

## The McGraw-Hill Companies Policy Paper: Using Innovations in Educational Technology to Improve US Economic Competitiveness

### Introduction: Education and U.S. economic competitiveness

The United States is in the midst of a severe economic downturn. More than a year into the recession, some indicators point to improvement, but many forecasters predict a full recovery won't occur until 2010. While policymakers have used a wide range of tools in an attempt to reignite growth, the long-term vitality of the U.S. economy ultimately depends on our ability to remain competitive in the global economy.

By many measures, the U.S. economy is already one of the most competitive in the world. Strong capital markets, a high degree of labor flexibility and a regulatory environment that encourages entrepreneurial activity make the U.S. a hospitable environment for business activity. The World Bank's *Doing Business* report ranks the U.S. third in ease of doing business (behind only Singapore and New Zealand),<sup>1</sup> and the World Economic Forum's (WEF) Global Competitiveness Report places the U.S. first among 134 countries.<sup>2</sup>

Yet below these top-line statistics are worrisome trends for the future, particularly with regard to American education. The WEF ranks the U.S. 25<sup>th</sup> in the world in the quality of its primary education system, calling it a "competitive disadvantage."<sup>3</sup> U.S. students also are slipping further behind their foreign peers in international assessments,<sup>4</sup> and fewer are showing an interest in the STEM fields – science, technology, engineering and math – that are vital to innovation and entrepreneurial vigor.

Innovation is crucial to continued U.S. economic growth and competitiveness because it boosts productivity and yields new products, processes and even whole new industries that support high-paying jobs. The U.S. has been the most successful innovator in the world for decades. From pharmaceuticals to iPhones, the U.S. has a long history of developing life-improving and life-changing technologies. Our challenge as a society is to maintain that competitive edge. Training current and future workers to develop their creativity, critical thinking and problem solving skills will be fundamental to these efforts.

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<sup>1</sup> World Bank, *Doing Business 2009*.

<sup>2</sup> World Economic Forum, *Global Competitiveness Report 2008-2009*.

<sup>3</sup> *Ibid*, p. 341.

<sup>4</sup> In a major education speech earlier this year, President Obama referenced the sobering statistics: "In 8th grade math, we've fallen to 9th place. Singapore's middle-schoolers outperform ours three to one. Just a third of our 13- and 14-year-olds can read as well as they should." He also noted that "Our curriculum for 8th graders is two full years behind top performing countries" and "Eight of our states are setting their standards so low that their students may end up on par with roughly the bottom 40 percent of the world."

## Education and innovation

Innovation requires 21<sup>st</sup> century skills that are often acquired through experience, but not systematically taught in our schools. These include<sup>5</sup>:

- creativity,
- collaboration,
- critical thinking and problem solving,
- understanding of global issues and the ability to communicate and collaborate well with others across geographical and cultural boundaries,
- financial, entrepreneurial and civic literacy,
- health and wellness awareness that complements core subject knowledge,
- life-long learning habits to ensure adaptability to rapidly changing work environments,
- and the ability to harness the power of a variety of media and information technologies.

These skills must be rooted in strong content knowledge – literacy, math, science, geography, history, etc. – that also incorporate valuable lessons for everyday life and a mindset that prepares students for work in a world where goods, services, capital and ideas easily flow across borders.

Furthermore, while all disciplines are important to innovation, some are crucial. The STEM subjects lay the foundation for the basic research that sparks breakthroughs in fields ranging from medicine to telecommunications to green building. While countries such as China and India continue to graduate an increasing number of students in STEM fields, the number of American STEM graduates is stagnating at about 230,000 per year.<sup>6</sup> A survey of nearly 300,000 students in all 50 states by Project Tomorrow found that only 17 percent of middle school students and 21 percent of high school students are “very interested in pursuing a career in a STEM field.”<sup>7</sup>

If the U.S. is to maintain its competitive edge, we must ensure that today’s students have the academic foundation needed to fuel innovation, including a passion for science and technology. At McGraw-Hill Education, we are focusing on the four pillars needed to give students this foundation:

- ***Data-driven Instruction/Learning.*** Recent digital innovations will enable states not only to access tremendous amounts to student data, but also to use that data to develop the best instructional methods for each individual. McGraw-Hill’s The Grow Network provides sophisticated reporting, and differentiated and performance-driven instruction linked to rigorous standards and teacher education.
- ***Intervention.*** Response to Intervention (RTI), a program that helps educators identify students at risk for poor learning outcomes and provides evidence-based interventions, is proving to be an effective framework for maximizing student achievement. McGraw-Hill Education is helping districts implement RTI so they can drive college and career readiness.

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<sup>5</sup> List of skills taken primarily from Partnership for 21<sup>st</sup> Century Skills literature.

<sup>6</sup> Tapping America’s Potential: The Education for Innovation Initiative, “Gaining Momentum, Losing Ground,” pp. 3-4.

<sup>7</sup> Project Tomorrow, SpeakUp National Research Project 2008 (released March 24, 2009), p. 7.

- **Literacy.** Basic literacy skills are essential to individuals' ability to succeed and reach their full potential. Unfortunately, entirely too many of America's young people are not making the grade in terms of reading and literacy skills. Systemic and intense intervention for struggling readers is critical to reversing this trend and McGraw-Hill Education produces the broadest range of instructional reading and intervention programs so districts can choose a program that best fits the needs of the children they serve.
- **Cognitive Learning.** Because all students learn differently, educational approaches need to be adapted to each learner's intelligence or aptitude. Recent advances in technology are enabling educators to identify, select and serve content and support services to individual learners at the point of need. These learning tools are built on principles of cognitive science and applied against the rich data streams that can be captured in online learning environments. McGraw-Hill's LearnSmart, for example, diagnoses a student's knowledge of a subject area and assesses what has been mastered, what has not and how much time additional study time is needed.

## **21<sup>st</sup> century skills are crucial to individual success**

In addition to broad economic and social benefits, preparing students to compete in the global workforce is also essential to their personal success. The U.S. labor market has been gradually transformed over the last 40 years, with a greater premium attached to being a "knowledge worker." As President Obama said in a major education address in March, "In a 21<sup>st</sup> century world where jobs can be shipped wherever there's an Internet connection, where a child born in Dallas is now competing with a child in New Delhi... your best job qualification is not what you do, but what you know."

In other words, this 21<sup>st</sup> century world requires a new education imperative. "What you know" can no longer be limited to a regional, or even national, view. Students need to have a global mindset and a global understanding. "What you know" also shouldn't be limited to what you learn in high school. The old K-12 shorthand for education needs to be expanded to incorporate a K-16 mindset, acknowledging the vital need for higher education.

The Bureau of Labor Statistics reports that 90 percent of the fastest-growing jobs in the new information and service economy will require some post-secondary education.<sup>8</sup> Meanwhile, the gap between the earnings of workers with a bachelor's degree and those with only a high school diploma has grown more than 60 percent since 1975.<sup>9</sup> The gap adds up. Over the course of a lifetime, an individual with a bachelor's degree will earn an average of \$2.1 million – nearly twice as much as a worker with only a high school diploma.<sup>10</sup>

It is essential for every student to have the opportunity to obtain a college education. That starts with ensuring high school graduates are prepared for college. Right now, too many high school graduates are not. Fewer than 22 percent of the 1.2 million students who took the ACT college-entrance examinations in 2004 were ready for college-level work in math, English and science.<sup>11</sup> As a result, colleges spend time and money on remedial education to teach what should have

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<sup>8</sup> Internal analysis from the Bureau of Labor Statistics Monthly Labor Review (November 2005) by U.S. Department of Labor staff, August 2006.

<sup>9</sup> Speech by US Treasury Secretary Hank Paulson at Columbia Business School, August 1, 2006.

<sup>10</sup> Day, Jennifer C. and Eric C. Newburger, *The Big Payoff: Educational Attainment and Synthetic Estimates of Work-Life Earnings*, Washington, D.C.: U.S. Census Bureau, 2002.

<sup>11</sup> ACT, *Crisis at the Core: Preparing All Students for College and Work*, Iowa City, Iowa, 2005.

been learned in high school. It also is important to ensure students are placed in the right reading and math programs so they are appropriately challenged. McGraw-Hill Education's successful partnership with the ALEKS Corporation to improve college math placement and remediation has led to increased enrollment and retention in calculus courses.

If we don't prepare students for success in college and beyond, we are selling them short and jeopardizing America's long-term economic competitiveness.

### **How can technology support the development of 21<sup>st</sup> century skills?**

Just as technology has driven improvements in efficiency and quality in business, educational technology can drive improvements in American education and help teachers incorporate 21<sup>st</sup> century skills into the curriculum.

Technology can personalize education by empowering students to become more self-directed and collaborative learners, supplementing their teachers' lessons with information from real-world sources, online tutorials, multimedia demonstrations, podcasts and a host of other tools. Technology also can equip teachers and administrators with more complete student performance data they can use to improve classroom work on a continuous basis.

In deploying innovative educational technology, our efforts should be organized around five objectives.

- ***Utilize technologies students are using.*** Project Tomorrow's SpeakUp survey reveals that students are often forced to "power down" when they enter the classroom.<sup>12</sup> Students who regularly do homework on laptops, communicate via mobile devices, coordinate with friends through social networking sites, and play games in virtual reality, enter the classroom and use many of the same devices that their parents used in school. That's why McGraw-Hill Education is creating offerings based on how students use technology to bridge the gap between digital socialization and digital learning. Students want more technology in the classroom. Let's give it to them.
- ***Make learning more mobile.*** Today's students are comfortable using mobile technology to do everything from texting with friends to performing web searches for school projects. Educational technology – including e-books, educational games, and collaborative project-creation software – should be compatible with mobile devices.
- ***Empower teachers, administrators and parents to use technology.*** It's common for adults to feel out of touch when they observe the way children and teens use technology, but most adults are more tech-savvy than they realize. Educational innovators must ensure that teachers, administrators and parents are comfortable and confident using new technologies.
- ***Bring down barriers to education, including distance and age.*** Education no longer stops at graduation. The skills required in today's highly mobile and competitive workforce motivate many adults to return to school later in their lives. But where, and what, is school? Innovative technology should make it possible for more adults to access education and training at any age, from anywhere.

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<sup>12</sup> Project Tomorrow, SpeakUp National Research Project 2008 (released March 24, 2009), p. 2.

- ***Tie technology to curricula and customization.*** Technology in education is about more than simply buying new hardware and software. Today's digital learning solutions need to be tied to state standards enabling educators to customize instruction so it can maximize achievement for students of all levels of ability.

Progress is already underway in several of these areas. Colleges and universities are particularly effective in deploying technology, including distance learning options and customizable digital textbooks. College students are often able to supplement classroom work with podcast lectures by their professors and other experts, and use online tutorials and self-assessments.

In elementary and secondary classrooms, technology still lags, with more limits to student use of technology amid concerns about equitable access and the need for safe online environments for younger students.

### **Driving digital innovation**

Education is entering a new phase of cutting-edge digital-based instruction, and McGraw-Hill Education is committed to leading the way.

Our new Center for Digital Innovation is marrying McGraw-Hill Education's century of expertise in curricula development with emerging technology to design new, paradigm-changing PreK-12 learning solutions. These offerings will help drive student achievement and accelerate the development of 21st century skills by bringing to the classroom the same digital environment that today's young people have embraced outside of school. The Center is developing digital platforms that are customized by state standards, district requirements and teacher and student needs for true individualization. From literacy to mathematics and science, the new programs will support all students –those in need of intervention to those in need of additional challenges – with personalized one-to-one learning opportunities.

The Bothell, Washington-based Center has several new technologies currently in development and testing and has already demonstrated success with the development of eSuite packages to accompany Wright Group's Everyday Mathematics and SRA's Imagine It! flagship programs. These complete, fully integrated technology components provide an interactive classroom solution for both students and teachers. Other successful developments from the Center include Instruction Targeted for TABE Success (ITTS) Online and Pre-GED Online, which are targeted for high school drop-out recovery as part of the Contemporary/McGraw-Hill product groups.

In elementary and secondary education, McGraw-Hill's Planet Turtle offers a safe social networking site for elementary students, with an emphasis on education and communication. CINCH Mathematics and CINCH Project are all-digital programs that raise the bar on interactivity, encouraging students to be active and collaborative learners through the use of multimedia and online tools. Teachers are also given more tools to comment on student work, provide extra help and plan customized lessons that target the different ways students learn.

Along the way, we're keeping in mind a central idea: students are often the most compelling and visionary thinkers in the educational technology space. By asking what students need, we look forward to bringing many more exciting innovations to American schools.

## Conclusion

America's economic growth and vitality depend on our ability to develop and maintain a strong, educated workforce, rooted in the mastery of 21st century skills. To develop such a workforce, as well as drive student achievement, we must accelerate the use of technology so we can go beyond the traditional "one-size-fits-all," approach and establish a new education model that individualizes instruction to fit each student's abilities.

With American students falling behind their peers around the world, it's time for a new emphasis in education that leverages the power of innovation to help students master both content knowledge and the ability to think creatively, collaborate broadly and communicate effectively.

To make this happen, education companies and policymakers alike need to become valuable partners and resources for educators, parents and students as they strive to create a continuous loop of customized feedback and instruction to drive more effective education solutions. Such a partnership will help teachers, parents and students unite around the goals of fostering growth and development, creating richer, more involved methods of learning and more effectively addressing issues that arise.

Maintaining the competitiveness of the U.S. economy tomorrow depends on the work we do in America's elementary, high school and college classrooms today. For educators, parents, policymakers and business leaders, that underscores the need to work together to advance the innovation, opportunity and creativity that will deliver a new era of prosperity.

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