# Next Generation Learning

The intelligent use of technology to develop innovative
learning models and personalized educational pathways

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## THE U.S. EDUCATION LANDSCAPE

Public education has been a cornerstone of the United States' advancement as a civil society, a democracy, and a global leader in innovation and economic growth. But American education is in crisis. Despite billions of dollars spent to improve the U.S. public education system, nearly 30 percent of students do not finish high school. The dropout rate among African Americans, Hispanics, and low-income students is even more staggering—nearly 50 percent.

Of those who do enroll in college, many do not graduate. Although college enrollment in the United States has grown significantly in the last few decades, only 42 percent of young people who enroll in college complete a bachelor's degree by the age of 26, and just 12 percent complete an associate degree. Among low-income students, the bachelor's completion rate is even lower, at just 26 percent, while only about 14 percent earn an associate degree.

In many other countries, meanwhile, the proportion of working adults with a college degree is growing. Each year, millions of young people in China, India, and elsewhere graduate from college ready to embark on careers in the global marketplace—in engineering, science, and business—at salaries considerably lower than those paid in the United States.

These trends have significant implications for the millions of young Americans who want a career-track job that will allow them to support a family, and for our country's ability to continue to compete in the world economy.

A high school diploma was once sufficient to obtain a middle-class job in the United States. But in recent decades, lower-skilled jobs have disappeared due to the pressures of global competition, while the demand for higher-skilled workers has increased. By 2018, 63 percent of all U.S. jobs will require some sort of postsecondary education.

Americans who lack a college degree not only have more difficulty finding employment, but the jobs they do find often do not pay a living wage. In 2008, the average wage for adults 25 and older with a four-year degree was $60,954, compared to $33,618 for those with only a high school diploma and $24,686 for those with no high school diploma.

"High school graduates and dropouts will find themselves largely left behind in the coming decade as employer demand for workers with postsecondary degrees continues to surge," according to a recent report by the Center on Education and the Workforce at Georgetown University. "As the economy gets back on track over the next five years, 60 million Americans are at risk of being locked out of the middle class, toiling in predominantly low-wage jobs that require high school diplomas or less."

The impact on U.S. employers will also be significant as they find it increasingly difficult to hire qualified workers. The Georgetown University study projects that nearly 22 million new workers with postsecondary degrees will be needed by 2018, but the U.S. higher education system will fall short of that mark by 3 million graduates.

Studies also reveal the impact of a lagging education system on the U.S. economy. If the U.S. had in recent years closed the gap between its educational achievement levels and those of better-performing nations, the nation's GDP in 2008 could have been $1.3 trillion to $2.3 trillion higher—a 9 to 16 percent increase.

A number of factors are contributing to the stagnation of the U.S. education system. In many high schools and colleges, instructional methods fail to engage students or help them understand core concepts, retain learned material, or apply their learning to real-life situations. Learning models are often inflexible and do not account for students' diverse learning needs. Organizational processes are too rigid to make use of data that could improve the teaching and learning environment. Too often, postsecondary programs are designed without regard to the real-life challenges that many students face—such as work commitments, family obligations, and financial constraints.

## THE FOUNDATION'S EDUCATION INVESTMENTS

Over the past decade, the Bill & Melinda Gates Foundation has invested $5 billion in programs and partnerships in the United States to address many of these challenges. Most of that effort has focused on increasing educational attainment for all students, low-income and minority students in particular. The foundation's two-pronged education plan includes a college ready focus to ensure that high school students are adequately prepared for success in college, and a postsecondary success strategy that concentrates on helping college students complete a degree or certificate that has genuine economic value.

We actively supported the Common Core State Standards Initiative, which produced a set of consistent, clear standards that states can voluntarily follow for language arts and math skills that students need to learn in high school if they are to succeed in college. We are investing in the development of

### The Foundation's Education Goals

- help ensure that 80 percent of U.S. students—particularly low-income and minority young people—graduate from high school prepared for college

- double the number of low-income young adults who earn a postsecondary degree or credential by age 26

Many in the field of education have a sense of what the future holds for students. Some, like Dr. Terry Holliday, Kentucky's commissioner of education, have shared their vision for a more engaging learning experience. Here is an adaptation from his blog:

*Alex is a member of four different Learning Teams. Each of his Learning Teams, as well as his extracurricular activities, has a dedicated section on his personalized class portal homepage—which includes a news feed, calendar, photos, video and message board capabilities. He clicks on his Learning Team in the Science section, one of five interdisciplinary teams that has been hired by a local outdoor equipment company to analyze materials for use as the bottom of a backpack. The company has provided specs, swatches and possible designs. Each team has one semester to use its mix of science, mathematics and literacy competencies to complete its analysis and provide feedback to a groupnet of subject matter experts.*

*In between classes the next day, he uses his tablet to review his online competency chart and learning map that plots the skills and standards he has mastered, along with those he still must complete. He clicks on a virtual quest that the system is recommending to him based on his learning status. He uses the remaining time to take a challenge to determine his proficiency level. He is assigned Novice: Level 2 status and a notification is sent to his teacher and parents. Alex can see some of his classmates further ahead on the leader board, including his girlfriend Jane. He tweets her to let her know that her score is squarely in his sights.*

instructional materials that align with those standards, as well as assessment tools that provide real-time feedback to students and teachers. We are also supporting bold efforts to transform how teachers are recruited, developed, rewarded, and retained. These include Intensive Partnerships for Effective Teaching, a $290 million reform effort in four urban school districts that seeks to greatly improve teacher effectiveness, boost student achievement, and dramatically increase the number of college-ready high school graduates. The program also seeks to provide policymakers and educators across the country with evidence-based tools to improve education.

Our Postsecondary Success investments include working with community colleges and other institutions to better serve low-income young adults, empower students to be active participants in their own success, and build awareness and a broader commitment to helping students complete degree programs. For example, the foundation provided $16.5 million in grants to 15 community colleges and five states to expand postsecondary remedial education programs. We also support Complete College America, a nonprofit organization that is working to build consensus at the state and national levels for policy changes and initiatives that can increase the nation's college completion rate.

## INNOVATIVE LEARNING MODELS AND PERSONALIZED PATHWAYS

We know that increasing teacher effectiveness, empowering excellent teachers, and engaging and motivating students will require changes to the current system, as well as new thinking and innovation. Building on the insights gained from our investments and partnerships in the past decade, we are focused on accelerating the development and adoption of breakthrough educational strategies that

will enable every student to follow a more personalized pathway to college success.

In this paradigm of next-generation learning models, students and teachers—both secondary and postsecondary—will have access to high-quality, relevant, and engaging content in a variety of forms. Class time and structure will be more flexible, to adapt to the learning needs of the students. Students will have access to multiple sources of instruction and use assessment and diagnostic tools to help direct the pace and format of their learning. Teachers will tailor their instruction and guidance to ensure progress and mastery for all students, with a focus on those who have historically been underserved.

The foundation's education teams work together, and separately, to accelerate the creation and adoption of next-generation learning models. Elements of this new paradigm include:

**Building Blocks.** Learning models that support personalized learning pathways require some basic building blocks. These include effective assessment tools that align with college preparation standards and clear postsecondary learning objectives, engaging digital content, algorithms that match student needs with content and delivery methods, technology-enabled professional development tools, and learning management platforms that integrate and deliver these diverse components. Examples of such building blocks include the more than 1,800 free online video tutorials available on the Khan Academy (www.khanacademy.com) website. Produced by a single individual, Salman Khan, the engaging 10-to-15-minute videos cover a wide variety of topics in math, science, and the humanities and are viewed by more than 300,000 people per month. Another example is Carnegie Mellon University's Open Learning Initiative (OLI, http://oli.web.cmu.edu/openlearning/index.php), which offers an array of web-based courses that users can access for free, or for

academic credit at a growing number of institutions worldwide. Self-guided materials and activities engage learners and provide frequent feedback about their performance. OLI data also provides rich feedback to instructors, course designers, and learning science researchers.

**New Learning Models.** We are funding a network of innovators who will assemble the various building blocks to create next-generation learning models. These models will include whole-school and whole-college models as well as more targeted approaches that focus on particular subjects. This "test kitchen" approach will help us demonstrate how the building blocks can work together to produce results for students. The School of One (http://schools.nyc.gov/community/innovation/SchoolofOne/default.htm) program, run by the New York City public school system, is one such experimental model. It uses a learning algorithm to match students with activities that best suit them, based on a diagnostic assessment of their performance at the end of the previous school day. Each student receives a daily customized "playlist" that might include teacher-led instruction, online modules, small group work, or one-on-one tutoring delivered live or online. Western Governors University (www.wgu.edu) is another innovative educational model that for more than a decade has offered self-paced online courses, with credit awarded based on what students have learned, not how much time they have spent in the classroom. Students who enroll in this private nonprofit program receive one-on-one guidance and support from a faculty mentor. Undergraduate tuition is a fraction of what other private colleges charge and is about the same as state university tuition—and the program does not rely on any state subsidies.

**Enabling Environment.** Building blocks and new learning models will take hold in schools, school districts, colleges, and universities only if policies that limit innovation—such as seat time

requirements, student-teacher ratio requirements, and charter caps—are addressed. Education entrepreneurs also need access to viable markets and capital. The foundation is working with states, districts, colleges, and education networks to aggregate demand for solutions that emerge from our building block and learning model investments, and we are working with partners to explore new financing vehicles for nonprofit and for-profit entrepreneurs. For example, we support a new social enterprise called Startl, which helps entrepreneurs with promising, early-stage learning products by connecting them to sources of capital and to a network of mentors and users. Through these connections, they can improve the quality and viability of their products and their go-to-market strategies.

To promote markets for innovative educational technologies, the foundation is directing its resources in three ways:

- connecting and convening stakeholders and innovators to foster collaboration and knowledge sharing
- directly investing in promising projects
- encouraging open innovation to spur the development and adoption

of breakthrough technology solutions (primarily through the Next Generation Learning Challenges partnership, described in the next section)

Although technology has not led to advances in education to the extent that it has in business, government, healthcare, and many other areas, we believe that it has an important role to play in improving student achievement.

There is growing evidence that innovative technology-based solutions can lead to more effective teaching and learning models. Technology also holds the promise of delivering learning solutions in a cost-effective manner, which is crucial in a time of nationwide economic challenges and state budget crises.

Although promising solutions are emerging, they remain fragmented and sub-scale. Educational institutions lack the flexibility and incentives to aggressively pursue innovations. Even when innovative solutions emerge, institutions and education entrepreneurs have few ways to find potential partners and collaborators.

## NEXT GENERATION LEARNING CHALLENGES

To address the barriers to educational innovation and tap the potential of technology, the foundation is committing significant resources to Next Generation Learning Challenges (www.nextgenlearning.com), a nonprofit partnership that aims to dramatically improve college readiness and college completion in the United States through the applied use of technology and digital media.

> Next Generation Learning Challenges seeks to pinpoint technology solutions that can measurably improve the quality of learning experiences and improve students' college readiness and chances of completion.

Next Generation Learning Challenges is guided by the belief that providing investment capital to strengthen emerging information and learning technologies, collecting and sharing evidence of what works, and fostering a community of innovators and adopters will result in a robust marketplace of solutions and a larger pool of institutional participants, which in turn will dramatically improve the quality of learning experiences and

college readiness and completion in the United States.

Many potentially breakthrough solutions are being developed and tested by educators, institutions, technologists, and entrepreneurs, but too often they operate as islands of innovation, with little access to each other or to opportunities to disseminate their innovations. They need more support to refine and rigorously test their solutions, to connect with other likeminded innovators, and to develop strategies to broaden their reach and impact. Similarly, technical and institutional barriers need to be addressed so new incentives and practices can take hold.

Next Generation Learning Challenges seeks to create a healthier marketplace of innovators and adopters working together where those who have the will to dramatically increase learning quality and completion have the way.

The initiative has multiple objectives:

• send a market signal to existing and new innovators to encourage more investment in technology-enabled solutions that improve the quality of learning and student outcomes for low-income students

• support a portfolio of solutions that have demonstrated early evidence of success and potential for scalability

• encourage large institutions to partner with early innovators to support broader adoption of their solutions

• establish a network of collective learning among innovators and adopters to shorten innovation cycles

Next Generation Learning Challenges is led by EDUCAUSE, a nonprofit association, in partnership with the League for Innovation in the Community College, the International Association for K-12 Online Learning, and the Council of Chief State School Officers. An executive committee that includes these partners as well as the Bill & Melinda Gates Foundation and other funders will guide the project's overall efforts.

(More information about the partner organizations can be found later in this paper.) EDUCAUSE has management and fiduciary responsibility for the program.

Next Generation Learning Challenges provides investment capital through waves of funding, one every 6 to 12 months, each involving a select number of challenges. The first wave will focus on postsecondary education. The second wave will focus on K-12 education, with an emphasis on secondary education. Future waves will likely focus on innovations at the system and delivery levels.

Professional evaluations of the funded projects and the overall effort will provide a body of evidence about efficacy and cost-effectiveness. The initiative will also foster a diverse community of innovators and adopters who can collaborate and share new ideas and solutions. Some challenges may involve teams that include an implementing institution, a solution provider, and a partner who, together, can help take a solution to scale.

## CONCLUSION

A society thrives only when all people have the opportunity to develop their talents. Education is the key to providing young adults with the knowledge and skills they need to find meaningful employment and contribute to their communities.

The United States has proven that it is capable of many great accomplishments. But we have not yet created an education system in which all students—especially those with the fewest resources—can attain a secondary and postsecondary education with genuine economic value.

We are optimistic that the intelligent use of technology, in combination with new and emerging evidence-based models of innovative teaching and learning, can dramatically improve college readiness and completion in the United States—and meet the standards that our students deserve and our economy demands. We are especially excited about the potential of Next Generation Learning Challenges to stimulate development of breakthrough technology solutions, encourage their broad adoption, and establish a network of collective learning among innovators and adopters.

As Bill Gates noted in a recent interview on 60 Minutes, "The country is built on ingenuity…. Education is the thing that 20 years from now will determine if this country is as strong and as just as it wants to be."

## NEXT GENERATION LEARNING CHALLENGES PARTNERS

### EDUCAUSE
EDUCAUSE (www.educause.edu)is a nonprofit association dedicated to the intelligent use of information technology in higher education. It helps those who

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**Next Generation Learning Challenges seeks to answer these questions:**

• How do we better engage young people in learning and demonstrate its relevance to—real life—and their aspirations?

• How do we personalize learning to accelerate and deepen understanding and knowledge retention?

• How do we encourage persistence and completion in spite of the competing demands of students' lives?

• How can institutions and educational systems afford improvements in student success in light of flat or declining budgets?

lead, manage, and use information technology by offering educational resources, analysis, advocacy, and opportunities for collaboration. EDUCAUSE members represent the breadth of higher education technology leadership, including chief information officers, IT managers and staff, faculty, librarians, and others who are interested in the application of IT. The association's programs include applied research and analysis, strategic policy advocacy, teaching and learning initiatives, professional development, print and online information resources, and special interest collaborative communities. The current membership comprises more than 2,300 colleges, universities, and educational organizations in over 40 countries, as well as 250 corporations. EDUCAUSE will implement and administer Next Generation Learning Challenges and will provide specific outreach to higher education and technology audiences.

## The League for Innovation in the Community College

For more than 40 years, the League (www.league.org) has served community college students, staff, and leadership through professional development opportunities, research, and knowledge sharing, including the development of model curricula and instructional materials. It hosts a series of international conferences and gatherings dedicated to sharing best practices and proven models in higher education. The League will provide targeted outreach to its members, creating a strong link between Next Generation Learning Challenges and the nation's community colleges.

## The International Association for K-12 Online Learning

The International Association for K-12 Online Learning (iNACOL, www.inacol.org) is a nonprofit organization that facilitates collaboration, advocacy, and research to enhance the quality of K-12 online teaching and learning. As

a truly global organization, iNACOL seeks to facilitate the sharing and dissemination of research and resources related to online learning, to advocate for policies that support effective teaching and learning in the virtual space, and to develop and facilitate national K-12 online learning standards. The organization also serves as a professional network and community for online K-12 leaders, providing a place to seek and share best practices and network and offering opportunities for professional development, such as an annual Virtual School Symposium and multiple monthly web seminars. Through guidance and outreach, iNACOL will provide a link between Next Generation Learning Challenges and its K-12 community of practitioners.

## The Council of Chief State School Officers

The Council of Chief State School Officers (CCSSO, www.ccsso.org) is a nonpartisan, nationwide, nonprofit organization of public officials who head departments of elementary and secondary education in the states, the District of Columbia, the Department of Defense Education Activity, and five U.S. extra-state jurisdictions. CCSSO provides leadership, advocacy, and technical assistance on major educational issues and has identified next-generation learning as one of its highest priorities. It seeks member consensus on major educational issues and expresses its views to civic and professional organizations, federal agencies, the U.S. Congress, and the public.

## The Bill & Melinda Gates Foundation

The Bill & Melinda Gates Foundation (www.gatesfoundation.org) works to help all people lead healthy, productive lives. In developing countries, it focuses on improving people's health and fighting hunger and poverty. In the United States, it seeks to ensure that all people have access to the opportunities they need to succeed in college and career.

### Next Generation Learning Challenges: Wave I

The first wave of grants will focus on strategies that seek to improve college completion in the United States. by:

- supporting the availability of high-quality open courseware, particularly for high-enrollment introductory classes such as math, science, and English, which often have low rates of student success

- increasing the use of blended learning models, which combine face-to-face instruction with online learning activities

- deepening students' learning and engagement through use of interactive applications such as digital games, video, immersive simulations, and social media

- helping institutions, instructors, and students benefit from learning analytics, which can monitor student progress in real time and customize support and interventions

**www.gatesfoundation.org**