MOVING FROM INPUTS TO OUTPUTS TO OUTCOMES

The future of education policy

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EXECUTIVE SUMMARY

The fast-growing field of online learning, in which over 4 million K–12 students[1] and over 75 percent of school districts nationwide[2] are utilizing some form of online learning, has the potential to transform the nation's education system into a student-centric one that allows each child to reach her human potential. But currently the vast majority of policy does not reward operators for moving toward this potential.

Instead, as Innosight Institute's case studies over the past two years reveal, the majority of policy is still focused on rewarding the systems, providers, and operators that best meet certain *input* measures, most of which are inappropriate for judging this emerging disruptive innovation of online learning. Focusing on inputs has the effect of locking a system into a set way of doing things and inhibiting innovation; focusing on *outcomes,* on the other hand, encourages continuous improvement against a set of overall goals and, in this case, can unlock a path toward the creation of a high-quality student-centric education system. To this point it appears that policies that create *access* to online learning—as evidenced in the rapid growth of the movement—are outpacing policies that reward *quality* for each student.

Although the opportunity to use online learning to transition to a student-centric education system remains bright, policymakers must take action to realize the promise. Below are a few policy recommendations that stem from the particular case studies we have chronicled over the past two years:

- Pay online providers not just for serving children, but also for student performance.
- Reward not just for output-based performance—as in, when a student completes a course—but for real learning outcomes independently verified.
- Reward operators for individual student growth that takes into account formative and summative assessments.
- Allow students to demonstrate competency through assessments, portfolios, or other means *anytime* they complete a course, not just at limited fixed times throughout the year.
- Eliminate input-based rules, such as student-to-teacher-ratios, seat-time, and teacher-certification requirements.
- Give school operators control over their budgets and allow them to have significantly more freedom in how they allocate dollars.
- Ensure the proper infrastructure—Internet access and Internet-access devices—is in place.

M0VING FROM INPUTS TO OUTPUTS TO OUTCOMES

Over the previous two years, Innosight Institute has published a series of case studies about the fast-growing field of online learning in K–12 education. One aim of this effort was to identify policies that had either positive or negative ramifications for students. This policy brief, sponsored by the Joyce Foundation, summarizes some of that thinking and research and builds upon Digital Learning Now's 10 elements of high-quality digital learning,[3] to which Innosight Institute contributed. Although this policy brief discusses a few of the policy issues on which the case studies have shed some light, it is not a comprehensive list of policy recommendations for online learning.

The quality question

A primary concern for education stakeholders about online learning is *quality.* Policymakers are understandably reticent to permit any set of resources—be it content or teachers—to reach students without some assurance that it will be of "high quality."

The solution to the quality conundrum has, historically speaking, generally been twofold. First, the textbook-adoption process, in which curriculum experts review textbooks at the district—and increasingly at the state—level, has created a hurdle over which the majority of content must pass before it can enter a classroom. Second, policies have mandated that teachers obtain a certain level of credential before they are eligible to teach in a public school classroom—and policies in most school districts have encouraged teachers to pursue higher credentials, often in the form of advanced degrees, in exchange for increased pay.

Both of these forms of quality control focus on *inputs* rather than *outcomes,* however.* Focusing on inputs has the effect of locking a system into a set way of doing things and inhibiting innovation; focusing on outcomes, on the other hand, encourages continuous improvement against a set of overall goals and can unlock a path toward the creation of a student-centric education system. As Clayton M. Christensen, Michael B. Horn, and Curtis W. Johnson noted in *Disrupting Class*,[4] the textbook-adoption process in particular has helped to create a system

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* In this paper, we intentionally distinguish between *outputs* and *outcomes*. Outputs are the end result of a process, whereas an outcome is a level of performance or achievement. Measuring outputs—such as course completions—is a step beyond measuring inputs, but it does not rise to the level of measuring outcomes, which is the most desirable state of policy as it describes the changes resulting from outputs along dimensions such as, ideally, student gains in competency. As a result, the reader may think of the desirability of policy as a continuum from inputs to outputs to outcomes.

Innosight Institute's case studies

Leland Anderson and Michael B. Horn, "Alpine Online School: A Utah school district's move into K-8 online education," Innosight Institute, August 2009, http://www.innosightinstitute.org/innosight/wp-content/uploads/2009/08/Alpine-Online.pdf.

Katherine Mackey and Michael B. Horn, "Florida Virtual School: Building the first statewide, Internet-based public high school," Innosight Institute, October 2009, http://www.innosightinstitute.org/innosight/wp-content/uploads/2010/02/FLVS.pdf.

James Sloan and Katherine Mackey, "VOISE Academy: Pioneering a blended-learning model in a Chicago public high school," Innosight Institute, December 2009, http://www.innosightinstitute.org/innosight/wp-content/uploads/2010/02/VOISE.pdf.

Katherine Mackey, "Wichita Public Schools' Learning Centers: Creating a new educational model to serve dropouts and at-risk students," Innosight Institute, March 2010, http://www.innosightinstitute.org/innosight/wp-content/uploads/2010/03/Wichita.pdf.

Kerry Herman and Heather Staker, "The North Carolina Connectivity Initiative: A public-private approach to improving school data networks," December 2010, http://www.innosightinstitute.org/innosight/wp-content/uploads/2010/12/North-Carolina-Schools-Connectivity-Initiative.pdf.

Katherine Mackey, "Implementing Apex Learning: A comparison of online-learning programs in three school districts," Innosight Institute, January 2011, http://www.innosightinstitute.org/innosight/wp-content/uploads/2011/01/Implementing-Apex-Learning.pdf.

Heather Staker and Andrew Trotter, "Providing ACCESS to Alabama: Connecting rural classrooms through distance and online learning," Innosight Institute, February 2011, http://www.innosightinstitute.org/innosight/wp-content/uploads/2011/02/Providing-ACCESS-to-Alabama.pdf.

that encourages the adoption of one-size-fits-all materials. This system flies in the face of students' needs for customized learning opportunities and prevents the creation of a student-centric learning system, however.

In the seven case studies that Innosight Institute has published to this point, the profiled actors involved in the creation or management of the various online-learning programs* took a variety of approaches to monitoring the quality of their programs.

One system chronicled in the case studies that appears to have some promising elements for creating high-quality overall schools is New Schools for Chicago, formerly know as Renaissance 2010. New Schools have more freedom in both curriculum and structure than traditional Chicago Public Schools (CPS).[5] In return for this increased autonomy, CPS holds New Schools to higher levels of accountability. For example, CPS requires every New School to reach pre-established

* Online learning, in this case, refers to any instance of a student learning online, be it in a distance-learning or blended-learning program.

benchmarks of student achievement every five years in order for that school's charter to be renewed for another five-year term. In other words, if the school does not meet the performance benchmarks, it goes out of business.[6]

School districts adopting online courseware faced a different challenge in monitoring quality. The process of choosing which vendor or vendors to use for their courseware often took the form of something resembling a textbook-adoption process, with several of the districts creating rubrics and then evaluating bids from different online-curriculum providers against these rubrics. The rubrics typically assessed the online curricula against a variety of factors, including the rigor and appropriateness of the content and assessments for the target audience, the alignment to state standards, the use of graphics and multimedia to enhance learning, and the ease for users to access the curriculum through a website. The districts that followed this process ultimately contracted with one or two providers at most.[7]

In the absence of state policy allowing dollars to follow students to the course or provider of their choice, this de facto adoption policy has also limited student choice based on geography. This runs counter to Digital Learning Now's 7th element of high-quality digital learning, which says, "All students have access to multiple high quality providers."[8]

The 10 elements of high-quality digital learning

1. **Student eligibility:** All students are digital learners.
2. **Student access:** All students have access to high-quality digital content and online courses.
3. **Personalized learning:** All students can customize their education using digital content through an approved provider.
4. **Advancement:** Students progress based on demonstrated competency.
5. **Content:** Digital content, instructional materials, and online- and blended-learning courses are high quality.
6. **Instruction:** Digital instruction and teachers are high quality.
7. **Providers:** All students have access to multiple high-quality providers.
8. **Assessment and accoutability:** Student learning is the metric for evaluating the quality of content and instruction.
9. **Funding:** Funding creates incentives for performance, options, and innovation.
10. **Delivery:** Infrastracture supports digital learning.

Source: Digital Learning Now!

FLVS has historically policed itself, which has worked well. But relying on the virtuousness of the provider is not a viable strategy for the country.

A successful system for monitoring the quality of online courses chronicled in the case studies was Florida's regulation of Florida Virtual School (FLVS).[9] FLVS has a performance-based funding system in which, at the time of the case study in 2009, the online school received the majority—roughly 89 percent—of its per-pupil funds only for students who successfully completed and passed a course. Under Florida's output-based policy, students who completed a virtual course received credit only if they passed the course's final examination. At the time of the case study, this funding policy focused on student results only when a student took a course through FLVS, but this has recently been revised.[10] In the states—Florida and Alabama—whose online-learning efforts were chronicled in the case studies, state policy did not create a framework for multiple high-quality providers. Instead, it created and governed *one* statewide provider—FLVS and ACCESS Distance Learning, respectively—and relied on the districts or statewide virtual school to provide additional curricular options.[11] For example, Volusia County Schools, based in Florida, offered students access to Apex Learning online courses in addition to FLVS courses—but Apex Learning was not paid based on its outputs, as was FLVS.[12]

Historically, there has been one potentially dangerous incentive in the way the output-based funding formula was crafted for FLVS, however. FLVS created its own final examinations, which students had to pass to receive credit for the course and for FLVS to get paid. This system meant that FLVS in essence policed itself, which appeared to work well in this context, but may not work in other contexts, as less scrupulous providers could create the equivalent of higher education diploma mills to chase dollars.

Future generations of quality-control systems should move toward fixing this potentially hazardous incentive. An easy first step would be to tie funding to outcomes standards based on the current generation of state assessments—provided that these assessments could be taken *anytime* a student completed an online-learning course, not just at limited fixed times throughout the year. Future versions of monitoring quality should shift even more to an outcomes focus by crafting growth models for students that take into account pre- and post-tests, as well as formative assessments that indicate progress within a given course or against certain standards.

Until this shift to an outcomes-based policy occurs, we suspect states will continue some regulation of inputs to attempt to monitor quality. But as states move increasingly toward competency-based learning systems that measure student outcomes and growth—a step beyond simple outputs—freeing providers to use creative-learning arrangements for students will be vital. Worries about student-to-

teacher ratios, teacher certification, and the like should not be overriding concerns for policymakers. If providers have the right incentives—to focus on an array of student outcomes, not just academic ones[13]—then student-to-teacher ratios and other such inputs should fall naturally into place. That said, in the immediate term, a key to FLVS's success has been that Florida's policy allows the online school to escape the input of seat time—and this flexibility is imperative for online learning to realize some of its most exciting benefits, as we explain below.

Eliminating seat-time rules

The real opportunity in the shift to online learning—be it in distance or, increasingly more frequently, blended environments*—is to move beyond the country's current factory-model system where seat time, an input measure, is used as the overriding metric that governs funding flows and so forth. The effect of this is that today's system holds time as a constant while learning is highly variable across students. Instead we should craft a system where learning is the constant and time is the variable—and where failure is never an option.[14]

The vast majority of the systems that Innosight Institute chronicled continued to lock education into an arbitrary time-based system, with the exceptions being the state of Alabama and FLVS.

For example, in the state of Washington, although online-learning programs, such as Auburn School District's virtual-school and learning-center programs, are technically exempt from the state's seat-time requirements, the Washington Office of Superintendent of Public Instruction determines the full-time equivalent (FTE) students enrolled in these programs based on the district's estimation of the students' average weekly hours of learning activity—a measure of time.

This estimate is calculated based on the written student-learning plans that online-learning teachers must create for each of their students on a weekly basis.[15] The state requires that written student-learning plans specify, among other things, a beginning and ending date for the online course in which the student is enrolled, an estimate of the number of hours per week that the student will spend working on the online course, a description of the student's specific learning goals and

Although Washington's online-learning programs are technically exempt from seat-time requirements, the state measures the number of students based on the average weekly hours of learning activity—a measure that maps back to seat time.

* Blended learning is any time a student learns at least in part at a supervised brick-and-mortar location away from home *and* at least in part through online delivery with some element of student control over time, place, path, and/or pace.

performance objectives in the course, and a description of the timelines and methods for evaluating student progress toward the learning goals and objectives specified in the learning plan.[16] In essence, the state funds online-learning programs based on time rather than on completion or mastery of courses. This structure means that teachers spend countless hours on bureaucratic paperwork that tracks the students' time, rather than focusing on student learning.[17]

One program reported that it had graduated more students than it had served, a remarkable triumph that sets a new quality bar for all schools not at a 100 percent graduation rate, but at a rate of 100 percent plus what some might call "extra credit."

A similar seat-time policy affected the establishment of VOISE Academy High School (VOISE) in Chicago, where the Illinois State Legislature's School Code requires that students receive a minimum of 5 hours per day of in-class instruction and compensates schools accordingly—not based on student competency.[18] If a student can complete a course faster than a semester, there is no mechanism for rewarding the school, so the state has built in a disincentive in policy for any school that might advance students based on mastery.[19]

In Kansas, the state department of education calculates its FTE students based on two headcounts taken in the fall. A student needs to be in attendance for a full seven hours on at least two designated days during a fixed period of time, usually during the last week of September and the first week of October, to be counted as a full-time student. As a result, to satisfy this regulation and allow students to work at their convenience rather than requiring attendance for a set number of daily hours, Wichita Public Schools' dropout-recovery centers require all students enrolled in the program as of September to attend two seven-hour orientations on the days the headcount is taken. This means that if a student enrolls in the program in late October, the dropout-recovery centers will not receive any state funding to serve that student. Conversely, if a student who is in attendance on both headcount days drops out of the program in late October, the program will receive the state funding for that student anyway.[20] These perverse incentives, which also are the norm in most traditional brick-and-mortar schools, existed in many of the districts that Innosight Institute chronicled across the country.

One of the negative ramifications of these perverse incentives was that they encouraged districts to adopt a compliance mentality rather than a service-oriented one. For example, some districts did not know how many students they had served over a given period of time. One district's dropout-recovery program—not Wichita's—even reported initially that it had graduated more students than it had served, a remarkable triumph that sets a new quality bar for all schools not at a 100 percent graduation rate, but at a rate of 100 percent plus what some might call "extra credit."

In Alabama, the state followed Florida's lead in eliminating seat-time requirements, but it did so for a much broader swath of its academic programs beyond the state's virtual school. In May 2008, the Alabama State Board of Education adopted a new graduation plan called First Choice, which allowed for credit recovery and credit advancement based on students demonstrating *mastery,* not on their completing a set number of hours in class.[21] If students failed a class, they could work on the failed portions of the course and earn promotion without retaking the entire course. First Choice also allowed students to advance quickly through a course without adhering to a seat-time metric. Students completed a course when they passed the required assessments, not when they clocked enough hours in class. The elimination of the seat-time requirement paved the way for more innovative scheduling options for Alabama's schools.[22]

Online graduation requirement

Alabama's adoption of First Choice also created a new default diploma for all students entering high school beginning with the 9th-grade class of 2009–10 called the Advanced Academic Endorsement Diploma. This diploma required students to pass a variety of courses as well as to complete at least 20 hours of an online course or experience.[23] This requirement moves the state closer to Digital Learning Now's 2nd element of high-quality digital learning, which, as one of its sub-bullets, says, "State requires students take high quality online college- or career-prep courses to earn a high school diploma."[24] The rationale behind Alabama's mandate was that the State Board of Education concluded that an online requirement was important because of the growing centrality of the Internet in the workplace and in higher education. College courses and corporate training are increasingly being taken and performed online, for example, which makes the acquisition of this skill in and of itself important.[25]

Building the right infrastructure

With more states eyeing a requirement for students to complete an online-learning course, as well as with the next generation of state assessments likely to be delivered online,[26] having the proper infrastructure—Internet access and Internet-access devices—in place is both a necessity and a significant challenge for many school districts and states.

As a New School, VOISE has fewer regulations governing how it can allocate its budget, as long as it adheres to all CPS policies, including hiring enough teachers to meet the district's set student-to-teacher-ratio requirements—an input-based metric. That said, VOISE found that with this increased freedom in both curriculum and structure, it could provide every student with a laptop computer for use at school and a refurbished desktop computer for use at home without receiving any additional public funding. The school could not afford to provide students with Internet access in their homes, however.[27] In the future, with the price of computing continuing to fall through the emergence of several technologies, including more powerful mobile devices like tablet computers and smartphones, it is likely that most students will be able to afford Internet-access devices, as these will be akin to the "Trapper Keeper" of the 21st century. For those that cannot afford these devices, the state or primary education provider will likely have to step in with funding to ensure equal access per Digital Learning Now's 10th element of high-quality digital learning, which, as one of its sub-bullets, says, "State ensures all public school students and teachers have Internet access devices."[28]

In the future, with the price of computing continuing to fall, it is likely that most students will be able to afford Internet-access devices, as these will be akin to the "Trapper Keeper" of the 21st century.

As the affordability of Internet-access devices will surely lead to an onset of more technologies in schools, it is vital for policymakers to clear the path for teachers to be able to use all types of technology to reach students. For example, Auburn School District prohibits teachers from using any form of technology other than phone and email to communicate with students outside of class.[29] The rationale behind the district's mandate was to prevent teachers from forming inappropriate relationships with students, but it has also restricted virtual-school teachers from using additional tools, such as instant messaging or virtual classrooms, to enhance their students' learning opportunities. In this particular case, specific laws should be created that ban sexual harassment, not technology.

Additionally, the question of providing suitable Internet access in schools remains a challenge, particularly in rural parts of the country, where a third of today's students are enrolled in school. North Carolina tackled this challenge through a multi-pronged approach that included a public-private partnership to fund the infrastructure upgrade from a variety of stakeholders in the state—such that the state did not front the full cost—and the creation of a support service for

districts to ensure that they were capturing the full value of E-Rate* funds available to them.[30]

The federal government is continuing to study ways to revise and modernize E-Rate, including simplifying its bureaucratic paper work, providing more funds, and creating looser rules that would allow it to pay for Internet-related services not just on school and library campuses, for example. One key question remains unanswered, however. If mobile devices continue to proliferate and become the true platform for online learning instead of today's computers, and these devices connect through wireless networks that know no geographic bounds, could this also release the states from spending significant dollars? Or could there be ways to streamline budgeting from a variety of government sources to improve access and capacity across states while saving money? Figuring this out is vital to fulfill another sub-bullet in the Digital Learning Now's 10th element of high-quality digital learning, which says, "State ensures high-speed broadband Internet access for public school teachers and students."[31]

Conclusion

To realize online learning's transformational promise of a student-centric education system, policymakers need to move beyond the input-focused policies that regulate seat time, attendance, student-teacher ratios, teacher certification, and enrollment caps—factors that may or may not have to do with learning—and instead move toward outcomes-based policies where states and districts pay based on student success and dollars follow students down to the course—or ultimately even the object—level. Managing this policy shift will challenge our assumptions about what education looks like and how it happens, but with the emerging world of digital learning, the potential to reinvent and reinvigorate the country's education system and better serve each and every student has never been brighter.

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* E-Rate, or the Schools and Libraries Program of the Universal Service Fund, provides discounts to assist U.S. schools and libraries in obtaining affordable telecommunications and Internet access. The funding is administered by the Universal Service Administration Company under the direction of the Federal Communications Commission.

Notes

[1] Sam S. Adkins, "The US PreK–12 Market for Self-paced eLearning Products and Services: 2010–2015 Forecast and Analysis," Ambient Insight, January 2011, http://www.ambientinsight.com/Resources/Documents/Ambient Insight_2006_US_eLearning_Market_Snapshot.pdf.

[2] Anthony G. Picciano and Jeff Seaman, "K–12 Online Learning: A 2008 Follow-up of the Survey of U.S. School District Administrators," The Sloan Consortium, January 2009, http://sloanconsortium.org/sites/default/ files/k-12_online_learning_2008.pdf.

[3] "Digital Learning Now!," Foundation for Excellence in Education, December 1, 2010, http://excelined.org/Docs/Digital%20Learning%20Now%20Report%20FINAL.pdf.

[4] Clayton M. Christensen, Michael B. Horn, and Curtis W. Johnson, *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns* (New York: McGraw-Hill, June 2008), Chapter 5.

[5] As discussed later, however, the schools likely do not have enough autonomy over how they are able to spend their budget.

[6] James Sloan and Katherine Mackey, "VOISE Academy: Pioneering a blended-learning model in a Chicago public high school," Innosight Institute, December 2009, http://www.innosightinstitute.org/innosight/wp-content/uploads/2010/03/Wichita.pdf.

[7] Katherine Mackey, "Implementing Apex Learning: A comparison of online-learning programs in three school disticts," Innosight Institute, January 2011, http://www.innosightinstitute.org/innosight/wp-content/uploads/2011/01/Implementing-Apex-Learning.pdf.

[8] "Digital Learning Now!," p. 6.

[9] Katherine Mackey and Michael B. Horn, "Florida Virtual School: Building the first statewide, Internet-based public high school," Innosight Institute, October 2009, http://www.innosightinstitute.org/innosight/wp-content/uploads/2010/02/FLVS.pdf.

[10] In 2011, the Florida Legislature revised Senate Bill 1620, which changed the policies for how this structure works. This policy brief discusses the policies that were in place at the time the case studies were written and does not touch upon this revised bill.

[11] Heather Staker and Andrew Trotter, "Providing ACCESS to Alabama: Connecting rural classrooms through distance and online learning," Innosight Institute, February 2011, http://www.innosightinstitute.org/innosight/wp-content/uploads/2011/02/Providing-ACCESS-to-Alabama.pdf.

[12] "Implementing Apex Learning"

[13] Chris Sturgis, Bob Rath, Ephraim Weisstein, and Susan Patrick, "Clearing the Path: Creating Innovation Space for Serving Over-Age, Under-Credited Students in Competency-Based Pathways," iNACOL, January 2011, http://www.inacol.org/research/docs/ClearingthePathReportJan2011.pdf.

[14] To explore this topic more in-depth and see the imperative for escaping our current time-based system and moving into a competency-based one, we highly recommend reading Chris Sturgis and Susan Patrick, "When Success Is the Only Option: Designing Competency-Based Pathways for Next Generation Learning," iNACOL, November 2010, http://www.inacol.org/research/docs/iNACOL_SuccessOnlyOptn.pdf.

[15] RCW 28A.150.262(1), "Defining full-time equivalent student," Washington State Legislature, http://apps.leg.wa.gov/rcw/default.aspx?cite=28A.150.262 (accessed April 18, 2011).

[16] WAC 393-121-182(4), "Alternative learning experience requirements," Washington State Legislature, http://apps.leg.wa.gov/wac/default.aspx?cite=392-121-182 (accessed April 18, 2011).

[17] "Implementing Apex Learning"

[18] 105 ILCS 5/18-8.05(F), "Compilation of Average Daily Attendance," Illinois General Assembly, http://www.ilga.gov/legislation/ilcs/ilcs4.asp?DocName=010500050HArt%2E+18&ActID=1005&ChapAct=105%26nbsp%3BILCS%26nbsp%3B5%2F&ChapterID=17&ChapterName=SCHOOLS&SectionID=49211&SeqStart=121000000&SeqEnd=124100000&ActName=School+Code%2E.%20This%20law%20has%20since%20been%20amended%20to%20allow%20Illinois%20school%20districts%20to%20establish%20virtual%20learning%20programs.%20F (accessed April 18, 2011).

[19] "VOISE Academy"

[20] Katherine Mackey, "Wichita Public Schools' Learning Centers: Creating a new educational model to serve dropouts and at-risk students," Innosight Institute, March 2010, http://www.innosightinstitute.org/innosight/wp-content/uploads/2010/03/Wichita.pdf.

[21] "Alabama's 'First Choice' and Supporting Programs," Alabama State Board of Education, April 2009, http://www.alsde.edu/general/Firstchoicebrochure_2009.pdf.

[22] "Providing ACCESS to Alabama"

[23] AAC Rule 290-3-1-.02(8)(d)(4), "Credit Restrictions—Distance Learning," Alabama State Board of Education, http://www.alabamaadministrativecode.state.al.us/docs/ed/McWord290-3-1.pdf. This regulation followed a similar requirement that the state of Michigan passed in 2006.

[24] "Digital Learning Now!," p. 7.

[25] "Providing ACCESS to Alabama"

[26] Catherine Gewertz and Erik W. Robelen, "Tough Work Begins for Race to Top Assessment Winners," *Education Week,* September 14, 2010, http//www.edweek.org/ew/articles/2010/09/15/03assess-update.h30.html?r=999653689 (accessed April 18, 2011).

[27] "VOISE Academy"

[28] "Digital Learning Now!," p. 13.

[29] "Implementing Apex Learning"

[30] Kerry Herman and Heather Staker, "The North Carolina Connectivity Initiative: A public-private approach to improving school data networks," December 2010, http://www.innosightinstitute.org/innosight/wp-content/uploads/2010/12/North-Carolina-Schools-Connectivity-Initiative.pdf.

[31] "Digital Learning Now!," p. 13.

About Innosight Institute

Innosight Institute, founded in May 2007, is a 501(c)(3) not-for-profit think tank whose mission is to apply Harvard Business School Professor Clayton Christensen's theories of disruptive innovation to develop and promote solutions to the most vexing problems in the social sector.

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