



Assembling Education

Infrastructure Needs To Support an
Assembly-Based Ecosystem

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A monochromatic, teal-toned photograph of two young girls in school uniforms. They are both looking down at a book held by the girl on the right. The girl on the left is also looking at the book. The background is blurred, suggesting an outdoor setting. The word 'Overview' is overlaid in large white text in the center of the image.

Overview

Executive Summary

There is growing demand for Assembly-based educational options that **exceeds the capacity of existing infrastructure** to ensure efficient and equitable access for students, families, and providers.¹

As Assembly introduces greater optionality into a child's education, infrastructure must adapt to support connections between families, students, and providers.

The **infrastructure needed** to support **equitable access to and navigation of** Assembly-based learning includes:

- Platforms, such as tech and non-tech connectors to Assembly-based options.
- Student records, such as digital, skills-based transcripts that assess and verify mastery.
- Existing infrastructure, such as internet access, devices, transportation, and facilities where learning can take place.

The existing infrastructure that connects families to education options outside traditional public schools is **insufficient, informal, and inequitable**.

A more connected and equitable infrastructure in support of Assembly would address and dismantle systemic barriers to this approach, including:

- Capacity to deeply understand student learning needs, interests, and motivations.
- Awareness of the range of Assembly-based options.
- Access to the resources necessary to take advantage of Assembly-based options.

Public schools, community-based organizations, and technology entrepreneurs (among others) have an opportunity to play an important role in supporting a more connected and equitable Assembly-based infrastructure.

Assembly will require both existing infrastructure to be used in **new and creative ways and new approaches to disrupt, recreate, and replace outmoded infrastructure**.



Demand for Assembly has increased and outstripped the capacity of existing infrastructure to support students and families

There is increasing demand for Assembly-based options

At least **one in three** school-aged children already participate in some form of Assembly-based education.²

During the COVID-19 pandemic, mobility rates among students **increased by 75%**, with 17.5% of students switching schools at least once.³

One-third of parents are unsatisfied with their local school, and parents are concerned with their child's academic progress.⁴

Parent opinion polls find **greater support for “bold change”** rather than returning to the pre-pandemic “normal.”⁵

Existing infrastructure is insufficient, informal, and unevenly distributed

Some schools serve as gateways to Assembled options, but **the role is largely informal** and operates on a student-by-student basis.

Outside schools, families are often **left alone to navigate the process** of selecting more flexible learning options for their kids.

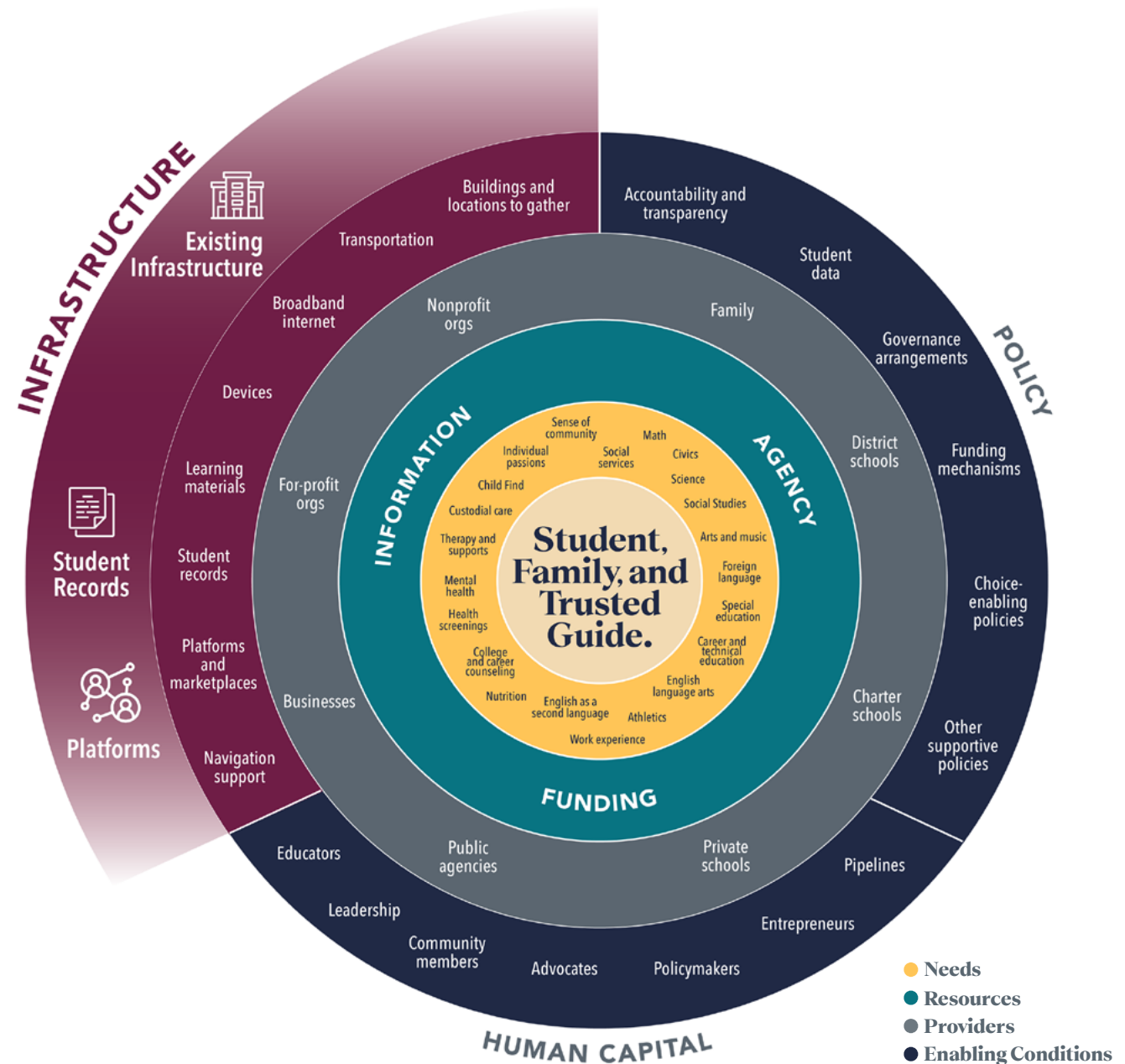
Access to facilities for flexible learning options is **challenging and/or expensive**.

Critical infrastructure, such as broadband internet and flexible, affordable transportation options, is **inaccessible to many students and families** (Figure 1).

Current student records **limit the types of learning experiences** that can be captured and validated.

Assembly will require both new infrastructure and changes to existing infrastructure to create a more student-centered system

Figure 1: A Student-Centered Framework for Assembling Education



New and improved infrastructure is needed to support equitable access to Assembly

Current State

Future State



Existing
Infrastructure

Lack of interoperable platforms leaves families with **limited awareness of how to leverage available options** to meet those needs.

Platforms **integrate information and connect learners/families** to providers and enable the exchange of public and personal funds.



Student
Records

There is **limited capacity for student records to reflect Assembly-based learning options** and/or a mix of traditional/Assembly learning and for records to be widely accepted by K-12 schools, institutions of higher education, and employers.

Student records **capture what students learn both within and outside of school** in a way that allows for accumulation and comparison of learning outcomes across experiences, demonstrating true skill mastery.



Platforms

Physical infrastructure is **not universally accessible or utilized** (e.g., not everyone has broadband or access to transportation and learning materials; schools are overcrowded while libraries and other community spaces are underutilized).⁶

Infrastructure needs such as broadband internet, devices, transportation, learning materials, and facilities are **broadly available to all students and work together** to create seamless access to learning experiences for students both in and out of school.

A woman with curly hair is sitting on a large beanbag chair, reading a book to a group of children. The children are sitting on the floor around her, looking at the book. The background shows a classroom setting with a alphabet poster on the wall and a window. The entire image has a teal color overlay.

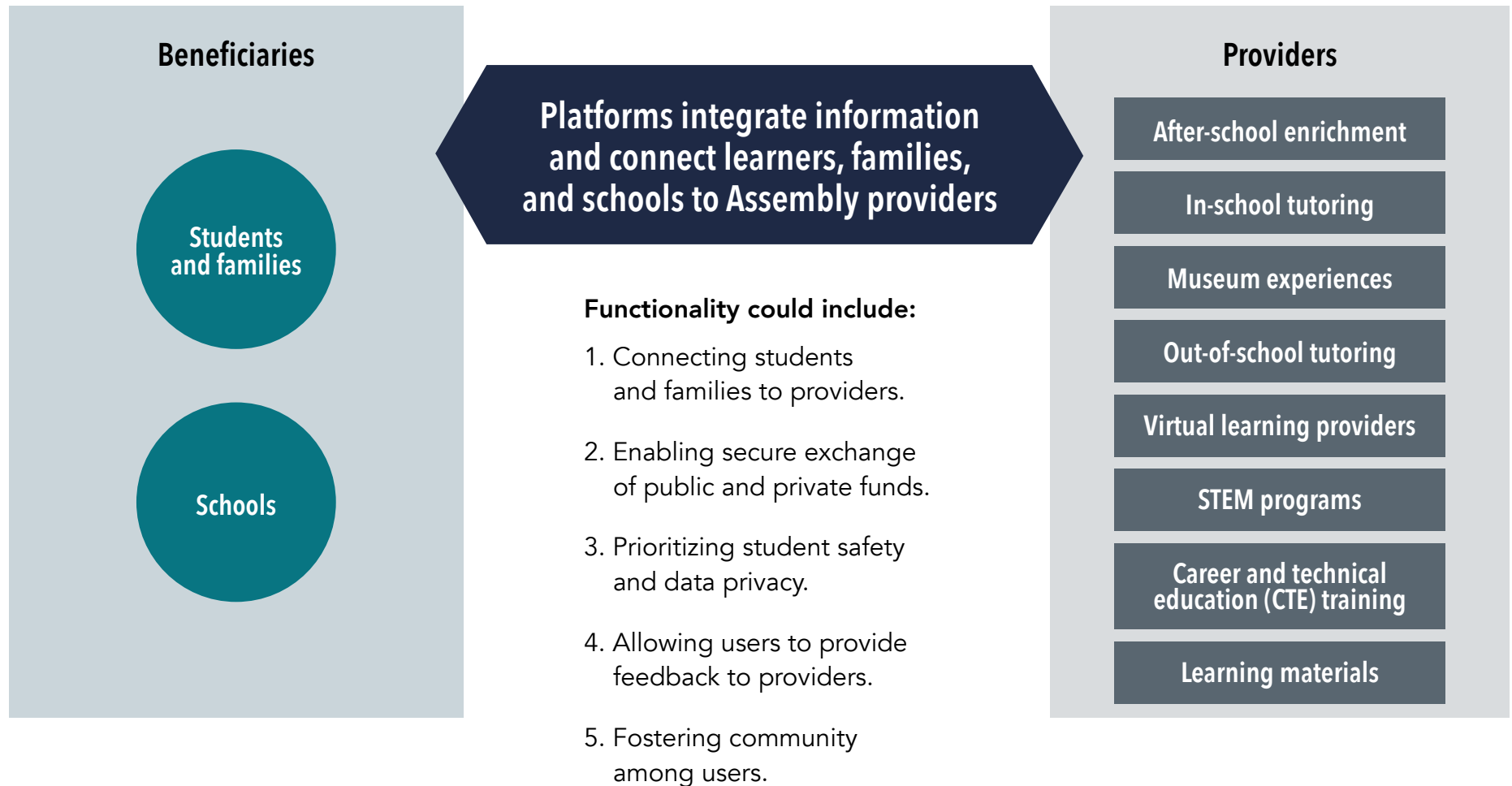
Platforms

Assembly platforms are currently ad hoc and informal, creating inequity and burdening students, families, and providers

Inequity	Students and families	<p>Many parents use existing Facebook groups and neighborhood listservs to find and assemble learning options.⁷</p> <ul style="list-style-type: none"> • Information is exchanged through existing social networks, via family friends, or through neighbors with similarly aged children. • Information that flows based on existing social networks can exacerbate inequities for those with the least social capital as social networks tend to be segregated by income.⁸ <p>High-income families spend \$7,500 per year more on enrichment opportunities than low-income families due to differential access to such activities.⁹</p>
	Providers	<ul style="list-style-type: none"> • Large providers with access to more resources are able to connect with a greater number of families and students, leaving smaller providers struggling to access a sustainable customer base.
Burden	Students and families	<ul style="list-style-type: none"> • State-supplied educational funds are difficult to access and burdensome to use.¹⁰ • Existing public payment platforms are cumbersome to use, often requiring reimbursement rather than direct-to-provider payments.
	Providers	<ul style="list-style-type: none"> • Customers are unable to easily use public funds to pay for services. • Providers struggle to access customers, particularly within a niche market set.

Comprehensive platforms offer an opportunity to connect both families and schools to learning providers

Example is illustrative, not exhaustive



Comprehensive platforms connect learners and families to providers equitably and with ease

Platforms should:

1. Connect students and families to providers and resources that meet their needs.	<ul style="list-style-type: none">• Students and families are able to easily and quickly find providers that meet their search criteria.• Providers are connected to a market of students and families.
2. Enable the secure exchange of public and private funds.	<ul style="list-style-type: none">• Families are able to easily access eligible public funding or personal funds to pay for options.• Learning providers will be able to accept payments via public or personal funding with equal ease.• Schools are able to use approved funds to purchase Assembly-based options on behalf of students.
3. Prioritize students' safety and data privacy.	<ul style="list-style-type: none">• Families are the ultimate arbiters and owners of student-level data.• Providers are properly vetted to ensure student safety, both in person and online.
4. Allow users to provide feedback to providers.	<ul style="list-style-type: none">• Students and families are given an avenue by which to provide viewable feedback regarding the quality and value of a given learning experience.
5. Foster community among users.	<ul style="list-style-type: none">• Students and families are able to connect with one another along lines of interest and/or need.• Parents are able to view the opinions and feedback of other parents.

Platform Spotlight: Odyssey



Odyssey supports education savings accounts (ESAs) and microgrant programs by enabling states to administer programs transparently, approve purchases quickly, and ensure accountability by tracking financial transactions.¹¹

Families

Customize their child's education by finding high-quality educational services and products and paying for them using state funds.

States

Provide a turnkey solution with marketing, application processing, marketplace creation, payment, customer support, and record retention all in one place.

Providers

Market to a statewide customer base, enroll new students, invoice customers, and accept payment from ESA and microgrant funds.

The Odyssey platform:

- Connects students and families to providers and resources that meet their needs.
- Facilitates the secure exchange of public, private, and combined funds from families to providers.
- Protects student data and privacy.
- Customizes around states' ESA and microgrant programs.
- Enables family access to high-quality education providers and services.
- Provides visible, family-produced feedback on the quality of goods or services purchased.

Platform Spotlight: RESCHOOL's Discover Learning



DISCOVER LEARNING

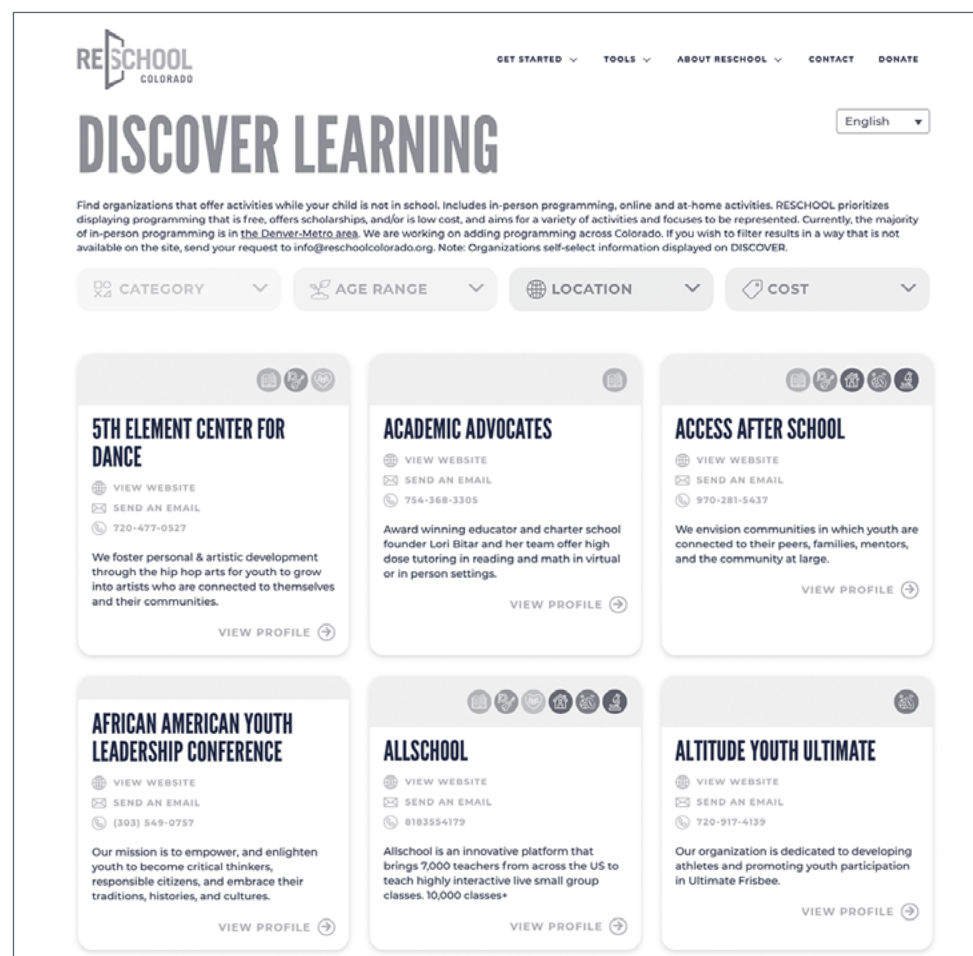
RESCHOOL is a Colorado-based nonprofit organization that believes that learning happens everywhere. RESCHOOL works alongside families to ensure that all young people have the resources to access the learning experiences they choose. RESCHOOL seeks to create an education system that is creative, adaptive, self-correcting, and decentralized.¹²

Families

- Find and filter providers based on interest, student age range, location, and cost.
- Connect with a Learner Advocate to guide students and families in forging a purposeful and relevant education path by supporting them in decisions about learning that happen both in and outside of school.
- Receive Learning Dollars to offset the costs of resources and experiences.

Providers

- Highlight their programming to students and families.
- Connect to a broader audience.
- Fund their programming through grant dollars.



Source: [RESCHOOL Colorado](https://reschoolcolorado.org/)

Platforms should be cautious not to replicate past mistakes

What was inBloom?

\$100M EdTech initiative funded primarily by the Bill & Melinda Gates Foundation aimed at improving America's schools by providing a centralized platform for data sharing, learning apps, and curricula.¹³

What happened?

Funded in 2011 and launched in 2013, the initiative ended abruptly in 2014 amid political backlash around data privacy concerns.¹⁴ While inBloom promised to equip teachers with a wealth of information about how to teach and support their students, creators failed to articulate a clear story of its benefits for teaching and learning or to adequately anticipate or respond to parent concerns.

What can we learn?

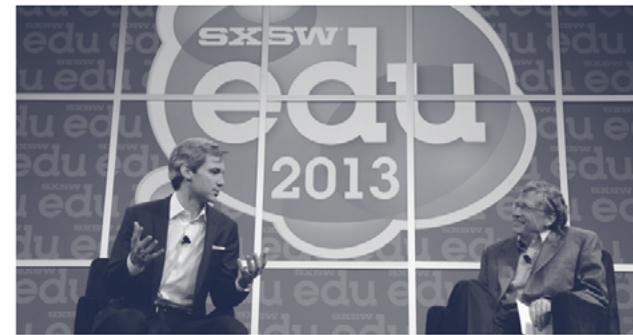
Platforms must not only ensure data privacy and security but also clearly communicate the methods by which data is gathered and shared. Ultimately, users (students and families) are the arbiters of their own data. Assessing user and political readiness for innovations in technology is key to successful stakeholder buy-in and platform adoption.

inBloom

Gates-backed inBloom winding down after non-profit faces concerns over privacy

BY TRICIA DURYEE on April 21, 2014 at 10:59 am

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InBloom, which was backed by \$100 million from The Bill and Melinda Gates Foundation and others, is closing up shop after parents worried that its database

EducationWeek®

DATA

inBloom to Shut Down Amid Growing Data-Privacy Concerns



By Benjamin Herold — April 21, 2014 9 min read



UPDATED

After months caught in the crosshairs of parents, advocates, and educators concerned about student-data privacy, controversial nonprofit inBloom announced Monday that it will close its doors.

Sources: [Geekwire](#) and [Education Week](#)

Platforms can offer solutions to the risks around student equity associated with Assembly

Valuing scale over equity	<p>Equity requires scale, yet scaling efforts could leave behind those who need Assembled solutions the most if they represent a smaller, more niche segment of the market. It will be important that smaller student segments requiring specialized learning or delivery models are equitably designed for and served by providers.</p>	<p>Platforms should design for the margins first.</p> <p>Create solutions for those for whom the system isn't working, then scale to use by the general population rather than trying to make a solution designed for the "model" student work for the marginalized.</p>	<p>"You have to start with the groups of students that aren't currently being well served — teen parents, students on academic probation. Then go from margins to the mainstream."¹⁵</p> <p>– Burck Smith CEO & Founder, Palette</p>
Creating a bifurcated market	<p>As seen in models like health care, there is a risk of low-quality options being offered to those using public funds and high-quality options being available to those who can afford more.</p>	<p>Platform should offer an equal exchange of funds.</p> <p>By allowing students and families to use personal and public funds with equal ease and value, platforms can provide an equitable place of exchange.</p>	<p>Just as debit cards reduced the stigma around food assistance programs and increased access to options, platforms that allow for the equal exchange of funds can increase access to high-quality education providers.</p>

Technical obstacles remain to building and maintaining comprehensive platforms



Capacity

States may not have the capacity to build and maintain their own platforms for families to use public dollars toward flexible learning options.



Cost

Building full-stack platforms, improving existing platforms, and maintaining platforms is costly and an expense states may not be prepared to take on.



Demand

Demand must be high enough for third-party platforms to justify entry into the market, and equitable demand may be generated by providing funds to those who cannot otherwise afford Assembly-based education.



Policy

State-specific policies, regulations, and systems around student- and aggregate-level data sharing may make platforms difficult for families to navigate and interoperability between state agencies and third parties challenging.

A high-angle, monochromatic photograph of two young children sitting on a patterned carpet. The child on the left, with short hair, is pointing at a notebook. The child on the right, with hair in a bun, is holding a pencil. The notebook is open, showing math problems. The text 'Student Records' is overlaid in large white letters on the right side of the image.


Student Records

The traditional transcript, though widely accepted, is unable to capture the depth and breadth of Assembly

In traditional transcripts, schools are often the primary holders of students' academic records, offering little to no input from students themselves or from third-party learning providers.

High school transcripts provide a **one-dimensional view of** a student's growth, concept mastery, and skill development.

Existing transcripts are largely **limited to courses that take place within the classroom and within the school day.**



HIGH SCHOOL TRANSCRIPT
(Grades 9-12)
Graduation Date: 05/30/2013

School of Record
Sample School Name
Sample Parent
1234 Town Road
Anywhere, VA 22345
123-456-7890
info@fasttranscripts.com

Student Information
Sample Student
Gender: M
Date of Birth: 12/08/1995
1234 Town Road
Anywhere, VA 22345
123-456-7890
info@fasttranscripts.com

Course Study - Grade 9	Grade	Credits
Lit / Composition	A	1
Algebra 1	A	1
Physical Science	B	1
Geography	B	1
Spanish 1	C	1
Physical Ed	PASS	.5
Health	B	.5
Instrumental Music	A	.5
GPA = 3.25		6.5

Course Study - Grade 11	Grade	Credits
American Literature	A	1
Algebra 2	A	1
United States History	A	1
Chemistry / Lab	B	1
Spanish 101*	B	1
Computer Applications	A	.5
Logic	B	1
GPA = 3.54		6.5

Summary By Grade				
Grade	9th	10th	11th	12th
Cum. GPA	3.25	3.35	3.42	3.48
Credits Earned	6.5	6	6.5	6

Grading Scale				
90 - 100	80 - 89	70 - 79	60 - 69	0 - 59
A	B	C	D	F

Authorized Signature _____ Date: 01/27/2014

Course Study - Grade 10	Grade	Credits
World Literature	A	1
Geometry	B	1
Biology / Lab	B	1
World History	A	1
Spanish 2	B	1
Physical Ed	PASS	.5
Choir	A	.5
GPA = 3.45		6

Course Study - Grade 12	Grade	Credits
AP: English Language	B	1
Pre-Calculus	B	1
Physics	A	1
United States Government	A	.5
Economics	A	.5
Debate	B	1
Financial Management	A	1
GPA = 3.67		6

Cumulative Summary (9th - 12th)			
Total Credits	GPA Credits	GPA Points	GPA
25.00	24.00	83.50	3.48

Commentary
*ACE Community College

Transcripts provide **little view into critical noncognitive skills** like communication, interpersonal and social skills, perseverance, and teamwork.

Traditional transcripts capture **summative learning along an established schedule** rather than formative learning along flexible timelines.

Source: Source: Indiana Association of Home Educators

Student records need to capture and reflect a wide range of learning experiences to support Assembly

Student records should:

1. Represent learning achieved across a range of providers (and even states).	<ul style="list-style-type: none">• Student records should include protocols that enable a broad range of stakeholders to provide input on student learning.• Records should represent learning received locally, nationally, or across state lines.
2. Capture learning experiences in a way that is comparable across experiences.	<ul style="list-style-type: none">• The outcomes of learning experienced in a variety of ways must be commonly expressed and assessed.• Records should include common frameworks and language when referring to learning outcomes.
3. Provide validation of learning, whether inside or outside the typical “prepackaged” learning pathways.	<ul style="list-style-type: none">• Student records should be able to capture all learning experienced by a student, whether it be all “traditional,” all “Assembled,” or some combination of the two.
4. Be interactive in showcasing mastery and demonstrating skills learned.	<ul style="list-style-type: none">• Students should be able to add learning experiences to their record as they are earned.• Education providers and employers should be able to see a multilayered view of mastery, including student-level work.
5. Be agile, adaptive, and secure.	<ul style="list-style-type: none">• As the requirements of education institutions and/or employers change, student records should be able to adapt to changing demands.• Student records should store student-level data securely and ensure that data ownership lies with the student and the student’s family (as applicable).

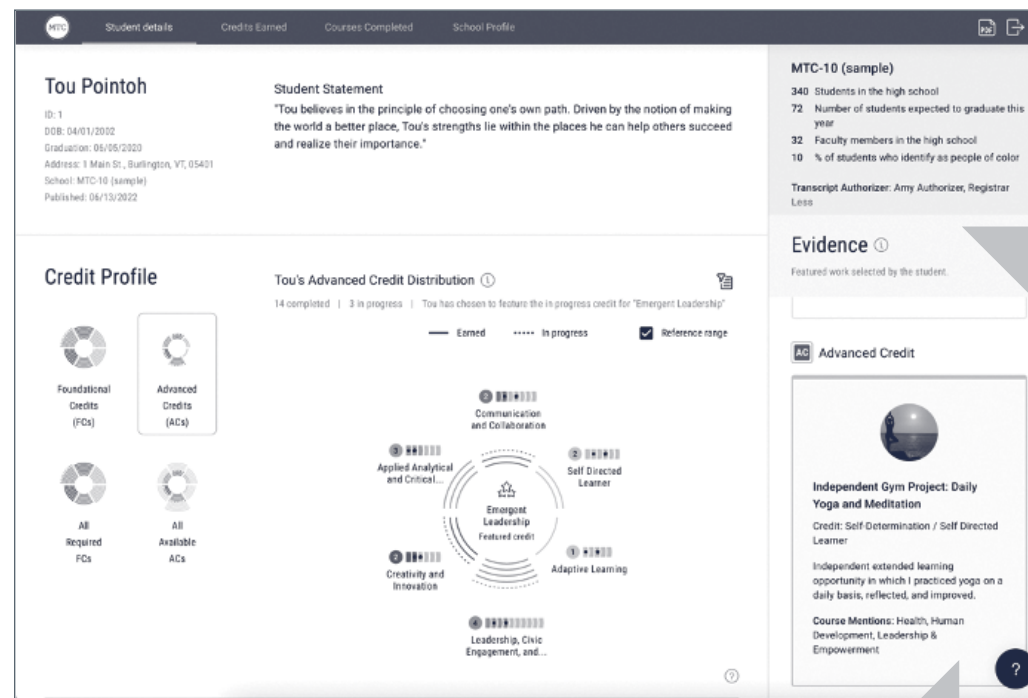
Student Records Spotlight: The Mastery Transcript



Organizations like the **Mastery Transcript Consortium** are working to create shared student records that capture a more holistic view of the competencies and skills acquired by a student over the course of all of their learning experiences, not just in-school coursework.¹⁶

The Mastery Transcript:

- Represents learning achieved across a range of providers.
- Provides validation of learning inside and outside the classroom.
- Is interactive in showcasing mastery of skills.
- Is agile, adaptive, and secure.



Source: [Mastery Transcript Consortium](#)

Mastered skills may be supported by multiple layers of evidence from a range of learning evaluators, both in and outside of the classroom.

The Mastery Transcript showcases a student's mastery of critical noncognitive skills like communication, problem-solving, and decision-making.

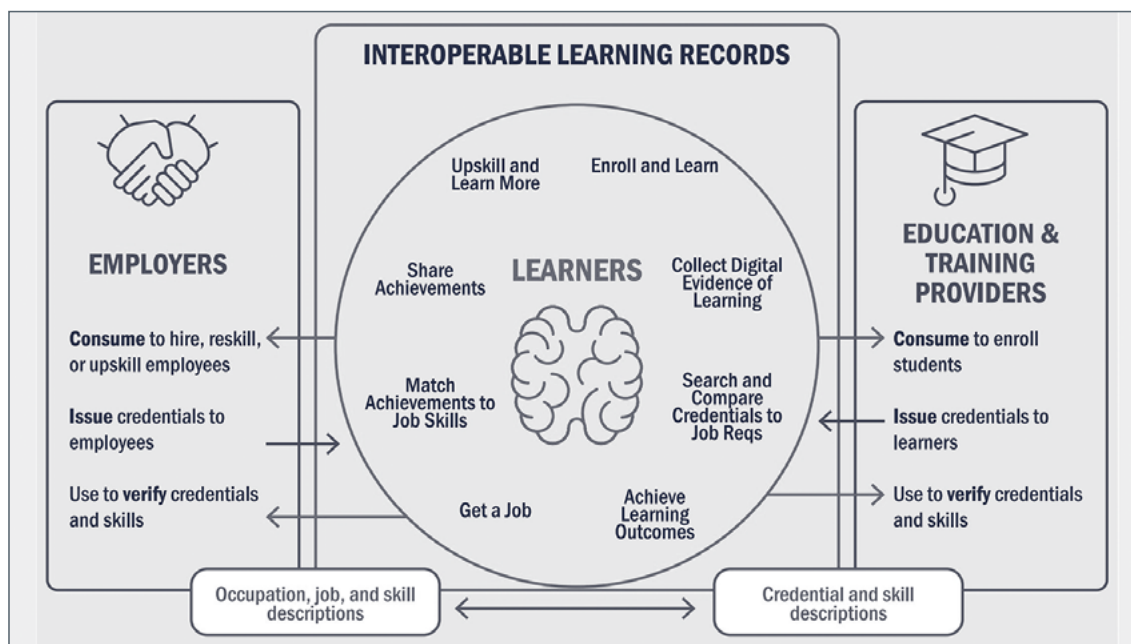
Student Records Spotlight: Interoperable Learning Records

The National Student Clearinghouse is working with the U.S. Department of Commerce's **American Workforce Policy Advisory Board**, colleges, and companies to develop a nationwide pilot of interoperable learning records (ILRs).¹⁷

Existing transcripts do not allow for easy transfer of information from one experience to another and cannot be easily combined into a single profile that represents the entirety of an individual's abilities.¹⁸ The goal of ILRs is to communicate skills seamlessly across employers and education and training providers.

ILRs:

- Represent learning achieved across a range of providers (and even states).
- Capture learning experiences in a way that is comparable across experiences.
- Provide validation of learning, whether gained inside or outside typical prepackaged learning pathways.
- Are agile, adaptive, and secure.



Source: Holcomb, et. al., [White Paper on Interoperable Learning Records](#)

Holistic student records may offer solutions to the risks around student equity associated with Assembly

	Risks	Potential solutions
Varying levels of value placed on experiences	The learning experiences of students who pursue more traditional pathways may be more highly valued than those of students who gain knowledge and skills through Assembly.	By capturing learning experiences in their totality, including those gained inside and outside the classroom, with similar outcome measures, learner records can provide equally trusted validation of students' knowledge and skills.
Verification of high-quality learning	In a more decentralized learning delivery model, there are concerns about verifying and confirming the knowledge and skills obtained by a student as a result of a learning experience.	Learning and employment records can be digitally confirmed by one or more issuers to be authentic and intact and can provide information about the provenance of the credential as well as skills attained to earn the credential. ¹⁹
Students not getting core education requirements	A deviation from the traditional education bundle may result in students not getting the core education needed to become a well-rounded citizen and successful in the workplace.	Interoperability with education providers and employers gives students greater sightlines into the skills and experiences that schools and employers are actually looking for and may allow students to more effectively tailor their learning pathway to a desired outcome.

Obstacles remain to building and scaling holistic, interoperable student records



Incentives

Students, education providers, and employers must be incentivized to adopt and use a new form of record. For example, rather than revolutionizing health care, electronic health records designed for communication within networks have created barriers to communication across provider networks.²⁰



Technology

Most learning organizations are already using learning management systems (LMSs) that are incompatible with comprehensive learner records.²¹ The process of shifting systems is onerous and time-consuming.



Cost

Investing in and maintaining new systems can be costly, particularly when schools and districts may have recently invested in upgraded LMSs or other technology updates coming out of the pandemic.



Shared Language

As student records increasingly reflect noncognitive and “soft skills,” there is a need to establish a shared definition and vision for mastery of these skills.



Policy

Student-level data sharing across state lines is challenging, and a federal student-level data network has been banned since 2008.²²

Existing Infrastructure

Existing infrastructure includes the physical and technical resources that facilitate student and family access

Existing infrastructure is designed for a student experience that primarily takes place in a school



Facilities

Existing community infrastructure, such as libraries and community centers, is **underutilized and unrecognized** as a location for learning.



Transportation

Existing student transportation systems are **inefficient and insufficient** to meet the changing needs of students and families.



Internet and device access

Accessible and affordable internet, along with reliable, updated devices, is a barrier to accessing Assembly-based options, especially for low-income and rural students.



Learning materials

Providers and **families have little visibility into the learning materials** used by students and often have to rely on schools as the gatekeepers to educational information.

Assembly will require existing infrastructure to be used in new and creative ways

In this vision of Assembly ...



Facilities would ...

- Be leveraged as part of an educational ecosystem of learning locations.
- Make effective and efficient use of public spaces and local providers.
- Be conveniently located and accessible for systemically marginalized communities.



Transportation would ...

- Provide flexible, adaptive options for students.
- Make effective and efficient use of local providers and public options.



Internet and devices would ...

- Be available to all students as an in-home option.
- Be affordable for all families.
- Be easily accessible, up-to-date, and reliable.



Learning materials would ...

- Be shared readily and frequently with families and caregivers.
- Be accompanied by sufficient guidance to be able to build on learning taking place inside and outside the classroom.



Facilities

Facilities are neither universally accessible nor effectively utilized for Assembly

Lack of accessibility

- Building code restrictions limit the use of community buildings for educational purposes.²³
 - During the pandemic, “learning pods” in Georgia were banned from meeting in local church buildings, facing steep fines.
 - In Florida, Broward County required learning pod families to file for a special license to assemble.
- Burdensome regulations typically imposed on child care centers are being applied to learning pods, resulting in a “stifling effect.”²⁴
- Arrows Academy, a faith-based traditional classroom and home-school hybrid school, postponed its 2022-23 enrollment to avoid costly fines around the use of church buildings for educational purposes.²⁵

Underutilization

- Young adults use public libraries at extremely low rates.
 - <3% of library program attendees are young adults.²⁶
- Despite high administrative costs, college campus facilities are underused and/or used inefficiently.
 - Studies show that utilizations levels for higher education average less than 20%.²⁷
- U.S. office space occupancy remains at 47%, compared with 95% before the pandemic.²⁸

Yet some community spaces are rethinking their role, and creative use of space can support Assembly



Libraries

- Libraries in Ann Arbor, Michigan, allow patrons to check out a variety of goods, from electronics to gardening and baking equipment.²⁹
- Colorado's Poudre River Public Library District offers a wide range of curriculum materials, including instruction manuals, workbooks, testing materials, and digital resources to support in-school, home-school, and hybrid learning models.³⁰
- Philadelphia transformed three children's libraries into "Play-and-Learn" spaces.³¹



Schools

- School districts in Lemon Grove, California, developed an agreement with the city to allow shared use of the middle school's facilities for "informal play and exercise."³²
- Schools provide community programs during the summer, offering:
 - Community gardens
 - Cultural events
 - Cooking and nutrition classes
 - Farmers markets
 - Continuing education opportunities³³



Private Property Owners

- Hospitals have opened their facilities for community use, building playgrounds, exercise facilities, and walking trails on hospital grounds for community use.³⁴
- Grace Baptist Church (Marion, North Carolina) built Creek Wise Park in rural Appalachia, including a community garden, playground, preschool area, walking trail, nature trail, soccer field, and multi-use court. The park was made possible by community partnerships with the high school, YMCA, local hospital, and others.³⁵

Creative and innovative use of space and resources can increase efficiency and make Assembly-based educational options more broadly available, reducing race- and income-based disparities by expanding access to safe, affordable opportunities.

A black and white photograph of a city street scene. In the foreground, a school bus is driving towards the viewer. The bus has "SCHOOL BUS" written on its front and "FIRST STREET" on its side. A white car is visible behind the bus. In the background, there are several tall buildings, some with construction cranes. A street sign on the left indicates "W 37 ST" and "ONE WAY". The word "Transportation" is overlaid in large, white, serif font across the middle of the image.

Transportation

Current student transportation systems are inefficient and insufficient to meet the needs of students and families

Inefficient

- Schools spend **\$28 billion per year on student transportation**, yet only one-third of students take the school bus.³⁶
- Existing school buses are often either **over- or undercrowded**.
- Low-efficiency routes result in **fewer transportation options for all students**.
- Policies and regulations **limit the use of more flexible transportation options** beyond iconic yellow school buses.
- Lack of transportation data makes **identifying inefficiencies difficult** for schools and districts.³⁷

Insufficient

- The bus driver shortage and increased operational costs mean that schools have **decreased the transportation services available to students**.³⁸
- High operational costs **divert resources from schools' core instructional mission**.³⁹
- Current transportation systems may **limit the educational opportunities** available to students throughout or beyond the school day.

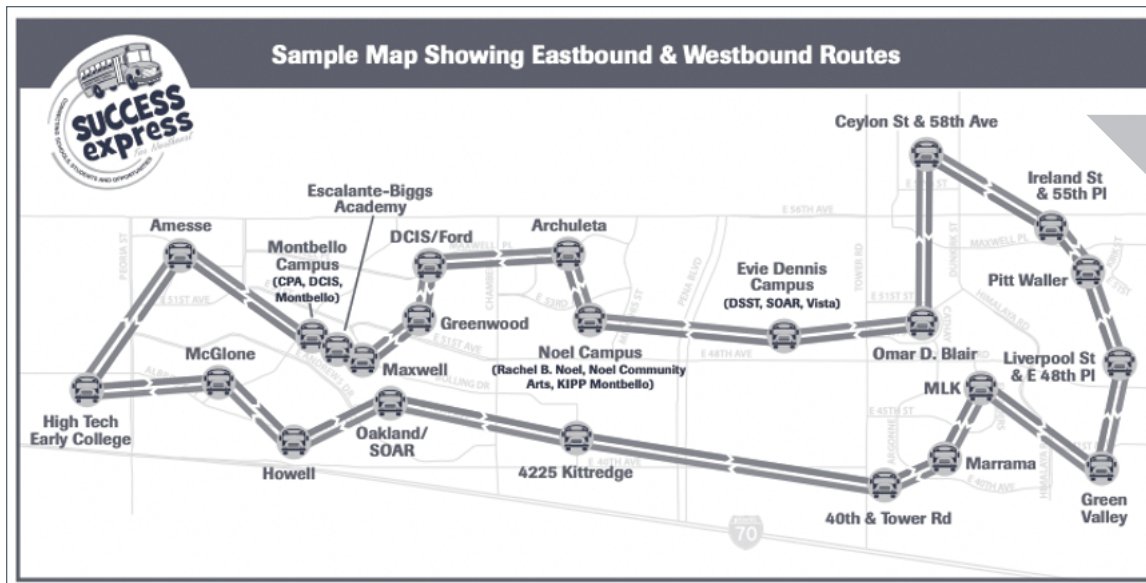
The burden of transportation often falls on those who can least afford it, resulting in some kids missing out:⁴⁰

- **42% of parents feel they have put their job at risk in order to meet their child's transportation needs.**
- **24% of parents say their child is missing out on enrichment activities due to unreliable transportation.**
- **Two out of three working parents say having to drive their kids somewhere disrupts their work regularly.**

Transportation Spotlight: Denver's Success Express



In operation since 2011, Denver's **Success Express** is a student transportation system that serves all Denver students participating in Far Northeast schools. The Success Express consists of a fleet of Denver Public Schools' (DPS') buses that circulate through Northeast neighborhoods, which have less access to other means of transit. The shuttle runs every 15 mins from 6:30 to 9:30 a.m. and 2:30 to 6:30 p.m. on a continuous loop, offering free and easy transportation to public and charter schools as well as extracurricular activities and enrichment.⁴¹



"A traditional system of delivery only works in a traditional system."⁴²

– Steve Clark
Transportation Operations Manager,
DPS

Source: [Denver Public Schools](#)

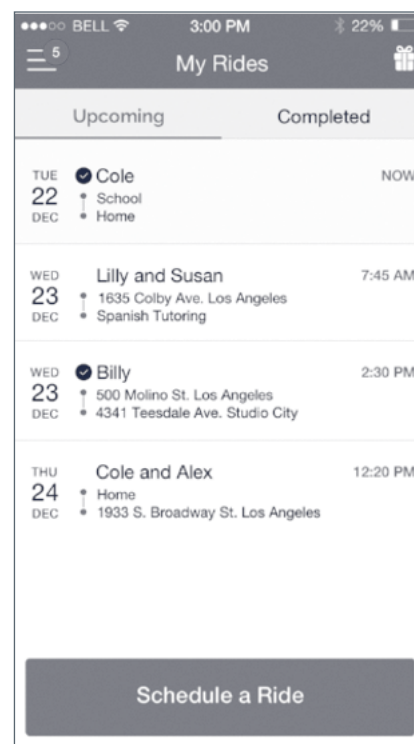
Transportation Spotlight: HopSkipDrive



HopSkipDrive is an innovative school transportation system that partners with schools and families to provide safe, reliable alternate transportation to students through personal CareDrivers. HopSkipDrive complements school transportation, solving for bus driver shortages and meeting specialized needs.⁴³

Benefits of alternative transportation options:

- Often more affordable than underutilized buses.⁴⁴
- Solve for school bus driver shortages.
- Offer flexible work options with reduced licensing barriers.
- Personal cars may reduce stigma associated with some student busing services.
- Students experiencing bullying on school transportation may experience increased safety.
- Technology enables parents and caregivers to know the exact location of a student.
- Reduced commute times enable students to participate in Assembly-based options like after-school tutoring, enrichment, and internships/workplace readiness experiences within or beyond the school day.



Source: [HopSkipDrive](#)

A grayscale photograph of a woman and two children sitting at a table, working on papers. The woman is on the right, looking down at the papers. A young girl is in the center, also looking down at her work. A young boy is on the left, partially visible, looking down. The background shows a room with a door and some furniture.

Internet and Device Access

In the last decade, accelerated by the pandemic, internet access and connectedness have expanded dramatically

Many Assembly-based options exist online, yet may not be available unless families have access to reliable, high-speed internet and the device(s) necessary to deploy it.

90%

of U.S. households
have access to cable
high-speed internet⁴⁵

92%

of U.S. households
have at least one type
of computer⁴⁶

85%

of U.S. households have
a broadband internet
subscription⁴⁷

\$300B

has been invested in internet
infrastructure over the past
20 years⁴⁸

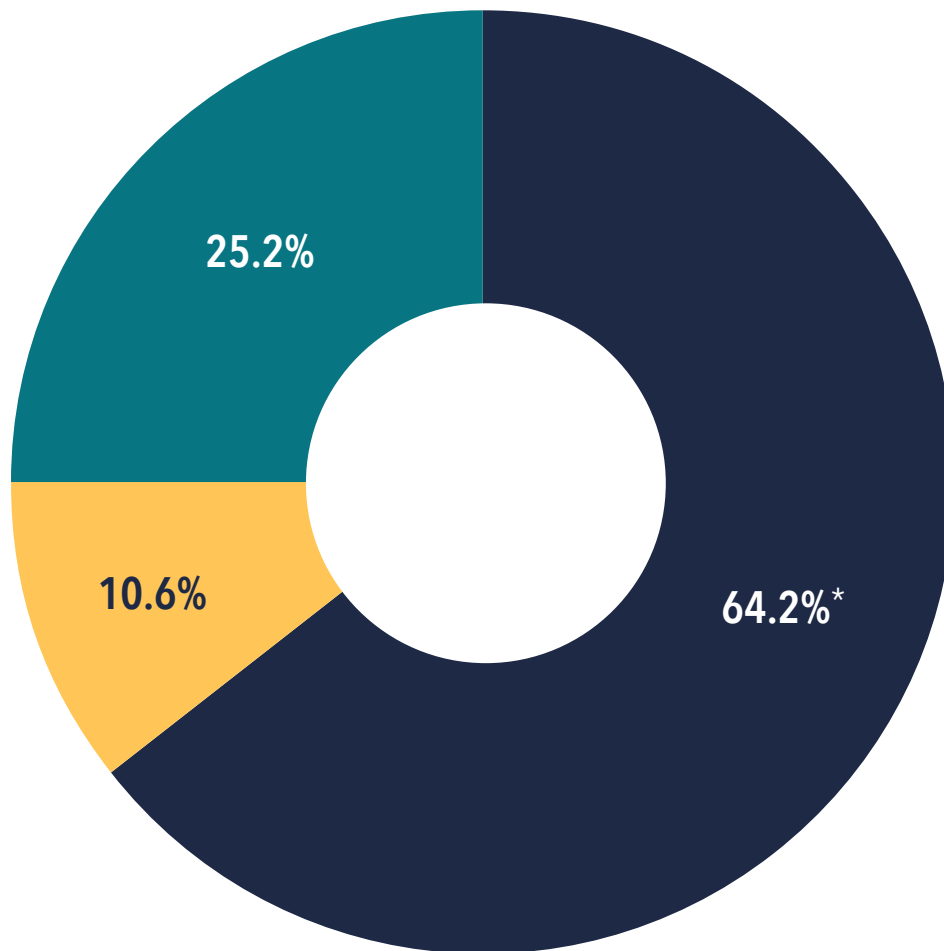
98%

decrease in the
cost per megabit (Mbps)
since 2000⁴⁹

14M+

consumers have connected
via low-cost broadband
programs in the past 10 years⁵⁰

Among 28.2 million disconnected U.S. households, affordability is the single greatest barrier to broadband internet access



Unconnected Households in the U.S.⁵¹

- Households with available broadband infrastructure that cannot afford to connect
- Households with available broadband infrastructure that are unconnected for reasons other than a lack of resources
- Households without available broadband infrastructure

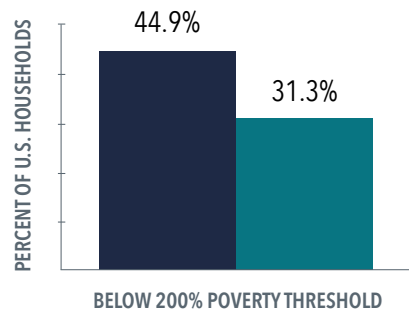
Source: [No Home Left Offline](#)

*Exact percentages differ from source due to rounding.

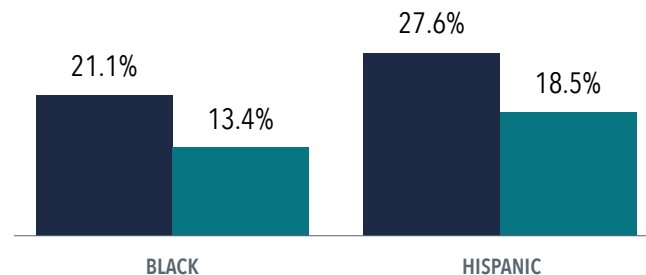
The affordability and availability gaps disproportionately affect low-income, Black, Hispanic, and rural communities

Affordability Gap

The digital divide is most concentrated in low-income communities.



The digital divide also disproportionately impacts Black and Hispanic Americans.



■ Unconnected Communities ■ National

Source: [No Home Left Offline](#)

Availability Gap

"25%

of unconnected U.S. households
7.1 MILLION HOMES

are without access to any broadband network. Primarily in rural areas, these are locations where there is insufficient coverage to deliver wired or wireless broadband service, or service speeds and quality are unreliable."⁵²

"The digital divide is also significantly higher for Americans with less than a high school education. These households are twice as likely to be unconnected as those with a high school education and six times more likely to be unconnected than those with a college education."⁵³

– No Home Left Offline, EducationSuperHighway

Local governments and municipalities can work to lower barriers to broadband access

Establish trust	<ul style="list-style-type: none">• People may believe that low- or no-cost internet options are “too good to be true” or accompanied by hidden costs.• Municipalities should ensure that messengers are trusted community members or institutions to address any skepticism about free services.
Provide enrollment support	<ul style="list-style-type: none">• Municipalities should work to lower barriers such as long wait times, complex terms and conditions, confusing language and/or spoken-language barriers, and extensive eligibility requirements.• Concierge-like enrollment assistance centers may help households overcome these barriers.
Deploy free Wi-Fi to low-income apartment buildings	<ul style="list-style-type: none">• Offering free Wi-Fi to low-income apartment buildings could close 20-25% of the digital divide by removing access barriers altogether.⁵⁴
Leverage data to identify unconnected households	<ul style="list-style-type: none">• Internet service providers should expand data exchange programs deployed in schools to cities, housing authorities, and health centers to identify and focus outreach efforts on unconnected households.⁵⁵

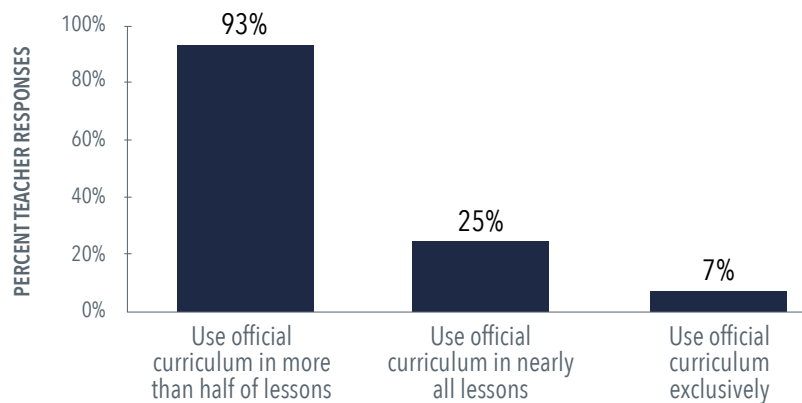


Learning Materials

Learning materials are highly variable across schools, and families are often left in the dark about what students are learning

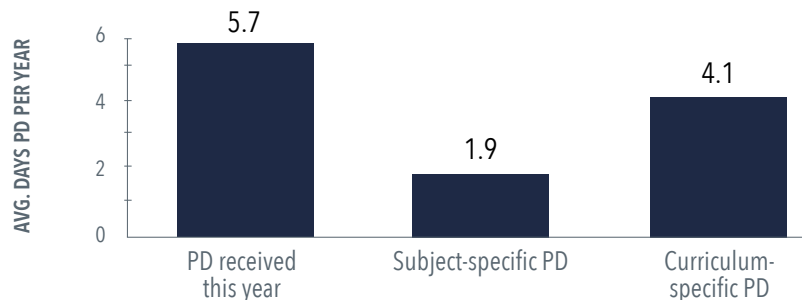
Highly variable learning materials

Use of instructional materials is not consistent⁵⁶



And teachers are not consistently trained to use materials effectively

Average days of professional development (PD) per year



Source: [Learning by the Book](#)

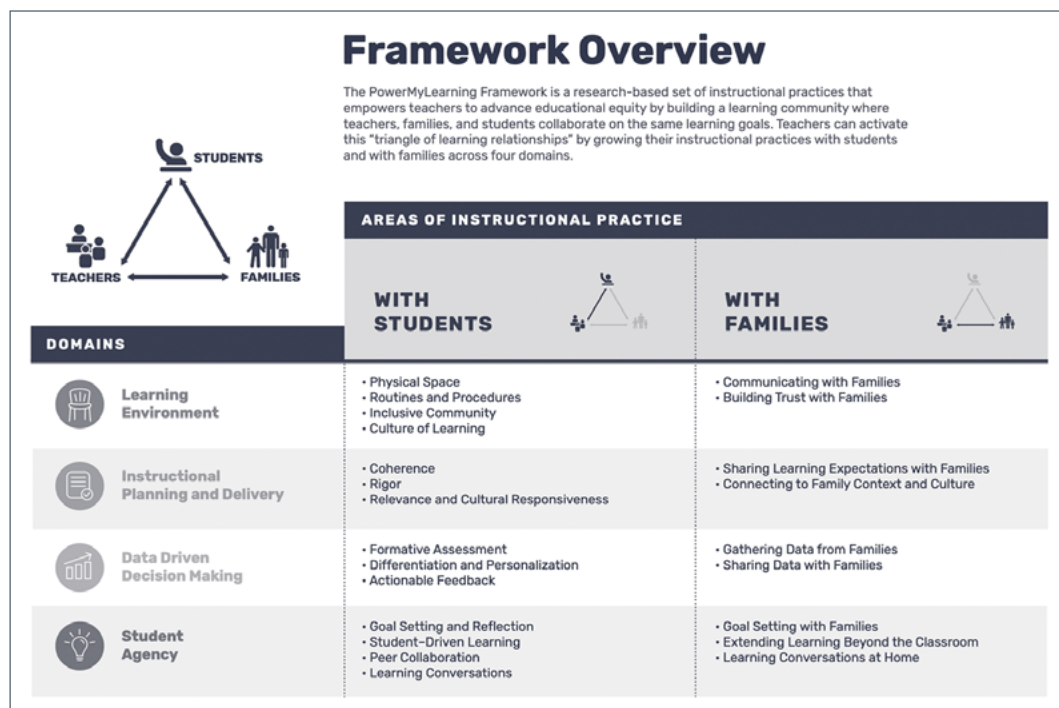
Families left in the dark

- 89% of parents rely on report cards to know if their child is performing at grade level.⁵⁷
- 71% of families say that a simple explanation of what their child is expected to learn in a given year would be very or extremely helpful.⁵⁸
- Parents need concrete and candid information to be more proactive in their engagement with teachers and supporting learning at home.
- High school parents receive the least amount of communication from schools regarding their child's learning (57% compared with 73% in lower grades).⁵⁹
- The process of learning in school has been largely "invisible" and mystifying to families, particularly for those with the lowest levels of education.

PowerMyLearning's Framework for Teachers empowers educators to advance equity by building a learning community where teachers, families, and students collaborate on the same learning goals. Strong connections are created between teachers, students, and families to engage students in meaningful learning in school and at home.⁶⁰

The PowerMyLearning Triangle of teachers, students, and families:

- Invites families into the learning process.
- Engages families in curriculum-related activities and setting learning goals.
- Promotes cultural responsiveness, as teachers have a better understanding of students' home lives and out-of-school learning.
- Encourages the sharing of insights between teachers and families, and vice versa.



Source: [PowerMyLearning Framework for Teachers](#).

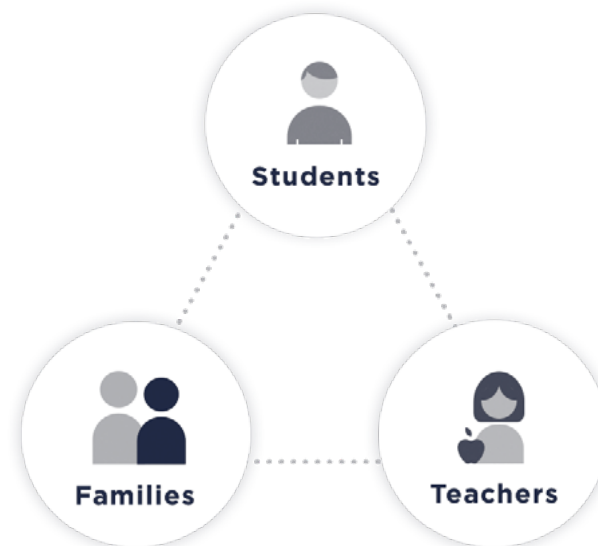
Learning Materials Spotlight: Springboard Collaborative



Springboard Collaborative improves literacy by engaging families in literacy instruction and providing training for parents to complement classroom instruction.⁶¹

Springboard Collaborative engages families by:

- Providing weekly workshops hosted by teachers to train parents on how to select on-level books and ask questions before, during, and after reading.
- Creating individualized reading plans for students and families.
- Encouraging teachers to visit the homes of their students to build parent buy-in and lay the foundation for a strong relationship.
- Providing learning bonuses like books and tablets to families based on student reading growth and attendance.
- Delivering one-on-one literacy support for families.



Source: [Springboard Collaborative](#)

"What I really like about Springboard Collaborative is that they don't leave all of the learning to the students. They expect the same from the parents by hosting family workshops that teach them the same skills that their children are learning, so they can reinforce what their teachers are teaching them at home. It's a group effort."

– Hui, Teacher

About the Authors



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Beta by Bellwether is an initiative to jump-start bold solutions to structural problems in the education sector. Beta moves beyond imagining a new sector by bringing together viewpoint- and experience-diverse teams from across education to create blueprints and tools for leaders around the United States. Our goal is to help build an education system that better serves all young people — particularly those from systemically marginalized communities — and models a new way forward for the sector. For more, visit bellwether.org/beta.



Bellwether is a national nonprofit that exists to transform education to ensure systemically marginalized young people achieve outcomes that lead to fulfilling lives and flourishing communities. Founded in 2010, we work hand in hand with education leaders and organizations to accelerate their impact, inform and influence policy and program design, and share what we learn along the way. For more, visit bellwether.org.

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The contributions of these individuals and entities significantly enhanced our work; however, any errors in fact or analysis remain the responsibility of the authors.



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Appendix

Interviews

Name	Title	Organization	Interview Date
Jaclyn Guglielmo	Executive Director	Indiana ESA Program	July 12, 2022
Colleen Dippel	Founder & CEO	Families Empowered	July 14, 2022
Selamawit Gebre	Director of Strategic Initiatives & Impact	RESCHOOL	July 21, 2022
Joe Connor	Founder & CEO	Odyssey	July 25, 2022
Mike Flanagan	Founder & CEO	Mastery Transcript Consortium	July 28, 2022
Evan Marwell	Founder & CEO	EducationSuperHighway	Aug. 18, 2022
Burck Smith	Founder & CEO	Palette	Sept. 6, 2022
Joanna McFarland	Founder & CEO	HopSkipDrive	Sept. 8, 2022



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