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In Defense of the Common Core Standards

Joshua Bleiberg and Darrell West

Joshua Bleiberg is Center Coordinator at Brookings' Center for Technology Innovation and is managing editor of the TechTank blog.

Darrell M. West is vice president and director of Governance Studies and founding director of the Center for Technology Innovation at Brookings. His studies include technology policy, electronic government, and mass media.

INTRODUCTION

The Common Core State Standards (CCSS) are under attack from the right and the left. Liberals fear that policy makers will use the standards to punish teachers. Conservatives believe the Common Core is an attempt by the federal government to take over schools. Supporters of the Core have their own bipartisan alliance that argues standards will help eliminate achievement gaps. This paper mounts a fresh defense of the Common Core and argues that there are numerous benefits to standards. We draw on the lessons of economic standards and point out that education standards create a platform that encourages the development of groundbreaking new ideas. Standards can increase coordination between diverse sets of stakeholders which aids in school reform. Well implemented education standards increase innovation, simplify the transfer of ideas, and improve personalized learning systems.

STANDARDS DEFINED

The National Education Association was the first organization to codify a set of educational guidelines at the end of the 19th century.[1] Years later states required schools across the country to adopt standards. The passage of No Child Left Behind mandated all states to have rigorous standards in place. Despite the law, there is still considerable variation in the quality of state standards.

Education standards set goals for teaching and learning. A standard includes a set of competencies and the level of education attainment that reflects when the student should acquire that knowledge. They include an extensive list of

skills and sub-skills along with an appropriate grade level. For example CCSS.Math.Content.6.EE.A.1 "Write and evaluate numerical expressions involving whole-number exponents" conveys a great deal of information.[2] CCSS, Math, and Content indicate this is a Common Core State Standard and covers Mathematical content. 6 indicates that the content is appropriate for sixth graders and EE stands for the domain "Expressions & Equations". Finally A1 refers to the standard itself. In practical terms the standard means that a student upon completion of the sixth grade ought to be able to demonstrate that skill.

Curriculum and standards together form the core components of teaching. Curriculum is the substance and the tools of teaching. It combines textbooks, teaching materials, and lesson plans. It also includes how the teacher chooses to deliver the lesson, how they tailor it to their students, and the order in which they deliver content. Curriculum is the providence of the teacher and each one approaches it from their unique perspective. There is considerable overlap between both standards and curriculum. In some cases standards can explicitly require certain lessons. For example the Texas Essential Knowledge and Skills require the teaching of Texas history.[3]

Teachers use standards as a road map for instruction. The writers of the Common Core recognized the tension between standards and curriculum. The Core's introduction argues that "the Standards define what all students are expected to know and be able to do, not how teachers should teach. For instance, the use of play with young children is not specified by the Standards, but it is welcome as a valuable activity in its own right and as a way to help students meet the expectations in this document…The Standards must therefore be complemented by a well-developed, content-rich curriculum consistent with the expectations laid out in this document."[4] High quality education is only possible with both rigorous standards and excellent curriculum.

The political alliance supporting the Common Core remains strong as only a few states have not adopted the standards. But the political future of standards based reform is far from clear. Full national adoption, support of implementation efforts, and resistance to tinker with the standards will all maximize the positive outcomes. It is reasonable to assume, even in the worst case scenario, the benefits of standards will be attenuated but still a net positive.

The Pros and Cons of Standards Based Reform

Standards based reform has its roots in state efforts from the 1980s. Supporters of this approach argue that norms are essential to improving the overall quality of the education system and to eliminating achievement gaps. This approach raises expectations and holds stakeholders responsible for reaching goals. Standards based reform has three main policy components.

1. First, rigorous new standards require educators to align and improve their instruction.[5]

2. Second, assessments based on standards evaluate student learning.

3. Finally, accountability policies hold students and teachers responsible for meeting those standards.

Standards based reform has many detractors who have serious concerns. They argue that standards are prescriptive and place too many restrictions on teachers. Teaching is a dynamic process that requires adapting to individual students. Many districts may direct teachers to use scripted lessons devoid of differentiated teaching techniques. Some would go further to argue that standards themselves are anathema to learning. They contend that students learn through self-directed processes of exploration and discovery. In this model standards disrupt learning in an attempt to impose order.

Core critics also believe the accountability provisions of standards based reform are unnecessarily punitive. Students from impoverished families or those with disabilities face significant challenges in meeting grade level proficiency. Standards demand that all students reach the same high level. The contention is that teachers are given lofty goals but not the resources to achieve them. Furthermore, some experts argue that standardized tests are not valid measures of what students learn.

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Past standards based reform efforts did not yield positive results. Research has revealed a weak relationship between the rigor of standards and test scores on NAEP.

Generally speaking there is little evidence that improving standards will improve student achievement.[6] Other research found that harmonizing standards between states (the aim of the Common Core) would have little impact. No Child Left Behind required each state to have its own standards in place so today standards are already "common" within states.[7]

Common Core will succeed where past standards based reform efforts have failed. Education reformers contend that the Common Core Standards were designed with teacher, researcher, and pedagogy expert feedback.[8] A recent analysis of standards from across the country found that the Common Core was better than most state standards. Byrd and others found that the Common Core was superior to state standards for 39 states in math and 37 states in English. For 33 states the standards are superior to both.[9]

The Common Core assessments are preferable to current tests. The two Common Core Testing consortia (SBAC and PARCC) have each designed their own assessments. Students complete the Common Core tests on computers rather than using a paper and pencil. Computer based tests have a number of advantages. They are easier to score than paper based tests which can take months to grade. Paper tests are more expensive to print and administer than computer based tests. Eliminating paper tests with hand written answers also limits a source of scoring error. Computer based tests can build accommodations for students into the assessments itself. Test vendors can also make computer based tests adaptive. Adaptive tests tailor questions to the skill level of the students. Students can complete adaptive tests quicker because they have fewer items on average. Adaptive tests also have improved reliability for very strong and very weak students.[10] Finally computer based tests make cheating for students and teachers more difficult because there are no paper answer sheets which are easy to manipulate.[11] The Common Core tests also include performance assessments which can assess a wider range of skills than multiple choice questions. Assessing a larger domain improves the validity of inferences. If properly written they can help guard against unnecessary narrowing of the curriculum.

The cost of Common Core implementation is difficult to predict. The Common Core tests will cost less than previous examinations.[12] States currently purchase their own assessments from test vendors. The Common Core allows states to combine their purchasing power and drive the prices of assessments down. Computer based tests are also less expensive to develop and administer. The costs of professional development and purchasing new course materials will impose substantial costs on schools. State and federal governments should do more to provide funds to tide them over in the interim.

Economics and Standards

The economics literature on standards demonstrates the value of this approach to innovation. In the broadest sense standards are a set of technical specifications reached through a formal negotiation and agreement process. There is no universally accepted definition or typology for standards across different sectors. The methods in which different fields use and define standards vary greatly. In his seminal paper, David Hemenway wrote, "Ironically, standards have not been completely standardized."[13] Few have engaged in the intellectual exercise of comparing the effects of standards across sectors. The way teachers use education standards bears little in common with how other professionals like electricians use standards. However, understanding the similarities and differences between standards in other sectors and in education helps elucidate their potential impact in school reform.

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There are numerous ways to categorize standards and a useful approach to describe the differences between them is by focusing on their effects. The following typology is based on Swann's groundbreaking work on standards. Swann describes four types of standards: compatibility and interface, minimum quality and safety, variety reduction, information and measurement.[14] Compatibility and interface standards are a series of technical specifications that allow different components to function with each other. For example the Plain Old Telephone System (POTS) allows users to call any phone number regardless of the telecommunications service provider or phone manufacturer. An agreement to use a specific design benefits everyone involved.[15] Minimum quality and safety standards are a series of processes that guarantee some minimal level of effectiveness for a product. For example without a system to credential doctors, patients would have a difficult time ascertaining whether they were quacks or highly qualified.[16] Variety reduction standards are a design that has specifications for size or quality. The most common example is the DIN A4 standard also known as letter format (8.5 by 11 inches). Standardizing paper size enables mass production of paper, printers, and many other products.[17] Information and measurement standards are a hybrid of minimum quality and variety reduction standards. Gasoline grades use both information and measurement standards. They inform consumers that the product is compatible with all cars. In addition they guarantee a minimum level of quality and limit the types of

gasoline available.[18]

Education standards do not fit cleanly into Swann's typology. There are elements of minimum quality, variety reduction, and information in education standards, which provides an interesting starting point for analysis and comparison. The main intent of standards in education is to ensure a baseline level of instruction quality. Another motive behind education standards is to minimize variation in learning goals across classrooms, schools, and districts. The strongest parallel between education and Swann's typology are information and measurements standards. The designers of standards intend to establish an architecture to assess educational outcomes that provides information to teachers, policy makers, and parents.

Education standards also impact curriculum materials in addition to teaching. Curriculum materials fit more cleanly into Swann's typology because the standards intentionally have more clearly defined goals for these products than for teachers. A test not aligned with the standards is useless whereas a teacher who differentiates instruction is desirable. Standards define which curriculum materials are appropriate and which are not through establishing a system to measure teaching materials and students. Education standards serve as the guide for the tests, textbooks, and numerous other teaching tools. For this reason it is easier to predict how full standards adoption will impact curricula materials than it is to predict the impacts for teaching.

The Benefits of Standards

Much of the economics standards literature is dedicated to the study of direct network effects. Direct network effects occur when an individual user of a product directly benefits from the number of other users. For example as the number telephone users increases so too does the value for owning a phone for each other user. Conversely there is no value to owning a communication system that no one else uses. Switching costs occur when technologies are not compatible with each other. For example iPhone applications will not work on an Android phone. Switching from one operating system to another would not just include the cost of the new system but also the loss of using the old system. Switching costs prevent users from leaving the network and lure others to join. Early adopters choose a system, stay with it because of switching costs, and then other users join because the value of joining increases along with the number of users. [19]

An example of the benefits of standards occurred more than a century ago. In 1904,

a nameless person took a puff from their cigar or cigarette. An ember drifted down into the basement of the John Hurst and Company building and started a hellacious fire that ripped through the city of Baltimore. Fire fighters were called and came from across the Mid-Atlantic. But many of the firefighters quickly realized they could do little to help. Many of those responding brought hoses that did not fit the Baltimore fire hydrants. Despite the presence of over 1,200 firefighters the fire dealt a devastating blow to Baltimore. Seven city blocks, about 1,500 buildings, and approximately 2,500 businesses burned to the ground.

The Great Baltimore Fire was a tragedy but also a failure of standards.

The Great Baltimore Fire was a tragedy but also a failure of standards. A study from the National Bureau of Standards – the precursor to the National Institute of Standards and Technology – found in 1904 that departments around the country used 600 different fire-hose couplings. Seemingly insignificant differences in pipe thread tapering had outsized consequences when collaboration between firefighters was necessary. In the aftermath of the fire stakeholders including insurance underwriters, Fire Chiefs, and utility workers gathered to develop national standards for the sizes of hydrants and pumpers. Today they are still known as the Baltimore standards.[20]

Standards whether they apply to hydrants or teaching are meant to simplify complicated problems. We ask too much of our teachers. It is unreasonable to give them a classroom full of students and take full responsibility for teaching them on their own. To provide support researchers and innovators need an avenue into classrooms. Standards create a platform that allows for the delivery of new techniques and technologies. Together through standards Americas educators can begin the desperately needed transformation our education system.

Another benefit of standards is indirect network effects. Indirect network effects occur in complex systems that have multiple components. The greater the number of people who use a system improves the utility of each individual using that system. When choosing between two similar products like Blue-Ray or HD-DVD the user wants the system with the greatest number of users because studios will have an incentive to release more movies for that system. Utility doesn't increase linearly with each new user, but after a critical mass is reached all users benefit because of confidence the system will continue to receive support.[21]

Education standards could generate network effects for personalized learning systems. The Common Core map skills to individual standards. This process is key to developing personalized learning systems which rely on big data analysis. The algorithms that underlie these technologies need people to attribute meaning to the data. A computer can't identify that a student needed to understand quadratic equations to answer a multiple choice question on a test. Because standards differ across states developers of these systems must remap the standards numerous times. This is expensive and time consuming. After the Common Core software developers can design tools for any state that uses the national standards. Switching costs will go into effect for schools that considered moving away from the Core because personalized learning software would no longer work.

Other indirect network effects would likely create benefits for standards adopters. The greater the number of districts and states that adopt the Common Core the greater the incentive for the developers of curriculum materials to develop products for the market. Furthermore, once the size of the network reaches a certain point, a bandwagon effect develops and the pace of adoption accelerates. This corresponds with increased investment from the private sector in developing new curriculum materials.[22]

Minimum quality standards can help ameliorate information asymmetries. When a consumer lacks basic information about a product it increases the probability of making a bad choice. In many cases repeated purchasing or information disclosure can eliminate information asymmetries. However, this is not possible in many cases because purchasing occurs infrequently or information is not available. Leland's research demonstrates that government requirements for minimum quality or quality discrimination standards can help to correct this market failure.[23]

Variety reducing standards allow firms to take advantage of economies of scale to lower prices for curriculum materials. Reducing the number of standards means fewer product skews for textbooks and other educational products. This reduces costs for companies who can pass on lower prices to schools. For example an assessment designer can write items and then use them for all states rather then write specialized test items which is expensive and time consuming. This is one of the reasons why Common Core assessments are inexpensive.[24]

Standards can mitigate "penguin effects." Farrell and Saloner explain that adopters of new technologies often act like penguins. They write, "Penguins who must enter the water to find food often delay doing so because they fear the presence of predators. Each

would prefer some other penguin to test the waters first."[25] The adoption of standards signals to prospective users a sufficiently large number of customers will "jump into the water" at the same time. This limits the risk of early adopters but also other users wary of making the change. The adoption of more rigorous standards is politically perilous for a district or state. If states agree to simultaneous adoption then blame is diffused across organizational and political boundaries.[26]

Model of How National Standards Could Improve Education

Past versions of standards had systemic flaws. Standards in some states were incoherent and not useful as guiding documents. Additionally, some districts had multiple sets of standards that were technically aligned but difficult to use. For example certain school districts had their own standards that were more rigorous than mandated state standards. Others used both the state standards for math and for national standards like the National Council for Teachers of Mathematics. Some states omitted entire grades from their standards. Predictably the effect of unintelligible and duplicative standards is to confuse teachers.

Research on standards suggests that a harmonization tipping point exists. The benefits of adopting standards are proportional to the number of participants and the degree to which they embrace the standards. Utility from each additional adopter is low initially until a stable network develops at which point a bandwagon effect begins. Then these guides have a larger positive impact on each individual user.[27] It is possible that past standards efforts have failed to reach this tipping point because of a lack of user adoption.

According to the popular definition of standards, they serve as a countervailing force to innovation that restricts flexibility and creativity. Paradoxically, standards spark innovation. Agreeing to coordinate certain technologies or strategies allows creators space and time to focus on solving problems. The developer of an application for a mobile phone doesn't need to invent the phone, the gyroscope in it, or the code for taking a picture. Similarly, standards let teachers focus on how to help their students learn. Standards then make it easy to plug a lesson from

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another teacher into their own curriculum. They also have benefits for the developers of curriculum materials. Critically standards allow innovators to take calculated risks. Large incumbent firms dominate education content creation. New entrants can take the time to develop materials that work with the Common Core knowing the standards will remain in place for years. They can also test new products on a small scale in a particular classroom and have greater confidence about their effectiveness in other classrooms across the nation. Education is in desperate need of innovation which standards can help to support.[28]

The Common Core can make it easier to communicate ideas between and within the professions that contribute to education. The organizational structure of schooling is insulated from change. Teachers are largely cloistered in their classrooms. Other professionals like psychologists, cognitive development experts, social workers and others remain largely isolated from the process of teaching. Standards create a common language for discussing the goals of education. For example consider how a leading researcher would try to improve education in the status quo. They might develop a series of interventions they find has positive impacts and then design a curriculum. Eventually someone may cite that work as a part of professional development or in a book. Alternatively researchers could study students who struggled with a specific standard and develop tailored interventions. Instead of a generic finding of increased reading proficiency the specific strategy would have far greater value for practitioners. The merit of standards is how they refocus professionals to work in ways that mutually benefit each other.

National standards will likely have the largest potential benefit on personalized learning systems. Although education technology has improved by leaps and bounds over the past decade. Personalized learning is far from commonplace. Standards could push teaching software into new territory for several reasons. First, standards allow for even larger big data systems. The ubiquity of the term big data has rendered the name meaningless. However, there are scales of big data. The data that Amazon uses is an order of magnitude larger than anything in the education sector. Using the same standards and assessments allows researchers to compare and access larger troves of data. The increased size makes a real difference after splits for specific demographics. For example a database that includes hundreds of thousands of students may have only a few low income students with learning disabilities who attend charter schools. As the students in a sample decreases so too does the statistical power which can turn strong results into weak ones. Standards can also fundamentally improve how big data analytics work. In most big data systems researchers understand learning as the greater likelihood

that a student answers a question. Incorporating larger data sets both in terms of the number of students but also in the type of assessments allows personalized learning designers to develop a more robust definition of learning than a correct answer on a series of multiple choice questions. Together these changes could lead to a personalized learning revolution.

Policy Recommendations

To summarize, we argue that Common Core standards offer several virtues in terms of innovation, collaboration, and personalized learning. There are many logistical obstacles to overcome, but adherence to the Common Core approach offers a number of benefits.

In order to maximize the likelihood of positive outcomes, we suggest several recommendations designed to improve the odds of successful implementation. They include the following:

1) The Common Core should vigorously enforce their licensing agreement. Their copyright allows anyone to use the standards free of charge. The license only allows the use of the standards, "for purposes that support the Common Core State Standards Initiative."[29] In the past textbook writers and others have inappropriately claimed that they aligned course content. This situation is further complicated by the relationship between some content publishers who financially supported the Core. Nonetheless the NGA and CCSSO should recognize that low quality content could sink the standards and enforce their copyright accordingly.

2) The federal government should provide financial incentives for the adoption of Common Core. Ideally Congress would reauthorize the Elementary and Secondary Education Act with provisions that increase the aid to states who adopt the standards and assessments. Additionally, action from the Hill could help with inappropriate labeling of course materials. A reauthorized law could include rules for using federal aid on curriculum materials that were improperly aligned with the Common Core. The federal government could also continue to incentivize the adoption of standards through competitive grant programs like Race to the Top.

3) All levels of government should stay agnostic to curriculum but not to the implementation of standards. Curriculum choices should remain the purview of educators. However, states and the federal government should pay close attention

to implementation. If schools need more money for professional development or for additional curriculum materials then government needs to provide additional financial support or provide more time for reforms.

4) The leaders of the Common Core need to engage teacher unions. Teachers support rigorous standards but rightfully worry about rushed implementation and overly harsh accountability policies. Formal support of the Common Core from the NEA and the AFT would serve as a huge boon to the process of national standards. Government officials ought to make the compromises necessary to gain such support. Standards work best when all users believe in the value of the system. If teachers lose faith and ignore the standards then the reform is doomed to fail.

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The Brookings Institution
1775 Massachusetts Ave., NW
Washington, DC 20036
Tel: 202.797.6090
Fax: 202.797.6144
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Beth Stone

Email your comments to gscomments@brookings.edu