



A series of interactive papers that provides specific guidance regarding the adoption of higher standards and quality assessments focusing on the shift to personal digital learning.



DATA BACKPACKS: PORTABLE RECORDS & LEARNER PROFILES

2015

The Shift
From
Cohorts to
Competency

Funding
Students,
Options, and
Achievement

Improving
Conditions
and Careers:
How Blended
Learning
Can Improve
the Teaching
Profession

Online
Learning:
Myths, Realty
& Promise

Blended
Learning
Implementation
Guide 3.0

Smart Series
Guide to
Edtech
Procurement

Personalizing
and Guiding
College
& Career
Readiness

Using Prizes
and Pull
Mechanisms
to Boost
Learning



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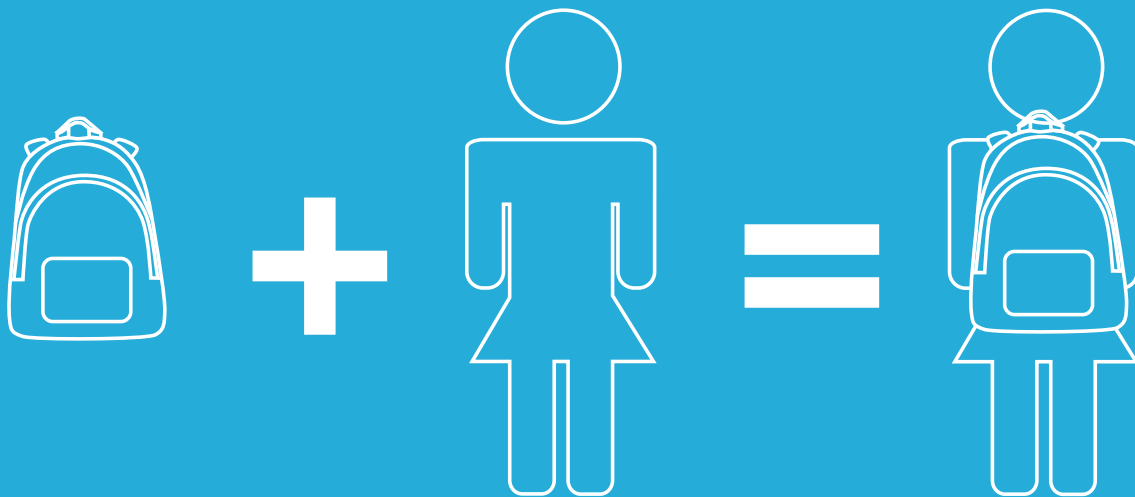


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EXECUTIVE SUMMARY

The current way student records and transcripts are managed is insufficient to meet the evolving needs of teachers, students, and parents. Only the most basic of information follows students into the classrooms they enter each year. Teachers have little visibility into the past performance of their students, what other teachers noted, or each learner's strengths, weaknesses, and individual needs. Parents and families lack access to and control over important student data that can boost personalized learning and drive better student outcomes.

What if students instead came to each course or classroom with a digital backpack of data about their learning levels, preferences, motivations, and personal accomplishments? How would this improve each teacher's ability to tailor learning to meet the needs of individual students? What if parents and students could easily access their child's records to share the information with afterschool providers? How would all of the personalization this affords add up to deeper learning and improved college and career readiness?

Data Backpacks: Portable Records & Learner Profiles asks these questions and reveals some key problems with the current system:

- 1** The current official transcript does not provide enough information for teachers to personalize learning from the first day of school.
- 2** Customized learning requires an enhanced and expanded Learner Profile.
- 3** Parents and teachers should have the ability to protect privacy and empower multiple providers to use and contribute to a Learner Profile.

This paper provides two recommendations for addressing the inadequacies of today's student records in order to power personalization from day one, at every step, for every student.

The Data Backpack

The Data Backpack is an expanded common electronic student record: an official transcript that follows students through every transition—grade to grade and school to school.

The Backpack includes traditional transcript data such as demographic information, state testing data, and supplementary student supports. However, it would also include additional information in order to represent a more holistic picture of student achievement—such as a gradebook of standards-based performance data and a portfolio of personal bests—and better capture the student's progression at any moment in time. This enhanced data would provide a context for attendance and behavior patterns, supplementary support services, grades, and other performance information such as proficiency scores and learning gains.

Since this data would follow students to each new learning experience, learning could be tailored to meet their individual needs from the first lesson rather than the extra time teachers must spend diagnosing student needs and abilities.

The Learner Profile

The Learner Profile builds on the “official transcript” of the Data Backpack to provide additional clues to unlock learner needs, preferences, and potential. While each student's Data Backpack would be populated by a set of common elements for all students at a new minimum level, the components of each student's Learner Profile could be customized based on student needs, platform data requirements, and family decisions.

Amazon, iTunes, and Netflix have demonstrated the potential of predictive algorithms. Adaptive software is powering high performance blended schools. Learner profiles—powered by achievement and keystroke data—will unlock secrets about the kinds of experiences that inspire persistence and performance for each student.

In addition to standard achievement data, Learner Profiles should contain expanded achievement information, student goal statements, badges and other recognitions, and a college/career readiness tracker. Students would contribute a full portfolio of work, complemented by teacher narratives on student assets and challenges. The Profile could also include non-cognitive variables that impact achievements, as well as an “early warning system,” self-management skills, behavior/character education, and a record of community service.

When learning is personalized to meet the needs of individual learners, everyone wins. Taken together, the Data Backpack and the Learner Profile can power personalization and protect privacy. **The Data Backpack ensures that personalized learning begins on Day One. The Learner Profile powers a personalized pathway toward college and career readiness.**

Customized learning, informed by enhanced and expanded student data, will boost motivation and achievement—keeping more students on track for college and career readiness.

The Opportunity

We are at a critical moment in time. With the introduction of college- and career-ready standards, online assessments and the shift to digital learning, districts are on the brink of receiving a flood of unprecedented amounts and variations of student data. Although no one has yet realized a full-scale solution to unlock the potential of personal digital learning that Digital Learning Now described in the [10 Elements of High Quality Digital Learning](#), the authors describe a rich field of toolsets and “point solutions” that address singular aspects of the overall needs. While much good work is underway, the paper concludes with a call to action and an assertion that the leaders of various efforts need to come together to create a common, integrated, and comprehensive system that is universally endorsed and widely implemented. Tackling the range of challenges—from privacy compliance to technical issues—will require collaborative involvement from everyone, ranging from state leaders and policymakers to developers and industry leaders, in addition to representatives from education agencies, advocacy organizations, and funders.

55million

students walked into the classrooms

7million

teachers in American pK-12 classrooms

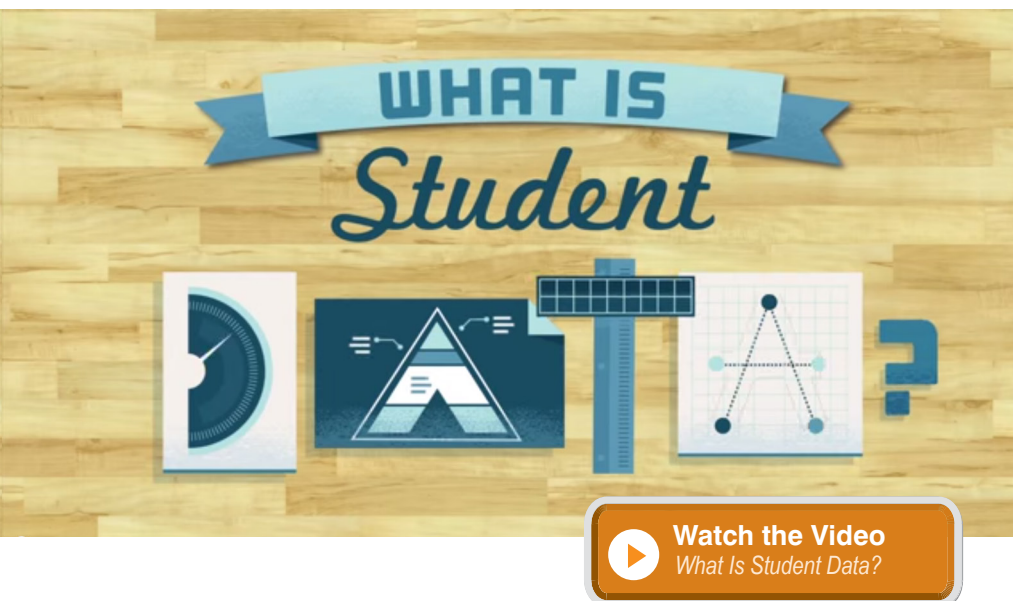
INTRODUCTION

Approximately 55 million students walk into classrooms led by more than 7 million teachers in America's Pre-K through 12 classrooms each year.¹ In most cases, the students showed up on

day one knowing little more about their teachers than the name on the classroom door. Unfortunately, teachers also have little access to much useful information about their incoming students.

Sometimes more information flows within a school as students move grade to grade, but often data and information is trapped within silos in a patchwork of paper and electronic systems. For districts with high student mobility rates and at transition points for all students in the system, this results in inaccurate instructional decisions and duplicative instruction—and contributes to students falling further behind. It can take weeks, if not months, for teachers to ascertain the individual strengths and weaknesses of each student in order to offer of the appropriate instruction to meet the unique needs of each learner.

What if students instead came to each course or classroom with a backpack of information—loaded with data about their learning preferences, motivations, personal accomplishments, and an expanded record of their achievement over time? How would this “Data



This [infographic](#) and [video](#) from Data Quality Campaign (DQC) describes the types of student data and shows that there's so much more to data than test scores. DQC believes that important requirements must be met for information to be truly useful and empowering. Student data must be: available, complete, relevant, secure, effective, supportive, communicated to students and used to improve learning.

Backpack” and “Learner Profile” improve each teacher’s ability to tailor learning to meet the needs of individual students? What if parents and students could access and customize this record to serve their own needs? How would all of the personalization this affords add up to deeper learning and improved college and career readiness?

Coupled with more widely affordable devices and a plethora of educational tools and apps, the shift to college- and career-ready standards and online assessments further necessitate a robust plan for organizing, analyzing, presenting, and comparing student data in a way that is most useful to students, teachers, and families. Without a robust plan for expanding our notions of transcripts, student records, and Learner Profiles, we won’t be able to make the most of the opportunities for truly personalized learning that these shifts present.

Current Benchmarks

Student records are currently guided by a complex patchwork of state and federal laws and regulations that specify what must be collected and reported—and under what conditions the data can be shared. More data is generally available about students at the classroom and school level; only a small portion is reported to the district. Even smaller portions of these records

are reported to the state and federal departments of education. Often, different data is needed for different uses or reasons. While some data is needed to inform daily instructional decisions, a state may require other data, such as student enrollment, to calculate funding payments or for accountability purposes.

[The Data Quality Campaign](#) (DQC) is a national, nonprofit advocacy organization leading the effort to empower educators, students, parents, and policymakers with the information they need to make the best decisions to improve student outcomes.² Since it launched in 2005, the education and policy fields have come to rely on DQC’s research and landscape analyses as the only source of information that captures the “state of the states” on effective data use—first with the [10 Essential Elements of Statewide Longitudinal Data Systems](#), and then with the [10 State Actions to Ensure Effective Data Use](#).

While these efforts have helped improve state systems, more has to be done to help districts enhance their systems to better inform instruction, target limited resources and interventions, and improve state and federal data collection.

Most district-based systems contain basic demographic information and possibly some academic performance indicators. While this type of standard data might tell the teacher something about the student, it reveals very little about the learner.

The growth in the use of new technology-based platforms has highlighted the fragility of these student data systems, the lack of interoperability among them, and the lost opportunities for deeper personalized learning experiences.

RECOMMENDATION FOR STATE-LEVEL STUDENT DATA

- Grade Level
- Attendance Information
- Special Program Status (Special education, Title I, Gifted/Talented, ESL, etc.)
- Academic Growth from Year to Year (“Value-Added” Data)
- Course Completions
- End-of-Course Grades
- Test Performance Data

What do teachers wish they knew about new students?

Are they meeting the standards in key areas like math, reading and writing?

What goals have they identified for themselves?

What level of support do they have at home? Do they participate in any community programs or organizations?

Do they do best when working alone or with peers?

What are their outside interests that I can use to motivate learning?

Is there anything in their learning history that I should flag for follow-up or special attention?

What did other teachers note about their strengths and challenges?

In what environment do they learn best? In a quiet room? Online?

Student Data Problems

This paper addresses three related problems with the current state of student data collection and dissemination:

1 The current official transcripts do not provide enough information to allow teachers to personalize learning from the first day of school. Students arrive into each new grade or school with little or no information, requiring every teacher to essentially start from scratch to build an understanding of each student's needs and capabilities. Most information is summative in nature and gives teachers little insight into the learner's individual strengths and weaknesses over time.

2 Customized learning for college and career readiness requires an enhanced and expanded Learner Profile. Learner Profiles are needed for differentiated instruction at the most basic level, and particularly for systematic methods such as Response to Intervention (RTI). Next generation adaptive platforms enhance instructional practice with smart recommendation engines that are based on a comprehensive profile of each student. This expanded Learner Profile portrays a holistic view of the student's unique learning preferences that gives context to student progress, such as his or her best learning modality (such as, "does the student learn best through visual representations in some cases and with hands-on learning in others?") and learning environment (such as, "does the student perform better in small-group or whole-class settings?"). The ability to better understand student progress toward goals through an expanded learner profile can

boost student agency, motivation and persistence. Parent/guardian understanding of progress toward college and career readiness can help guide family decision-making.

3 The system must balance the need for access to student data with privacy management tools that empower families. Parents who wish to access their children's student records are often met with complicated systems of forms, fees, and long waits. The current system is not set up to accommodate easy access to student data, and parents have little or no control over the information that is collected or shared about their students. There is no mechanism for parents to grant access to (and accept contributions from) multiple providers, but that can change through [parent-managed learner profiles](#).

Big Data in Education

The flood of data is coming. There's more of it, and it's coming from lots of new and different sources.

Using data to guide decisions is certainly nothing new. We are moving from a time of data poverty, in which data-driven decision making relied primarily on a single high-stakes assessment score, to a time of data abundance, in which it is collected frequently throughout the day. What's more, today's education system is data rich but information poor. There is already a tremendous amount of data produced through homework, essays, quizzes, assessments, projects, grades, teacher observations, tutoring sessions, and student portfolios. However, much of this resides in a paper format; even if it is captured electronically, it is usually trapped within different applications

and does not contribute to an overall individual record. Next-generation digital tools, services, platforms, and systems now give us the opportunity to collect and classify information down to the individual keystrokes of comparable students in parallel situations. We are just beginning to understand how these data can inform our understanding of the learners in our care.

The tools within this new technology-rich, personalized world of learning will both produce and consume data that can be analyzed to tailor each student's experience. The personal educational experience of each student will be further enhanced by ongoing and authentic assessments that are integrated seamlessly into the lesson, customized task lists that are driven by smart recommendation engines, social learning on a global scale, progress based on demonstrated mastery, and achievement recognition systems that certify attainment—all of which are made possible by advances in educational technology and learning sciences.

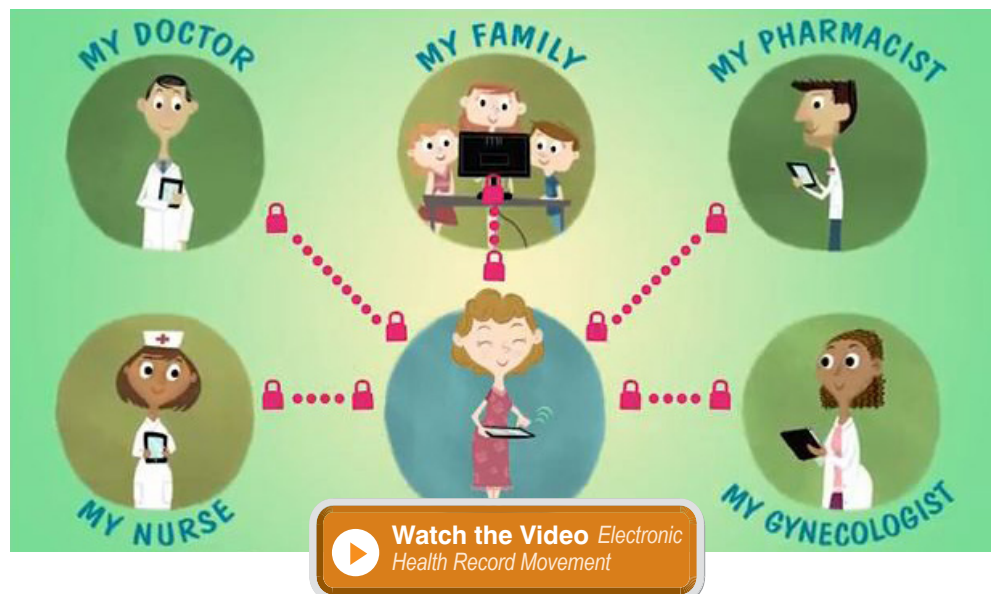
What can education learn from healthcare?

The U.S. healthcare and education systems are remarkably similar in some key ways. Both sectors deal with sensitive personal information and have laws to govern privacy protections regarding data—The Health Insurance Portability and Accountability Act of 1996 (HIPAA) Privacy Rule and the Family Educational Rights and Privacy Act (FERPA). As education leaders consider big data strategies, it may be helpful to explore how the healthcare sector has struggled with the same questions, particularly the move to electronic health records (EHR).

However, the healthcare sector is further ahead in both conceptualizing and implementing portable, personal EHRs than education. EHRs enjoy strong bipartisan support due to their ability to drive savings in healthcare while also reducing medical errors and improving healthcare quality. Fueling the rapid adoption of EHRs is \$20 billion in America Recovery and Reinvestment Act funds that established a “Meaningful Use” adoption initiative. Under the program, physicians are eligible to receive a Medicare or Medicaid bonus payment if they not only adopt EHRs that meet certain technical and privacy standards but also demonstrate that they are “meaningfully using” these technologies based on adopted use and reporting standards. These financial “carrots” end in 2015, at which point a “stick” of financial penalties kicks in for physicians who do not meaningfully use EHRs.

The education sector could benefit from a similar approach that focuses on creating a more robust portable electronic student education record. Educators would have instant access to the student's entire education history, including the interactions and experiences with outside specialists - be it a tutor, a speech therapist, or a student's online AP teacher. And just as EHRs help facilitate better coordination of care among physicians and specialists, so too could an electronic student record facilitate better coordination of instruction among all of the adults and professionals that a student comes across in their academic careers.

Note: Video available publicly on YouTube, courtesy of Health.Gov.





THE POTENTIAL OF CUSTOMIZED LEARNING

In the [Impact at Scale: The Learning Platform Series](#), [Getting Smart](#) describes [how learning will work in the near future](#), [what next-gen learning platforms should do](#), and [how and why students should own their own learning record](#). The team also describes desired characteristics, noting that schools, districts and networks want a platform that:

- Powers and tracks personal learning plans;
- Manages assignments and dynamic grouping;
- Supports development of standards-aligned projects;
- Makes it easy to combine proprietary, open, district, and teacher developed content;
- Combines formative assessment in a standards-based grade book;
- Incorporates social, collaborative, productivity, and presentation tools;
- Integrates with other system, provides single sign-on for lots of apps, and
- Connect students, parents, and teachers anywhere on any device.

Personalized learning has long been an aspiration of education technology.³ National education technology plans, going back to the Clinton Administration and following through to the U.S. Department of Education's 2010 plan entitled "Transforming American Learning: Powered by Technology," all highlight the potential for technology to improve student learning, accelerate and expand effective practices, and boost data as a teaching guide.⁴ The plan issues a call to action for American schools to leverage learning sciences and modern technology to "create engaging, relevant, and personalized learning experiences for all learners that mirror students' daily lives and the reality of their futures." Further:

The model of learning described in [the nation's EdTech plan] calls for engaging and empowering learning experiences for all learners. The model asks that we focus what and how we teach to match what people need to know, how they learn, where and when they will

*learn, and who needs to learn. It brings state-of-the art technology into learning to enable, motivate, and inspire all students, regardless of background, languages, or disabilities, to achieve. It leverages the power of technology to provide personalized learning and to enable continuous and lifelong learning.*⁵

Achieving this vision has proven to be elusive. In early iterations, the technology overpromised results and often failed to deliver. New platforms with the algorithms and digital content necessary to deliver customized learning have only recently emerged. Schools struggled with adjusting their classroom models and instructional practices to take advantage of new technologies. And the majority of funding streams at the state and federal levels reinforced old models of learning. Only recently has the U.S. Department of Education restructured funding streams to support new models through programs such as Race to the Top District and the Investing in Innovation Fund.

Digital Learning

We know that every student should have equal access to personalized learning, and we believe this will not be possible without access to personal digital learning opportunities.

[Digital Learning Now's 10 Elements of High Quality Digital Learning](#) is a state policy framework for the future of education based on the premise that all students have a right to a high-quality education, which in the 21st century must include digital learning.⁶ The framework stems from the belief that all students are digital learners and should have access to quality learning experiences that are unbounded by geography or artificial policy constraints.

Developed in 2010 with input from more than 100 experts, the framework was extended in 2011 to include a [Roadmap](#)

[for Reform](#) that provides tangible steps toward systemic change.⁷

Specific recommendations for state policymakers include:

- States should ensure local and state data systems (and related applications) are updated and robust enough to inform longitudinal management decisions, accountability, and instruction;
- States should ensure a digital formative assessment system;
- States must hold school and individual providers accountable for achievement and growth;
- States should evaluate the quality of content and courses predominantly on student learning data; and
- States must require students to demonstrate competency on a standardized assessment in order to advance.

“Also known as learning analytics, the potential of big data has created a great hope to transform education. Big data tracks interaction and direct feedback between learners and teachers, continuous monitoring of progress and attendance, more opportunities for personalized learning and guided pathways to the students’ interests. The users generate all kinds of data, and from those choices, they can be taken from one activity to the next. It is the learning analytics factor of big data that can guide the students and teachers to better understand the trajectory of the learner’s progress, to adapt to the learner’s understanding of a subject, analyze his/her social relationship and network, as well as evaluate not only the quantity, but also the quality of the learner’s input. At the macro level, the analysis of this data can contribute to sound policy development by providing access to numerous factors from the environments, approaches, and pedagogies that bring about actual results.” [An Overview of Big Data in Education, UNESCO](#)

Video available publicly
on YouTube, courtesy of
Digital Learning Now



Watch the Video
Personalized Learning



According to a state policy brief from [Data Quality Campaign](#), there is an “urgent need” to support teacher data literacy since most current policies do not actively promote the development of these skills. As such, many teachers are still more overwhelmed by the student data rather than empowered by its ability to inform instruction and impact student outcomes. See [Teacher Data Literacy: It’s About Time](#) for detailed recommendations for policymakers to promote data use skills, ensure ease of access and incentivize data literacy.

Personalized Learning

When learning is customized to the needs of individual learners, everyone wins. Much of the guesswork is removed from teaching, and limited resources like time and money can be funneled to more efficient and proven strategies. Teachers can focus on helping students take the next step down their individual learning paths, rather than wasting time trying to figure out where they are each beginning. Rather than being forced to “teach to the middle” on a predetermined path, teachers will have the tools to differentiate learning seamlessly, without adding more to an already overflowing plate.

New types of data can inform instruction and educational choices. Teachers can use metadata such as keystroke information, how much time students spend on each question, and what types of activities generate the most success to inform their understanding of each student’s motivation and to form a comprehensive Learner Profile that will drive sophisticated recommendation engines and produce customized task lists of learning opportunities for each of their students across both content and context. Perhaps most importantly, this type of non-standard data can provide clues that indicate which types of learning experiences are most likely to encourage the most student persistence and so drive student success.

PERSONALIZED LEARNING - TYLER’S STORY

Tyler has always struggled in math. His parents have run out of ways to help him at home and his teachers have grown frustrated by his behavior problems during class. When Tyler’s family moved to a new town after his mom found a new job, he was placed in Mrs. Putter’s classroom. On Tyler’s first day, Mrs. Putter spent some one-on-one time introducing Tyler to his tablet computer and helping him create his profile. Tyler answered some simple questions and then chose from a list of pre-installed apps for the afternoon’s independent work time. While he was working, Mrs. Putter used her laptop’s screenshare feature to watch Tyler work through his chosen online activities. As she switched windows to view another student working, Mrs. Putter’s sidebar alerted her that Tyler had incorrectly answered 4 of the 5 questions on comparing fractions, so she dragged and dropped his name into the small-group instruction block from 3:00-3:30 for the students struggling with similar concepts. Tyler received a meeting invitation in his classroom inbox and an instant message from his teacher. The meeting would take place in the school cafeteria, where Mrs. Putter planned to use items from the kitchen to demonstrate comparing fractions, since she had learned from Tyler’s earlier online survey

that he wanted to be a chef when he grew up. That evening when Tyler got home, his parents invited him to help prepare dinner using a recipe that required measuring and comparing fractions that was sent to them automatically as a follow-up activity based on his work in class. As the year went on, Mrs. Putter learned more and more about Tyler, thanks to the technology that powered his digital learning experiences. She learned what types of problems he was most likely to skip, and that he preferred fiction to illustrate difficult concepts. She learned he was motivated by competitive games and would persist longer at tasks if there was a clear path to recognizing his completion. Although Tyler’s math scores began to improve almost immediately, the program was set up to notify Tyler’s parents and teachers if he triggered any of the “early warning indicators” in the system, such as missed questions. When this happened, Mrs. Putter was able to add descriptions to his Learner Profile based on what she had learned about through her personal interactions with him, and observations with his peers, to augment the computer-generated data to help focus the interventions on the methods most likely to tap into Tyler’s motivations and interests.

CURRENT EFFORTS

Although no one has yet realized a full-scale solution that can truly unlock the potential of personal digital learning that Digital Learning Now first described, a number of current efforts are tackling some key components of the problem as we see it. These various efforts address different parts of the overall education data problem—some are looking for ways to expand the information that is collected, some are seeking to integrate information that is currently available, while others are providing new solutions for data analysis and presentation. In order to realize big data's true potential to impact learning, however, these efforts must come together in a unified way to address what might be called both the “what” and the “how” of personalized learning.

Learning Analytics

Traditionally, school systems and state departments of education have focused on building and enhancing data warehouses and student information systems. These technologies allowed for data to be collected, stored, and reported in rudimentary ways. Implementation challenges included identifying data owners who were responsible for updating elements, reducing duplicative reporting requirements, and producing data runs for compliance purposes.

As these systems improved and it became easier to collect data, a new field emerged around learning analytics, which focused more on analyzing data for trends, forecasting possible outcomes, and producing more actionable reports.

New personalized learning recommendation engines are now emerging that use the same science that drives Amazon's shopping recommendations or Netflix's suggested movies. Pandora and Spotify can create customized music playlists based on previous selections, but the magic in the user experience is in discovering whole new worlds of music that we never knew existed—now revealed to us by hidden analytics tied to the previous experiences of millions of other users. It only stands to reason that student learning could also be a personally tailored experience based upon a shared understanding of how similarly situated students learned a new skill or concept most effectively. At their best, these kinds of recommendations would be matched to student-level archives of information collected over years of building digital student profiles based on the individual successes and failures of each student.

Pioneers such as [Scholastic's Read180](#) intervention, [New Classrooms](#), and [Education Elements](#) already provide blended learning solutions that harness technology's potential to create a new degree of customized learning within a school setting. Tools from [Knewton](#) and [TenMarks](#) also deploy smart engines and real-time analytics to guide what material students are presented in various situations. Stanford's [H-STAR](#) Institute is developing a 5-year plan for learner analytics, with the goal to bootstrap a national data ecosystem. Over time, tools will capture a growing set of student records that will become a new map of optimal learning paths to better inform instruction.

Current Solutions

Current student data efforts include: [Achievement Standards Network](#), [Achievement Standards Network \(ASN\)](#), [Common Education Data Standards \(CEDS\)](#), [National Education Data Model \(NEDM\)](#), [Ed-Fi Learning Resource Metadata Initiative](#), [Postsecondary Electronic Standards Council \(PESC\)](#).

Learn more about Learning Analytics

Interested in learning more about how learning analytics can inform instruction and improve student achievement? Check out these infographics on [Learning Analytics and Student Data](#) and [How Big Data is Changing the College Experience](#).

The Rise of the Algorithm

Adaptive assessments quickly identify a student's learning level by adjusting the difficulty of questions based on his or her responses. Adaptive assessment and personalized instruction are being combined in powerful new ways.

[Rocketship Elementary](#) uses engaging and adaptive math products [DreamBox Learning](#) and [ST Math](#) to personalize math instruction. [i-Ready](#) from [Curriculum Associates](#) is an adaptive K-12 diagnostic that delivers targeted instruction in K-8 reading and math.

Blended learning platforms such as [Schoolology](#), [Gooru](#) and [Agilix](#) help teachers personalize instruction using multiple content libraries.

Learner Profiles— For Teachers

[Bloomboard](#) allows teachers and leaders to create personal learning plans for professional development based on a Learner Profile and individual learning needs. Bloomboard includes tools to allow teachers to set their own goals, manage the observation process, and connect to a set of online resources that are specific to their own professional learning objectives.

All of this is very good, but none of it is nearly enough.

The flood of new data that is coming—potentially pouring in every moment of the day from billions of continually connected devices—first requires a strategy with the power, flexibility, and comprehensive internal architecture of the data system to make a whole array of personalized learning variables interoperable. If our future technologies are to identify and recommend singular learning paths based on a continuously expanding matrix of content characteristics (to include at least factors of learning preferences, learning environment, and student motivation), then we need to work today to define that data taxonomy that will promote sound engineering to the same degree it invites continuous innovation.

Point Solutions for Student Data

Enabling the next generation of personalized learning will require us to collect more robust and significantly enhanced student records. Taken together, these records should form the foundation of new district data systems. Nowhere near the rich variety of data envisioned here is currently captured and tied to a unique student record, since a uniformly categorized and shared set of student information does not yet exist. While some progress is being made in this area of “shared data standards,” current efforts to date are more like “point solutions” that solve a single legacy issue. What is needed

is a comprehensive student record of the kind described below and a safe, secure, flexible, and transparent technical infrastructure that adapts to the rich variety of digital data that is now pouring in from multiple instructional settings and across various aspects of the teaching and learning process.

One way to quickly see the limitations of our current environment is to imagine a whole universe of rich instructional content tied to smart assessment tools that could be seamlessly processed in four ways for every individual student, regardless of setting: (1) analyzed into unique component parts, (2) synthesized into multiple potential learning objects, (3) orchestrated across multiple learning paths, and (4) curated into singular personalized learning portfolios. Systems that are sufficiently flexible to adapt to these demands, while catering both to the unique needs of individual users and to the internal integrity of very specific content objects, are absolutely essential to the future of personalized learning.

Realizing this vision, however, requires both a more comprehensive student record and a more robust technical infrastructure than exists today. The following recommendations describe a path forward that address both the potential of student data to personalize learning and a path to protecting student information. This is not just a huge problem to solve, but a huge opportunity to seize.



RECOMMENDATIONS

There is a two-part solution to push the field one step closer to realizing this goal: creating a “Data Backpack” that follows each student along every transition throughout their education and developing an expanded “Learner Profile” that will power personalization and protect privacy. Inherent in these two new components is the recognition of questions regarding the “what” and the “how” of educational data; both are needed to synthesize the student records necessary to personalize learning.

The Student “Data Backpack”

The official transcript information that a teacher receives about a new student, either on the first day of school or in the middle of the school year, often reveals little more about the learner than his/her name, gender, race, age, and standardized test score history. Teachers

are faced with the overwhelming task of spending weeks evaluating what works best for each individual student, often through inefficient trial and error methods that frustrate both teachers and students—and all of this information is lost the moment the student transitions to another teacher or grade level.

State and school district leaders should explore establishing a new minimum—a student “Data Backpack” that forms a new official transcript that can unlock the potential to personalize learning by giving students, parents, and teachers access to a greater quality and quantity of information. When coupled with conventional transcript records regarding demographics, special program status, and attendance history, the Data Backpack would form the foundation for personal digital learning across traditional, online, and blended

Recommendations to Power Personalization

**Personalized
Learning
*From Day One***



**Personalized
Learning
*To College and
Career Readiness***



Student Data Backpack



- Demographic data
- Standards-based gradebook (computer and teacher entered items)
- Grades and transcript data (for secondary students)
- Portfolio of personal bests (e.g., current writing sample)
- State testing data
- Attendance and behavior data
- Supplementary student supports

Expanded Learner Profile



- Expanded achievement data
- Motivational profile that predicts persistence and performance
- A narrative description of student assets and challenges
- Recognitions and badges
- Full portfolio of student work
- Student goal statements
- College and career readiness tracker

Optional Additions to Profile:

- Non-cognitive variables
- Self-management skills
- Behavior and character education
- Record of community service

Profiles and Platforms

See Appendix A: Toward Comprehensive Learner Profiles for an overview of current tools that highlight the potential breadth of the Learner Profile.

Portfolios

As Tom Vander Ark describes, “Every student should have a collection of personal bests—a cloud-based story of their development and artifacts of accomplishment that’s easily shareable in full or in part and organized for presentation. At their most basic level portfolios can simply be a storage strategy. They can also be an active work, collaboration and reflection space including a blog and feedback from teachers and peers. Active use cultivates habits of lifelong learning by promoting reflection on what to learn and how to learn. The third level of use is portfolio as showcase around a set of learning outcomes—an achievement documentation system—such as high school graduation.” (See Every Student Should Have a Digital Portfolio for 8 tools that schools are using to build a collection of personal bests.)

learning settings. This would differ from a traditional data warehouse in key ways. While a data warehouse houses student information, the Data Backpack is our description of the new minimum standard for official student transcripts.

Each student’s Data Backpack would move seamlessly from course to course, classroom to classroom, grade to grade, school to school, and across learning experiences of every kind, including afterschool and enrichment programs. This universally transferable set of information would function as a “super gradebook” for teachers and house standards-based achievement information (tagged in correlation with CCSS subskills for example). While current transcripts do not reveal a student’s ranking along a continuum of learning objectives, the “super gradebook” would not only contain summative data from standardized achievement tests, but thousands of formative observations (gathered both from teachers and computer-based learning experiences). As a lifelong archive of achievements, the Data Backpack would also allow for collections of demonstrated competency, such as a portfolio of personal bests and proudly stored artifacts of learning such as essays or projects.

Each student’s Data Backpack would be formed from both teacher-entered and computer-generated entries. Data from participation in digital learning experiences such as games, apps, and programs could be set to automatically enter student data into a pre-determined template to house information that would be most useful to teachers, parents, and students. Overall, the Data Backpack would function as the “read-only” portion of the student record, as it would only

contain artifacts from pre-approved and certified sources.

A student portfolio of this kind would be used in many contexts and across many layers of the technology architecture. Properly used, it could seamlessly inform parents, students, and educators of student progress; provide insight for curriculum, content, and application development; inform scholars regarding the effectiveness of individual interventions; and advance the state of education science.

An Expanded Learner Profile

Each student’s Data Backpack would be complemented by an expanded “Learner Profile” that could be easily accessed and managed by the various teachers, tutors, and education providers that come in contact with a student. It would simultaneously function as a way to track student progress and preferences and to gather data to evaluate content, courses, interventions, and teachers. The expanded Learner Profile would move beyond the limitations of today’s paper transcript to track and measure factors that affect learning which have, until recently, been nearly impossible to efficiently gauge. With recent advances in technology inside and outside the field of education, we can now gather and evaluate student data related to learning patterns, preferences, and the types of learning experiences that produce the most effective outcomes for each student.

In contrast to the Backpack, which would function as the “read-only” portion of the student record, the broader Learner Profile would be more open to contributions from multiple providers and sources.

The expanded Learner Profile will also need to remain flexible to allow for integration with new achievement recognition systems such as learning badges and data visualization strategies. As these systems become more widely recognized and adopted, they will increasingly become the new standard for communicating demonstrated achievement and will move to the standard Data Backpack. There are a number of technological tools to facilitate the development of an online portfolio that will form an archive of student work over time. Part of that record could be constantly updating

“personal bests,” for example of a piece of writing or a project. One option would be to include the “personal best” artifact as one element of every student’s new minimum Data Backpack and to archive personal bests and other work samples in the deeper Learner Profile. Students, teachers, and parents could all be a part of the decision to choose work samples. In order to prevent the Learner Profile from becoming a disorganized assembly of artifacts, we propose a common system of predetermined categories that will help facilitate improved comparability across classrooms and schools.

AN EXPANDED LEARNER PROFILE - MADELINE’S STORY

Madeline was a third grader assigned to Mrs. Moore’s class when she moved into Forest Lane School District in 2009. The week before school started, Mrs. Moore reviewed the cumulative files of her 25 incoming students. She was especially eager to review the files of Madeline and the three other students new to the district this year. As she thumbed through Madeline’s file, she discovered that Madeline was a Caucasian female student with a March birthday. She missed four days of school last year, and her parents’ names were Jill and Steven. A review of Madeline’s grades from elementary school to date revealed “Satisfactory” in all subjects, and her standardized test scores showed she was performing on grade level.

Madeline was a seventh grader assigned to Mr. Miner’s class when she moved again in 2013. Over the summer, Mr. Miner reviewed the online records of the students coming into his new class on his tablet. Mr. Miner was in his tenth year of teaching, and particularly loved teaching seventh graders since they began each year with a fresh start in a new building in his district. He also knew it could be a challenging time for students who were experiencing big social and emotional changes, and he understood the importance of finding ways to connect with each of them individually. As Mr. Miner reviewed the learning profiles of the students in his class, he used data visualization

tools to get a quick overview of the students’ abilities and found out right away that all but two students had already mastered the standards in the first math unit. He noticed that a new student, Madeline, had already mastered the majority of the standards for the seventh grade curriculum, and he flagged her advanced level work and sent her profile to the guidance counselor for a gifted evaluation. As he flipped through each student’s Learner Profile, he was able to start building a picture of each of them. Combined with the narrative descriptions from past teachers and examples of personal best work, the expanded achievement data gave Mr. Miner an advanced understanding of the strengths and weaknesses of his class as a whole and of each individual student in his class—all before Mr. Miner or any of his students stepped a foot into the classroom. Madeline was eager to meet Mr. Miner, who had already emailed her over the summer to introduce himself and ask her about her passion for horses that was revealed in her profile. School was always a pretty boring place for Madeline, but she was amazed to find that her work was engaging and interesting—and almost immediately. Each morning Madeline eagerly opened her “playlist” to find options for the day’s activities. She knew that as she mastered something, she could move onto what was next, rather than having to sit and wait for something that challenged her. And she couldn’t wait to get started.

The Learner Profile would evolve to meet students' needs over the course of their educational careers. For instance, as the student approaches later grades, the profile could grow to include a college and career readiness tracker with data visualization tools to support the achievement of key milestones along the way.

An additional option for expanding the Learner Profile would be to include non-cognitive variables that impact learning. Monitoring factors like persistence, psychological health, and resilience could create an "early warning system" that could trigger further evaluation and intervention. Over half of U.S. states are now producing early warning reports with varying approaches in collection and dissemination.⁸ America's Promise and Johns Hopkins University have also highlighted how readily accessible data can serve as an early warning indicator for student dropouts.⁹

Tools—such as those employed by Charlotte-Mecklenburg County, North Carolina and Arizona State's eAdvisor System—use prediction models based on factors such as truancy, disciplinary problems, changes in course performance, overall grades, and more to signal when students fall "off track" or exhibit "at-risk" behavior. This data could be further combined with information gleaned from other informal learning settings, club activities, athletics, and the arts—or merged with descriptions of various skills and behaviors that teachers observe based on more closely working with students, such as their study habits, personal character traits, and interactions that unlock their deepest individual interests. In the end, it is neither utopian nor Orwellian to suggest that any information collected from participation in any activity at all (e.g., Boys & Girls Clubs, mentorship programs, outside tutoring) could only further bolster the Learner Profile's ability to present a holistic picture of the student across every stage in a lifetime of learning. But to work well, the Learner Profile has to be properly designed.

What questions does a parent have about his/her child's education?

Is he/she on track to graduate high school? Is he/she on track to attend college?

Are there areas where my child is really thriving or showing advanced aptitude that I can use to further motivate him/her?

How is my child achieving compared to his/her peers?

Are there any areas where my child is struggling? What resources exist for me to help him/her at home in the exact areas where she is weak?

What type of learning environment seems to work best for my student? Online? In a traditional classroom setting?

How can I become more involved in helping my child to succeed to his/her fullest potential in school?

Why are you passionate about the use of data in education?

In this video from the [EdPolicy Leaders Online Course](#), experts across the field answer the question, "Why are You Passionate About the Use of Data in Education?"



Watch the Video

Why are you passionate about the use of data in education?

What does it take for a parent to access his/her child's records?

While it differs from state to state, there are often many hurdles that parents have to overcome to access their child's school records. Often, access requires the completion of an application, payment of a processing fee and waiting for several weeks. In New York City Public Schools for example, principals have 45 days to fulfill parent requests. Even if parents jump through these hoops, the information they do get is often limited and difficult for a non-educator to decode.

Safeguarding Student Data

The [Roadmap to Safeguarding Student Data](#) from [Data Quality Campaign](#) highlights the importance of data privacy management and offers three key areas for safeguarding student data:

1. **Transparency:** Clearly communicate internally and with the public about the policies and procedures designed to protect student data and about how data are collected, used, and safeguarded.
2. **Governance:** Design structures and delineate roles and responsibilities that establish stable procedural and personnel-based supports for the effective implementation of privacy policies.
3. **Data Protection Procedures:** Implement specific security and privacy strategies, processes, and controls that physically, technically, and legally safeguard student data.

Privacy Management Tools

When it comes to student records, control and transparency are equally important considerations and raise important questions regarding privacy and information sharing. Privacy management tools must be an element of the shift to expanded student records and profiles, in order to protect students and empower families and help better meet the goals of the Family Educational Rights and Privacy Act (FERPA) and state privacy laws. Key questions include:

- What limits are placed on a school's ability to disclose data in education records to third parties without parents' consent?
- How can parents and students more easily access all education records directly related to them?
- What is the process for challenging, correcting, or appealing inaccurate or misleading data?

Many states have student record privacy or confidentiality laws that affirm or extend FERPA. While no state may have a law more lenient than FERPA, some states may impose greater restrictions on the types of data that can be collected, how it is stored, and under what conditions it can be released.

This is about more than just complying with federal and state regulations; it is about protecting sensitive student information and privacy rights as a core design principle in developing enhanced student records.

Empowered Choices

While the contents of each student's Data Backpack would be populated by a set of common elements for all students at a new minimum level, the components of each student's Learner

Profile could be customized based on family decisions.

The [MyData](#) initiative is a joint project between the U.S. Department of Education and the White House Office of Science and Technology Policy (OSTP) to encourage schools and digital learning providers that host student data to allow students and parents to easily download their own data in order to create a personal learning profile that they can keep with them throughout their learning career.

This approach offers a first step to parents and students to easily export their data and potentially share it with other services and providers. Supporting the exporting of data will require different providers to use uniform protocols for granting access to and authorizing any transmission of the official record in a way that is safe, secure, and respects the privacy of all concerned. From a technical standpoint, the [SIF Association](#) is a nonprofit organization with 3,200 members that have come together to create a set of rules and definitions that enable software programs from different companies to share information. In addition to ensuring that programs within a school or district are able to share data without requiring each vendor to learn and support the intricacies of other vendors' applications, it is critically important to anticipate the needs of individual students and parents so that a single student record like the Student Data Backpack could be accessed and used by individual students and their families as they choose. This is simply not possible today.

When it comes to educational data, awareness is important, but it is possible to go one step further by creating processes within the system

that engage and empower families. This type of engagement could include options for parents and students to get involved with collaborative goal setting throughout the school year and systems that alert parents when students are exhibiting declining effort or achievement.¹⁰ In order to facilitate meaningful family involvement in student record management, the data must be displayed in a user-friendly format and be matched with specific tools and actions. Careful attention must be paid to presenting users with data that serves their individual needs in a format that is customizable and adaptive. While parents might want to have access to comprehensive profiles, they will most likely be interested in real-time information that they can use to guide involvement right now.

Privacy management is a critical aspect of making these records more easily available to students and parents. In addition to standard privacy controls such as encryption for sensitive information and user authentication, the new records will include a Facebook-like set of privacy management tools that let parents determine what data gets shared, and with whom. Parents could determine, for instance, if they were comfortable with sharing information about their child's profile with outside community organizations, institutions of higher education, or tutors. The key design principle must be to give users the tools to control what is shared with whom in a way that is easy to understand and allows the parent and student to know when information is disclosed and to whom.

Proper training of students and parents will be essential to guide them to make the best decisions regarding data and information sharing. Teachers and administrators will also need thorough

professional development to learn more about interpreting these new and varied data sources—and to become well versed in the legal issues surrounding student privacy and data management. Training will also help lessen the potential for tracking students based on a set of differentiated expectations, rather than properly using data to differentiate and personalize instruction in a way that sets high expectations for all learners.

Policy Resources for Student Data Privacy

Recently, student data privacy has become an issue debated by legislators as they create policies that decide how student data is collected, stored, used and shared. In 2014, 22 states enacted legislation on the topic of student data privacy, debating more than 110 bills. In the first half of 2015 alone, lawmakers in 45 states introduced more than 170 bills addressing the issue. This policy area requires carefully balancing competing interests. On one hand building trust and empowering parents; and on the other providing teachers, school leaders, policymakers and innovators with information that can spur student achievement. To address this challenge, [ExcelinEd](#) is actively providing support to state policymakers as they work to modernize outdated laws and respond to the concerns of parents by advancing comprehensive, balanced student data privacy protections.

To assist states, ExcelinEd has recently developed:

- A framework of seven [fundamental student data privacy principles](#) as a resource for states to think about the complex issues, laws and regulations surrounding student data privacy.
- The [Student Data Privacy, Accessibility and Transparency Act](#), this model legislation built on the fundamental principles, provides protections to ensure student data is used responsibly, by addressing data collected by the government, data collected by vendors and parental access to their child's data. This model was recently used by Georgia lawmakers to craft legislation that unanimously passed the House and Senate and ultimately signed into law.
- [Building a Trusted Environment: a Snapshot of State Laws on Student Data Use, Privacy and Security](#) serves as a resource for policymakers and advocacy organizations as they examine the wide-variety of state-specific data privacy practices from across the country and work to find the right balance in their state.
- An online course "[Data Privacy? Get Schooled.](#)" that discusses the value of data and offers recommendations for safeguarding student data while using it to improve student success.

States currently lack access to the out-of-state data required to best serve students who cross state lines. The [Breaking Down State Silos](#) report highlights this problem and issues an urgent call to action - “It is vital that policymakers understand the impact of the combination of out-of-state mobility and lack of out-of-state student-level data on their ability to provide actionable information to stakeholders in their state. Policymaker leadership is necessary to guide multistate solutions (e.g., efforts to standardize education data and share limited and appropriate data) to address these challenges.”

IMPLEMENTATION CONSIDERATIONS & CHALLENGES

The transition from the current official student record to a more comprehensive and holistic Data Backpack and Learner Profile will not be without its challenges. After addressing basic questions around FERPA, state and local regulations, and other legal issues such as varied definitions of what constitutes a student record, there are a number of agenda-setting “big questions” that will need the focused attention of leaders across all aspects of the system. Tackling these challenges will also require collaborative involvement from all parties, ranging from state leaders and policymakers to developers and industry leaders, in addition to representatives from education agencies, advocacy organizations, and funders.

Our research has generated a list of implementation challenges in these categories:¹¹

Borders and Boundaries

The Data Backpack and Learner Profile must be operational for a wide range of stakeholders—from students and parents to teachers and administrators, as well as course providers and service providers. State and local leaders, in collaboration with the private sector and federal government, need to determine to what extent information from external providers and informal learning opportunities will become a part of each student’s record, in addition to the overall question of “ownership” of the components of the official transcript. While issues of quality are of course important, being too strict about allowing information about students generated from learning experiences that fall outside the standard school day could be detrimental. Many kids are blending

their own learning down to the course level, and the new transcript must allow for information to be accumulated from multiple sources, platforms, and providers.

Technical and Translational Issues

Systems such as predictive algorithms and smart engines already exist at scale in fields outside of education. As technology evolves, existing privacy and information-sharing policies have also evolved to accommodate new opportunities offered by technology while still protecting sensitive information. The biggest challenge to education is to “translate” the relevant functionality from various systems in fields like health, supply chain management, library science, and ecommerce into the field of education. Once translated, additional issues that fall under this category include system design and maintenance and determining protocols for coding, organizing, and sharing information.

Collaboration Concerns

Researchers from the Brookings Institution note that the most significant obstacle to overcome is building a common data-sharing network and explaining how current systems are disconnected from one another, with separate systems for academics, discipline, attendance, etc.¹²

This problem is further complicated by the fact that data is collected outside the traditional school system, by external providers and online applications, that could provide useful information for the schools to expand and inform student records. Without system integration and shared data

formatting, comparability is lost and important learning trends go unrevealed. The lack of a common system can also force providers with innovative solutions to go straight to students outside traditional school hours, because it's too difficult to work within school districts with diverse systems.

For example, a common system for tagging new college and career-ready standards into microstandards will be necessary to build a common comprehensive Learner Profile with improved comparability from grade to grade and state to state. This raises questions about proprietary information and incentives to share what many industry leaders consider intellectual property. Standards databases, like the Achievement Standards Network, will allow translation between states. These are issues that will need further investigation as solutions are generated, since there will be some data points (testing, for example) that are common enough to cross systems, while others may be unique to the needs of individual users and providers and would only clutter and muddy the student backpack and profile elements that are intended to guide instruction.

Unintended Consequences

The move to an expanded system of student record keeping is not without its risks. If the data collected are not valid, rich, and properly used, the expanded profile could have the opposite effect of narrowing the educational experience, rather than enhancing it. There's certainly an important difference between differentiated instruction and differential expectations. In addition to maintaining a keen awareness of the potential for lowered expectations, the system must

also guard against potential threats like privacy exploitation, cheating, and misrepresentation. As we move beyond measures of basic skills to formulate a more comprehensive overall profile of student learning, we must be careful not to generate unintended consequences.

Technical Challenges on the Path to Personalization

There are five challenges to overcome to unlock the power of personalized learning. These are imminently solvable problems—they are more politically than technically challenging. Solutions will take leadership from industry groups, EdTech leaders, and foundations.

- **Student record.** Each state will need to define a common student record for a portable data backpack. More broadly, a learner profile will be rather fluid with lots of opportunity to customize.
- **Interoperability.** A common data standard, like IMS's [Learning Tools Interoperability \(LTI\)](#), will guide how information is shared between systems.
- **Combining formative.** Many U.S. schools benefit from more information from many sources of formative assessment, often embedded in digital learning experiences, but have no way to combine the information from multiple sources in ways that are useful for driving instructional improvement or managing student progress. The solution probably involves tagging content and assessment data (the way [Houston requires partners to use Thin Common Cartridge](#)).
- **Estimating growth.** As more students progress on personalize pathways, it will become necessary to develop [comparable growth rates](#) to ensure that all students are making adequate progress. Current scales (like Lexile/Quantile) are frequently used to compare growth. New more subtle measures aligned with new standards would be even better.
- **Correlation.** Better use of formative assessment (and less reliance on big year end summative tests) will require comparable achievement and growth rates so student learning can be compared from school to school. In addition to tagging, post hoc data barrage can correlate data sequences from different environments after the fact by analyzing thousands of data points. [IMS's Caliper Analytics](#) standards support both post hoc and real-time data feeds for millions of students daily.

Much has happened since the first version of this report was released in October 2012. The [Aspen Task Force on Connected Learning](#) endorsed the concept for a data backpack, particularly in an era where students are engaged in learning activities inside and outside of school. Utah [passed legislation](#) creating a [Student Achievement Backpack](#). Recognizing the importance of protecting student privacy in this connected learning environment has led more than 151 companies to sign a [voluntary pledge](#) for safeguarding data. The Data Quality Campaign led a diverse coalition endorsing [principles](#) for the use and protection of student data. Georgia passed one of the [most comprehensive data privacy laws](#) in the country that balances the need to better empower parents without closing off innovative instructional models.

CONCLUSION

The potential for achievement and participation data to personalize learning and improve educational outcomes in the United States is vast. In this paper we have described how the rich concept of a Student Data Backpack, paired with a more comprehensive Learner Profile, could greatly improve educational decisions, increase access to more focused and relevant instruction, motivate students to learn in new ways, and boost achievement.

Strong leadership, broad collaboration, and a commitment to innovation that does not sacrifice privacy are essential to getting this right. But it is also true that a new era is already upon us; too much time has already been wasted, and too many resources squandered. Digital natives are in our classrooms today, and we must build new systems that can work together to support the smarter evolution of our educational system into one that better personalizes instruction and expands the total opportunity for all of us to learn.

In summary, we believe there is a threefold challenge before us: a definitional challenge, a legal challenge, and a technical challenge. Together we need to answer the following questions: (1) What kind of data are we talking about? (2) What legal guidance is required for custodians and users of the data? And (3) How do we safely and securely move the data in ways that both maintain its integrity and make it maximally useful?

The majority of this paper has concentrated on the definitional challenge. We have described the power and potential of the Student Data Backpack and Learner Profile not just to inform the imagination, but to invite a

more rigorous and systematic definition of what exactly constitutes each of these and what exactly must be built to bring them into being. We do not believe that we have completed that assignment here—there is still much work left to be done. To take but one example from these pages to demonstrate how our recommendations are not yet actionable, consider how a gradebook full of achievement data would follow a child. Today almost all assessment data is course/content, platform, district, or state specific. For this information to meet our minimum requirement that it be analyzed into component parts and then curated into singular personalized learning portfolios, would require at least (1) a universally recognized micro-tagging strategy and 2) a common record format that makes it easy to export/import this kind of data. Getting this done is an absolutely necessary first step that has yet to be successfully executed by a cross-industry working group with the expertise to make it happen.

Privacy is a real issue that must be protected as these systems evolve. However, much of what is described in this paper can be done within the bounds of FERPA and other privacy laws already on the books.

Finally, it is important to note that the primary barrier to the widespread use of these enhanced records is organizational, not technical. These records build on the important work is underway by efforts such as the NEDM, DQC, and other state transcript efforts. Analytic and personalization tools have advanced in other areas, particularly in consumer services. There are also important lessons to learn from how the healthcare sector is deploying safe, secure electronic

medical records to every American within the next five years. The main challenge for implementing the Student Data Backpack and Learner Profile is pulling these piecemeal initiatives into a comprehensive effort driven by state and district leaders.

More than anything else, it is absolutely essential that we work together across all 50 states and all 15,000 school districts to outline the specifications of a new universal standard for the Student Data Backpack and Learner Profile. An adoption campaign, not less substantial than the DQC of the last decade, will be required to gain widespread agreement on the specifications of a new universal standard for the Student Data Backpack and Learner Profile. Working together we can craft an approach that will allow for the safe, secure, and nearly instant communication of student data in a myriad of settings across a myriad of users to support deeper, richer, and more informed learning experiences to improve educational outcomes for all. This is what we are calling for.

To be successful, each constituency in the “digital learning landscape” not only has to be engaged, but also has to work hard to arrive at a solution that addresses the needs of all the other parties in question. Federal and state governments together with vendors and school districts need to take action in tandem to work towards a single solution that meets everyone’s needs at once.

In order to get there as quickly as possible, the following next steps are recommended as immediate action items that we can put in place now:

1 States should use state transcripts to advance the Student Data Backpack recommendations, incorporate the expanded records into their longitudinal data systems, facilitate in state transfer of grade book data, and accelerate the adoption of important standards such as Ed-Fi, SIF, and the work underway by the SLC.

2 State and federal funding streams should encourage the adoption of robust, enhanced student records. State and federal policies related to the adoption of electronic medical records provides a useful model. IEPs may also offer a starting point given the need to coordinate education services among multiple providers, support parental decisions, and enable better state and federal reporting.

3 Districts should build these same data interoperability and industry standards into new RFPs for instructional resources, online services, and data systems and create pilot projects around expanded learner profiles.

4 Private sector solution providers should embrace emerging standards such as Ed-Fi, SIF, as well as the MyData specifications from the U.S. Department of Education.

Working together, we can execute an action plan to design and develop the cross-industry adoption of a safe, secure, flexible, and transparent universal standard. How this data is stored, who is the official steward of it, and the actual data structure itself will all be defined so that participants in the teaching and learning process can all benefit from the power of the Student Data Backpack and Learner Profile to usher in a new era of personalized learning.

APPENDIX A: TOWARD COMPREHENSIVE LEARNER PROFILES

To illustrate some of the breadth of a comprehensive Learner Profile, this exhibit includes examples of the rich and rapidly developing landscape of tools. Profiles will include student information systems, gradebooks, portfolios, and non-cognitive variables. Data will be shared within networks or across state lines using facilities like [Hobsons e-Transcripts Solutions](#). The list of profile elements is illustrative and not comprehensive.

Student Information Systems

[PowerSchool](#) is a student information system that supports 15 million students. When a student moves from any PowerSchool district to another, the student record is transferred to the new school. In districts with PowerSchool and Schoolnet, an integrated backpack combines the gradebook data with summative and formative assessment data. Any special documentation (RTI, IEPs, etc.) is also attached.

[Infinite Campus](#) manages more than 5 million students. Scheduling tools help match students with teachers based on learning plans. Other widely used systems include [Illuminate Education SIS](#), [Genius SIS](#), and [Maestro SIS](#).

Standards-based Gradebooks

[PowerTeacher](#) is the most widely used standards-based gradebook. With similar functionality, [Engrade](#) combines gradebook, attendance, and calendar in one toolset. [Echo](#) powers project-based learning across the [New Tech Network](#). [Project Foundry](#) supports project-based learning and competency tracking in [Edvisions schools](#).

Dozens of schools are sponsoring the development of next-generation tools. [E.L. Haynes Public Charter School](#) sponsored the development of [SchoolForce](#) gradebooks.

Portfolio of Student Work

[Digication](#) and [Pathbrite](#) are comprehensive e-Portfolio providers for K-12 and higher education. [Nureva Troove](#) is an open resource. [Three Ring](#) manages student artifacts. With more than 40 million active users of [Google Apps For Education](#), there are likely thousands of schools making use of Google Drive for student portfolios. Students can create work in Google Docs, save it in Drive, and create a showcase portfolio using Google Sites (see [Google Sites as a Tool for Student Portfolios](#) and [Kern Kelly videos](#); also see how [Voyager Academy](#) uses Drive for portfolios.)

Non-cognitive Variables

[Renzulli Learning's Personal Success Plan](#) helps students identify their interests, develop talents, associate with role models, and create goals and plans. [Goalbook](#) helps educators, students, and parents collaborate on personal learning plans for students with special needs based on individual learning goals and needs.

[TurnAround for Children](#) helps New York City schools measure and address the predictable effects of poverty on cognitive, social, and emotional skills. The [Strive Network](#) dashboard combines academic and non-academic student support data from sources inside and outside the classroom to form a comprehensive student profile and evaluate programs and investments.

[Naviance](#) helps high school students and teachers navigate college and career readiness with tools to monitor student performance and provide early warning indicators for falling off-track.

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John Bailey serves as the Vice President of Policy at the Foundation for Excellence in Education, a state-based education advocacy organization. His experience includes senior positions in the private sector, White House, and U.S. Department of Commerce. He served as the nation's second Director of Educational Technology at the U.S. Department of Education. He co-founded Whiteboard Advisors, where he helped government officials, policy influencers, investors, and technology leaders understand and navigate complex regulatory issues and adopt innovation-friendly policies. He also served as a senior program officer at the Bill and Melinda Gates Foundation. He is currently on the Board of Directors for the Data Quality Campaign and previously served on the regional board for the social innovation fund Indego Africa. He is an alumnus of the American Council on Germany Young Leaders Program and in 2014 was selected to participate as a Pahrara-Aspen Fellow.

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Carri is Director of Knowledge Design at Getting Smart. With a background in both policy and practice, she has taught in classrooms from elementary schools to college campuses. Carri served as an online educator from 2005–2012 in a fully online Master's program in educational leadership and has authored several pieces on the future of education. She co-edited the book *Building a 21st Century U.S. Education System* with Bob Wehling, published by NCTAF. Carri has been actively involved in supporting education policy efforts to advance digital and blended learning opportunities as a consultant to state and national organizations. She holds an M.Ed. in educational administration and an Ed.D. in urban educational leadership.

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Tom Vander Ark is author of *Getting Smart* and *Smart Cities* and is the founder of Getting Smart, a learning design firm. Tom is also a partner in Learn Capital, an education venture capital firm investing in edtech startups. Previously he served as President of the X PRIZE Foundation and was the first Executive Director of Education for the Bill & Melinda Gates Foundation. Tom served as a public school superintendent in Washington State and has extensive private sector experience. Tom serves on several boards including iNACOL, BloomBoard and Imagination Foundation.

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Tom Vander Ark is a partner in Learn Capital, a firm whose portfolio companies may be mentioned herein

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ENDNOTES

1. U.S. National Center for Education Statistics, as cited in the Statistical Abstract of the United States: 2011 (Tables 215 and 615). <http://www.census.gov/compendia/statab/>
2. Data Quality Campaign, 10 Essential Elements of a State Longitudinal Data System Website, <http://dataqualitycampaign.org/your-states-progress/10-essential-elements/>
3. For example, the USDOE 2004 EdTech plan also referenced data, personalized learning, and competency-based learning. See Toward A New Golden Age In American Education. <http://files.eric.ed.gov/fulltext/ED484046.pdf>
4. U.S. Department of Education Office of Educational Technology. Transforming American Learning: Powered by Technology, 2010. <http://www.ed.gov/sites/default/files/netp2010.pdf>
5. Ibid.
6. Digital Learning Now website. <http://digitallearningnow.com/>
7. Digital Learning Now Roadmap to Reform website <http://digitallearningnow.com/site/uploads/2014/03/Roadmap-for-Reform.pdf>
8. <http://www.dataqualitycampaign.org/wp-content/uploads/files/DQC%20Early%20Warning%20June12.pdf>
9. For example, See Heppen, J and Susan Bowles Therriault, S. Developing Early Warning Systems to Identify Potential High School Dropouts. National High School Center, 2008. http://www.betterhighschools.org/pubs/ews_guide.asp
10. For example, LearnSprout's Early Warning System identifies at-risk students using live data from the school's student information system and recent assessments to develop appropriate interventions and prevent dropouts. <https://www.learnsprout.com/ews>
11. This list was generated from numerous interviewers and conversations. Please see the Acknowledgements section for a list of participants.
12. West, 2012.