggestions for improvement where tests reveal that things are not up to standard, and (3) give the below-standard schools time to improve and then retest. ("The suggestions cannot be given today and tests given tomorrow, or even next week"; Ballou, 1916, pp. 354–355).

In some ways this stance seems surprisingly modern—or perhaps I should say that the testing stance held by some "reformers" is surprisingly old-school. In some ways, it differs substantially. Then as now, the validity of the testing is unquestioned, at least by its adherents. Back then, there was no mention of high stakes or of consequences; the assumption was that the aim was improvement and that schools would be *supported* in the improvement process. This stands in sharp contrast to the sharply punitive implementation of the No Child Left Behind (2001) and Race to the Top (U.S. White House, 2009) assessments.

There are interesting differences in the framing of test scores. In 1916, the basis for standard setting was purely empirical. Here are the results for the first requirement for graduation from

[1]University of California, Berkeley, CA

Educational Researcher, Vol. 45 No. 2, pp. 105–111
DOI: 10.3102/0013189X16639025

elementary school, "accurate copying." The standard—"a graduate of elementary school should be able to copy at least twelve lines of simple prose or poetry and a bill of at least seven items"—was established by the Boston Board of Superintendents, and Ballou's job was to calibrate how well the student should be able to do it. To do so, he tested 4,944 recent elementary school graduates. The standard for accurate copying, based on the median achievement of these 4,944 pupils, reads as follows:

> A boy graduating from the elementary school should be able to copy fifteen and a half lines (four and a half inches long, or 30 ems of 10 point type) of ordinary prose, in fifteen minutes, making not more than five errors of any kind . . . A girl graduating from the elementary school should be able to copy sixteen lines of ordinary prose in fifteen minutes, making not more than five errors of any kind. (Ballou, 1916, p. 356)

Ironically, a third standard for a mixed class of boys and girls contained a copying error: "making nor [*sic*] more than four errors of any kind" (Ballou, 1916, p. 356). Note the setting of different proficiency standards for boys and girls. The issue of gender differences would take a half century to emerge as a research issue.

Note also the assumptions underlying the standard-setting process. The process was purely empirical: Once the desired performance (copying so many lines of text) was set out, the question of how well elementary school graduates should do so was settled by computing the average performance of recent graduates. This, as we shall see in the next paper as well (Monroe, 1917), is part of the "scientific" approach to education that was clearly being championed at the time. Just how scientific that approach was went unquestioned. That, alas, is hardly an unfamiliar issue. Just what *is* scientific in education research is a recurring and sometimes controversial theme, although rarely recognized as such by those who advance their own scientific agenda. As a recent case in point, consider the scientism involved in the imposition on the field of the "gold standard" of randomized controlled trials by the U.S. Department of Education in the early 2000s (see U.S. Department of Education, 2003, for a summary). That approach, grounded in the notion that a particular "scientific" approach was to be prized above all others, demeaned a wide range of scientific research. It was controversial and brought forth a more balanced perspective on the issue by a committee of the National Research Council (2002).

As noted, Ballou's stance was empirical—the average *should* be the standard. This makes sense within a particular logic, given that well-defined skills are the target performance: If something is being taught, then average performance is something everyone should shoot for. It also exemplifies a certain epistemological position: that tests are objective measures of what they set out to measure and that test scores represent a certain objective standard. I return to that issue later in this article.

Turning to the curriculum itself, what strikes the reader is the strong skills orientation of the enterprise. The goals of instruction were to teach the following:

Accurate copying, as discussed above. Also, penmanship experts were reviewing a sample of the accurate copying papers. A forthcoming report would indicate areas where improvements could be made.

Spelling. A list of vocabulary words, including "naphtha, phlegm, quadrilateral, reminiscence, sovereignty, and zephyr" (Ballou, 1916, p. 357) was given. The goal of testing was to sort out when students should be able to spell them. In addition, a committee of teachers was examining research on pedagogical methods to say which methods would be best.

Geography. The specifics were not given, but one does hear a complaint that would echo through school corridors for the next century:

> The most surprising result of this [geography] test is that so little of what has been taught in 6th grade remains in the minds of eighth grade, high school, or Normal School pupils. This test has indicated the urgent need of defining the minimum essentials on the course of study, if pupils graduating from the elementary school are to carry with them a knowledge of those common facts of geography which should be the intellectual possession of every person. (Ballou, 1916, pp. 357–358)

Addition of fractions. Of note is the fact that the fractions test (addition only) was given in sixth, seventh, and eighth grades. Norming would follow in the same way as with accurate copying.

Four fundamentals of arithmetic. "In May 2015 all of the seventy elementary schools [in Boston] were tested, involving 214 buildings and 55,277 pupils." (Ballou, 1916, p. 359)

There are many things to note about this list, perhaps the most central of which is the fundamentally *functional* notion of the curriculum—the idea being that there are certain knowledge and skills that people need in order to lead productive lives as citizens and wage earners. In short, there is content to be mastered; it is the schools' job to help students master it. A century later, we hear the echoes of this functionality in the calls for "21st-century skills."[1]

What a difference a century makes! Where 20th-century skills meant accurate copying and performing mathematical operations, 21st-century skills in mathematics include persevering in problem solving, putting together extended chains of reasoning, and modeling real-world situations (Common Core State Standards Initiative, 2010b); in English language arts, they include reading closely and making logical inferences from text, supporting conclusions with specific textual evidence, and assessing how point of view or purpose shapes the content and style of a text (Common Core State Standards Initiative, 2010a).

Similarly, the goal in 1916 and 100 years later is improvement. But here is how improvement was characterized a century ago:

> If these objective standards become the end to be attained by pupil and teacher, and if they become an incentive to both to put forth their best efforts or to economize time, as the case may be, the results cannot be other than a more homogeneous group of pupils in each class and grade. (Ballou, 1916, p. 359)

That is, improvement will help to enhance performance and thus reduce variance. Those are not the terms of contemporary dialogue, where lack of adequate improvement (to an arbitrary standard) has been grounds for punishment.

Walter Monroe's (1917) research paper, "The Ability to Place the Decimal Point in Division," sheds light on the ways that research provided analyses into thought processes in the early 20th century and, in many ways, long beyond. The big question at hand is, What are the "abilities" in arithmetic? As Monroe notes, prior research had shown that there are multiple abilities; the question was to identify them carefully so that they could then be enhanced by instruction. Of course this was long before calculating technologies were at hand. People couldn't whip out their smartphones to compute the answer to long divisions, such as

$$3\overline{)16.2},$$

so they needed to be able to compute the answer correctly, including the correct placement of the decimal point. Was placing the decimal point a separate ability?

The way to find out was to build a test that isolated the ability and then see if it was stable. The division above was the first item on one of many tests Monroe created. For each task, Monroe gave students the "answer" without the decimal point (in the long division above, 54) and asked students to insert the decimal point to give the correct answer (here, 5.4). Here was Monroe's reasoning:

> A pupil's performance depends upon several factors of which his ability is one. His performance is influenced by his physical condition, his mental and emotional status, the physical condition of the room, and particularly the way in which the tests are presented to him by the examiner. Thus, in order to be able to infer from the performances of a pupil whether the ability which functions in two different situations is a single general ability or two specific abilities, it is necessary to have the other factors which affect his performance as nearly constant as possible. In this investigation the same examiner gave the tests, and care was taken to have the other factors as constant as possible. Thus if the individual pupils made approximately the same relative scores on each of the tests, the evidence will indicate that the same ability functioned in all tests. On the other hand, if there are large differences in the two sets of scores, there will be evidence that the ability which functioned in one test was not the same ability that functioned in the other test. (Monroe, 1917, p. 289)

Monroe then goes on to discuss the correlations between the many tests he gave. As in Ballou's case, there is a clear logic to the approach: Tests isolate "abilities," which one can then focus on. An interesting thing to observe in this case is the awareness of the need to control for external factors—but, at the same time, the fact that little or no attention was given to children's instructional history.

In any case, the use of testing to document various "abilities" continued long into the 20th century. The constructs (e.g., verbal ability or spatial reasoning) may have been more complex, but the idea was the same: Certain "abilities," whether they can be taught or are thought of as being innate, contribute to—and "explain"—some percentage of performance. But what *explain* meant was very much open to question. As far as one could tell, having "verbal ability" meant scoring well on a test of verbal ability. How having such an ability actually contributed to the acts of reading, writing, or doing mathematics was not addressed at a level of mechanism. Thus, for example, as recently as 1981, I wrote the following in a review of a factor analysis study in which the author had given 22 tests, including tests of "figure matrices," "gestalt completion," and "problem solving":

> A statistical analysis revealed "six comparable common factors (Verbal, Two Induction, Numerical, Perceptual Speed, and General Mathematics)" for the whole sample, and slight differences for the male and female subsamples. It is not at all clear what these factors mean (save for their tautological meanings). Nor is it clear how these factors, which closely resemble the factors discovered in previous experimentation, can be of the least use. Without wishing to seem unduly harsh, I propose that there be a moratorium on this kind of study either until a profitable interpretation of such "factors" has been made or unless a particular study can provide in addition useful information about another kind of question. (Schoenfeld, 1981, p. 388)

Over the past quarter century, the use of such analyses has waned. Although descriptive statistics still play a very important role in characterizing educational phenomena, the increased use of complex, multimethod analyses to explore performance in detail and of more high-powered statistics for more complex large-scale analyses has been salutary.

The 1920s and '30s

Through the 1920s and '30s, AERA presidents represented disciplines as diverse as social studies (Harold Rugg, 1921), mathematics education (W. J. Osburn, 1927), reading (William Gray, 1933), and English composition (Harry Greene, 1937). Rugg (1921) issues a complaint about process that resonates today—just who gets to specify the curriculum, and how? He sees randomness and caprice where there should be order and science:

> I have recently made an exhaustive study of the procedure of all the national committees in history and in the other social studies beginning with the [1892] Committee of Ten. In no one of these reports is there stated definitely a scheme of criteria against which the validity of subject-matter can be checked. They all make recommendations as to the materials to be taught—nation and period to be studied—but no fundamental discussion of the bases of selection and of the placement of materials is given.
>
> This the curriculum-maker today regards as an essential first step, and he feels that committees should be stopped from recommending materials without a complete statement of criteria and organizing principles and before the materials have had a controlled and measured trial in a considerable number of public schools. The student of the curriculum takes the stand that committees of educational associations are doing more harm than good when they recommend courses of study before those courses of study have been thoroughly experimented upon. (Rugg, 1921, p. 694)

Plus ça change, plus c'est la même chose, n'est-ce pas?

Osburn (1927) addresses subtraction. I must quote his opening in full:

> There are three general types of subtraction, the additive, the take-away, and the complementary. Thus, in the subtraction example
>
> $$\begin{array}{r} 71 \\ \underline{-39}, \end{array}$$
>
> if we use the additive method, we may think, "9 and 2 are 11; write the 2; 3 and 3 are 6; write the 3." If we do the same example by the take-away method, we may think, "11 take away 9 are 2; 6 take away 3 are 3." Of course "less" or "minus" may be used instead of "take away." According to the complementary method we think, "9 from 1 I cannot take, so I take 9 from 10; 9 from 10 leaves 1; 1 and 1 are 2; write the 2; 3 from 6 leaves 3. Write the 3." (Osburn, 1927, p. 237)

Got that? Osburn goes on to prove, experimentally, which method is best. His findings, in the last paragraph of the article, follow:

> According to these data, a school which changes from the take away decomposition to the take-away equal-additions takes far less chances than all of us take in almost everything that we do. The superiority of equal-additions (carrying) over decomposition (borrowing) is "as certain as taxes" and "almost as certain as death." The superiority of the take-away equal-additions method over the additive is not so certain but most of our school procedure is decided upon when the chances of a wrong decision are much greater than one to sixteen. With sixteen gains to one loss all gamblers would get rich. (Osburn, 1927, p. 246)

Two quick notes. First, the focus on procedures as the be-all and end-all of mathematical instruction is, thankfully, something now documented as archaic and dangerous (see, e.g., Schoenfeld, 2004; Senk & Thompson, 2003). We now focus on conceptual understanding (that is, the procedures should be linked to children's understanding of how we represent numbers so that the procedures should make sense) and listening to students as they work on problems to see how they're making sense.[2] My second note is about sensemaking itself. Recently I had the privilege of watching one of the most exciting third-grade lessons I've ever seen, where the students were almost jumping out of their seats in excitement as they were led to discover (though they *did* know the formal procedure) that you don't have to use the formal procedure for a problem like the one discussed above by Osburn. After all, 39 is very close to 40, which is a nice number to work with. If you add 1 to the top and bottom in Osburn's subtraction example, you get

$$\begin{array}{r} 72 \\ \underline{-40}, \end{array}$$

which is so easy you can do it in your head. Now that's sensemaking and the kind of flexible understanding we (should) aim for today.

Gray (1933) wrote about changes in teaching reading. Keeping the Common Core standards in mind, it is worth considering the reforms he discusses. Gray describes earlier reforms that "improve[d] the methods by which young children were taught to read thoughtfully, fluently, accurately, and independently"; modified the content being read "to harmonize with the literary ideal"; and expanded the scope of readings (Gray, 1933, p. 161). But he had a clear agenda:

> The fact is universally recognized, for example, that education must be more closely integrated with social life in the future than in the past. The demand is insistent for greater enlightenment concerning the trends, institutions, and problems of contemporary social life. Equally urgent is the demand for the development of those interests, insights and abilities which will enable all citizens to participate more intelligently and zealously in remoulding American life. (Gray, 1933, p. 162)

And, what should they read?

> As soon as pupils have learned to engage in continuous meaningful reading from books, they should be introduced to very simple, interesting, challenging reading material in each of the fields of study that have large social significance, such as the social studies, the world of nature, health, art, and number. Some of the important aims of teaching such materials are to establish early a broad background of experience in each field, to develop and enrich essential meaning vocabularies, to initiate the development of habits of thinking and interpretation appropriate in each, and to cultivate important interests, attitudes and ideals. (Gray, 1933, p. 164)

This, in interesting ways, runs parallel to the Common Core State Standards English language arts standards (Common Core State Standards Initiative, 2010a), their full title being the Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects.

Greene (1937) turns to "Principles of Method in Elementary English Composition." His stance is simple: "Research in education . . . is important to the teacher only to the degree that it affects classroom practice." His article, introducing *The Fifth Annual Research Bulletin of the National Conference on Research in Elementary School English*, is aimed at translating research into practical guidelines. It has a table of contents that might well stand today: (1) modern points of view in language instruction, (2) content and grade placement of the language curriculum, (3) psychology of learning as applied to elementary English, (4) method in language teaching, (5) measurement of results of language instruction, and (6) remedial and corrective instruction in language (Greene, 1937, p. 103).

In this case, the categories are familiar but, of course, the insights and methods have changed substantially over the intervening years. *Plus c'est la même chose, plus ça change . . .*

The 1940s, '50s, and '60s

For lack of space, I will be more pointillist and selective in what follows.[3] Arthur Gates (1942) introduces a new trend—diagnosis and remediation in reading (!). Today such work is part of our instructional DNA. I must say that it was interesting to see the origins of a long-standing practice, buttressed by evidence that made a plausibility case for its implementation. Ernest Horn, in two coauthored chapters of a *Review of Educational Research* volume (Horn & Spencer, 1940; Spencer & Horn, 1940), provides introductions to the topics of spelling and speech. An excerpt from the former conveys the flavor of the reporting:

> Perhaps the most significant contribution made with regard to the vocabulary aspects of spelling within the past three years has been the emphasis upon the so-called "semantic" phases of the problem. Rinsland and Moore [citation] reported a study of some six million running words used by elementary-school children. This group was found to contain some 25,634 different words. This study is being continued to determine the meanings which are attached to the word forms as used. Lorge [citation] and Lorge and Thorndike [citation] reported a similar study of the frequency of meanings associated with multimeaning words used in a "representative sample of English and American writing." Such studies are designed to enable educators to select and to arrange for instruction the most important word forms and to provide for association with the various word forms the most common and important concepts which they are used to represent. (Horn & Spencer, 1940, p. 149)

David Russell's (1958) article "Some Research on the Impact of Reading" opens things up in a new way. Here is a part of the introduction:

> What happens to an adolescent who studies Elizabeth Barrett Browning's "How do I Love Thee?" or J. D. Salinger's *Catcher in the Rye?* Perhaps a hint about the effects of the latter book can be found in the estimates of Holden Caulfield's personality and character made by a group of California high school students. They said such individual things as "Holden is a bum," "He's a crazy mixed-up kid," "He's a sensitive boy," "He's almost like myself," "Holden Caulfield should have minded his parents," and "I can understand how he felt about school." Apparently interpretations, and possible effects, are individual matters. But we can scarcely be content with the generalization that the same story produces different effects in different people. (Russell, 1958, pp. 398–399)

From today's perspective, this seems so obvious as to be unremarkable. But, this was the first paper in the subset that I read that actually looked at learning from the student's point of view. Up until then, the questions had been What content should be taught? How should it be taught? The student was a black box, the recipient of instruction. Here for the first time, the learner as a sentient being, who actually responds to instruction as an individual, was being recognized. The field had not yet reached the point where individual cognition would be the focus of attention, but recognition of its importance represents a major potential turning point. Change was slow in coming, however.

Finally in terms of my tour of assigned papers, we come to the 1960s. Kenneth Anderson's papers (Anderson, 1962; Anderson & Edwards, 1962) are firmly planted in the view of science that was a leitmotif of all the papers I reviewed. The underlying perspective is crystal clear: If we just structure our experiments correctly, the best instructional treatments will be revealed. Anderson (1962) argues for factorial design in examining curricular innovation. But Anderson and Edwards (1962) also take us into the land of the future, with a breathless view of what technology can offer. Here is the framing in "The Educational Process and Programmed Instruction":

> The tempo of change has accelerated within our own lifetimes. . . . We have experienced an exponential growth in the production of radios since the crystal sets of 1923 and of passenger cars since 1905. We are now experiencing perhaps an even more rapid growth with regard to television. . . . The development of an industry from a zero point to a point of near saturation covers a period of time smaller than that during which any youth is required to attend school. Thus, each individual emerges from school into a world whose technological development and political and social organization differs consider ably from that of the world into which he was born. The implications of this last statement for education are horrendous, for accompanying the growth in population is the equally frightening explosion of knowledge. Thus, to the two great problems in modern education, quantity and quality, there seem to be no easy answers. (Anderson & Edwards, 1962, p. 537)

Enter technology to the possible rescue—in this case, the technology of programmed teaching, which "must find a place in the public schools" (Anderson & Edwards, 1962, p. 542). The technology should not be used indiscriminately, of course. Scientific experimentation will say how best to use it:

> The science researcher should use the powerful tool of analysis of variance and covariance to bolster the controlled experiment in science education, and insofar as possible consider in future studies the possibilities of varying all the essential conditions simultaneously by designs of the factorial type so that our findings will reflect natural settings and thus have wider applicability in our science teaching. When this becomes an accomplished fact, science teaching via realistic research will improve immensely. (Anderson, 1954, cited in Anderson & Edwards, 1962, pp. 553–554)

This last series of quotes distills a number of themes from the first 50 years of AERA's history. Some have been transcended. Others are alive and kicking, and others appear to have died, only to be reincarnated in different guise.

Reflections

Four major categories to consider are epistemology, methods, technology, and curriculum theory.

It is striking to note that "mind"—the mind of the learner, that is—was glaringly absent from almost all of the studies from 1916 to 1960; it was referred to (and obliquely at that) in just one report (Russell, 1958). Nowhere was there the idea that what went on in the mind of the learner was an important determinant of the learner's interaction with instruction. Indeed, for the behaviorists, the very concept of mind was anathema; the idea was to arrange the contingencies of instruction so that learning was optimized. In the years since 1960, the cognitive revolution, the expansion to sociocultural issues as fundamental drivers of thinking and learning, and notions of learning in and from communities of practice have transformed the field. So have understandings of what it means to be proficient in a domain. Today we think of the desired outcomes of mathematics learning as comprising not only students' mastery of facts and procedures but their emerging from instruction with certain dispositions, their persevering at problem solving, their being inclined to pursue mathematical connections, their being able to produce extended chains of reasoning and communicate them orally and in writing, and their seeing themselves as members of the mathematical community. With these as goals, one's conception of powerful mathematical instruction changes. And, once one has the understanding that not only students' content mastery but their beliefs, dispositions, and practices are all shaped by instruction, one's analytic lenses change as well. The same holds for reading and writing, for social studies, and for every other discipline.

Epistemological issues are deeply intertwined with issues of method, because how one explores issues of thinking, teaching, and learning depends very much on how one views those processes. This is an issue I have written about extensively (see, e.g., Schoenfeld, 1994, 2000, 2007, 2014). One key point is that most "treatment A versus treatment B" experiments are much more complex than the models used for their analyses. If two adjacent fields of corn were treated identically save for the amount of water or fertilizer they were given, then it is reasonable to assume that the variation in the difference in water or fertilizer was responsible for any differences in yield. But children are not ears of corn, and classrooms are not always interchangeable for statistical purposes. Whether a class meets before or after lunch or is taught by a teacher who "buys into" the instructional treatment may be a far more potent (and typically ignored) variable than the treatment itself.

We have seen for a century that the trappings of science are easy to mimic—but there is a big difference between being scientific and being scientistic (National Research Council, 2002). Doing science includes making tentative hypotheses, building models, conducting exploratory and explanatory studies of various types, and using appropriate quantitative and qualitative measures (better, both in concert) whenever possible. This is an issue in which the field has made great strides over the past 50 years—but we have a long way to go.

Issues of technology are also rooted in epistemology. If you have a simple view of knowledge and learning, it's easy to think there are simple fixes. In the 1960s, programmed instruction fit with a "blank slate" epistemology. That's gone, right? Well, not really. It has been reincarnated in many of the proposed tech fixes that one sees today. Having trouble with the quadratic formula or some other mathematical content? There's a YouTube video for you that explains exactly what you need—and since you have the choice (and since in some cases there are diagnostic programs to help you find the YouTube video you need), the approach is adaptive in the same way programmed instruction was, and more user-friendly. This may be more flashy than programmed teaching, but it's the same at heart. Alas, eternal vigilance is the price of a meaningful stance toward thinking, teaching, and learning.

A final comment on the hermeneutical survey from 1916 to 1960 is that some things are conspicuous by their absence. Reviewers of a draft of this manuscript observed not only that curriculum theory was absent but that there was no mention of curricular and philosophical giants, such as Dewey, Brownell, and Judd, in my draft. The reason is simple: There was no mention of these scholars at all in any of the papers I reviewed! Also largely invisible, except by implication, were any of the curricular conflicts or deeper rationales for curricular structure that have been a core aspect of education theory and research. We see indications of the pragmatic functions of curriculum, and the need for relevance, highlighted in some of the articles chosen for review—the skills orientation of Ballou (1916) and Monroe (1917), and Gray's (1933, p. 162) call for "the development of those interests, insights and abilities which will enable all citizens to participate more intelligently and zealously in remoulding American life." Such comments and orientations reflect the tip of the tip of the curriculum theory iceberg and the curricular battles over the century of AERA's existence. In providing the deep context for the "math wars" of the 1990s, the anthropologist Lisa Rosen (2000) characterizes three "master narratives" (or myths) regarding education in America,

> each of which celebrates a particular set of cultural ideals: *education for democratic equality* (the story that schools should serve the needs of democracy by promoting equality and providing training for citizenship); *education for social efficiency* (the story that schools should serve the needs of the social and economic order by training students to occupy different positions in society and the economy); and *education for social mobility* (the story that schools should serve the needs of individuals by providing the means of gaining advantage in competitions for social mobility). (Rosen, 2000, p. 4; see also Schoenfeld, 2004; Stanic, 1987)

As a mountain of curriculum scholarship indicates, these perspectives are still alive and kicking. Consider the idea of "cultural literacy" championed by E. D. Hirsch (1987), the "21st-century skills" movement that provides some of the underpinnings of the Common Core State Standards, and the emergence of critical theory and critical race theory (see, e.g., Ladson-Billings & Tate, 1995). Constrained by space limitations, I can give only passing mention to our field's vibrant literature on curriculum and curriculum theory.

For the same reason, I can only allude in passing to curricular trends beyond those in the presidential papers surveyed in this article. In mathematics alone, we have seen the "New Math" in the 1960s, "back to basics" in the 1970s, "problem solving" in the 1980s, and various iterations of standards (National Council of Teachers of Mathematics, 1989, 2000; Common Core State Standards Initiative, 2010a, 2010b) from 1989 to the current day. We have seen gender and race, and more generally, issues of equity, come to the fore. We have seen research on thinking and learning influence the standards and, through that influence, the creation of "standards-based" curricula. Technological changes are reshaping classroom possibilities, in not always healthy ways. The (re)discovery of mind—including aspects of productive thinking, such as problem-solving strategies, metacognition, and beliefs as objects of learning and instruction—and the reinvigoration of cultural issues as central concerns have led to creative ferment that in some ways is continuous with the trends of the first 50 years and in some ways goes beyond it.[4] We are experiencing the curses, and blessings, of living in interesting times.

Coda

As a researcher for more than 40 years, I've seen the field evolve enormously; by virtue of longevity rather than by design, I have somewhat of a historical view of the field. But the larger history is deeper, more exciting, and more entertaining than I had imagined. I want to end this essay with sincere thanks to the editors for their invitation to delve into the archives and the pleasures that the access provided. I extend the invitation to the reader as well. Have fun.

NOTES

The author gratefully acknowledges the helpful comments of the editor and two anonymous reviewers.

[1]There were, of course, competing philosophical perspectives on curricular goals. Such competing views were not to be seen in the articles themselves. I shall return to this point in the concluding discussion.

[2]Here I restrict my comments to issues of content. Issues of affect are something else altogether. There is a large literature on the impact of day after day of rote mathematics.

[3]There were more than a dozen relevant papers in the archives. My preference is to give the flavor of the pieces I work with, so I've spent most of my allotted space on just a few papers.

[4]See Schoenfeld (in press) for a discussion of all of these issues.

REFERENCES

Anderson, K. (1962). Avenues to the improvement of research in science education. In E. Obourne, P. Blackwood, & M. McKibben (Eds.), *Research in the teaching of science, July 1957–July 1959* (pp. 11–22). Washington, DC: U.S. Department of Health, Education, and Welfare, Office of Education.

Anderson, K., & Edwards, J. (1962). The educational process and programmed instruction. *Journal of Educational Research*, 55, 537–543.

Ballou, F. (1916). *Improving instruction through educational measurement*. Boston, MA: Department of Educational Investigation and Measurement.

Common Core State Standards Initiative. (2010a). *Common Core State Standards for mathematics*. Retrieved from http://www.corestandards.org/the-standards

Common Core State Standards Initiative. (2010b). *Common Core State Standards for English language arts*. Retrieved from http://www.corestandards.org/the-standards

Gates, A. I. (1942). Diagnosis and remediation in reading. *Elementary English Review*, *19*(8), 286–290.

Gray, W. (1933). New issues in teaching reading. *Elementary English Review*, *10*(7), 161–164.

Greene, H. A. (1937). Principles of method in elementary English composition. *Elementary English Review*, *14*(3), 103–109.

Hirsch, E. D. (1987). *Cultural literacy: What every American needs to know*. New York, NY: Vintage.

Horn, E., & Spencer, P. (1940). Spelling. *Review of Educational Research*, *10*(2), 149–151.

Ladson-Billings, G., & Tate, W. F., IV. (1995). Toward a critical race theory of education. *Teachers College Record*, *97*(1), 47–68.

Monroe, W. S. (1917). The ability to place the decimal point in division. *Elementary School Journal*, *18*, 287–293.

National Council of Teachers of Mathematics. (1989). *Curriculum and evaluation standards for school mathematics*. Reston, VA: Author.

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: Author.

National Research Council. (2002). *Scientific research in education* (R. J. Shavelson & L. Towne, Eds.). Washington, DC: National Academy Press.

No Child Left Behind Act of 2001, Pub. L. No. 107-110 (2001).

Osburn, W. J. (1927). How shall we subtract? *Elementary School Journal*, *16*(4), 237–246.

Rosen, L. (2000). *Calculating concerns: The politics or representation in California's "math wars"* (Unpublished doctoral dissertation). University of California, San Diego.

Rugg, H. (1921). Needed changes in the committee procedure of reconstructing the social studies. *Elementary School Journal*, *21*(9), 688–702.

Russell, D. H. (1958) Some research on the impact of reading. *English Journal*, *47*(7), 398–413.

Schoenfeld, A. H. (1981). Review of John G. Harvey and Thomas A. Romberg's *Problem-Solving Studies in Mathematics*. *Journal for Research in Mathematics Education*, *12*(5), 386–390.

Schoenfeld, A. H. (1994). A discourse on methods. *Journal for Research in Mathematics Education*, *25*(6), 697–710.

Schoenfeld, A. H. (2000) Purposes and methods of research in mathematics education. *Notices of the American Mathematical Society*, *47*(6), 2–10.

Schoenfeld, A. H. (2004). The math wars. *Educational Policy*, *18*(1), 253–286.

Schoenfeld, A. H. (2007). Method. In F. Lester (Ed.), *Handbook of research on mathematics teaching and learning* (2nd ed., pp. 69–107). Charlotte, NC: Information Age.

Schoenfeld, A. H. (2014). What makes for powerful classrooms, and how can we support teachers in creating them? *Educational Researcher*, *43*(8), 404–412. doi:10.3102/0013189X1455

Schoenfeld, A. H. (in press). Research in mathematics education. *Review of Research in Education*.

Senk, S., & Thompson, D. (Eds.). (2003). *Standards-based school mathematics curricula: What are they? What do students learn?* Mahwah, NJ: Lawrence Erlbaum.

Spencer, P., & Horn, E. (1940). Speech. *Review of Educational Research*, *10*(2), 149–151.

Stanic, G. M. A. (1987). Mathematics education in the United States at the beginning of the twentieth century. In T. S. Popkewitz (Ed.), *The formation of school subjects: The struggle for creating an American institution* (pp. 147–183). New York, NY: Falmer Press.

U.S. Department of Education. (2003). *Identifying and implementing educational practices supported by rigorous evidence: A user friendly guide*. Washington, DC: Institute for Education Sciences.

U.S. White House. (2009). *Fact sheet: The Race to the Top*. Retrieved from https://www.whitehouse.gov/the-press-office/fact-sheet-race-top

AUTHOR

ALAN H. SCHOENFELD, PhD, is the Elizabeth and Edward Conner Professor of Education at the University of California, Berkeley, Graduate School of Education, EMST, Tolman Hall, MC #1670, Berkeley, CA 94720; *alan@berkeley.edu*. His research is concerned with thinking, teaching, and learning writ large. He served as AERA president from 1998 to 1999.

Manuscript received November 9, 2015
Revision received February 1, 2016
Accepted February 2, 2016