

Harnessing Pull Mechanisms for Advancing Learning Technologies

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## Introduction

We must improve the opportunity to learn for people of all ages, ensuring quality and expanding access to underserved individuals and populations. As a capitalist democracy with a deep commitment to public education, we have an obligation to prepare all Americans to be successful workers and entrepreneurs in a highly-competitive 21st century economy, informed and engaged citizens in diverse communities tackling tough public problems, and lifelong learners in a world that is increasingly interconnected and fast-changing. While the challenge is daunting, now, more than ever before, the path forward is within our sights.

Digital learning, facilitated by excellent educators and powerful instructional technologies, promises to improve equity, increase engagement, and personalize learning. It can create new efficiencies and advance productivity, empowering learners and educators to use their time most effectively. Mathematics, language development and literacy, deeper learning competencies, and skills of all types can be supported with the smart use of technology.

While digital technologies have already improved learning opportunities for select classrooms and schools, they have failed to deliver the same systemic and revolutionary impacts for students and teachers that we’ve seen in other sectors. Too often, technology in schools has been layered on top of, or simply replicated, existing instructional processes. And schools have struggled with a lack of connectivity, expensive and hard-to-manage hardware and software, and a lack of high-quality digital content aligned to academic standards.

A confluence of factors is creating the potential for things to be different:

* Faster, more comprehensive broadband Internet access in and out of schools.
* Lower price points for new more powerful and easier-to-use mobile devices.
* A proliferation of lightweight, Web-based software applications.
* APIs to simplify account set up and data integration from multiple sources.
* An explosion of digital content, tools, and resources in a $7.9 billion market[[1]](#footnote-1) from open-source providers, start-ups, traditional publishers, and educators themselves.

These developments all create opportunities to rethink how students learn and teachers teach.

Traditionally, educational technology developers have taken an “if we build it, they will come” approach. Products are pushed into the market through various channels and sold using traditional contracts with an individual state, district, or school. Firms are paid to provide a product, not to demonstrate results.

Digital Promise is excited that the White House Office of Science and Technology Policy (OSTP) is requesting comments on pull mechanisms – policies and practices that can cultivate and leverage smart demand – to spur the development, evaluation, and adoption of advanced solutions to the nation’s most pressing learning challenges, recognizing the role that technology can play.

## Who We Are

Digital Promise is an independent nonprofit authorized by Congress in the Higher Education Opportunity Act (2008) and launched by President Obama in 2011, with the mission to spur innovation in education. Digital Promise works with educators, entrepreneurs and developers, researchers, and leading thinkers to support research and development to benefit lifelong learners.

A number of our initiatives are organized around understanding and improving the educational technology marketplace and point to opportunities for pull mechanisms. Our team at Digital Promise has been thinking about these issues for a number of years. We appreciate the opportunity to share our perspective with OSTP.

## The Promise of Pull

Pull mechanisms are promising strategies for improving educational outcomes for children and adults, but can also be complex initiatives to structure and administer. The results achieved through pull mechanisms in other sectors (health, energy) included in OSTP’s RFI are compelling. We recognize, however, that successfully educating students of all ages is different from vaccinating people against a disease.

An intervention that effectively empowers, engages, and educates one learner may be different from the type of intervention that will be successful for another learner – whether they’re in the same classroom or across the country.

It is also more difficult to isolate cause and effect in education. Because people learn offline, online, and in blended settings, attributing improvements in educational outcomes to specific inputs – an essential task for accurately selecting prize winners, advance market commitment recipients, and pay-for-success partners, for example – requires sophisticated program and evaluation design and data analysis.

Pull mechanisms that require certain, attributable success in order to identify “winners” would be most successful under conditions that make it possible to judge the success of the innovation objectively, including:

* Clear definitions of the problem to be addressed and the vision for success.
* Clear definition of the outcomes to be measured and availability of sound metrics to be used in measurement.
* Identification of appropriate test-beds for the innovation.
* Careful matching of the optimal pull mechanism to the challenge under consideration.
* Rigorous evaluation and monitoring to create confidence in results and award decisions.
* Development of independent expert groups to support and manage these processes.

And, perhaps most critically, we need a policy environment that not only permits, but also incentivizes the use of pull mechanisms.

For pay-for-success approaches described in the RFI, a new class of social impact investors may also be needed in the educational technology marketplace. These investors cover program implementation costs and are repaid only after the provider achieves program objectives.

Those who seek to employ pull mechanisms to drive the development of new, game-changing solutions should begin with a focus on a small number of grand challenges with ambitious goals, as well as clear success metrics. This would advance well-known proof points associated with the viability of pull mechanisms in education.

Cooperative purchasing as a pull mechanism is different. The purpose of cooperative purchasing is not to drive the development and testing of new tools, but to get the best possible price for an existing product by leveraging volume and, by doing so, bring the product to teachers and learners who might not have had access to it otherwise.

This is already happening regularly with basic goods that school districts acquire (i.e., pencils, paper, printers), and increasingly with computers and mobile devices (e.g., NJPA administers national contracts for computer hardware). We don’t observe cooperative purchasing happening widely yet for the acquisition of instructional software. We agree that this seems like an area of opportunity, as long as educators can be as nimble as they need to be in acquiring software products that address specific learning needs for individual students.

One significant barrier to cooperative purchasing of instructional software at the elementary and secondary level – from digital books to fully-adaptive learning and assessment programs – is the absence of a trusted online ecosystem with well-organized and continuously-updated information. This type of online resource would help districts identify appropriate and promising products by providing them with product descriptions, features, recommended usage, pricing, associated research, expert and user reviews and ratings, case studies, purchasing patterns, and more.

If such an ecosystem were designed and deployed, purchasers could self-organize into groups for acquiring these products together. For example, school districts with similar characteristics and similar instructional needs that are looking for instructional software could connect with one another, collaboratively develop product preferences and purchasing procedures (RFPs, sole-source contracts, etc.), and leverage collective buying power.

As with other types of pull mechanisms, cooperative purchasing of instructional software cannot happen if state, municipal, or district policies get in the way.

## Grand Challenges: Seeking Fresh Solutions

There are many critical educational needs that stand to benefit from cutting-edge, high-quality, and high-impact innovations. Digital Promise suggests particular educational needs in this brief list not to exclude others, but to illustrate the kinds of targeted learning outcomes that would be good candidates for the introduction of pull mechanisms because of the tremendous scale of need and the availability of concrete success metrics:

* Increasing access to and improving outcomes in adult education.
* Improving English language proficiency for English learners.
* Increasing passage rates for math placement tests and developmental math coursework at postsecondary institutions.

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## Grand Challenge 1: Adult Education

Last October, the Organisation for Economic Co-operation and Development (OECD) released the results of an international survey of adult skills that is part of the Program for International Assessment of Adult Competencies (PIAAC).[[2]](#footnote-2) The findings shined a spotlight on the large number of adults in the U.S. with low basic literacy skills – roughly 18 percent of the adult population, or 36 million people. In addition, nearly one in three U.S. adults have poor math skills.

Further analysis of the U.S. PIAAC results commissioned by the U.S. Department of Education[[3]](#footnote-3) revealed a significant unmet demand for adult education services, amounting to an estimated 3 million people who are not enrolled in adult education programs, but would like to be. Technology could provide new opportunities for these adults to learn – both in and out of formal programs – but the market for such tools is underdeveloped.

Pull mechanisms could enable more of those with low skills and/or lacking a high school diploma to move into postsecondary education and training. A prize competition appears to be a particularly promising pull mechanism in this space, as a way to bring new solutions and developers into the field. The publicity and attention of a prize competition could increase the number and quality of products and services available to states, local adult education programs, and directly to students themselves.

### Grand Challenge 2: English Language Proficiency

Increasing the English language proficiency of English language learners (ELLs) is another powerful opportunity to leverage pull mechanisms. The number of school-age ELLs has more than quadrupled since 1980 and now totals approximately 4.7 million. Still, many states lack the capacity to serve large numbers of ELLs. As a result, there is a huge need to develop and adopt learning technologies that can augment the services that bilingual or English as a second language teachers are able to provide for students, and/or increase the time on task that ELL students devote to learning English – all while providing content that is engaging, personalized, and available anywhere.

There are several types of pull mechanisms that could effectively serve this population:

* Prizes could be used to incentivize the development or adaption of existing products to demonstrate they are able to rapidly increase English language proficiency.
* An advance market commitment to purchase access to digital content and/or tools on behalf of a consortium of districts or states.
* Pay-for-success agreements between organizations that provide digital content and school districts that aim to increase English language proficiency at ambitious rates.

### Grand Challenge 3: Developmental Math

Developmental math represents a third critical opportunity to leverage pull mechanisms. Spending on developmental courses for the 60 percent of community college students referred to them tops $7 billion annually, and only 20 percent of those students go on to complete credit-bearing introductory math courses.[[4]](#footnote-4) Developmental math presents a number of challenges for which pull mechanisms offer the potential for improvement, including increasing passage rates on placement tests, improving the accuracy of placement tests, and increasing passing rates for those enrolled in developmental math courses. Potential examples include:

* Prizes for technologies that can increase passing rates, improve the accuracy of placement testing, and/or encourage collaborative efforts to create new solutions.
* An advance market commitment on behalf of a consortium of community colleges to purchase innovative technologies that demonstrate effectiveness in improving developmental math outcomes in less time.
* A pay-for-success challenge that gives providers an opportunity to prove the effectiveness of their intervention and create a proof point to scale their technology.

## Roles for the Federal Government, Digital Promise, and Others: Pull and Push

Because pull mechanisms are not yet prominent in the educational technology marketplace, and changing something as entrenched and complicated as the public procurement process is no small challenge, the federal government has an important role to play to make it more attractive and easier for states, school districts, educational institutions, and foundations to enter into these types of arrangements. The ability of the federal government, and the White House in particular, to convene a diverse group of stakeholders and widely publicize new initiatives, prizewinners, and program successes is of tremendous value to the growth and acceptance of pull mechanisms.

Another group critical to the success of pull mechanisms will be independent organizations that can help organize, administer, and promote these initiatives. Digital Promise is strategically positioned to play a role in advancing pull mechanisms to accelerate the development and adoption of learning technologies that are focused on improving learning outcomes at multiple levels.

## Current Activities

Digital Promise leads several relevant initiatives and partners with critical actors needed to drive these advances – innovative school districts, education technology companies, leading researchers and thinkers, and philanthropic foundations involved in the digital learning ecosystem. These efforts include:

* [League of Innovative Schools](http://www.digitalpromise.org/league) - The Digital Promise League of Innovative Schools, a consortium of 46 public school districts in 25 states that collectively serve nearly 3 million students. These districts are committed to demonstrating, evaluating, and scaling up innovations that deliver improved results for students, and are frequently called upon as leaders among their peers.
* [Marketplace](http://www.digitalpromise.org/initiatives/marketplace) - Market research to improve educational technology procurement policies and practices, including earlier work with IDEO[[5]](#footnote-5) and a current project with Johns Hopkins University and the Education Industry Association[[6]](#footnote-6), as well as the development of plans for a Consumer Education Service.
* [Research](http://www.digitalpromise.org/initiatives/research) – Advance the use of research toward better product development and better decision making among practitioners. The Teacher Wallets project, a procurement pilot program, engages researchers in developing better understanding of the decision making strategies of individual educators when they are the final decision-makers.
* [Adult Learning](http://www.digitalpromise.org/initiatives/adult-learning) - To advance learning and support for underserved and undereducated adults and close the skills gap through the use of digital learning technologies and facilitated partnerships.
* [Educator Micro-credentials](http://www.digitalpromise.org/initiatives/educator-micro-credentials) - The development of micro-credentials (i.e., digital badges) for K-12 educators that support the recognition of teaching competencies, including those that demonstrate the ability to engage students in deeper learning experiences, which are critical in the attainment of the Common Core Standards.

Our work at Digital Promise focuses on the intersection of educators, researchers, and entrepreneurs and developers. Through these projects and others, we are developing a deep understanding of the educational technology marketplace, strong relationships with key stakeholders, and a vision for how we can best contribute to spurring innovation to support learners of all ages. We view advancing pull mechanisms – to catalyze development of new products that solve grand challenges in education, and to leverage buying power of educators working together – as a critical part of that vision.

Our primary activities to support the expansion of pull mechanisms in the educational technology marketplace will be focused on connecting, convening, and communicating. We will gather and share insights about challenges and opportunities for pull mechanisms. Specifically, we will:

* Establish and coordinate a smart demand network within the League of Innovative Schools so leading superintendents and their designees can begin developing and disseminating strategies for:
  + Pull mechanisms that could improve acquisition of today’s technology solutions; and
  + Pull mechanisms that could drive development of new solutions based on clear articulation of district needs and appropriate incentives for developers.
* Begin investigating state, municipal, and school district policies that stand in the way of the adoption of pull mechanisms in the educational technology marketplace.
* Identify specific challenges and opportunities for pull mechanisms, informed by our market study on educational technology procurement to be concluded in fall 2014.
* Conduct a pilot prize competition in identified school districts, including within the League of Innovative Schools, to promote the use of micro-credentials for teacher competencies to support the move to competency-based education.
* Contribute to the national conversation about both pull and push mechanisms for developing a smarter demand and smarter supply in the educational technology marketplace through a strategic communications campaign.

## Ideas for future work

There are a number of things we could do to continue advancing pull mechanisms in the educational technology marketplace, including:

* Convening state, municipal, and school district policy officials to better understand and develop creative strategies for overcoming legal and regulatory hurdles that stand in the way of the adoption of pull mechanisms in the educational technology marketplace, and developing strategies for overcoming them.
* Developing a Consumer Information Service focused on providing credible information and documentation of current and emerging products and services to facilitate innovative acquisition strategies such as cooperative purchasing agreements, teacher wallets, and advance market commitments based on challenges and gaps. This would facilitate the ability to easily identify products, prices, pilot opportunities, and evidence for educational technology products in the marketplace, whether free or paid.
* Developing an online procurement platform for school districts to:
  + Communicate their key characteristics and instructional needs;
  + Connect and collaborate with other districts with similar characteristics or needs; and
  + Identify and acquire educational technology solutions that are a strong fit, either on their own or collaboratively with other districts.
* Empowering the League of Innovative Schools, adult learning consortia, and other educators with tools and strategies to adopt and evaluate the use of pull mechanisms – starting with cooperative purchasing and prizes, and later moving to advance market commitments and pay-for-success programs.
* Creating and administering pull mechanisms ourselves, including managing prize competitions at the national or even global level, or facilitating cooperative purchasing.
* Working with large and small school districts across the country to build capacity to design and manage prize competitions. For smaller districts, this may mean collaborating with one another to be sufficiently attractive to potential developers.
* Structuring evaluation and monitoring programs for the management of pull mechanisms, including pay-for-success programs.
* Identifying and promoting best practices in the use of pull mechanisms through our national network.

**Push Mechanisms for Smart Supply**

We can’t talk about smart demand without also talking about smart supply. Investors, entrepreneurs, and developers need access to basic research on learning, clear understanding of the instructional needs of educators, and credible product evaluation methodologies to ensure the products they develop are as likely as possible to solve critical challenges in learning and instruction. That means push mechanisms are also important, and Digital Promise has a role to play there, as well.

This year, we will establish and coordinate a smart supply network, in partnership with industry associations, regional startup hubs, and others, to develop and disseminate best practices for applying learning science research and information about educators’ instructional needs in the design of their products. Additionally, through our Research@Work initiative, we will spotlight developers utilizing learning science findings and research methods to develop, evaluate, and improve their products.

Though known to most simply as Digital Promise, our name in the authorizing language from Congress is the National Center for Research in Advanced Information and Digital Technologies. Research is at the center of our mission and is the common thread that connects all of our work.

We recently hired a Director of Research who, in collaboration with our research partners at the University of California, Davis School of Education and Johns Hopkins University, among others, is leading our work on harnessing data, evaluation, and research findings to inform product design and development. These efforts will make it more likely that products in the marketplace address real needs, and do it well.

While Digital Promise can help cultivate a community of data-driven, evidence-based product developers and entrepreneurs, there remains a critical need for increased research and development funding to:

* Advance the use of learning science principles in the design of digital learning tools, curricula, and learning environments.
* Support the directed development of effective learning technologies focused on specific grand challenges.
* Understand the impacts learning technologies can have on noncognitive skills, as well as the development of deeper learning competencies (collaboration, communication, problem-solving, etc.) applied across contexts.

## Changes in Public Policy to Support Experiments with Pull Mechanisms

States and municipalities may have to enact changes to permit school districts and educational institutions to enter into novel agreements like pay-for-success bonds and advance market commitments, and even to pursue cooperative purchasing arrangements. Or they may simply need to issue guidance to school districts to clarify what is already permitted. For example, when asked about the possibility of school districts using prize competitions, pay-for-success contracts, or social impact bonds to acquire learning technologies, one state educational technology director told us, “I know of no rules, policies, or statutes that would prevent a school from doing things in innovative ways.”

States and municipalities may consider taking a gradual policy development approach by testing pull mechanisms in a contained setting before rolling them out to the entire jurisdiction. For example, the iZone, part of the New York City Department of Education – a member of the Digital Promise League of Innovative Schools – serves as a test bed of 300 schools within the district’s nearly 1,800 public schools. The iZone is innovating instructional approaches, as well as rethinking the ways in which the district interacts with the educational technology marketplace (i.e., including awarding over $100,000 in prize money as part of a “gap app challenge”). Other districts and education institutions could create an innovation incubator like the iZone as a venue for piloting pull mechanisms before deciding whether and how to scale them more broadly.

## Conclusion

At Digital Promise, we bring together educators, researchers, and educational technology entrepreneurs and developers to spur innovation in education that will benefit all learners. It is clear to us that through smarter demand and smarter supply in the educational technology marketplace – including through the adoption of pull mechanisms – teachers and learners will be more likely to have access to learning technologies that will help them achieve their goals.

If you’re interested in discussing these ideas, contact [marketplace@digitalpromise.org](mailto:marketplace@digitalpromise.org).

1. <https://www.siia.net/blog/index.php/tag/education-technology-market/> [↑](#footnote-ref-1)
2. <http://skills.oecd.org/Survey_of_Adult_Skills_US.pdf> [↑](#footnote-ref-2)
3. Ibid. [↑](#footnote-ref-3)
4. Data from a variety of studies compiled by the [Community College Research Center](http://ccrc.tc.columbia.edu/Community-College-FAQs.html) at Teachers College FAQ. [↑](#footnote-ref-4)
5. <http://www.digitalpromise.org/ideo-digital-promise-release-evolving-ed-tech-procurement-in-school-districts/> [↑](#footnote-ref-5)
6. <http://www.digitalpromise.org/join-us-in-improving-ed-tech-purchasing-practice/> [↑](#footnote-ref-6)