

A Time for Deeper Learning: Preparing Students for a Changing World

Our increasingly complex world demands much of its students. In almost every aspect of their lives, young people are being asked to learn more, process more, and produce more. These increasing demands mirror the world around them. Now more than ever, the nation's education system is being challenged by a technology-driven global economy that requires a skilled and deeply literate workforce.

In recent years, a national consensus has emerged around what should be the educational expectations for all students. Rigorous standards for college and career readiness developed by state leaders have now been adopted by forty-four states and the District of Columbia. State leaders have also formed two unique consortia that are designing a new generation of assessments to support these standards. This shared agreement among so many states to educate all students to the same high levels of achievement represents a major shift in the nation's attitude about public education.

Unfortunately, the nation's educational infrastructure is not currently designed to support this important shift in education goals. In order for all students to meet high standards of college and career readiness, young people will need to leave high school with deep content knowledge and the skills most prized in a changing world economy. To accomplish that, policy and practice at the federal, state, and local levels will need to support *deeper learning*, the knowledge and skills all students will need to succeed in college, career, and life.

This paper describes deeper learning, with regard to both its necessity and the growing body of global evidence supporting its wide-scale implementation. While providing a picture of what deeper learning might look like in classrooms, this brief also describes the policy changes necessary to ensure that all students have opportunities for the kind of learning needed in an increasingly complex world.

Deeper Learning: An Imperative For All Students

Deeper learning is simply what highly effective educators have always provided: the delivery of rich core content to students in innovative ways that allow them to learn and then apply what they have learned. Rigorous core content is the heart of the learning process; true deeper learning is developing competencies that enable graduating high school students to be college and career ready and then make maximum use of their knowledge in life and work.

The basic concepts of deeper learning are not new to education; indeed, they are routine educational practice for many accomplished individual teachers and educators and some high-performing schools. These successful practices are now being confirmed by increasing bodies of evidence underscoring the necessity for deeper learning as an integral part of the educational process.

Deeper learning prepares students to

- know and master core academic content;
- think critically and solve complex problems;
- work collaboratively;
- communicate effectively; and
- be self-directed and able to incorporate feedback.

The evidence from international studies dramatically demonstrates that deeper learning produces high academic performance. The assessments, studies, and reports conducted by the Organisation of Economic Co-operation and Development (OECD), the leading international organization of the world's most-developed nations, provide thorough support for the effectiveness of deeper learning. The leading example comes from the results of the Programme for International Student Assessment (PISA), which every three years measures fifteen-year-olds' knowledge and their ability to apply that knowledge to real-world situations.

OECD's vision of PISA illustrates core deeper learning principles. As described by the OECD,

PISA assessments are designed not only to find out whether students have mastered a particular curriculum, but also whether they can apply the knowledge they have gained and the skills they have acquired to the new challenges of an increasingly industrialized world. Thus, the purpose of the assessments is to inform countries on the degree to which students are prepared for life.¹

In this collaborative assessment effort by seventy countries, a main characteristic of the highest-performing nations, such as Shanghai–China, is that students regularly have opportunities to engage in deeper learning. As an OECD report accompanying the recent PISA results concludes,

[T]he inquiry-based curriculum component in Shanghai–China asks students, with support and guidance from teachers, to identify research topics based on their experiences, seeking to develop the capacity of students to learn to learn, think creatively and critically, participate in social life, and promote social welfare ... Teachers' performances are now also evaluated by the time given to student participation and how well student activities are organized.²

Unfortunately, PISA scores show U.S. students trailing behind students in other developed countries in the application of key subjects like reading, math and science.³ The performance of underserved students in the United States on PISA exams is especially worrisome. There is a huge gap between the lowest and highest achievers on the PISA exams in reading, with fifteen-year-olds from families with lower socioeconomic status scoring about 20 percent lower than their peers from families with higher status.⁴ These findings are especially troubling because other countries have demonstrated that socioeconomic status need not define educational opportunity. The correlation between socioeconomic status and PISA scores among U.S. students is more than twice that of the highest-performing systems, among them Finland, Hong Kong, and Canada.

PISA exams are some of the best available and most widely used tests of deeper learning. Looking at how students perform on PISA can tell us a great deal about how many students are truly engaging in the kind of work that experts feel is necessary to succeed in college and compete in the global workforce. An excellent example of that comes from another study by the OECD that followed 30,000 Canadian students for six years after they took the PISA exam in 2000. The study found that students



that scored at the top PISA level of reading proficiency (Level 5) were twenty times more likely to access university than those scoring at or below Level 1.⁵

To thrive in an increasingly complex and dynamic world, one must grasp the fundamentals of scientific inquiry and analytical thinking, know where to find reliable information, and be able to communicate and work with other people. David Conley, a leading thinker on postsecondary success, argues that success in post secondary education depends on a range of “key cognitive strategies” that are neither well taught nor well measured by existing practice and tests. These cognitive strategies include critical thinking and problem solving, as well as the ability to make reasoned arguments. These strategies are important not only in college but also in the workplace. Conley’s research is supported by surveys of both faculty members and leading business organizations that have identified critical thinking, problem solving, and communication and interpersonal skills—all competencies closely aligned to deeper learning—as the qualities necessary for college and career success.

A shift toward all students mastering the kind of advanced skills embodied in deeper learning comes at a time when many schools continue to struggle to teach even basic skills. National assessments show that many U.S. students are not achieving basic proficiency in the essential areas of reading, writing, math, and science. Some would argue that the nation’s schools need to focus on the “basic” and leave deeper learning for those schools that can afford to teach at that level. This argument is short sighted and will only weaken the nation’s ability to compete economically with its international counterparts.

One only has to visit a modern automobile production facility to see the value of deeper learning for all students. For almost a century, a line of workers performed the same repetitive task all day, every day—no depth of knowledge was required. Today’s modern production process requires line workers to have a much wider set of knowledge and skills. Teamwork, innovation, communication, and adaptability characterize today’s manufacturing facilities. Catherine Snow, the Patricia Albjerg Graham Professor of Education at Harvard states it well: “Fifty years ago kids who figured it out graduated, while others went to work at GM. Now we actually do have to teach everyone.”

Achieving Educational Equity ... One School at a Time

While the economic data suggest that individuals will benefit from developing deeper learning abilities, the nation as a whole will only succeed if large numbers of individuals—particularly those from traditionally underserved groups—learn deeply. Making deeper learning opportunities more equitable is imperative from both a moral and an economic perspective.

The moral imperative is overriding. For years, U.S. schools have tended to offer a two-tiered curriculum, in which some students, primarily white and relatively affluent, have had opportunities for deeper learning, while others, primarily low-income and students of color, have focused almost exclusively on basic skills and knowledge. More-affluent and white students get to analyze works of literature and write extensively, while low-income and minority students tend to complete worksheets that focus on memorization.⁶

Many policymakers have long been rightly concerned about the large numbers of low-income and minority students who progress through the U.S. education system without being able to demonstrate that they have learned basic skills like reading or math computation. But just as these students have not mastered basic skills, neither do they have the skills embodied in deeper learning—the ability to know, think, and do. In today’s information age, equity now becomes economically vital as well. The nation’s



prosperity in the near future will depend more than ever on students from underserved groups. Minorities now account for about half of all births in the United States, and by 2050 the U.S. is expected to become “majority-minority”—that is, more than half the population will be made up of people of color, compared with 35 percent in 2010.⁷ The U.S. economy can only thrive if the whole population, not less than half, is equipped to succeed.

The growing body of evidence on how students learn also creates an imperative to expand deeper learning. Hundreds of schools across the country are now incorporating deeper learning principles and many have shown promising educational results. These schools exist in both urban and rural areas and serve a range of student populations. Envision schools, New Tech Network, the Expeditionary Learning network, and the High Tech High Schools are some of the leading edge schools that have incorporated deeper learning practices into the daily life of students, teachers, and the community. Envision Schools, which operates four urban high schools in the San Francisco Bay area, educates predominantly disadvantaged students, the majority of whom are first generation college-bound. The graduation rates for Envisions students fly in the face of most college-going statistics; in 2008, 95 percent of Envision graduates were admitted and have stayed in college.

Envision’s founder Bob Lenz credits the “Graduate Vision”—all graduates must demonstrate the mastery of content, skills, and understandings learned through the completion of rigorous academic coursework and major projects—and the Deeper Learning Student Assessment System for much of the progress the schools have made with their students. The graduation vision and the assessment system that supports it ensures that a student not only has met the state’s minimum standards, but that he or she has demonstrated, through a body of evidence and multiple academic measures, a breadth of leadership and cognitive skills that are relevant for the twenty-first-century, technology based workplace.

To get a better sense of what deeper learning looks like, consider this mathematical problem solving application used by Envision Schools. *The Really Super Amazing Technical Dive* tells the story of a dedicated teacher, Ms. Lundin, who will perform a technical dive from a Ferris wheel into a tub of water to help her students learn. The problem involves three things: a Ferris wheel, a stopwatch, and a moving tub of water.

According to the problem, a platform that Ms. Lundin can stand on is attached to one of the Ferris wheels seats. There is also a tub of water on a moving cart that runs along a track passing underneath the Ferris wheel and platform. As the Ferris wheel turns, Ms. Lundin needs to jump at exactly the right time so that she will land safely in the tub of water and will not get injured in her attempt.

Unlike math problems that measure just basic skills and not application, students are asked not only to solve the problem and show the final equation, but they are asked to determine exactly when Ms. Lundin should jump (time) and from what height (distance) so she lands safely in the tub. To do this, the students must demonstrate a series of analytical steps:

- 1) Determine what information is needed to determine when and from what height Ms. Lundin should jump.
- 2) Create a model of the situation (physically and graphically).
- 3) Write out a problem statement that clearly explains the situation, the questions being asked, and show the model.



- 4) Give the final equation and explain the sub-equations used to solve it.
- 5) State a recommendation using evidence to convince Ms. Lundin of the findings, and include two problem-solving methods to verify the answer.
- 6) Reflect on the process. What worked? What other factors could have changed the answer?
- 7) Highlight concepts in the problem statement, answer, and reflection.

To complete this task, students must know the subject matter content—in this case, algebraic functions and physics. They must be able to think critically about all the variables and use their knowledge to formulate and solve a problem, just as they would in college and the workplace. They must be able to communicate effectively, to explain their solution using evidence, and, because the work is team-based, they must collaborate with their peers. Finally, the students must be able to reflect on their work and show that they have learned how to learn.

In order for both students and teachers to benefit from this kind of deeper, more comprehensive approach to solving a math problem, schools need supportive policies in place that align with this kind of educational approach. For example, schools that incorporate deeper learning principles provide both teachers and students time for collaboration; student performance is based on the mastery of both rigorous content and skills and measured by more than a simple multiple choice test; students have access to technology and resources that will help guide and inform their project work; and teachers are encouraged to create more complex problems that require students to utilize a variety of skills and content knowledge.

At New Tech High at Arsenal Tech in Indianapolis-- part of the New Tech Network -- the school day is organized into blocks that combine subject areas, such as history and English and astronomy and mathematics. The curriculum for each combined class is designed around a set of projects, with a heavy emphasis on technology, that enable students to meet state standards for each subject. Each project culminates in a public presentation, and students are graded not only on their content knowledge but also on their critical thinking, oral and written communications, and teamwork.

There are many more examples of schools around the country that have demonstrated the power and promise of deeper learning for all ranges of students. Many of these schools would like to reach even more students. Public school systems like the Long Beach Unified School District in Long Beach, California have also incorporated programs that emphasize deeper learning. The district implemented a math curriculum and professional development program called MAP²D that emphasizes student collaboration and communication. The district has seen Latino fifth graders improve from a rate of 15 percent proficiency in math to more than 60 percent over four years.⁸

Deeper Learning: The Road Ahead

The good news is that momentum is growing for more schools to embrace the principles of deeper learning for all students. President Obama and the nation's business leaders have called for the kind of change in public school systems that would finally put in place for all students rigorous high standards that foster the kind of critical thinking, problem solving, and communication skills that are absolutely necessary for college and career readiness. There is a unique opportunity now that forty-four states and the District of Columbia have agreed to implement common standards for all students that are internationally benchmarked with those of the highest-performing nations in the world.



Similarly, next generation assessment systems that align to these high standards are also being developed. Building on the tests of deeper learning that have already been created, (such as PISA and the Collegiate Learning Assessment), these new assessments could have a tremendous impact on how students nationwide are assessed for college and career readiness. Additionally, new technology platforms are making possible learning opportunities unimaginable a decade ago. One of the most practical developments is educational technology that makes it easier for all teachers to collaborate, communicate, and share a common focus on student progress. Model curricula for all subjects is available on the Internet and communities of teachers and learners can use the Web's resources to organize learning communities as well as access a vast trove of resources to support traditional learning materials. Technology also helps promote greater equity among students by providing access to students who are isolated because of overwhelming poverty or being located in a remote area.

Policy Actions That Support Deeper Learning

While individual schools and systems are successfully applying deeper learning and can demonstrate its effectiveness and practicality, bringing such experiences to scale for all students-especially those most underserved-is a formidable undertaking. Fortunately, the foundation for change has been well laid. Supportive policies, such as the adoption of standards that support college and career readiness and the development of next generation assessments, indicate that policymakers are starting to come together on what changes and investments are needed to achieve this important goal.

While much of federal education policy in the past decade has been focused on the important goals of ensuring that all students are proficient in the core subjects of reading and math, education leaders nationwide now agree that education policy at both the federal and state level needs to address the range of academics and skills needed for all students to be fully ready for college and careers. The upcoming reauthorization of the Elementary and Secondary Education Act (ESEA) presents a unique opportunity for federal policymakers to create opportunities for states and districts to put in place the kinds of policies and practices that a deeper learning environment requires.

Standards

ESEA should reinforce the hard work already underway in states to better prepare students for the demands of college and a changing workforce and support the state-led movement toward standards for college and career readiness. Many current state standards focus on breadth of coverage and do not emphasize a depth and application of understanding. This patchwork of standards has created a climate of confusion and not proved effective in producing large numbers of students who can achieve at even sufficient levels in college and career. Existing language in current law could be amended to require that states adopt standards for college and career readiness that contain both rigorous academic content and the teaching of advanced skills such as critical thinking, communication, and the application of content knowledge. Current law encourages the teaching of advanced skills, but that provision has clearly not had the impact needed to ensure students are gaining these essential life skills. Because states and local districts have primary responsibility over education policy, ESEA should emphasize that states have the choice to determine their own standards for college and career readiness, provided they are peer reviewed and externally validated by representatives from higher education and the business community to indicate college and career readiness.



Current law could also be amended to require that standards not only describe three static levels of achievement—basic, proficient, advanced—but that they also describe growth and academic achievement toward the ultimate goal of college and career readiness and so that states can implement high-quality growth models if they choose to do so. Robust implementation of standards that recognize and emphasize the key principles of deeper learning would ensure more students leave high school with those skills researchers, policymakers, and the business community know are essential to success in college, career, and civic life.

Assessments

As the majority of states transition to a shared set of standards for college and career readiness, there needs to be a set of assessments that schools can use to measure the full range of content and skills included in the standards. Most current state assessments that are used for ESEA accountability purposes do not actually measure the kinds of deeper learning skills and knowledge that are desired by colleges and business leaders. Tasks and questions that ask students to apply their knowledge to solve complex problems, work in teams, and effectively communicate their knowledge and analysis are completely overlooked by most current statewide, standardized assessments.

Rich assessments that measure the kinds of skills and knowledge most desired in the modern workforce can and should be aligned with the assessments used to ensure rigorous accountability. The deeper learning network of schools mentioned earlier in this paper demonstrate that it is possible to have teachers and leaders using high-level instructional practices with rigorous academic content, formative assessment, and high-quality summative assessments of student work. Unfortunately, the current status of ESEA makes it very difficult for more than a small number of schools to successfully strike that balance

The federal government has invested substantially in the development of next generation assessments by funding two unique consortia of states: SMARTER Balanced Assessment Consortium (SBAC) and Partnership for the Assessment of Readiness for College and Careers (PARCC). These two consortia were charged with developing assessments that measure the full range of college- and career-ready standards. The initial \$330 million investment made by the federal government is only one small step in the process of seeing these assessments fully developed and implemented. Currently, the federal government helps states cover the costs of developing and implementing assessments by providing funding through formula and competitive programs authorized in Title VI of ESEA. If all states are going to adopt high-quality, next generation assessment, the federal government will need to maintain its commitment to helping states meet these assessments costs through the Title VI program and by allowing states that wish to use federal funds to help pay for the ongoing development and implementation of the next generation assessments the flexibility to do so.

Accountability

The foundation for deeper learning rests on the premise that all students will leave school with the ability to know and understand core content based on rigorous standards that teachers and leaders are held accountable for. To that end, ESEA should support an aligned assessment system that measures student growth and progress on standards for college and career readiness *and* that provides reliable measures of student progress for accountability purposes. Congress should also reform the federal accountability system to ensure that it uses more complete measures of student achievement.



Currently, states use statewide reading and math tests and graduation rates to calculate Adequate Yearly Progress (AYP) for secondary students. The majority of states have responded to this requirement by implementing low-quality standardized assessments. Because of the strong influence of tests on classroom practice, the curriculum and instruction choices that stem from this practice represent a major challenge to deeper learning. There is an opportunity now in federal law to encourage more schools and districts to move to a system of higher-level instruction and assessment. Accountability systems should include a range of essential skills that are being assessed. Congress should signal its support for statewide, district, and school accountability systems that are designed around new and more complete measures of student achievement that are rigorous, fair, valid, and reliable for all students, hold all students accountable to the same high standards, and are comparable across all school districts within a state or consortium of states.

Professional Development and Teaching Practice

All teachers need to be capable of leading classrooms in which students have opportunities to engage in tasks and assignments that enable them to demonstrate the deep understanding of content and higher-level skills necessary for success after high school. Teachers need to develop these abilities before they start in the classroom and they must have opportunities to continually hone their skills throughout their careers.

Research shows clearly that clinical experience is essential for prospective teachers, but many preparation programs provide too few opportunities for teacher candidates to develop their craft alongside a skilled mentor. Federal and state policies can support improved preparation by directing resources to those programs—both university-based and alternative programs—that include substantial clinical experiences and that employ curricula that support deeper learning. The federal and state governments can also support the use of performance assessments for prospective teachers that show whether they can demonstrate the skills they need to be successful in the classroom, and hold all preparation programs accountable for the performance of their graduates in the classroom.

Federal and state governments could also direct resources for professional development toward efforts that are effective in improving instruction and deeper learning for students. Currently, professional development funds support a wide range of coursework, most of which is unrelated to developing teachers' ability to improve student learning. By targeting resources on effective practices—including enabling teachers to collaborate to develop and hone lessons—federal and state governments can support continual improvements in teaching and learning.

State-level Policies

It is essential that changes in state-level policies are aligned with the larger federal issues described earlier. Key policy areas such as curriculum adoption, the use of technology, and advancement based on seat time will be important determinants in the success of deeper learning. For example, the rapid development and application of technology and the availability of Open Educational Resources (OER) content directly confronts the traditional views of how time and resources are used during the school day. Deeper learning often shifts school practice away from Carnegie units and other seat-time requirements towards a measure of student progress based on competency and application of knowledge. To accomplish that important goal, states and districts need to be able to allocate to both teachers and students the time they need to master college- and career-ready standards.



Although the federal government is restricted from influencing curriculum materials directly, about half the states have textbook-adoption policies that provide them with powerful control over the materials used in schools. These policies were adopted almost a century ago to offer a measure of quality control, but in some instances they have impeded innovation and restricted schools' flexibility in adopting materials that would deepen students' learning. At the same time, advances in technology have sharply reduced the need for conventional textbooks and the traditional means of adopting their content.

To take advantage of the opportunities technologies have opened up, states could provide greater flexibility to enable schools to use digital materials in classrooms. But digital materials are not just substitutes for textbooks. They offer new opportunities to expand learning by providing students with access to a wealth of content and connections to experts and peers around the world, as well as new learning experiences through simulations and other means. Moreover, students can learn using digital materials at any time, not just from 8:30 a.m. to 3:00 p.m. By providing students with access to digital learning, schools, districts, and states can enhance deeper learning.

Flexibility in the use of technology is not enough. As any Internet user knows, the sheer volume of materials available online is vast, and educators need guidance in selecting those that are effective and appropriate. States can play a role—similar to their role in textbook adoption—in evaluating digital resources, aligning them to standards, and providing at least a baseline for rich media materials for all teachers for all state standards. In addition, states can also remove restrictions that limit students' access to digital learning. States could also expand schools' access to broadband so that students can take advantage of the huge range of open educational resources and other materials available on the Internet.

Toward a Deeper Learning Experience for All

The federal government and the states have undertaken an ambitious education policy agenda in a time of great economic uncertainty. During the next few years, policymakers face two major challenges—one consciously sought, the other externally imposed. The first is the shared desire among education policymakers to have higher educational standards that truly incorporate what students need to know and be able to do in today's global economy. The wide-scale adoption of standards for college- and career-readiness standards was a bold step that now requires an even greater commitment to implementation. Education leaders will need to be sure that the rigorous mix of knowledge and skills called for by employers and higher education are foremost in implementation in order to fully realize the promise of the standards.

The second and unsought challenge is the severe budget shortfall facing most states, forcing state leaders to undertake significant reforms with less revenue and in a climate of greater anxiety. During this critical period, policymakers at every level will be making critical decisions about how they spend their limited resources. Despite these challenges, it remains a unique moment for education policy. The highest levels of leadership at both the state and federal level are focused on the urgent need to realign the nation's education system to better prepare students for college, career and civic life. The policies and practices discussed in this paper support a focus on deeper learning, the kind of education that higher education experts, researchers, and business leaders agree is essential to achieve that goal.

Support for this paper is provided by The William and Flora Hewlett Foundation. The opinions expressed are those of the author(s) and do not necessarily reflect the views of The William and Flora Hewlett Foundation.



Endnotes

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² Ibid., p. 93.

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