Countdown to Summer Conference

St. Louis, Mo.
July 1-3, 2012
60 days, 15h : 12m : 24s

| HOME | STORE | | MEMBERSHIP | MY ACCOUNT | HELP | LOG IN |

ASCD
LEARN. TEACH. LEAD.

SEARCH ASCD   GO

About ASCD | Books & Publications | Educational Leadership | Conferences | Professional Development | Programs | Topics

2012 Summer Conference

Learn about effective new programs and practices and join with colleagues in advancing a positive agenda for the future. July 1-3, St. Louis, Mo.

More

Most Viewed Articles

1. Every Child, Every Day (Mar 12)
2. The Challenge of Challenging Text (Mar 12)
3. Ten Roles for Teacher Leaders (Sep 07)
4. Taming the Wild Text (Mar 12)
5. The Myth of the Culture of Poverty (Apr 08)

More

Permissions

ASCD respects intellectual property rights and adheres to the laws governing them. Learn more about our permissions policy and submit your request online.

Policies and Requests

Translations Rights

Books in Translation

EL EDUCATIONAL LEADERSHIP

| Home | Current Issue | Archives | Buy | Contact |

Print This Page
Send to a Friend

September 2009 | Volume **67** | Number **1**
Teaching for the 21st Century Pages 16-21

21st Century Skills: The Challenges Ahead

Andrew J. Rotherham and Daniel Willingham

To work, the 21st century skills movement will require keen attention to curriculum, teacher quality, and assessment.

A growing number of business leaders, politicians, and educators are united around the idea that students need "21st century skills" to be successful today. It's exciting to believe that we live in times that are so revolutionary that they demand new and different abilities. But in fact, the skills students need in the 21st century are not new.

SHARE

Critical thinking and problem solving, for example, have been components of human progress throughout history, from the development of early tools, to agricultural advancements, to the invention of vaccines, to land and sea exploration. Such skills as information literacy and global awareness are not new, at least not among the elites in different societies. The need for mastery of different kinds of knowledge, ranging from facts to complex analysis? Not new either. In *The Republic*, Plato wrote about four distinct levels of intellect. Perhaps at the time, these were considered "3rd century BCE skills"?

What's actually new is the extent to which changes in our economy and the world mean that collective and individual success depends on having such skills. Many U.S. students are taught these skills—those who are fortunate enough to attend highly effective schools or at least encounter great teachers—but it's a matter of chance rather than the deliberate design of our school system. Today we cannot afford a system in which receiving a high-quality education is akin to a game of bingo. If we are to have a more equitable and effective public education system, skills that have been the province of the few must become universal.

This distinction between "skills that are novel" and "skills that must be taught more intentionally and effectively" ought to lead policymakers to different education reforms than those they are now considering. If these skills were indeed new, then perhaps we would need a radical overhaul of how we think about content and curriculum. But if the issue is, instead, that schools must be more deliberate about teaching critical thinking, collaboration, and problem solving to all students, then the remedies are more obvious, although still intensely challenging.

What Will It Take?

The history of U.S. education reform should greatly concern everyone who wants schools to do a better job of teaching students to think. Many reform efforts, from reducing class size to improving reading instruction, have devolved into fads or been implemented with weak fidelity to their core intent. The 21st century skills movement faces the same risk.

To complicate the challenge, some of the rhetoric we have heard surrounding this movement suggests that with so much new knowledge being created, content no longer matters; that ways of knowing information are now much more important than information itself. Such notions contradict what we know about teaching and learning and raise concerns that the 21st century skills movement will end up being a weak intervention for the very students—low-income students and students of color—who most need powerful schools as a matter of social equity.

The debate is not about content versus skills. There is no responsible constituency arguing against ensuring

Online Store

ASCD's Top 5 Books

1. *Enhancing Professional Practice: A Framework for Teaching, 2nd Edition*
2. *Classroom Instruction That Works: Research-Based S*
3. *Teaching with Poverty in Mind: What Being Poor Does to Kids' Brains and What Schools Can Do About It*
4. *The Art and Science of Teaching: A*

that students learn how to think in school. Rather, the issue is how to meet the challenges of delivering content and skills in a rich way that genuinely improves outcomes for students.

What will it take to ensure that the idea of "21st century skills"—or more precisely, the effort to ensure that all students, rather than just a privileged few, have access to a rich education that intentionally helps them learn these skills—is successful in improving schools? That effort requires three primary components. First, educators and policymakers must ensure that the instructional program is complete and that content is not shortchanged for an ephemeral pursuit of skills. Second, states, school districts, and schools need to revamp how they think about human capital in education—in particular how teachers are trained. Finally, we need new assessments that can accurately measure richer learning and more complex tasks.

For the 21st century skills effort to be effective, these three elements must be implemented in concert. Otherwise, the reform will be superficial and counter-productive.

Better Curriculum

People on all sides of this debate often speak of skills and knowledge as separate. They describe skills as akin to a function on a calculator: If your calculator can compute square roots, it can do so for any number; similarly, if a student has developed the ability to "think scientifically," he or she can do so with any content. In this formulation, domain knowledge is mainly important as grist for the mill—you need something to think *about*.

Skills and knowledge are not separate, however, but intertwined. In some cases, knowledge helps us recognize the underlying structure of a problem. For example, even young children understand the logical implications of a rule like "If you finish your vegetables, you will get a cookie after dinner." They can draw the logical conclusion that a child who is denied a cookie after dinner must not have finished her vegetables. Without this familiar context, however, the same child will probably find it difficult to understand the logical form *modus tollens*, of which the cookie rule is an example. (*If P, then Q. Q is false. Therefore, P is false.*) Thus, it's inaccurate to conceive of logical thinking as a separate skill that can be applied across a variety of situations. Sometimes we fail to recognize that we have a particular thinking skill (such as applying *modus tollens*) unless it comes in the form of known content.

At other times, we know that we have a particular thinking skill, but domain knowledge is necessary if we are to use it. For example, a student might have learned that "thinking scientifically" requires understanding the importance of anomalous results in an experiment. If you're surprised by the results of an experiment, that suggests that your hypothesis was wrong and the data are telling you something interesting. But to be surprised, you must make a prediction in the first place—and you can only generate a prediction if you understand the domain in which you are working. Thus, without content knowledge we often cannot use thinking skills properly and effectively.

Why would misunderstanding the relationship of skills and knowledge lead to trouble? If you believe that skills and knowledge are separate, you are likely to draw two incorrect conclusions. First, because content is readily available in many locations but thinking skills reside in the learner's brain, it would seem clear that if we must choose between them, skills are essential, whereas content is merely desirable. Second, if skills are independent of content, we could reasonably conclude that we can develop these skills through the use of *any* content. For example, if students can learn how to think critically about science in the context of any scientific material, a teacher should select content that will engage students (for instance, the chemistry of candy), even if that content is not central to the field. But all content is not equally important to mathematics, or to science, or to literature. To think critically, students need the knowledge that is central to the domain.

The importance of content in the development of thinking creates several challenges for the 21st century skills movement. The first is the temptation to emphasize advanced, conceptual thinking too early in training—an approach that has proven ineffective in numerous past reforms, such as the "New Math" of the 1960s (Loveless, 2002). Learning tends to follow a predictable path. When students first encounter new ideas, their knowledge is shallow and their understanding is bound to specific examples. They need exposure to varied examples before their understanding of a concept becomes more abstract and they can successfully apply that understanding to novel situations.

Another curricular challenge is that we don't yet know how to teach self-direction, collaboration, creativity, and innovation the way we know how to teach long division. The plan of 21st century skills proponents seems to be to give students more experiences that will presumably develop these skills—for example, having them work in groups. But experience is not the same thing as practice. Experience means only that you use a skill; practice means that you try to improve by noticing what you are doing wrong and formulating strategies to do better. Practice also requires feedback, usually from someone more skilled than you are.

Because of these challenges, devising a 21st century skills curriculum requires more than paying lip service to content knowledge. Outlining the skills in detail and merely urging that content be taught, too, is a recipe for failure. We must plan to teach skills in the context of particular content knowledge and to treat both as equally important.

In addition, education leaders must be realistic about which skills are teachable. If we deem that such skills as collaboration and self-direction are essential, we should launch a concerted effort to study how they can be taught effectively rather than blithely assume that mandating their teaching will result in students learning them.

Better Teaching

Greater emphasis on skills also has important implications for teacher training. Our resolve to teach these

skills to all students will not be enough. We must have a plan by which teachers can succeed where previous generations have failed.

Advocates of 21st century skills favor student-centered methods—for example, problem-based learning and project-based learning—that allow students to collaborate, work on authentic problems, and engage with the community. These approaches are widely acclaimed and can be found in any pedagogical methods textbook; teachers know about them and believe they're effective. And yet, teachers don't use them. Recent data show that most instructional time is composed of seatwork and whole-class instruction led by the teacher (National Institute of Child Health and Human Development Early Child Care Research Network, 2005). Even when class sizes are reduced, teachers do not change their teaching strategies or use these student-centered methods (Shapson, Wright, Eason, & Fitzgerald, 1980). Again, these are not new issues. John Goodlad (1984) reported the same finding in his landmark study published more than 20 years ago.

Why don't teachers use the methods that they believe are most effective? Even advocates of student-centered methods acknowledge that these methods pose classroom management problems for teachers. When students collaborate, one expects a certain amount of hubbub in the room, which could devolve into chaos in less-than-expert hands. These methods also demand that teachers be knowledgeable about a broad range of topics and are prepared to make in-the-moment decisions as the lesson plan progresses. Anyone who has watched a highly effective teacher lead a class by simultaneously engaging with content, classroom management, and the ongoing monitoring of student progress knows how intense and demanding this work is. It's a constant juggling act that involves keeping many balls in the air.

Part of the 21st century skills movement's plan is the call for greater collaboration among teachers. Indeed, this is one of the plan's greatest strengths; we waste a valuable resource when we don't give teachers time to share their expertise. But where will schools find the release time for such collaboration? Will they hire more teachers or increase class size? How will they provide the technology infrastructure that will enable teachers to collaborate with more than just the teacher down the hall? Who will build and maintain and edit the Web sites, wikis, and so forth? These challenges raise thorny questions about whether the design of today's schools is compatible with the goals of the 21st century skills movement.

For change to move beyond administrators' offices and penetrate classrooms, we must understand that professional development is a massive undertaking. Most teachers don't need to be persuaded that project-based learning is a good idea—they already believe that. What teachers need is much more robust training and support than they receive today, including specific lesson plans that deal with the high cognitive demands and potential classroom management problems of using student-centered methods.

Unfortunately, there is a widespread belief that teachers already know how to do this if only we could unleash them from today's stifling standards and accountability metrics. This notion romanticizes student-centered methods, underestimates the challenge of implementing such methods, and ignores the lack of capacity in the field today.

Instead, staff development planners would do well to engage the best teachers available in an iterative process of planning, execution, feedback, and continued planning. This process, along with additional teacher training, will require significant time. And of course none of this will be successful without broader reforms in how teachers are recruited, selected, and deselected in an effort to address the whole picture of education's human capital challenge.

Better Tests

There is little point in investing heavily in curriculum and human capital without also investing in assessments to evaluate what is or is not being accomplished in the classroom. Fortunately, as Elena Silva (2008) noted in a recent report for Education Sector, the potential exists today to produce assessments that measure thinking skills and are also reliable and comparable between students and schools—elements integral to efforts to ensure accountability and equity. But efforts to assess these skills are still in their infancy; education faces enormous challenges in developing the ability to deliver these assessments at scale.

The first challenge is the cost. Although higher-level skills like critical thinking and analysis can be assessed with well-designed multiple-choice tests, a truly rich assessment system would go beyond multiple-choice testing and include measures that encourage greater creativity, show how students arrived at answers, and even allow for collaboration. Such measures, however, cost more money than policymakers have traditionally been willing to commit to assessment. And, at a time when complaining about testing is a national pastime and cynicism about assessment, albeit often uninformed, is on the rise, getting policymakers to commit substantially more resources to it is a difficult political challenge.

Producing enough high-quality assessments to meet the needs of a system as large and diverse as U.S. public schools would stretch the capacity of the assessment industry, and incentives do not exist today for many new entrants to become major players in that field. We would need a coordinated public, private, and philanthropic strategy—including an intensive research and development effort—to foster genuine change.

Substantial delivery challenges also remain. Delivering these assessments in a few settings, as is the case today, is hardly the same as delivering them at scale across a state—especially the larger states. Because most of these assessments will be technology-based, most schools' information technology systems will require a substantial upgrade.

None of these assessment challenges are insurmountable, but addressing them will require deliberate attention from policymakers and 21st century skills proponents, as well as a deviation from the path that policymaking is on today. Such an effort is essential. Why mount a national effort to change education if you

have no way of knowing whether the change has been effective?

A Better, But Harder, Way

The point of our argument is not to say that teaching students how to think, work together better, or use new information more rigorously is not a worthy and attainable goal. Rather, we seek to call attention to the magnitude of the challenge and to sound a note of caution amidst the sirens calling our political leaders once again to the rocky shoals of past education reform failures. Without better curriculum, better teaching, and better tests, the emphasis on "21st century skills" will be a superficial one that will sacrifice long-term gains for the appearance of short-term progress.

Curriculum, teacher expertise, and assessment have all been weak links in past education reform efforts—a fact that should sober today's skills proponents as they survey the task of dramatically improving all three. Efforts to create more formalized common standards would help address some of the challenges by focusing efforts in a common direction. But common standards will not, by themselves, be enough.

The past few decades have seen great progress in education reform in the United States—progress that has especially benefited less-advantaged students. Today's reformers can build on that progress only if they pay keen attention to the challenges associated with genuinely improving teaching and learning. If we ignore these challenges, the 21st century skills movement risks becoming another fad that ultimately changes little—or even worse, sets back the cause of creating dramatically more powerful schools for U.S. students, especially those who are underserved today.

References

Goodlad, J. I. (1984). *A place called school*. New York: McGraw-Hill.

Loveless, T. (2002). A tale of two math reforms: The politics of the new math and NCTM standards. In T. Loveless (Ed.), *The great curriculum debate* (pp. 184–209). Washington, DC: Brookings.

National Institute of Child Health and Human Development Early Child Care Research Network. (2005). A day in the third grade: A large-scale study of classroom quality and teacher and student behavior. *Elementary School Journal, 105*, 305–323.

Shapson, S. M., Wright, E. N., Eason, G., & Fitzgerald, J. (1980). An experimental study of the effects of class size. *American Educational Research Journal, 17*, 141–152.

Silva, E. (2008). *Measuring skills for the 21st century*. Washington, DC: Education Sector. Available: www.educationsector.org/usr_doc/MeasuringSkills.pdf

Andrew J. Rotherham is Cofounder and Publisher of Education Sector and writes the blog Eduwonk.com; arotherham@educationsector.org. **Daniel Willingham** is Professor of Psychology at the University of Virginia and the author of *Why Don't Students Like School?* (Jossey-Bass, 2009); willingham@virginia.edu.

Tags:

(Log in or register for ASCD EDge (free) to add a tag.)

YOUR COMMENTS

☆☆☆☆☆ (0 Ratings)   Log in to save to your profile!

(Log in or register for ASCD EDge (free) to add a comment.)

The following are comments from our users. This is not content created by ASCD

Victor_Concepcion   Very interesting but are colleges preparing future teachers with 21 st century teaching skills in mind?

Feb. 22, 2011 10:23pm EST

                                                                              Report

1703 North Beauregard St.
Alexandria, VA 22311-1714

MISSION: ASCD is a membership organization that
develops programs, products, and services essential to
the way educators learn, teach, and lead.

© 2012 ASCD. All Rights Reserved.
P4

ABOUT ASCD

Contact Us

Help

Press

ASCD Job Ramp

Privacy Policy

Permissions

Terms of Use

Advertise With Us

Sponsorships

CONNECT WITH US

Affiliates

Connected Communities

Student Chapters

Professional Interest
Communities

ASCD EDge

ASCD on Twitter

ASCD on Facebook

ASCD on YouTube

ONLINE STORE

ASCD Store Home

Books

E-Books & Downloads

Videos

Online Learning

Periodicals

Conferences

Join ASCD

Clearance

PROGRAMS

Conferences and
Institutes

Leadership Institute for
Legislative Advocacy
(LILA)

Educator Advocates

The Whole Child

Emerging Leaders

Outstanding Young
Educator Award