Chapter 9
Research Evidence and the Common Core State Standards

Lorraine M. McDonnell and M. Stephen Weatherford

9.1 The Context

One of the most striking characteristics of US public education, a trait that sets it apart from other countries, has been the absence of national academic standards. Each state has had its own standards specifying the content and skills students are expected to master. However, this element of American exceptionalism began to disappear in 2010, as 45 states adopted common standards in mathematics and English language arts (ELA), setting in motion a fundamental policy change. The process by which these Common Core State Standards (CCSS) were promoted, developed, adopted, and are now being implemented is also notable. CCSS advocates and developers promised that the standards would be "research and evidence based." With that assurance, a group of policy entrepreneurs, standards writers, policymakers, and educators were expected to use education research as they crafted the CCSS. By highlighting research as the basis for the standards, CCSS proponents were distinguishing the basis of the Common Core from that of traditional state standards. In testimony before the House Committee on Education and Labor, the executive director of the Council of Chief State School Officers (CCSSO) noted that the CCSS

> …is being driven by evidence and research. In the past, standards were largely based on personal judgment to determine what concepts are in or out of standards, the process often becomes a negotiation, rather than a reflection on what the evidence and research tells [sic] us about the connection between K-12 experiences and success in higher education and promising careers. (Wilhoit 2009)

However, the reference to research and evidence suggested that the CCSS would be based on more than just findings from formal research studies. Several decades of policy analysis have documented that validated research is not the sole, or often

L.M. McDonnell (✉) • M.S. Weatherford
Department of Political Science, University of California – Santa Barbara, Santa Barbara, CA, USA
e-mail: mcdonnell@polsci.ucsb.edu

K.S. Finnigan and A.J. Daly (eds.), *Using Research Evidence in Education: From the Schoolhouse Door to Capitol Hill*, Policy Implications of Research in Education 2,
DOI 10.1007/978-3-319-04690-7_9,

even the most important, basis for policy choices (Stone 2012; Majone 1989). Therefore, in examining the CCSS, we have sought to think broadly about the process of policymaking. A key contribution of our research is to elaborate a typology of different kinds of evidence, ranging from the results of formal research studies to statistical data, judgments based on professional expertise, the personal experience of practitioners, existing policies and practice, and appeals to values articulated through stories and symbols.

The CCSS represent "an idea in motion," moving over the short span of 5 years from its initial conception to the policy agenda and on through the design, adoption, and now implementation process. This process has allowed us to trace the use of research in this major policy initiative in real time, where previous studies of research use have typically relied on the recollections of participants whose views of the process are often shaded by knowing the outcome. Its potential for addressing widely agreed shortfalls in US public education, moreover, meant that the Common Core has engaged a diverse array of actors and drawn on research to inform a variety of tasks. More than 25 organizations have been actively involved in the Common Core: most are interest groups representing specific constituencies, although some are advocates for particular policy agendas. Prominent among them are the National Governors Association (NGA) and the CCSSO that represent elected officials; these organizations acted as policy entrepreneurs in developing the CCSS. Other groups include teacher unions, civil rights organizations, foundations, private providers, and parent groups. Additionally, among the users of research and evidence are the professionals who drafted and reviewed the standards as well as the hundreds of thousands of educators who must now translate the Common Core into classroom instruction.

Over the course of this process, and especially at the stage when the new standards were developed and articulated with current state standards, new communication channels were opened and old ones reinvigorated. The resulting networks linked researchers with curriculum and testing experts in states and school districts, with teachers and teacher organizations, and with public and private entities that supply textbooks, tests, and teacher professional development.

9.2 Frameworks

Because the CCSS initiative is essentially an education reform policy, our conceptual lens is grounded in the policy analytic and political science research literature. Three strands are especially relevant. The first focuses on the policy process and specifies how research and other evidence use vary over phases of the policy cycle. For example, because the solutions or policy options that are considered typically depend on how a policy problem is defined, research-based evidence may be interwoven with normative arguments that appeal to elected officials' and their constituents' core values. In this phase, evidence use typically consists of research and statistics that define the nature, distribution, and likely causes of a problem combined with the strategic use of a variety of evidences linking a problem definition to a particular policy option (Stone 2012; Kingdon 1995). In contrast, once policy

options reach the agendas of decision-making institutions, evidence use again combines research and other information, but the focus is on informing the details of policy design – e.g., the effects of different funding mechanisms and administrative arrangements – while also maintaining support and minimizing opposition to the proposed policy. Similarly, other phases, such as policy enactment and implementation, evoke the use of evidence in different combinations.

A second strand of our conceptual framework focuses on explaining a defining characteristic of the CCSS and also exploring a more general dimension of evidence use in policymaking. The question specific to the CCSS is: why was this initiative successful after previous attempts to move the United States toward national standards had failed? One likely reason is that Common Core proponents had learned from earlier efforts to draft voluntary national standards that had become enmeshed in controversies over curricular values and fears of federal encroachment (Rothman 2011). Political and policy conditions had changed over the ensuring decades, but CCSS advocates had to discern what those changes were and their implications for the design and advancement of a new approach to national standards. The broader issue is how policy entrepreneurs use evidence – including research knowledge – about past policy successes and failures in shaping their substantive and strategic agendas.

Organizational learning requires that institutional actors identify and understand the factors contributing to past successes and failures. In doing so, they need to draw inferences from their experience and that of others and then use those inferences to shape and guide future behavior (Levitt and March 1988). That process requires collecting and analyzing information to identify problems and their causes, searching for solutions, and applying them to improve performance (Mahler 2009). In a policy context, organizational learning may take two different forms: political learning that results in more sophisticated advocacy of a policy and policy learning that leads to changes in a policy's scope or its implementation plan. May (1992) notes that the evidence for political learning often involves a shift in advocates' tactics, while policy learning is typically associated with more fundamental changes, including redefined objectives. Although policy learning may lead to altered goals, it can also result in a reaffirmation of the proposed policy's original goals, but with a shift in its scope or targets.

Because of our interest in evidence use, we elaborated our focus on learning by drawing on theories of information processing. Jones and Baumgartner (2005) define information processing as "collecting and assembling, interpreting, and prioritizing signals from the environment" (p. 7). These signals are characterized by uncertainty and ambiguity because it is often not clear if the external environment has actually changed or in what way, thus complicating learning by policy entrepreneurs. Nevertheless, to the extent that they can collect, distill, and validly interpret information about the external environment, they gain a valuable resource not only to aid in their own learning, but also one that can be used as part of their advocacy strategies.

We utilize a third and final body of theory to analyze the interplay between researchers and policymakers. We interpret the process through which research (and other types of systematic evidence) is integrated into policy or practice as analogous with attitude change and persuasion and uses the theoretical approach pioneered in cognitive psychology (Petty and Cacioppo 1986; Bohner et al. 2008). As with the

process of coming to a new opinion about an issue, the use of research in an ongoing activity involves more than simply learning new information; the recipient must see the new information as relevant and credible and also understand how its use could improve the ongoing activity (Bohner and Dickel 2011; Holyoak and Chang 2011; cf. Spillane et al. 2002). Thus, this perspective distinguishes two stages in the process of taking up new information: the communication of new ideas and their supporting evidence, and the comprehension and integration of that new information in the context of previously established behaviors and organizational routines (cf. Kennedy 1983; Davies and Nutley 2008).

9.3 Methods

This analysis draws on three data sources.[1] The first is interviews with leaders of the Common Core movement, interest groups supporting the CCSS, members of the work groups and committees charged with writing and validating the CCSS, national and state education policymakers, groups critical of the CCSS, and private providers of curricular and professional development materials. Between May 2011 and June 2013, 116 interviews were conducted at the national level and in California, Indiana, Massachusetts, and Tennessee.[2] These structured interviews focused on the politics and process of Common Core promotion, development, and adoption; why participants chose to use certain types of evidence and what other types were either unavailable or not used; and what they see as major implementation challenges and the types of information and evidence that would be most useful in addressing them. These interviews are the primary basis for the findings presented in this chapter.[3]

[1] The study on which this chapter is based was supported by a grant from the W. T. Grant Foundation as part of its Uses of Research Evidence Program. We were assisted in our data collection by Lisa Argyle, Alex Cortez, Marika Fain, Cecilia Farfan-Mendez, Jeanette Yih Harvie, Natalie Miller, Arlene Perez, Mabel Perez, Kristoffer Smemo, Chelsy Thompson, and Kimberly Zilles at UC Santa Barbara and by Stephanie E. Dean, Ashley Clark Perry, and Lindsay Shouldis at the Hunt Institute.

[2] These four states were selected to provide regional variation and to include representation from states receiving Race to the Top funding and ones not receiving it. Half the interviews were conducted with national-level actors; the balance was divided among respondents in the four states. National-level respondents ranged from congressional staff to executive directors of national organizations (including teachers, school boards, and civil rights groups as well as groups focused on general education policy advocacy), in addition to participants in the CCSS process (including the drafters and members of work groups and validating committees). State-level respondents included state education agency leadership, legislators, university researchers, teachers, and representatives of education policy advocacy groups.

[3] About 10 % of the interviews were conducted over the telephone, the remainder in person. The average duration of the interviews was between 45 and 60 min. Interviewees were assured that their responses would be confidential and not attributed to them or their organization, so only their role positions are noted in citing interview data.

A second data source are research reports, policy briefs, speeches, blog posts, press releases, media accounts, and Congressional testimony related to the CCSS that were produced between 2006 and the end of 2011. Approximately 1,500 artifacts were archived and a sample of 30 %, stratified by stage of the policy process and type of organization producing the artifact, were coded.[4] The coding captures the type of evidence cited, the intended audience, the policy issues discussed, how they have been framed in the CCSS process, and their links to other artifacts and organizations.

The final data source is participant observer notes from weekly conference calls between September 2010 and January 2011 among groups engaged in implementing the CCSS. Initiated and moderated by the Hunt Institute, the confidential calls typically involved 7–14 "advocacy partners," including organizations representing elected officials, teachers and administrators, higher education, parents, and non-profit private providers, most linked by common sources of funding for their work on the CCSS. The participants discuss their individual and shared activities, political developments that advance or threaten the Common Core, and their upcoming information needs. The notes chronicle the continuing role of organizations that serve as research and information intermediaries for various policymaker, professional, and public audiences.

9.4 Findings

The story of the CCSS – its implementation, effects, and the role of research in shaping it – will not be fully known for a decade or more. Yet its early history suggests three major conclusions about the use of research and other types of evidence in promoting the fundamental policy shift that the Common Core represents. The first is that, consistent with the literature on policy analysis, research use differed over stages of the Common Core's development and that variation served both substantive and strategic purposes. Second, advocates learned from the experience of prior standards-based reform attempts, and this political and policy learning enriched the CCSS process in several ways, including fostering a more discerning assessment of the political conditions for change; a more robust appreciation for the federal structure of American education governance, resulting in a state-led (rather than a federal) initiative; and a sharpened sensitivity to the danger that ideology and partisan competition could derail reform if the initiative did not maintain a clear problem focus. Third, throughout the process policy advocates, researchers, and

[4] In addition to those produced by organizations active in the Common Core movement, news articles, op-eds, editorials, and blog posts on the CCSS which have been published by *Education Week*, the *New York Times*, and the *Washington Post* are among the artifacts that have been archived and coded. Similar artifacts were also archived from the largest circulation newspapers in each of the four states (*Los Angeles Times, Indianapolis Star Tribune, Boston Globe*, and the *Memphis Commercial Appeal*).

policymakers combined formal, peer-reviewed research findings with other types of evidence – particularly statistical data, expert judgment, and practitioner knowledge – in a process of collaborative problem-solving that successfully spanned the oft-lamented gap between the "cultures" of research and practice.

9.4.1 Research Use over the Stages of the Policy Development Process

In promoting the idea of standards common across multiple states, advocates used research-based evidence in making two arguments in support of the policy. Drawing on data from the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS), they argued that the achievement of US students is low as compared with the nation's economic competitors and that unlike the United States, countries with high-achieving students have focused, rigorous, and coherent national standards. For groups with an equity agenda, even more compelling were arguments based on data showing persistent patterns of differential achievement among students depending on their race/ethnicity, social class, and place of residence; students' lack of preparation for postsecondary education or employment; and significant variation among states in the rigor of their standards.[5]

These arguments were substantive in their reliance on international data documenting variations in student performance and suggesting a relationship between test scores and differential learning opportunities. Decades of research highlighted the shortcomings of the United States' fragmented approach to specifying what students should know as compared with other countries' more coherent and focused approach to academic standards. At the same time, research was used strategically in defining the problem of US students' low and variable achievement as one that could be addressed by adopting national standards. Although the achievement of US students as compared with peers in other countries and the generally low quality of state standards were generally accepted, there was less agreement about the relationship between standards and achievement or the causes of the differing levels of achievement by US students. Diagnosing the reason for the relationship, in short, required interpretation, and CCSS proponents identified the cause of US students' low achievement as due to states' low and variable quality standards. That strategic framing pointed to common standards as the primary solution (National Governors Association 2008). In contrast, and as we might expect from the literature on strategic framing (Stone 2012; Majone 1989), some researchers drew a different conclusion and emphasized the lack of system capacity, especially supports for teachers and students (Cohen and Moffitt 2009).

[5] We discuss the use of evidence during this early phase of the CCSS in McDonnell and Weatherford (2013).

This same combination of substantive and strategic purposes extended into the development and adoption of the standards. At one level, the CCSS development process was a technical task characterized by the systematic use of research and other types of evidence.[6] Consistent with its promised reliance on research-based evidence, a variety of sources were used, including peer-reviewed journal articles, research syntheses prepared by expert panels convened by federal agencies and professional associations, surveys of postsecondary faculty, and reviews of international test data and the standards of high-performing countries. So, for example, among the works consulted in drafting the mathematics standards were scholarly studies related to teaching mathematics to young children, the final report of the National Mathematics Advisory Panel, National Research Council reports synthesizing research on how people learn, analyses of PISA and TIMSS, the NAEP mathematics frameworks, and standards from about a dozen countries and five US states that had what were considered rigorous mathematics standards (Common Core State Standards Initiative 2010).

However, in addition to producing the mathematics and ELA standards, CCSSO, NGA, and their allies had to concentrate on several other tasks. They needed to ensure that those who would be responsible for adopting and implementing the CCSS, especially state officials and classroom teachers, were invested in the endeavor. Consequently, groups representing those constituencies were regularly consulted, given draft standards to review, and their input seriously considered. In obtaining input from state officials through continued consultation with state departments of education and from interactions with teachers convened by the two national teacher unions, the standards writers were acting strategically. They were also using a different kind of evidence than the results of formal research, viz., the judgments of expert state administrators and experienced classroom teachers about the content of the standards and about how to smooth the process of implementing them. The process of collecting that evidence was strategic in that it helped build trust and acceptance of the standards among key constituencies.

However, the evidence itself played a critical substantive role because it was based on the expert judgments of practitioners familiar with how standards operate once they are translated into classroom instruction. Although past research could provide some information about the school and classroom implementation of standards, input from practitioners not only lent greater credibility to the development process, but it also provided the writers with more finely grained information about the linkages between standards and classroom practice. Classroom teachers were especially attentive to the instructional logic inherent in the order of standards across grade levels and to the language used in communicating the intent of each standard. Members of the American Federation of Teachers (AFT) who were among the teacher reviewers talked about focusing on the Common Core's utility in the classroom and its ability

[6] For more details on the different types of research and other evidence used in the standards development process, see Weatherford and McDonnell (2013).

to guide instruction. So, for example, mathematics teachers wanted to see a balance between an emphasis on deep conceptual understanding of mathematical concepts and students' mastery of mathematical procedures (Personal interviews, AFT 2010). During the adoption process, research and other evidence were used strategically to convince state boards of education to substitute the CCSS for their current state-specific standards. The same research findings that had been used to build the initial case for moving toward common standards were repeated in state venues through vehicles such as presentations to the state board of education and in media outlets through letters to the editor and op-ed articles. To assist state-level CCSS supporters, CCSSO and NGA provided a "messaging toolkit" with talking points and sample content for letters to the editor and op-ed articles. In California, for example, then-president of the State Board of Education (SBE), Ted Mitchell, published an op-ed article just prior to the SBE's vote on the CCSS. He echoed points outlined in national discussions and the toolkit: that the Common Core "has been informed by the best available evidence," that it reflects "the realities of the classroom" and "includes rigorous content and skills," and that "the standards are benchmarked to those of other top-performing countries" (Mitchell 2010). At the same time, he raised a controversial issue specific to California about teaching algebra in the eighth grade and argued that the mathematics CCSS better prepare students for algebra and provide another option for students not ready for algebra in the eighth grade.

These generic sources were augmented with analyses comparing the CCSS in detail with current state standards as a basis for demonstrating that the Common Core is at least as rigorous in the topics and skills covered as the state standards and in most cases more coherent and focused. One of the states where such an analysis was critical to support for adoption of the CCSS was Massachusetts because it had both high standards and relatively high student achievement as compared with other US states. With funding from the Gates Foundation, the Massachusetts Business Alliance for Education (MBAE) commissioned WestEd to analyze the extent to which the revised Massachusetts state standards corresponded with the CCSS. In a 500-page report, WestEd presented a crosswalk analysis of the two sets of standards and assessed their degree of alignment on content skills and knowledge, depth of knowledge, and the clarity and measurability of each standard by grade and content area. Because WestEd concluded that both the Massachusetts standards and the CCSS overlapped in content coverage and were comparable in clarity and measurability, the MBAE board decided that Massachusetts "couldn't go wrong either way" in adopting either its own recently revised standards or the CCSS. However, it supported adoption of the CCSS and urged the SBE to incorporate where appropriate Massachusetts standards not reflected in the Common Core (Personal interviews, MBAE 2010; WestEd 2010).[7]

[7] In collaboration with the Massachusetts Department of Education, Achieve also conducted a comparative content analysis of the revised Massachusetts standards and the CCSS and found a 90 % alignment overall. However, MBAE commissioned the WestEd analysis because it perceived Achieve as biased, stemming from its support of the Common Core. The Massachusetts SBE unanimously adopted the CCSS on July 21, 2010. At the same time, one of the major groups

9.4.2 Research Use and Political and Policy Learning

The explanation for the combined use of research for substantive and strategic purposes lies in a second finding about research as a resource in political and policy learning. Because of the highly visible and divisive failure of earlier attempts to promote national standards, the success of the Common Core depended on both political learning, yielding more sophisticated advocacy of the idea, and policy learning, leading to reshaping the institutional arrangements by which standards were developed and would operate. The first challenge for those promoting national standards was to discern, given signals from the policy environment, whether conditions had changed so that national standards were now more politically feasible. Based on several different indicators, the Common Core leaders decided that conditions were now more favorable than in the 1990s. These signals included the participation of 16 states in the American Diploma Project with its common college- and career-ready high school graduation requirements; public opinion polls indicating support for national standards; and state policymakers beginning to see the potential cost advantages of common standards, especially given the requirements of No Child Left Behind (Rothman 2011; Personal interviews). One of the leaders of the CCSS initiative explained how he and his colleagues interpreted these indicators and used them in their advocacy with state policymakers:

> …we had very disparate standards across the country. That was particularly revealed with No Child Left Behind because it required states to define "proficiency" based on their standards, and then to define cut scores. So you had states demonstrating widely different ideas of what they expected kids to know to be ready for the 21st century. That just seemed to me to drive us toward a common core that more truly reflected where we wanted to go…
>
> …to legislators, I would often use a cost-effective argument: Do you really want to be in this business 50 times and try to come up with the best standards, or do you want to pool your efforts at the state-level – not the federal – to collaborate. And I would point to some early examples of collaboration – New England [NECAP], Achieve was already underway with their Algebra II standards. It was important to have some examples of where this was already happening and producing good results.

However, even with greater support than in the past, the resulting policy proposal had to avoid two pitfalls of past attempts: it could not appear to be a federal or even a national incursion into state authority, and it could not become entangled in ideological disputes over curricular values. The first obstacle was avoided when CCSSO and NGA took the lead in organizing the development of the initiative. Constituency organizations representing state officials, CCSSO and NGA outlined an adoption process that would proceed on a state-by-state basis, according to the policy enactment rules of each state. In corresponding fashion, the organizers' insistence that the development process be research and evidence based helped to avoid the second pitfall. Policy learning helps explain much about how this effort was organized.

---

opposing the CCSS, the Pioneer Institute, is located in Boston and continues to argue that the state's adoption of the Common Core is weakening the quality of academic content in the state's classrooms (personal interviews).

Lessons were drawn from the failure of the G. H. W. Bush and Clinton administrations' proposals for national standards and from the "curriculum wars" of the 1990s that had threatened standards policies in some states.

Relying on research and evidence as a primary foundation for the CCSS had the substantive benefit of grounding them in available knowledge about developmental processes, teaching and learning, the structure and logic of disciplines such as mathematics, and the skills needed for students to be prepared for college or for entry-level careers. At the same time, this approach was also strategic. CCSS leaders acknowledged that their commitment to ground the effort in research and evidence was a strategy to avoid past ideological debates that had plagued standards and assessment policies in a number of states during the 1990s (Personal interviews; McDonnell and Weatherford 2013).

The success of the CCSS will ultimately depend on how much policy learning has occurred about the necessary conditions for successful classroom implementation of top-down policies. Although the enabling resources necessary for the CCSS to produce their intended effects – such as instructional materials and provisions for professional development to prepare teachers to work with the new content – were not stressed as the idea of Common Core standards was promoted and developed, its advocates understood that its promise depends on effective implementation. Some 20 years of standards-based reform had taught that lesson.

We do not yet know the extent to which research will be used during the CCSS implementation process. Our interviews with those responsible for implementation in four states and with a number of private providers suggest that use is likely to vary across states and local districts depending on the resources available to support educators, including the strength and quality of existing professional development networks, and whether states and districts have additional funding from sources such as foundations and the federal Race to the Top program. The ambitious aims of the Common Core State Standards, along with the fact that state education budgets have been cut all across the country, mean that implementing the Common Core will also depend much more than with past curriculum reforms on the resources available from hundreds of nonprofit and for-profit providers of instructional materials and professional development. These materials, widely advertised as aligned with the CCSS, will doubtless vary in their effectiveness, because no central body is assessing the quality of the materials being produced by an increasingly dense network of private providers, or the degree of their alignment with the CCSS. Even if the quality of materials and their alignment with the Common Core can be assessed by state agencies and local districts, using tools such as the publishers' criteria for mathematics and ELA developed by the standards writers (Coleman and Pimentel 2012; National Governors Association et al. 2012, 2013), there is still the challenge of how new materials can be incorporated into ongoing instruction. As a researcher working closely with districts in California noted:

> I do think that there is currently a dearth of really strong aligned materials, so availability right now is an issue, but what I see is going to be a bigger issue is there's going to be a ton of stuff out there…The issue is knowing how to use it, knowing how to incorporate materials into your instructional program, into your curriculum, how do you actually build curriculum that reflects the Common Core?

Private providers are playing a critical role in that process and in doing so, they are drawing on a range of evidences. Some market their materials as designed "by teachers for teachers" and draw on surveys of teachers and the developers' experience in working with teachers. Other providers are relying on the former teachers and teacher educators who prepare the instructional materials and professional development programs they sell to revise and adapt existing products for the CCSS. In contrast, some major providers, with funding from sources such as the Gates Foundation, draw directly on research to create templates that teachers can then adapt to their local contexts. One example is the Mathematics Design Collaborative (MDC) whose work on formative assessments is based on research conducted by the Shell Centre at the University of Nottingham and at UC Berkeley. In these cases, research-based evidence is used in such a way that it can be integrated with "the wisdom of practice" (Personal interviews, Phillips and Wong 2012).

9.4.3 Combining Research with Other Types of Evidence

That approach leads to our third and final finding: throughout the CCSS process, research has been resourcefully combined with other types of evidence. The political nature of the adoption phase made it appropriate to invoke the sort of strategic reasoning that called on evidence such as teachers' and state officials' judgments, public opinion data, and past policies. However, the integration of research with other types of evidence was an equally prominent part of the process when the purposes were more substantive and technical, as during the formulation and writing of the standards. Certainly the experience of educators, working with different types of students in different institutional contexts, can augment research knowledge. However, there are also aspects of the standards where the relevant research is incomplete or its findings mixed. In those instances, CCSS proponents had to draw on multiple sources of evidence if standards development was to be completed in a timely manner.

For example, research on learning trajectories in mathematics is quite robust at the K-2 level, but not at higher grade levels.[8] Trajectories are better developed in the early grades because developmental psychologists have compiled a rich research base about children's early learning and because concepts and skills at the early childhood level are simpler than the more complex topics and sequencing in advanced mathematics (Clements 2011, p. 20). But the notion of learning progressions was a crucial idea in organizing the standards beyond the research-rich early grades, to ensure that the sequence of topics taught in successive grades would be

[8] Learning trajectories or progressions are defined as "empirically supported hypotheses about the levels or waypoints of thinking, knowledge, skill in using knowledge, that students are likely to go through as they learn mathematics and one hopes, reach or exceed the common goals set for learning. Trajectories involve hypotheses both about the order and nature of the steps toward the goals of school mathematics" (Daro et al. 2011, p. 12). Researchers acknowledge the probabilistic nature of learning progressions and that existing ones require additional examination (Sztajin et al. 2012).

logical and avoid redundancy. Consequently, the standards writers had to look to expert judgments as a substitute for knowledge gained from research studies. They asked multiple researchers, including mathematicians who drew on their knowledge of the logic of mathematics as a discipline and the foundations for higher-level study to offer their best judgment of the appropriate progression of standards, and scholars who study math education, who drew on the research literature on how students learn to assemble their best judgment about what trajectories might look like in higher grades. They then used those inferences in placing topic and skill standards at appropriate grade levels (Personal interviews).

9.5 Conclusion and Implications

The Common Core State Standards initiative involved innovation in both politics and policy. The politics of formulating the CCSS, as much as the process of persuading 45 states to adopt the standards, has been distinguished by an appreciation of the operation of the US federal system at a moment of unusual partisan polarization. Although the idea of strengthening content standards in K-12 education and making standards more uniform across the country was widely seen to comprise an attractive response to the poor showing US students' achievement in international comparisons, previous attempts to move forward with the most obvious version of this reform – national standards disseminated from Washington, D.C. – had generated intense opposition. It took the entrepreneurial insights, and the confidence born of experience in elected office, of a few state-level leaders and organizations to imagine how two risky gambles could cut through the stalemate. Could the states collaborate, where the tradition had been distinctiveness? The leaders of NGA and CCSSO succeeded in organizing a reform process led from the states and yet capable of producing standards that were clearer, higher, and more coherent than what most states had produced alone. But the process would have foundered, if it had become mired in the polarized politics that typify Washington and many state capitals. Could the conventional competition among organized stakeholders over educational standards be set aside in the interests of formulating and adopting better, common standards? The firm admonition that the reform would be "research and evidence based" was intended to transform the historical pattern of standard-setting in the states, but it was unclear at the time whether relying on the stature and legitimacy of scholarly research could succeed in parrying interest groups' drive to capture the process. In the end – although neither the process nor the product is perfect and the implementation of CCSS remains a fragile work in progress – seasoned observers from across the spectrum agree that the accomplishment is quite remarkable. This historic process is clearly one from which useful lessons can be drawn.

Our research, including close observation of the process, document analysis, and interviews with key participants, allows us to contribute to knowledge about the use of research in policy in three ways. First, the challenge of tracing the evolution of a policy initiative in real time forced us to develop techniques that previous scholars,

typically observing research use well after the fact, could not utilize. We were able to collect an unprecedented range of documentary information, including formal reports but also press releases, blogs, and advocacy publications – many of which are naturally ephemeral, living out their short life-spans in service to one stage of the policy process. In addition, our interviews with advocates, standards writers, researchers involved in reviewing draft standards, state and district administrators, and teachers took place while they were participating in the process, thus ensuring that their knowledge of events was fresh rather than recollected after a long interlude and often allowing us to check their interpretations and reflections against subsequent public statements and actions.

Second, tracing the process through which the standards documents were produced, and the more overtly political process that brought the standards forward for adoption by the states, pushed us to develop a more thoroughly elaborated concept of "evidence." The CCSS process was distinguished by a rich set of exchanges involving researchers, practitioners, and policymakers, and the currency for these exchanges was "research and evidence" relevant to improving educational standards. One of the strengths of the process, of course, was to invite active engagement by participants from a range of vocational communities and knowledge cultures, but their collaboration hinged on the willingness and capability to move out of their disciplinary niches to appreciate the different ways the evidence helped push the search for solutions forward. The willingness to consult evidence other than peer-reviewed research was especially important in areas where the cumulation of formal research has not yet obtained closure on some question of educational practice or policy, but where progress on formulating standards required setting out a provisional statement. Observing this process led us to reconceptualize the notion of "evidence," developing a typology anchored by the paradigm of peer-reviewed research but also including statistical data, the expert judgments of professionals, the experience-based reflections of practitioners, and even values-based advocacy in some situations. In this conception, the properties of formal research set a standard for validity, but other forms of evidence can carry warrants that are not qualitatively disjoint but differ along a common continuum.

Third, the empirical results of our research encourage us to underline the importance of two aspects of the process of research use in the Common Core State Standards movement: policy learning and networks of communication and information exchange. Neither of these concepts is new, but when we trace the development of CCSS, it is possible to map out their role with a degree of detail and concreteness unavailable in most studies of research use. Specifically, we have been able to observe each of the stages of policy learning, as we traced the way different participants engaged in collecting information about recent events, processing the information and interpreting it in light of previous political and policy choices, reflecting on their experience and drawing inferences, and then considering and deciding to change strategy or to continue on the same course. It is a truism that networks of communication are important for the transmission of new information, such as the results of recent research. But the CCSS process revealed changes – some serendipitous, some intentional – in the crucial network variables of size, density, and age.

The magnitude of the proposed reform created an incentive for actors to join the debate from various corners of the system, from organizations representing occupational groupings such as teachers, to corporations that supply textbooks and tests, to civil rights groups, to representatives of political units such as school districts and state governments. The potential was high for combat among interest groups to dominate the process. Some organizers, however, sought to structure communication to foster cooperation and deflect competition, and they were able to secure foundation funding to deepen ties among established organizations and in a few cases to create new networks of groups advocating standards-based reform. By increasing the density of network ties – creating new links among groups who may share interests in CCSS but had not previously worked together and strengthening existing ties by multiplying the topics on which networked groups communicate – entrepreneurial organizers and funders were able to craft the architecture for cooperative advocacy.

Finally, it is worth noting three implications that we believe our research holds for policy and practice. First, the organizers were successful early on in framing the way people thought about the problem and in shaping the message. The process was centered on a concrete, relatively delimited problem (rather than a large, ideological goal or the ill-fitting summation of the separate demands of coalition partners), and the norm was established that the process would be research and evidence based. This was essential, not only to focusing the work and giving it a clear trajectory but also to circumscribing the role of narrow interests and side-payments that would have undermined the push for strengthening standards and dissipated their coherence. Second, the attention to communication, particularly by creating new networks and revivifying established ties, served two critical functions. As communication channels, the networks kept major players in touch with the progress of the writing group, as well as creating a culture of accountability by transmitting feedback from stakeholders to those working directly on the standards. And as foci for cooperative advocacy work, the networks made it possible to craft well-planned communications when campaigning for the standards with state officials and the public, and to respond to critics with an informed, univocal message. Third, the inclusive nature of the process, undergirded by the implicit acceptance of an image of legitimate evidence that honored different types and sources of evidence but held all claims to comparable standards, made it possible to build and maintain an exceptionally broad-based coalition, spanning not only a wide range of intellectual disciplines but also engaging players whose political views would usually have put them at odds.

References

American Federation of Teachers. (2010, April 15). *Teachers make their mark on Common Core State Standards*. AFT News. http://www.aft.org/newspubs/news/2010/04150standards.cfn

Bohner, G., & Dickel, N. (2011). Attitudes and attitude change. *Annual Review of Psychology, 62*, 391–417.

Bohner, H. E., Erb, H.-P., & Siebler, F. (2008). Information processing approaches to persuasion: Integrating assumptions from dual- and single-processing perspectives. In W. D. Crano & R. Prislin (Eds.), *Attitudes and attitude change* (pp. 161–188). New York: Psychology Press.

Clements, D. (2011, October 27). What do we know about content and curriculum? In *Research in mathematics education: Where do we go from here?* Proceedings. Institute for Research on Mathematics and Science Education, Michigan State University, Washington, DC.

Cohen, D. K., & Moffitt, S. L. (2009). *The ordeal of equality: Did federal regulation fix the schools?* Cambridge, MA: Harvard University Press.

Coleman, D., & Pimentel, S. (2012). *Revised publishers' criteria for the Common Core State Standards in English language arts and literacy, grades 3–12*. www.corestandards.org/assets/publishers_criteria_for_3–12.pdf

Common Core State Standards Initiative. (2010). *Common Core State Standards for mathematics*. www.corestandards.org/Math

Daro, P., Mosher, F. A., & Corcoran, T. (2011). *Learning trajectories in mathematics: A foundation for standards, curriculum, assessment, and instruction* (Research Report #R-68). New York: Consortium for Policy Research in Education.

Davies, H. T. O., & Nutley, S. M. (2008). *Learning more about how research-based knowledge gets used: Guidance in the development of new empirical research*. New York: W.T. Grant Foundation.

Holyoak, K. J., & Chang, P. W. (2011). Causal learning and inference as rational process: The new synthesis. *Annual Review of Psychology, 62*, 135–163.

Jones, B. D., & Baumgartner, F. R. (2005). *The politics of attention*. Chicago: University of Chicago Press.

Kennedy, M. M. (1983). Working knowledge. *Knowledge: Creation, Diffusion, Utilization, 5*, 193–211.

Kingdon, J. W. (1995). *Agenda, alternatives, and public policies* (2nd ed.). New York: Harper Collins.

Levitt, B., & March, J. G. (1988). Organizational learning. *Annual Review of Sociology, 14*, 319–340.

Mahler, J. G. (2009). *Organizational learning at NASA*. Washington, DC: Georgetown University Press.

Majone, G. (1989). *Evidence, argument, and persuasion in the policy process*. New Haven: Yale University Press.

Massachusetts Business Alliance for Education. (2010, July 21). *Statement to the Massachusetts Board of Elementary and Secondary Education in favor of adoption of the Common Core State Standards*. Boston: Author.

May, P. J. (1992). Policy learning and failure. *Journal of Public Policy, 12*(4), 331–354.

McDonnell, L. M., & Weatherford, M. S. (2013). Evidence use and the Common Core State Standards movement: From problem definition to policy adoption. *American Journal of Education, 120*(1), 1–25.

Mitchell, T. (2010, July 30). Common educational standards for common good. *San Francisco Chronicle*, p. A-14.

National Governors Association, Council of Chief State School Officers, & Achieve. (2008). *Benchmarking for success: Ensuring U.S. students receive a world-class education*. Washington, DC: Author.

National Governors Association, Council of Chief State School Officers, Achieve, Council of Great City Schools, & National Association of State Boards of Education. (2012). *K-8 publishers' criteria for the Common Core State Standards for mathematics*. www.corestandards.org/assets/math_publishers_criteria_k-8_summer2012_final.pdf

National Governors Association, Council of Chief State School Officers, Achieve, Council of Great City Schools, & National Association of State Boards of Education. (2013). *High school publishers' criteria for the Common Core State Standards for mathematics*. www.corestandards.org/assets/math_publishers_criteria_hs

Petty, R. E., & Cacioppo, J. T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change*. New York: Springer.

Phillips, V., & Wong, C. (2012). Teaching to the Common Core by design not accident. *Phi Delta Kappa, 93*(7), 31–37.

Rothman, R. (2011). *Something in common*. Cambridge, MA: Harvard Education Press.

Spillane, J. P., Reiser, B. J., & Reimer, T. (2002). Policy implementation and cognition: Reframing and refocusing implementation research. *Review of Educational Research, 72*, 387–431.

Stone, D. (2012). *Policy paradox*. New York: W.W. Norton.

Sztajin, P., Confrey, J., Wilson, P. H., & Edgington, C. (2012). Learning trajectory-based instruction: Toward a theory of teaching. *Educational Researcher, 41*(5), 147–156.

Weatherford, M. S., & McDonnell, L. M. (2013). *Evidence use in education policy: A new perspective on an old problem*. Santa Barbara: University of California.

WestEd. (2010). *Analysis of the Commonwealth of Massachusetts state standards and the Common Core Standards for English language arts and mathematics*. San Francisco: Author.

Wilhoit, G. (2009, December 4). *Improving our competitiveness: Common core education standards*. Prepared testimony before the Committee on Education and Labor, U.S. House of Representatives.