Educational Innovation and Technology

A Synthesis of Ideas from the Harvard University Advanced Leadership Initiative Think Tank
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FACULTY CHAIR,
EDUCATIONAL INNOVATION AND TECHNOLOGY THINK TANK

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Preface:
The Think Tank Premise

The Advanced Leadership Initiative (ALI) at Harvard University is dedicated to educating and deploying a leadership force of experienced professionals from a wide range of backgrounds who can address challenging national and global problems. An important part of the process is to stimulate discussion among experts and advocates about the gaps that can be filled by advanced leaders, including the Advanced Leadership Fellows at Harvard who are preparing to transition from their primary income-earning years to their next years of service. Each year, ALI convenes three solution-finding workshops called Think Tanks to delve deeply into the nature of social problems, their potential solutions, the barriers to change, and the ways advanced leaders can make a difference.

Addressing an unmet social need or unsolved problem, such as educational innovations and technology, differs from assigning tasks or formulating strategies in established organizations or exercising leadership in a domain with existing pathways and institutions. Even seemingly simple ideas for change require multiple strategies in multiple domains, taking various stakeholders into account. Advanced leaders must work within complex and unorganized social contexts, where goals are vague or conflicting, resources are dispersed, authority is diffused, stakeholders are diverse, and existing pathways for action do not exist. Forging change thus requires a special kind of leadership. When leaders lack formal authority over an unbounded system, they need to think systematically while mastering relevant subject knowledge. They must influence individuals and groups to mobilize resources and work together. They need a highly developed sense of contextual and emotional intelligence to understand stakeholder assumptions and motivations. And they must find ways to create a shared purpose and common ground to get multiple actors to move forward on an issue. Leading innovations in education and technology calls for the collaboration of not one but many advanced leaders.

From March 31 to April 2, 2011, over 150 leaders in the field of education gathered to discuss the challenge of using technology to create innovations in education. The Think Tank was chaired by Fernando Reimers, the Ford Foundation Professor of International Education and co-Chair of the Advanced Leadership Initiative. The challenges are vast and difficult to circumscribe. Information and communication technologies have enabled global social and economic transformation, which in turn have generated a need for 21st century skills. Yet, teaching 21st century skills also requires better leveraging of technology to enhance the relevancy and quality of education. This transformation in education calls for advanced leaders to identify opportunities, develop innovations, and bring them to scale.

Specifically, the Think Tank sought to consider such questions as the following:

1. What have we learned about the use of technology to support high quality instruction, more personalized instruction, and more relevant curricula?
2. What do we know about the effects, scalability, and limitations of online learning to support independent learning?
3. How can we leverage technology to design more effective approaches to enhance the professional skills of teachers and principals?
4. How is technology being used to assess new competencies, more relevant to the demands of a knowledge economy?

5. What do we know about the role of technology supporting education outside the school building, in neighborhoods, communities, independent learning? What are the educational applications of gaming?

6. What are best practices in the use of social media to support educational improvement?

7. How can technology be used to engage universities in K-12 renewal?

8. What do we know about the limits and opportunities to large-scale educational innovation using technology?

In the spirit of modeling the technological capabilities discussed during the event – “walking the talk,” as Reimers said – the conversation began 10 days prior to the Think Tank with the publication of a think piece series on Harvard Business Review’s online portal – HBR.org. (See Appendix 2 for titles from the series and web links.) During the Think Tank, conversations were also streamed live, while discussions continued via the Facebook page and questions were fielded, in real time, from online followers.

This report offers a narrative summary of the gaps identified during the event and highlights opportunities for innovation and action, both large and small. It seeks to synthesize the event’s proceedings by answering the following questions: What is the problem? What can technology do? How does technology create educational innovations? And where do we go and what do we do from here? ✮
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Summary
What is the Problem?

Technology both demands new skills of individuals and stems from the innovation of skilled individuals. It is also a major driver of globalization, which has transformed the skill set that students of the 21st century must master in order to meaningfully contribute to economies and societies. These phenomena are cyclical: globalization requires new technological skills; these skills enable further technological innovation; and innovation drives globalization.

The Think Tank launched with a collective call to reconceive the role of schools in this cycle, including where and how students learn, who teaches them, and what the content and abilities imparted by schools should be. Traditional schools, it was declared, are neither efficient nor relevant to the needs of youth in the 21st century. Globalization and rapid technological change have redefined the skills needed to flourish in the workplaces of tomorrow, which will sustain the “learning society” we have become. “The business of educational opportunity is one that takes a village,” Fernando Reimers pronounced in the opening session. “Education systems fail to provide adequate opportunities to many children, and our schools are not keeping up with the pace of change of societies around them. There is an urgency to this.”

TODAY’S SCHOOLS REFLECT YESTERDAY’S NEEDS

Despite the increasing interconnectedness of the world, rapid technological change, and new needs of tomorrow’s workforce, the structure, content, and processes of schools have changed little over the last century.

The traditional school day has remained from 8am until 3pm, in line with daylight hours, despite the invention of the light bulb. The traditional school year in the United States, for example, has remained from September to June, in line with farming needs, despite the fact that the country is longer an agrarian society. Even academic subjects are still taught as discrete courses, as though they were not interrelated. According to this school structure, one could assume that students are farmers living without electricity and only need to know some math, literacy, history, and science to lead successful, productive lives.

Not only is the school structure still very traditional, but the content has largely remained unchanged. In an integrated world, how can we teach subjects as though they are not also interrelated? When the information of millions of encyclopedias are available at the touch of a keystroke, why are schools focused primarily on the acquisition of that readily-available information, rather than building the skills needed to analyze that information and the creativity to generate new knowledge? In the learning society, “success is based not on what you know or how much you know, but on thinking and acting creatively,” said Mitch Resnick, Professor of Learning Research at the MIT Media Lab. Teachers should be less concerned with delivering content—much of which is no longer relevant—and more concerned with developing students’ abilities, noted Dan Buckley, Director of Research and Development at Cambridge Education. “We used to go to school to learn to work,” said Tom Carroll, President of the National Commission on Teaching and America’s Future. “Now learning is the work.” In the 21st century, jobs are increasingly defined by problem-solving, collaboration, and the constant acquisition of new skills. Educational initiatives should thus teach students to think imaginatively, reason systematically, and work together.

Technology is a fundamental part of this 21st century skill set. Youth must learn to use technology, and at
the same time, technology enables radical innovation in the way educational content is delivered, digested, retained, and reused. It transforms the process of educating. Technology has the potential to increase schools' access to quality content at low cost, to ease reporting and data-sharing, to create communities of practitioners and school leaders, and much more. Even when schools attempt to teach integrated content that builds new skills, they often do so with an obsolete teacher-centered pedagogy. Teachers still stand in front of the classroom as students listen or take notes while sitting in isolated desks arranged in rows. Moreover, when it comes time to assess student learning, students are still filling in multiple-choice bubbles and regurgitating facts, like they did in the pre-Internet era.

THE CHALLENGES WE FACE
While the promise of technological innovation is tantalizing, the problem—the education systems’ current failure to keep pace with 21st century needs—is messy and plagued by challenges, including but not limited to defining and measuring a new skill set, retraining and supporting teachers, and enlisting and empowering students.

One challenge is reaching consensus on what “21st century skills” actually entail and how to teach them. In the United States, for example, 50 states have 50 different ideas of what competencies are needed for students’ success, mainly indeterminate concepts like creativity and collaboration, despite cross-sector efforts such as the Partnership for 21st Century Skills. “How do you teach collaboration?” asked Greg Butler, Worldwide Education Strategy Director for Microsoft. And once a best teaching practice is developed, how do we share it with teachers at scale? Butler continued, “How do you measure collaboration? Assess whether or not it’s there?”

The challenge of assessing 21st century skills is significant, especially when teachers are used to teaching from books that hold immutable facts, while the importance of memorizing content has been usurped by the need to solve problems. “Filling in bubbles” is no longer an effective way to evaluate the skills that we now want to impart, according to Anthony Miller, Deputy Secretary of Education for the U.S. Department of Education. How then do we put together robust, informative assessments? How do we resolve the global data gap on what children know, and how they learn—worldwide?

Of course, teachers need to feel ownership over the redesign of classrooms and schools, and another challenge is how to train teachers to use multiple learning modalities and feel comfortable integrating technology into their classrooms. We have not yet defined what proficiency in information technology is for teachers, and many teachers struggle with how to embed 21st century skills into their learning activities. Moreover, isolation is a significant challenge for individual teachers and principals, as well as individual schools, noted Tom Burnett, Strategic Initiatives Manager at Apple, and Ronald Thorpe, Vice President for Education at WNET. Teaching is “the last solitary profession,” said Paul Resta, Professor and Director of Learning Technology Center at the University of Texas at Austin.

“The business of educational opportunity is one that takes a village. Education systems fail to provide adequate opportunities to many children, and our schools are not keeping up with the pace of change of societies around them. There is an urgency to this.”

- Fernando Reimers, Harvard Graduate School of Education

Teachers practice in collaboration but perform alone. Principals lack widely-shared models of school leadership and end up governing in the style of principals they formerly experienced. Innovative schools can also feel isolated on “islands of excellence,” warned Stanley Litow, President of the IBM Foundation and IBM’s Vice President for Corporate Citizenship and Corporate Affairs. As a result, “we have a tendency to think that innovation only happens in out of the way places,” said Gavin Dykes, Associate Director of FutureLab and Fellow of Education Impact, and we fail to draw it up into policy or take it to scale.

Another challenge is empowering students, who are often overlooked as a source of educational innovation. “The greatest resource,” what learners can contribute, is not being used to develop classroom
WHAT IS THE PROBLEM?

cost, said Gavin Dykes. Children are even capable of developing teacher training modules and teaching classes themselves, according to Dan Buckley, who noted, “We need to get over the idea that children are from another species.” Yet while implementing and scaling innovations, leaders should remain aware of the danger in expanding the digital divide between more affluent and lower-income students, reminded Veronica Biggins, former Director of Personnel in the Clinton Administration, Partner at Hodge Partners, and 2011 Advanced Leadership Senior Fellow.

Panelists also recognized the fear inherent in technological change for many people. The rapid pace of technological development often outstrips available teacher training, such that students can know more about new media than their instructors. Open resources, such as free online textbooks, seriously threaten some education stakeholders, such as textbook companies. Where the traditional education system was hierarchical, “what’s scary about today’s open learning ecology is we don’t own it, we don’t direct or manage it, we just nurture and shape it,” said Tom Carroll. One audience member added, “The future of education can’t be so difficult that people can’t envision a transition to it.”

At the macro-level, the question of whether technology can support innovation has not yet been proven, according to Reimers. “Technology in education has had a very long infancy,” he said, questioning why technological innovation has not reliably led to better education for all children, at scale. Certainly, the challenge of scope is daunting, as Dan Buckley observed, “Systemic change means we’re talking about every classroom in the world.”

So far, according to Wayne Craig, Regional Director of the Department of Education and Early Childhood Development in Victoria, Australia, we have only used technology to “replicate the past.” In fact, Stanley Litow added, “many innovations that were supposed to or could have changed education have not.” Although, through conferences like these that convene committed people, he expressed hope: “it is not the technology itself that will change education, it is people and will that will change education.” The challenges to change are more human than technological. People are the lever and technology but the tool.

Yet leading change still requires trenchant domain-specific understanding of what technology can (and cannot) do in order to identify opportunities for innovation and, then, articulate and execute on strategies and tactics for transforming educational systems.
What Can Technology Do?

Information and communication technologies have the potential to either enhance or create new capabilities in the educational sector. Major areas identified during the event included easier reporting, increased access to quality content and value, and community creation, among others.

EASES REPORTING
Technology is a key enabler for the production, dissemination, and efficient use of student- and school-level data, both to keep schools and their stakeholders accountable and to provide evidence that innovations work. That is, if data even exists. David Barth, Director of the Office of Education for USAID, described a global data gap in education, noting there has been “too much applause on enrollment gains” because we lack information on what children in schools actually know or what helps them learn. Technology can help systems get past the “ultimately pointless data point of ‘numbers served’,” to the impact information on real, concrete goals. “We can get past simply knowing that sixth graders around the world can’t read for comprehension, but instead learn why they aren’t learning to read.”

New adaptive assessment platforms can tailor a test to an individual test-taker’s level of ability, in real time, by capturing precise data on students’ skills and competencies, rather than collecting rote output. For example, McGraw-Hill, described by Ted Smyth, Executive Vice President of Corporate Affairs, as “not a textbook company, but a learning company,” is seeking to develop competency-based adaptive platforms for student learning and evaluation. Technology also enables a radical rethinking of testing formats. Gavin Dykes of Education Impact/Futurelab cited the example of a Dutch secondary school in which students accessed the Internet on computers during exams, because their exams test powers of inquiry, discovery, cogent argumentation, synthesis, and analysis, rather than content memorization. “It is an example of where assessment should be in the 21st century,” said Dykes.

In the private sector, Keith Krueger, CEO of the Consortium for School Networking, noted that businesses powerfully use data to provide feedback to consumers, before turning the spotlight on schools, asking, “How do schools use data not just for accountability, but to inform instruction?” Ronald Thorpe of WNET commended New York City’s School of One, which places data from students’ daily lessons and performance into a “learning algorithm”

“In today’s world, information is dynamic — determining quality is a constant process since the information is no longer fixed”

- Richard R. Rowe,
  Open Learning Exchange, Inc.
Technology also provides the means to collect, store and analyze longitudinal data, which is important for the monitoring and evaluation of school-based innovations that may take years to bear fruit. Kwasi Asare, Associate Director of Education Technology at the US Department of Education, pointed out that investing in education requires “patient capital,” i.e., investors who do not mind waiting at least eight years for a return on their investment. Technologies that can both store data in the long-term, as well as report data in real-time to highlight smaller, more incremental victories, might assuage investors who question the slow incubation time of many school reforms.

INCREASES ACCESS TO QUALITY CONTENT AND VALUE IN EDUCATION

The global economic downturn of the last several years has resulted in a “new normal,” where governments, companies, and civil society are expected to do as much as always (if not more) with fewer resources. Many actors working in the education sphere asserted that technology is a useful tool for increasing access to education, and, more importantly, access to quality education, at low cost. For example, Shai Reshef, Founder and President of University of the People, cited the huge economic barriers to higher education in many parts of the world as a reason for establishing the first free, online university. Students, mainly from rural areas and developing countries, can major in either business administration or computer science. Shantanu Prakash, founder of EduComp Solutions LTD in India, further noted the role of for-profit companies in solving educational problems, including problems of access. “India does not have a vocational structure at all and after three years in college, many students are still not suited to take a high-skill job. So EduComp created ‘studios’ throughout India to train students in a particular profession, say, accounting, and EduComp hires one teacher then satellite–projects the lesson to ‘studios,’ using technology to scale the teacher.” Much in the same way, Jerry Jones, Chief Legal Officer and Senior Vice President of Axiom Corporation, founded a virtual school in his native Arkansas to help solve the state’s problem of limited resources for students in rural areas. With full enrollment in grades K–8, public and private funding, and content provided by a company with a proven history of student achievement, Jones cited his school as a paradigm for the proper application of investment capital to achieve results at scale.

MIT, along with 250 additional universities in the OpenCourseWare Consortium, also provides free online access to every course it offers, said Vijay Kumar, Senior Associate Dean of Undergraduate Education and Director of the Office of Educational Innovation and Technology at MIT. MIT’s “BLOSSOMS” program (Blended Learning Open Source Science or Math Studies) provides shorter video modules recorded by MIT faculty specifically for use in concert with K–12 teachers and their STEM curricula, reported Richard Larsen, Mitsui Professor in Engineering Systems at MIT. MIT also experienced an unintended benefit from “opening” its lecture halls to unlimited online viewership: When faculty members realized the scope and posterity of their classes, instructional quality at the university improved markedly. In this way, organizations and universities have been able to increase access to free content online at very low cost per user, while retaining (if not improving) quality. According to Daniel Hastings, Dean of Undergraduate Education and Professor of Aeronautics and Astronautics and Engineering Systems at MIT, while the university does not have a school of education, it believes in sharing innovative solutions and ideas for broad-scale use free of charge. In this way, the institution operates under the theory that education is not a finite resource, and that quality, quantity, and value are not mutually exclusive.

Yet decreasing cost does not necessarily result in increased value. Catalina Laserna, Senior Research Analyst for the Harvard University Division of Continuing Education, acknowledged that for users of her program, which opens up many of Harvard’s courses to distance learners through communication technology, the quality of experience that Continuing Education students receive is less than what students receive when they can participate in classes on campus. Moreover, the trend toward increasingly open textbooks and curriculum, which are often free, is distressing to some who worry about the quality of the product if it is free and online, rather than edited and copyrighted by a publishing company or educational institution. Mark Horner, Open and Collaborative Resources Fellow at the Shuttleworth Foundation, and Joel Thierstein, Associate Provost for Innovative Scholarly Communication at Rice University and Executive Director of Connexions, advocated for free teaching materials in South Africa and the United States, respectively, but they noted the
need for strict review and vetting guidelines for free content. To date, technology has been used effectively to lower the cost of education for many, but there is still work to be done to use technology to increase the value of the education that many are receiving.

**CREATES COMMUNITY**

In addition to decreasing the cost and potentially increasing the value of education, technology can be used to create new and different learning communities. Organizations such as Ultranet in Victoria, Australia WIDE World at Harvard, and BLOSSOM at MIT, as described by Wayne Craig, Martha Stone Wiske, and Richard Larson, respectively, connect students, teachers, and professors in real relationships and collaborations through virtual means. Anustup Nayak, Partner at iDiscoveri Education in India, asked, “What if every teacher had access to a professional education coach? What if every teacher in the world had access to one another so that they could learn together?” Technology may be the answer. For example, Keith Oelrich, CEO and co-founder of Ignite Education Capital Group, pointed out that online schools can give children opportunities to make connections that are different and sometimes better than they might have in person because the relationship is more one-to-one. For students who might have been bullied because of their looks or social skills in a traditional school, in online schools they may be able to make relationships based on common interest or other affinity.

Technology can also help to engage parents to assume strong advocacy roles for their children’s education.

“Parents that are demanding consumers can be such a powerful tool that technology can help to breed by informing parents of their rights,” said David Barth of USAID. But

Chris Dedé, Professor in Learning Technologies at Harvard Graduate School of Education, raised an important question, “How do we harness online learning for face-to-face learning, since research shows that a hybrid model may work best?” Susan Patrick, President and CEO of the International Association for K-12 Online Learning, challenged all when she stated that “we’re still at the bottom of the curve in blended learning.”

Not surprisingly, not all of the technological innovations shared at the Think Tank fall into neat categories. Many bridge these domains and provide services and solutions in various areas. Lucía Araujo of the Roberto Marinho Foundation described the activities of Canal Futura, an educational television channel in Brazil, which not only provided educational content but also hard copies of teacher development information. For such a large country, with vast and sparsely populated regions, this kind of integrative solution has reached 2 million of Brazil’s 3.8 million teachers.

And beyond the technological tools that meet more than one need lay those that have not yet been imagined. As long as there is a need to be addressed and as long as innovative minds continue creating, new technologies will be developed to improve educational access, quality, and value. But how exactly do these new technological capabilities translate into systemic educational innovations? What do the new models look like? ☞
What Kinds of Education Innovations Do Technologies Create?

During the course of the Think Tank on Education, Innovation and Technology, two implicit models of education and technology emerged: an “enhanced” schooling model, in which technology supplements traditional teaching methods and outcomes, and a “disruptive” schooling model, in which technology drastically changes the way teachers and students engage with knowledge and with one another.

In an “enhanced” schooling model, students learn in a blended environment, using new information and communication technology but still attending a traditional school where teachers are knowledge brokers and students are knowledge consumers. Technology may help teachers deliver content more easily; a SmartBoard may replace a blackboard, or customizable online textbooks may assume the role of hard copies. Students may complete online modules or coursework semi-independently, but teachers are still the primary means of transfer of information. Game-like activities, or “edutainment,” are reserved for homework or out-of-school time, as Eric Klopfer (Massachusetts Institute of Technology) noted: “We don’t need to use class time for students to play mobile phone learning games, they can be used in the interstitial times in school—in the halls, on the bus, at lunch, etc.” In an “enhanced” model, the traditional school structure still exists, with grade-level classrooms determined by age and funding determined by students’ seat-time.

A “disruptive” model re-imagines the power structures of the traditional school system. For example, textbooks might be customizable for teachers and free of charge for students, with content viewable on an array of mobile devices as rudimentary as a Nokia 3330 cellphone—which breaks down the hegemony of textbook companies over the knowledge taught in schools. Teachers and students may view one another as colleagues or even peers, collaborating on problem-solving, analysis, and interpretation of the facts now so readily available at our fingertips. Assessments may be open-book, judging students’ ability to interpret information rather than regurgitate it. Students may assess their peers without the intervention of a teacher.

Both models of technological innovation in education affect the educational process, and the people involved in schooling, in different ways.

“Technology acts as a magnifying glass: it can highlight both the good and the bad. We need to get learning right, then use technology to magnify it.”

- Gavin Dykes,
Education Impact / Futurelab

THE EFFECT ON PROCESS
In the “enhanced” model, the “process” of education is not very different from how it looks today. As mentioned above, teachers are still the knowledge brokers and students are still the knowledge consumers, with technology granting teachers and students easier and faster access to content. Even if students attend virtual schools, such schools often replicate the structures of physical schools, with subjects siloed into different
WHAT KINDS OF EDUCATION INNOVATIONS DO TECHNOLOGIES CREATE?

courses and content acquisition rather than ability development as the primary goal.

On the other hand, in a “disruptive” schooling model, students and teachers experience fundamental changes to their educational environments. Content delivery is no longer tethered to teachers and textbooks, but rather experienced or discovered by learners themselves. In the UK, they are getting kids to produce videos on problems that are facing. In this case, the learning was in the production, not in the product. Technology was used to make it possible for the student to become the teacher, since there is evidence that people learn more in teaching than in being the learner,” according to Gavin Dykes of Education Impact / Futurelab.

“Rather than content being king, context is.”
- Gavin Dykes, Education Impact / Futurelab

Not only are students learning through teaching in the “disruptive” model, but also through platforms that mimic reality and situations that “engender gamelike experiences,” as Donald Brinkman described them. For example, the EcoMove project involves an immersive software environment where students can understand complex causality and ecology, according to Chris Dede. And at the New York Hall of Science, even very young students learn about concepts like friction through playground play, according to Margaret Honey. These tools, as Bruce Dixon from ideaSLAB put it, “moves the locus of control [in the learning process] to the child.”

The process of assessment in a “disruptive” model can also be moved to be more child-centered and competency-based. Dan Buckley of Cambridge Assessment described an assessment platform, called PbyP, where teachers, students, and peers assess both skills and competence according to a progressive scale—where personal development, including skill development, is a primary goal, rather than knowledge acquisition. In other words, “disruptive” assessment is the type of test you would give a student if they had access to the internet during the test.

THE EFFECT ON PEOPLE

The “enhanced” and “disruptive” models of education also have very different implications for educational stakeholders like teachers, students, and principals. In the “enhanced” model, as stated above, teachers are didactic knowledge brokers for students, who learn content within a traditional classroom structure. The teacher’s role at the front of the room may be enhanced or even attenuated in the presence of technology; for example, a SmartBoard may allow the teacher to expand the range of curricular content she shows her class, or enable guest-teaching by content experts in a remote location via video feed. Students, too, may find their classroom learning aided by the presence of laptops, iPads, or other personal devices on their desks that enable faster note-taking and rapid information retrieval.

The possibilities for teacher training are also greatly expanded by the technology of an “enhanced” model of education. Technology that disseminates best practices in teaching and leadership—such as television shows like Teacher TV in the United Kingdom or Futura in Brazil—can break down the isolation of both teachers and principals. Moreover, principals can use communicative devices to stay in touch with neighboring school districts to share ideas and resources.

In the “disruptive” model of education, however, teacher and student roles are radically reimagined. Mitchel Resnick (MIT Media Lab), for example, called for primary and secondary schools to model themselves after kindergartens, with students engaging in unstructured play and collaboration, without much information delivered directly from the teacher. Tom Carroll posited that teachers and students of the 21st century should act as members of “learning teams,” while Ted Smyth suggested they act as members of the same staff, with teachers “managing” their students like “coworkers.” Dan Buckley (Cambridge Education) suggested children teach classes while teachers learn from the children’s pedagogical example. With an emphasis on self-directed learning and creativity, students in the “disruptive” model are granted autonomy to inquire, hypothesize, discover, argue and analyze around their curricular content, rather than memorize and output facts.

In a “disruptive” education model, teachers worldwide are also understood to be collaborators on the
greater educational project of educating youth worldwide. Teachers have access to an increasing amount of high-quality curricular content and open courseware, and they are expected to customize resources on a nearly learner-by-learner basis and to learn from the teaching process. In this vein, Tom Carroll (NCTAF) noted that “we need to move to ‘true teams,’ teach-

"Why do we think open education is important? It disrupts existing relationships."
- Vijay Kumar, MIT
What to Do?

The three-day Think Tank on Educational Innovation and Technology showcased innumerable ventures, models, products, services, initiatives, and coalitions dedicated to leveraging technology to transform educational systems for 21st century society. A thousand flowers are beginning to bloom. But how can they be harvested? How can leaders spread their innovations — either through scaling or replication?

Whether a technology-driven innovation is enhanced or disruptive, however, obstacles remain the same:

- **Stakeholders are diverse:** The education sector includes local, state, and national governments; teachers and unions; principals and administrators; publishers; universities; technology companies; citizens; the private sector and industry; and, of course, families and children. Each has their own perspective on multiple issues in education. How and when can these stakeholders be convened around a particular problem? Change entails new relationships among stakeholders, which implies more work, new capabilities, new skill sets — all threats in their own right. How can leaders overcome inevitable, natural resistance?

- **Authority is diffused:** Given the diversity of stakeholders and the shared responsibility actors have in realizing outcomes, decision-making authority is inevitably diffused. National authority depends on state governments and local districts which in turn depend on individual schools which rely on buy-in from teachers, families, students, and the general public. Change requires coalition building and alignment. Furthermore, new relationships among actors may change the distribution of authority and decision-making power. Either the pie may grow or there will be winners and losers — or both. How can leaders influence others to coordinate efforts?

- **Goals are vague or conflicting:** Multiple stakeholders and diffused authority inevitably give way to vague or conflicting goals. National, state, and local governments may want different outcomes. Teachers may not want principals want. Publishers may not want what schools want. Families may not want what teachers want, and so on. How can actors develop common standards and shared assessments of curriculum, teachers, and students? Is it possible to define and measure 21st century skills?

- **Resources are dispersed:** Resources, whether financial or skills-based, are dispersed among actors and organizations — or, in many cases, they are scarce. Governments have revenue-raising powers, via taxation, but in a time of global recession and budget cuts, the education sector must compete over a shrinking pie for disbursements. For-profits and non-profits also have limited funds at their disposal either from capital markets or philanthropic sources. New models may threaten existing players, as with the case of publishers in the face of the open source content movement. How can leaders amass the resources needed to demonstrate a project or, more importantly, scale an innovation? What revenue model offers the reaching sustainability?

- **Pathways are nonexistent:** When approaches cut across sectors or imply a reconfiguration of existing relationships then leaders of change must also contend with the lack of institutional pathways. The traditional educational system and its stakeholders are structured in specific ways. An
enhanced but especially a disruptive model of schooling must contend with new forms of teaching, training, and assessment, all of which imply new institutions to meet these needs. Who will fill these needs? How can a new educational ecosystem be created? What legal structures should be put in place?

Advanced leaders—change agents dedicated to transforming the educational sector through technological innovation—may confront barriers to change by making two classes of strategic choices. What vehicle should a leader choose? And what aspect of the system should a leader target?

**WHAT VEHICLE FOR CHANGE?**
The choice of which organizational vehicle to use for change has important implications for how to marshal resources, exercise decisions, or influence other stakeholders. Logical choices range from the use of an existing organization to the creation of a new organization, to working through a formal coalition of organizations to an ad hoc convening of organizations to individual action.

MIT used its clout as an existing organization of higher education to innovate in the fields of online courseware and the sharing of content. Microsoft, Apple, Cambridge Education, and McGraw-Hill are other examples. Yet there are times when it may be best to form a new organization either to fill a new need or ensure that innovation does not get stifled from within. iDiscoveri Education was founded in India to implement XSEED platform for students and teachers among other initiatives. But sometimes one organization is not enough. After Richard DeLorenzo led the transformation of an Alaskan K-12 district from a time-based to performance-based system, he founded the Reinventing Schools Coalition, where he works with over 250 educational systems to enact similar changes. Coalitions may also consist of a less formal, more ad hoc, but no less influential convening of stakeholders and participants, such as that encouraged by Richard Rowe through Open Learning Exchange. Finally, individuals may exercise clout. After all, it was individuals, such as Al Zollar, former General Manager for IBM’s Tivoli Software, who contributed articles to the event’s HBR.org think piece series—not formal organizations.

Yet vehicles—whether an individual, an organization, or a coalition—also need to target an aspect of the educational system, as Rosabeth Moss Kanter, Ernest L. Arbuckle Professor of Business Administration at Harvard Business School and Chair and Director of ALI, has reminded. Think Tank participants had already begun to work multiple fronts targeting several components of the educational system, including advocacy for new policies to change rules or garner resources, demonstration of innovative programs or services, and mobilization of actors to raise awareness or share new tools for action.

**WHAT TARGET FOR CHANGE?**
Whatever the vehicle, there must be a target lever for change, whether it is a policy that hampers innovation, an inventive new program that meets a need, or people who rally behind a solution that works. The Think Tank showcased innumerable programs using technology, each striving to meet a need, fill a gap, or solve a problem—with many mentioned in this report. Yet, as David Barh of USAID highlighted, there is a need for more data on impact and better proof of concept before more programs could be brought to scale. “Can we identify the right tools for the right places?” he asked. But even if all of the data needed on the success of a program was on hand, stakeholders must decide whether the target policy or people.

Scaling programs requires greater advocacy for changing policies unfriendly to education and technology programs. For example, Susan Patrick of the International Association for K-12 Online Learning noted that existing funding policies hinder the popularity of online schools. In many states, funding is tied to “seat time” or the number of hours a student physically sits in school. Since “seat time” is harder to gauge in online schools and may in fact be shorter than in traditional schools, online schools may not get adequate or any funding using this criteria. An “enhanced” solution to this problem would be to extend “seat time” to “time online” for virtual students—a solution that may encourage the growth and expansion of online schools. Or, a “disruptive” solution could be to do away with the “seat time” concept altogether and find an alternative school funding model. However, making this sort of radical change to an entrenched policy would be difficult. Doug Levin, Executive Director of the State Educational Technology Directors Association, reminded Think Tank participants how
difficult it is to work with fifty different states, with fifty different sets of laws and policies. Regardless, he continues to see the state as the “natural unit of scale for education.”

Another target for change is people. How can a promising program be truly successful without a critical mass of supporters, participants, and champions? Teacher and principal professional development is needed to create a group of educators that understands how to use information and communication technology to improve student learning. Organizations like Don Knezek’s International Society for Technology in Education (ISTE) perform this role, but how can advanced leaders help it reach more teachers and principals, and have more widespread impact? Moreover, some of the actual programs themselves cannot function successfully without a large number of people as participants. For example, open source and other open materials, such as textbooks, lesson plans, and even Shai Reshef’s open university, University of the People, cannot meet their potential without people to contribute, evaluate, and use them. Yet, even when a program is deemed successful and has generated enough support to make it work, there is the added difficulty of finding even more supporters to scale it up. For example, a few different online curriculum sharing platforms were shared during the Think Tank—which one should be scaled or replicated, if any? By whom? How do you make it known to other actors in the field? These questions remained unanswered by the end of the Think Tank.

Even for coalition of supporters and champions convened to the Think Tank for the specific purpose of finding ways for advanced leadership in the field of education and technology, it was difficult to find a way forward. Participants, in the final sessions, debated the merits of scaling projects, making them even larger and reaching even more people, versus replicating them by sharing them with others to implement elsewhere on the same scale as before. Kristen Hamilton, Global Director of Education Audiences at Microsoft Education, also highlighted the risk of “scaling the value out of innovation” as programs grow. However, despite these possibilities, participants looked for ways to move forward and shift from discussion to action. However, this proved difficult. At the end of the Think Tank, five options for action were proposed:

1. Establish a small group that creates an online process to allow the exploration of future work, to recommend steps for action, by a later date;

2. Create a digital tool to disseminate information (i.e., creating a space or creating a hashtag);

3. Participate in supporting scaling up Richard DeLorenzo’s initiative: RISC;

4. Not decide to act now, but run a survey that polls what can be done next; and

5. Organize a student conference to include everything above.

In the end, select participants volunteered to put a combination of these proposals into action, with the understanding that there was still much work to be done.
Educational Innovation and Technology
A Synthesis of Ideas from the Harvard University Advanced Leadership Initiative Think Tank

Appendices
APPENDIX 1: THINK TANK AGENDA

THURSDAY MARCH 31, 2011

2:00PM  Introduction to Advanced Leadership and Think Tank Goals and Purpose
        Rosabeth Moss Kanter, Chair and Director, ALI; Harvard Business School
        Fernando Reimers, Co-Chair, ALI; Harvard Graduate School of Education
        Anthony Miller, Deputy Secretary of Education, US Dept of Education

3:00PM  OPENING SESSION
        Fernando Reimers, Harvard Graduate School of Education
        Lucia Araujo, Roberto Marinho Foundation
        David Barth, US Agency for International Development
        Stanley S. Litow, IBM International Foundation

4:15PM  PUBLIC FORUM: INNOVATIONS IN LEARNING AND CURRICULUM THROUGH TECHNOLOGY
        Dan Buckley, Cambridge Education
        Wayne Craig, Department of Education and Early Childhood Development, Victoria, Australia
        Gavin Dykes, Education Impact / Futurelab
        Mitchel Resnick, MIT Media Lab
        Paul Resta, Learning Technology Center, The University of Texas at Austin
        Ted Smyth, The McGraw-Hill Companies

FRIDAY APRIL 1, 2011

8:30am  Opening Remarks

9:15AM  ONLINE LEARNING
        MODERATOR Chris Dede, Harvard Graduate School of Education
        Keith Odlrich, Insight Schools
        Susan Patrick, International Association for K-12 Online Learning
        Shai Reshef, University of the People
        Stone Wiske, Harvard Graduate School of Education

9:15AM  TEACHER PROFESSIONAL DEVELOPMENT
        MODERATOR Fernando Reimers, Harvard Graduate School of Education
        Greg Butler, Microsoft Education
        Tom Carroll, National Commission on Teaching & America’s Future (NCTAF)
        Anustup Nayak, iDiscoveri Education (India)
        Shantanu Prakash, Edcomp Solutions Ltd

11:00am Discussion of Concurrent Sessions

1:30PM  PRINCIPAL DEVELOPMENT
        MODERATOR Allen Grossman, Harvard Business School
        Tom Burnett, Apple, Inc.
        Monica Higgins, Harvard Graduate School of Education
        Don Knowles, ISTE
        Ronald Thorpe, WNET

1:30PM  GAMING AND EDUTAINMENT
        MODERATOR James Honan, Harvard Graduate School of Education
        Donald Brinkman, Microsoft Research
        Chris Dede, Harvard Graduate School of Education
        Bruce Dixon, ideaLAB
        Margaret Honey, New York Hall of Science
        Eric Klopfer, Massachusetts Institute of Technology

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3:30pm  Business Models to Scale Up Innovation Through Technology

MODERATOR  Allen Grossman, Harvard Business School  
Kwasi Asare, US Department of Education  
Jerry Jones, Axiom Corporation  
Keith Krueger, Consortium for School Networking (CoSN)  
Al Zollar, Advanced Leadership Initiative at Harvard University

3:30pm  Universities Engaging in K-12 Renewal

MODERATOR  James Honan, Harvard Graduate School of Education  
Tom Dretler, Eduventures, Inc.  
Daniel Hastings, Massachusetts Institute of Technology  
Catalina Laserna, Harvard University Division of Continuing Education  
Joel Thierstein, Rice University

5:00pm  Discussion of Concurrent Sessions

SATURDAY, APRIL 2, 2011

8:30am  Open Source

MODERATOR  Samir Toufassy, Harvard Advanced Leadership Initiative  
Mark Horner, Shuttleworth Foundation  
Vijay Kumar, Massachusetts Institute of Technology  
Richard R. Rowe, Open Learning Exchange, Inc

11:00am  Opportunities and Challenges to Scaling Up Innovation Nationally

MODERATOR  Veronica Biggins, Harvard Advanced Leadership Initiative  
Richard DeLorenzo, Reinventing Schools Coalition  
Kristen Hamilton, Microsoft Education  
Richard Larson, Massachusetts Institute of Technology  
Tung Le, EdisonLearning  
Doug Levin, State Educational Technology Directors Association
HBR.org Think Piece Series on Educational Innovations and Technology

*Educational Innovation, Technology and Entrepreneurship*
Fernando Reimers, Harvard Graduate School of Education

*Can Technology Reinvent Education?*
Robin Willner, IBM

*Unleashing the Power of Networked Learning*
Martha Stone Wiske, Harvard Graduate School of Education

*From Good Teachers to Good Teaching*
Anustup Nayak (with contributions from Ashish Rajpal), iDiscoveri Education

*The Social Network – College Edition*
Tom Dretler, EduVentures

*21st Century Education Requires Lifewide Learning*
Chris Dede, Harvard Graduate School of Education

*Teaching The World’s One Billion Marginalized Children*
Richard Rowe, Open Learning Exchange International

*How Can We Scale Educational Innovations?*
Al Zollar, 2011 Advanced Leadership Fellow

*Why Does Teach For America Spawn So Many Education Entrepreneurs?*
Monica Higgins, Harvard Graduate School of Education

*When Will Educators Get Serious about Gaming?*
Bruce Dixon, Anytime Anywhere Learning Foundation

*The Innovation Mismatch: “Smart Capital” and Education Innovation*
Joanne Weiss, US Department of Education

Advanced Leadership Background Think Pieces

*The Traits of Advanced Leaders*
Rosabeth Moss Kanter, Harvard Business School

*Leadership Longfellow Would Appreciate*
David Gergen, Harvard Kennedy School of Government
APPENDIX 3: THINK TANK PANELISTS

Lucia Araujo  
Roberto Marinho Foundation

Kwasi Asare  
U.S. Department of Education

David Barth  
U.S. Agency for International Development

Veronica Biggins  
Harvard Advanced Leadership Initiative

Donald Brinkman  
Microsoft Research

Dan Buckley  
Cambridge Education

Tom Burnett  
Apple, Inc.

Greg Butler  
Microsoft Education

Tom Carroll  
National Commission on Teaching & America's Future (NCTAF)

Wayne Craig  
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Richard DeLorenzo  
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Gavin Dykes  
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Kristen Hamilton  
Microsoft Education

Daniel Hastings  
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James Honan  
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Margaret Honey  
New York Hall of Science

Mark Horner  
Shuttleworth Foundation

Jerry Jones  
Axiom Corporation

Rosabeth Moss Kanter  
Chair and Director, ALI  
Harvard Business School

Eric Klopfer  
Massachusetts Institute of Technology

Don Knezek  
ISTE

Keith Krueger  
Consortium for School Networking (CoSN)

Vijay Kumar  
Massachusetts Institute of Technology

Richard Larson  
Massachusetts Institute of Technology

Catalina Laserna  
Harvard University Division of Continuing Education

Tung Le  
Edison Learning

Doug Levin  
State Educational Technology Directors Association

Stanley S. Litow  
IBM International Foundation

Anthony Miller  
Deputy Secretary of Education  
U.S. Department of Education

Anustup Nayak  
iDiscoveri Education (India)

Keith Oelrich  
Insight Schools (formerly)

Susan Patrick  
International Association for K-12 Online Learning

Shantanu Prakash  
Edulab Solutions Ltd

Fernando Reimers  
Co-Chair, ALI  
Harvard Graduate School of Education

Shai Reshef  
University of the People

Mitchel Resnick  
MIT Media Lab

Paul Resta  
Learning Technology Center  
The University of Texas at Austin

Richard R. Rowe  
Open Learning Exchange, Inc.

Ted Smyth  
The McGraw-Hill Companies

Joel Thierstein  
Rice University

Ronald Thorpe  
WNET

Samir Toubassy  
Harvard Advanced Leadership Initiative

Stone Wiske  
Harvard Graduate School of Education

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APPENDIX 4: 2011 ADVANCED LEADERSHIP FELLOWS

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2011 ADVANCED LEADERSHIP FELLOWS
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Anna Burger
Former Chair, Change to Win
International Secretary-Treasurer, Service Employees International Union

Gilberto Dimenstein
Daily National Affairs Journalist, Grupo Folha

Harvey Freishtat
Former Chairman, McDermott, Will & Emory LLP

Somak Ghosh
Co-Founder and Former Group President, Corporate Finance and Development Banking, YES Bank

Deborah Jackson
Former CEO, American Red Cross of Massachusetts Bay

Carlos Jáuregui
Secretary of Public Security, State of Nuevo León

Gwendolyn Norton
Former Senior Vice President, Wachovia
Former Finance Commissioner, Virgin Islands

John Peirce
Former Owner, Indiana Stamp Company, Board of Trustees, Fort Wayne Schools

General Gale Pollock
Major General, US Army (Retired)
Former Acting Surgeon General, U.S. Army

James Rosenstein
Former Global Director of External Affairs, Bentley Motors

Thomas Santel
Former President and CEO, Anheuser-Busch International, Inc.

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Former Senior Vice President, U.S. Steel

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Founder and Former Managing Director, Reuters Greenhouse, The Reuters Venture Capital Fund

David Weinstein
Former Chief of Administration, Fidelity Investments

Mike Zak
General Partner, Charles River Ventures

Al Zollar
Former Global General Manager, Tivoli Software, IBM

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Charles Denham, M.D.
Chairman, Texas Medical Institute of Technology

Raymond A. Jetson
Pastor, Star Hill Church; Former CEO, Louisiana Family Recovery Corp.

Douglas Rauch
Former President, Trader Joe’s Company, Inc.

Rodney Slater
Partner, Patton Boggs LLP; Former U.S. Secretary of Transportation

Fred Southwick, M.D.
Chief of Infectious Diseases, Professor of Medicine, University of Florida College of Medicine

Junko Yoda
Managing Director, Shellingford Limited; Former Director for Asia, Deutsche Bank
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PHOTOGRAPHS (LEFT TO RIGHT): Harvard Professor Fernando Reimers; MIT Professor Richard Larson and student; United States Deputy Secretary of Education Andrew Miller

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