

Keeping the Promise of Accountability: Building “Student Capacity” Through Cognitive Skill Training

Summary

The U.S. Department of Education has released “A Blueprint for Reform,” the document that embodies its proposals for reauthorization of the Elementary and Secondary Education Act (ESEA). One of the core principles in the Blueprint is accountability. While accountability was central in No Child Left Behind (NCLB, the previous reauthorization of ESEA), the new ESEA proposal espouses a more ambitious goal – “true college and career readiness” for every student.¹

Accountability is, at heart, a promise.² The Blueprint’s promise is that all students will graduate from high school ready for either college or a career. To accomplish that, schools must, among other things, build “student capacity” – the ability to think and learn. Neuroscience research has shown that the ability to think and learn can be developed and enhanced through cognitive exercise. BrainWare Safari³ is a cognitive exercise software program that has been shown to dramatically improve student capacity to learn. When students have the ability to learn and to benefit from good curriculum and teachers, the outcome of the next ESEA authorization can be a promise kept.

Accountability and Student Capacity

Schools and teachers have raised concerns about being held accountable for things over which they have no control. Chief among those things, in many cases, is the caliber of students who show up in their classrooms to be educated. That view is expressed by Eric Hanushek and Margaret Raymond who propose that, “Consequences for teachers must be directly related to their effect on student performance. If related to overall levels of student performance, the system would obviously be unfair for teachers who worked with students entering their classrooms with large deficits.”⁴

The Blueprint recognizes that students possess a diversity of learning abilities. It makes meeting the needs of students with varying abilities a mandate, stating “Schools must support all students by providing appropriate instruction and access to a challenging curriculum along with additional supports and attention where needed.”⁵ If students, in fact, had all the requisite abilities, then their progress over the school year could be attributed to the effectiveness of the teacher and the school. Since they don’t, schools must support them in developing those abilities.

¹ <http://www2.ed.gov/policy/elsec/leg/blueprint/>

² Moldoveanu, Mihuea, “The Promise: The Basic Building Block of Accountability,” *Rotman Magazine*, Fall 2009

³ BrainWare Safari is a software program, derived from proven clinical therapy techniques combined with video-game technology, that develops cognitive processing skills. www.MyBrainWare.com.

⁴ Hanushek, Eric A., and Raymond, Margaret E., “Sorting Out Accountability Systems,” in *School Accountability*, Williamson M. Evers and Herbert J. Walberg editors, Stanford, CA: Hoover Institution Press, 2002

⁵ Blueprint, op. cit.

Kenneth Wong has described students' needs and abilities to learn as "capacity," and identifies support to build up student capacity as one of the key components of an effective accountability system.⁶

Recognizing that students show up in classrooms with varying capacities and recognizing the need to build up those capacities, we need to answer three questions:

1. What is it that we need to build students' capacity to do?
2. How can we build that capacity?
3. What are the practical and economic effects of this type of capacity building?

The Capacity to Do What?

In addressing the question of what this built-up capacity will enable students to do, the Blueprint and many other current observers acknowledge that the promise of student readiness for careers and college is different from the promise of a minimum level of competence in reading and math under NCLB. Today there are hundreds of jobs in technology, the environment, social media and health care (to name a few fields), that didn't exist ten years ago. We simply cannot know precisely for what careers we need to be educating students. Under the Blueprint, States are left to determine what those areas of competence and measurement will be for purposes of accountability. A logical starting point, however, might be a source such as the Workforce Readiness Report⁷, which provides the following list of skills needed for workplace success:

Basic Knowledge / Skills	Applied Skills
<ul style="list-style-type: none"> • English Language (spoken) • Reading Comprehension (in English) • Writing in English (grammar, spelling, etc.) • Mathematics • Science • Government / Economics • Humanities / Arts • Foreign Languages • History / Geography 	<ul style="list-style-type: none"> • Critical Thinking / Problem Solving • Oral Communications • Written Communications • Teamwork / Collaboration • Diversity • Information Technology Application • Leadership • Creativity / Innovation • Lifelong Learning / Self Direction • Professionalism / Work Ethic • Ethics / Social Responsibility

⁶ Wong, Kenneth K., "Integrated Government in Chicago and Birmingham (UK)," in *School Choice or Best Systems*, Margaret C. Wang and Herbert J. Walberg, editors, Mahwah, NJ: Lawrence Erlbaum Associates, 2001, p. 166

⁷ The Conference Board, the Partnership for 21st Century Skills, Corporate Voices for Working Families, and the Society for Human Resources Management, *Are They Really Ready to Work?* 2006

This view of what it will take to produce a nation of workplace-ready high-school graduates is echoed by the Broader Bolder Approach to Education Campaign⁸ which suggests similar domains for focus and assessment.

Tests should assess critical thinking, reasoning, and advanced content, as well as basic skills ... Accountability should focus on students' academic skills and cognitive growth, and on those aspects of the development of the whole person that are within the scope of a schools' responsibilities, including physical health, character, social development, and citizenship skills – the knowledge and skills that young people need to become effective participants in a global environment.

The common thread and the implication of these broader concepts is that education needs to be more about developing problem-solvers, not repositories of knowledge. We must care about how students think, not what they think – about the capacity to think, not just content. Students' capacity to think is what needs to be built and enhanced.

Building the Capacity to Think

Educational scholars have proposed many approaches to building students' cognitive capacity. Mariale Hardiman, among others, refers to a growing and potentially powerful source of answers to the question of how to build capacity. "Neurological and cognitive sciences," she says, "will surely continue to shed light on topics such as the effects of attention, memory, sleep and emotions on thinking and learning. Future research in this area should be informed by the practical needs of educators."⁹

In fact, not only have the neurological and cognitive sciences been shedding light on the effects of various mental processes on thinking and learning,¹⁰ they have also begun to show how attention, memory and other cognitive processes can be developed and enhanced. Further, recent research has shown that improving these cognitive skills leads to improvements in academic performance. And, finally, research is showing that comprehensive cognitive skill development is effective with a wide variety of students and populations, including those identified in the Blueprint.¹¹

A full review of the research on cognitive skill development is beyond the scope of this discussion. However, the potential for dramatic impact on student capacity, across populations is evident in the following summary of research on BrainWare Safari, the comprehensive cognitive skill training software developed by Learning Enhancement Corporation. The interventions with BrainWare Safari were 10-12 weeks, unless otherwise noted.

⁸ School Accountability: A Broader, Bolder Approach, June 15, 2009, www.boldapproach.org

⁹ Hardiman, Mariale, "The Arts Will Help School Accountability," Dana Foundation, May 2009, <http://www.dana.org/news/features/detail.aspx?id=21768>

¹⁰ Wolfe, Patricia, *Brain Matters: Translating Research into Classroom Practice*, Alexandria, VA: Association for Supervision and Curriculum Development, 2001

¹¹ The Blueprint mentions English Language Learners, students with disabilities, Native American students, homeless students, the children of migrant workers, and neglected or delinquent students, as well as high-need regions.

Study	Population	Measures	Effect
Published Peer-Reviewed Study ¹²	Grades 1-7, M/F, suburban, wide range of learning abilities	Woodcock Johnson III Cognitive Battery and Tests of Achievement	4 years 3 months growth in intellectual development (Control Group = 4 months growth) 1 year 11 month growth in academic performance (Control Group = 1 month growth)
Xilin Community Center	Ages 7-11, M/F, English Learners (Chinese-speaking)	Woodcock Johnson III Cognitive Battery and Tests of Achievement	3 years 6 months growth in intellectual development 2 years 4 months growth in academic performance
Harbor Beach, MI	Ages 7-16, M/F, rural, students with learning issues	Woodcock Johnson Cognitive Battery	3 years 1 month growth in intellectual development Two students improved ACT scores in Reading (6 points, 9 points)
Indianapolis, IN	Grades 4-5, M, urban, at-risk students	Woodcock Johnson Cognitive Battery	6 years growth in intellectual development
Indianapolis, IN	Grade 4, F, urban, range of abilities	DIBELS ORF	Students doubled rate of progress, performed better (absolute score) than students in Grades 5-7
Glenwood, IL	Grades 2-8, M/F, urban/suburban, disadvantaged	Woodcock Johnson Cognitive Battery and Tests of Achievement	Average intellectual growth of 1.5 Grade Equivalent in 2 nd Grade up to 3.0 GE in 7 th Grade Average academic growth from .5 GE in 2 nd Grade up to 2.9 GE in 8 th Grade
Whitney Center	Ages 9 & 12, M, learning disabled	Woodcock Johnson Cognitive Battery	5 years 4 months intellectual growth and 2 years 2 months intellectual growth
Children with Autism	Ages 5-16, M/F, range of AS diagnoses	CARS, LEC Behavioral Rating Scale	Improvements in perceptual processing, attention, thinking (older children and higher-functioning)
Gap School (school-year long usage)	Ages, M/F, IQs of 70-80	Gibson Cognitive Battery Detroit Tests of Learning and Aptitude	9 months growth in intellectual development
Gifted Program Qualifying (17 weeks)	Grade 2, M/F, disadvantaged	CogAT	11 point increase in CogAT composite score. Number of students in top 3 deciles doubled.

¹² Helms D, Sawtelle SM. *A Study of the Effectiveness of Cognitive Skill Therapy Delivered in a Video-Game Format*, Optometry & Vision Development, Volume 38, Number 1, 2007.

The Practical and Economic Aspects of Student Capacity Building

Schools and districts that have implemented BrainWare Safari have experienced three primary effects:

1. Following use of the program, students make better progress academically and teachers can cover more curriculum material in less time. Initially, time must be found for the program during the school day¹³ – recommended usage is 3 to 5 times per week for 30-60 minutes per session, over 10-12 weeks. Thus, a total of approximately 40 hours of a semester must be dedicated to the program. While many teachers and administrators are concerned about giving up time for cognitive training, they find that greater student capacity to learn results in being able to accomplish more in less time following use of the program.
2. The program is extremely cost-effective. The costs of implementing the program are generally offset and can generate net savings, through the need for fewer interventions for students who have used the program and the shorter duration of interventions (interventions are more effective) when they are needed. Resultant savings may be reinvested in helping students with greater needs or in arts, music, drama or other programs.
3. Improved cognitive skills also lead to improved behavior. Teacher observations of improvements include finding students more engaged in their work, less frustrated, better able to follow directions, better able to communicate with them and their peers, and generally possessed of greater self-esteem.

Summary

Accountability is a core principle of the Blueprint for reauthorization of ESEA. The “promise” of accountability is that all students will graduate from high school ready for college or a career. In order to accomplish that, schools must build student capacity – the ability to think and to learn. Neuroscience research has characterized the capacity to learn as a variety of cognitive skills that are necessary, not just for basic reading, writing and math, but also for so-called higher order thinking skills and problem-solving. It has shown that those skills can be developed and greatly enhanced, leading to improved academic performance. Practical research with BrainWare Safari has shown its effectiveness in improving both cognitive functioning and academic performance, across a variety of populations.

Building student capacity improves their ability to benefit from good curriculum and good teachers, the very foundation of accountability and the new “promise” of education in the United States.

¹³ Schools have also implemented before- and after-school programs as well as enabled students to use the program both at school and at home. Therefore, time during the normal school day is not always mandatory. The frequency and duration of time on the program are what is important.

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