

Scaling Access & Impact

Realizing the Power of EdTech

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The data underpinning this report come from interviews, surveys, site visits, and desk research by a team of researchers and EdTech practitioners led by RTI International, drawing on local expertise in each of the case study countries. The team conducted more than 100 interviews with teachers, school principals, education administrators, policymakers, and EdTech experts and entrepreneurs throughout September–December 2018. A separately available country report for each case study country provides further detail on the findings and data sources for each country snapshot below, in addition to the comprehensive descriptions found in the executive summary and full global synthesis report.

To receive the executive summary and detailed global and country reports, please email EdTech@omidyar.com.

About Omidyar Network

Omidyar Network is a philanthropic investment firm that invests in and helps scale innovative organizations to catalyze economic and social change. Established in 2004 by eBay founder Pierre Omidyar and his wife Pam, the organization has committed more than \$1.3 billion to for-profit companies and nonprofit organizations across multiple initiatives, including: Digital Identity, Education, Emerging Tech, Financial Inclusion, Governance & Citizen Engagement, and Property Rights.

To learn more, visit www.omidyar.com, and follow on Twitter [@omidyarnetwork](https://twitter.com/omidyarnetwork) #PositiveReturns.

Acronyms and Abbreviations

ARRA	American Recovery and Reinvestment Act
BETA	Business Education Technology Alliance
CoSN	Consortium for School Networking
EdTech	education technology
ESEA	Elementary and Secondary Education Act
ESSA	Every Student Succeeds Act
FCC	Federal Communications Commission
GDP	gross domestic product
i3	Investing In Innovation
IDEA	Individuals with Disabilities Education Act
ISTE	International Society for Technology in Education
IT	information technology
ITCL	Instructional Technology Curriculum Leader
LMS	learning management system
NCLB	No Child Left Behind Act
NCREN	North Carolina Research and Education Network
NCVPS	North Carolina Virtual Public School
NETP	National Education Technology Plan
NGO	non-governmental organization
OER	open educational resources
OET	Office of Educational Technology
RTT	Race to the Top
SCI	School Connectivity Initiative
SETDA	State Education Technology Director Association
TESOL	Teachers of English to Speakers of Other Languages
UDL	Universal Design for Learning
US	United States
USD	United States dollars
USF	Universal Service Fund

Executive Summary

About this Series: Scaling Access & Impact: Realizing the Power of EdTech

There are 250 million learners around the world who have finished their schooling – yet aren't able to read or write well and lack the skills they will need to succeed in the 21st century. Additionally, around the globe are classrooms with tens of thousands of teachers struggling to close that educational gap – but lacking the access to tools and resources that will enable *them* to succeed.

The Brookings Institute described a 100-year gap,ⁱ the century it will take for the world's poor children to achieve educational parity with the wealthy at today's pace. Neither our world nor those learners can wait that long: We must find ways to close that gap quickly and efficiently, to allow all learners, educators, and educational systems to realize their full potential.

In pursuit of this goal, Omidyar Network's Education initiative began in 2009 to invest in innovations in education with such "leapfrog" potential and in 2014, specifically focused some of our investments on innovations powered by technology. Omidyar Network has since invested more than USD 150 million in promising global innovations in education across four continents.

Our efforts have been inspired by bold entrepreneurs as well as public, private, and social sector education leaders who are unleashing the human potential of a generation of learners through "Equitable EdTech." Omidyar Network defines Equitable EdTech as the promise of technology to be a great equalizer in improving quality education for learners in need. We have witnessed that Equitable EdTech models can bring students from several years behind to on grade level, while also shifting the norm from teacher-centered instruction to student-centered learning. We are therefore hopeful that the power of technology, when thoughtfully employed, can serve as a great equalizer in delivering quality education.

By enabling ubiquitous access and personalization, Equitable EdTech can close the gap for students while also empowering teachers to be more effective, especially when there is lack of access to high-quality schools, high-quality teacher training, rigorous curriculum, or appropriate interventions. Additionally, recent evidence demonstrates that these models can be both highly impactful and cost-effective.ⁱⁱ

However, our experience has also taught us that scaling and sustaining Equitable EdTech requires much more than eager learners and motivated educators. It demands the alignment of multiple actors across sectors in local ecosystems. This report examines such ecosystems and how they combine the efforts of government and education leaders, investors and philanthropists, and innovators and entrepreneurs.

Specifically, we sought to:

- > **Identify the events, actions, and initiatives across public, private, and social sectors that have contributed to the equitable scaling of EdTech in these countries; and**
- > **Inform a public policy and investing agenda by identifying the highest-impact interventions that might contribute to EdTech scaling in other countries.**

Our hope is that the country-system examples we examined, including Chile, China, Indonesia, and the United States, will inspire these interdependent actors to collaborate on creating the enabling conditions for equitable impact of technology at scale in their regions. We also hope that the ecosystem model presented in this report will spark debate as well as attract new partners.

There are six reports in the *Scaling Access & Impact: Realizing the Power of EdTech* series, including:

- | | |
|--------------------------------|--|
| > Executive Summary | > Country Report: China |
| > Global Report | > Country Report: Indonesia |
| > Country Report: Chile | > Country Report: United States |

This report is the case study report for the United States. A separately available country report for each other case study country and a full global synthesis report are also being published

United States (US) Country Report

Technology is a part of life for most Americans. Many school districts run 1:1 tablet initiatives or invite students to bring their own personal mobile devices. Other school districts do the best they can with a handful of connected computers in each school. Teachers use online resources to prepare lessons, for professional development, or to communicate with students and parents. With the rise of smartphones, students now have access to the Internet in their pockets and can access learning opportunities from home. Personalized learning does occur in classrooms, but increasingly, such learning also takes place on personal devices in after-school learning settings. Several states have launched virtual public schools in addition to their brick-and-mortar schools. Additionally, many schools partner with virtual school programs and encourage their students to take online classes for special interest topics and/or enroll in online university preparatory courses.

In 2018, 44.7 million students and 2.6 million teachers in more than 81,000 schools had Internet access with connection speeds of at least 100 kbps per student.³ The 2018 State of the States report from the non-profit organization Education Superhighway expects that by the end of the 2018–2019 school year, 99% of school districts will provide scalable fiber broadband Internet connectivity to their students. Federal grants, particularly the **E-Rate Program**, helped accelerate the build out of broadband Internet access in schools.

Much of the initial doubt about technology initiatives in communities and school districts and among administrators has now, after several well-run, well-documented model projects, been replaced with enthusiasm. Government initiatives such as **Race to the Top (RTT)** and the **Investing In Innovation (i3)** initiative have led to large-scale education technology (EdTech) deployments, assisted by one or multiple research partners. Coalitions and interest groups such as **Future Ready Schools** and advocacy groups for state technology leaders, district leaders, and many other stakeholders have

been critical in building the education system’s capacity to truly transform education and take EdTech to scale.

The US K–12 EdTech market totaled US dollars (USD) 18 billion in 2017, according to Futuresource Consulting, Ltd.⁴ This total includes hardware, software, information technology (IT) services, digital courseware, and assessments. The company predicts strong growth for data analytics and instructional tools, such as learning management systems (LMSs) and tools for classroom management, collaboration, and student monitoring. Large players, including Microsoft, Google, Apple, and now Amazon, have forcefully entered the market. Google has quickly gained market share with its low-priced Chromebooks and free online services for schools, including an LMS. Microsoft offers school districts packages such as Microsoft Office tools to teach digital literacy skills and productivity tools to accomplish school work. Many Apple iPads can be found in elementary schools. Smaller EdTech startups often find it helpful for scaling to bundle their services with one of these big players. Others leverage open educational resources (OER) available in the US and create content repositories aligned with grade-level standards and curricula. Traditional publishers who are not making the transition to digital quickly enough are losing profits.⁵ In recent years, major foundations such have invested in innovations that provide students with personalized learning paths based on their learner profiles. With personalized learning depending on data and the US registering more computer devices in schools than anywhere else in the world, compatible device management, student information systems, and LMSs are key to continued growth in this market.

This case study involved interviewing and surveying more than 20 EdTech stakeholders in the US. These experts provided recommendations on which states or districts could serve as examples of effective EdTech scale-up (at the access, use, or impact level). Suggestions included Utah, California, Maine, Rhode Island, New York, North Carolina, and Florida. Two specific ‘deep dives’ are included in this report: the state of North Carolina and the Miami-Dade County public school district in the state of Florida. Both North Carolina and Florida have, in the past decade, aggressively transformed education and implemented policies and initiatives to improve education opportunities for all students with the help of EdTech.

Exhibit 1 summarizes the key takeaways from the US country study and **Exhibit 2** presents a snapshot of the US EdTech ecosystem.

Exhibit 1: Key Takeaways

Inspiring Proofpoint	Practice for Replication	Practice for Further Exploration
<p>A multi-year government vision and strategy—articulated not just as a legislative act, but also branded as an initiative, backed by funding, supported by multisectoral commissions, evaluated and updated regularly—can be a powerful roadmap for collective action.</p>	<p>Advocacy organizations, coalitions and non-profit organizations participating alongside educators and school administration to carry out EdTech vision.</p>	<p>How to measure the impact of EdTech at scale, other than using standardized tests or isolated pilots. What are alternative measures of EdTech impact?</p>

Exhibit 2: United States EdTech Country Snapshot

Ecosystem Profile

EDTECH SUPPLY AND BUSINESS MODEL

There is a large EdTech market for US hardware and software manufacturers, but decentralization means fragmented sales and distribution for entrepreneurs.

ENABLING INFRASTRUCTURE

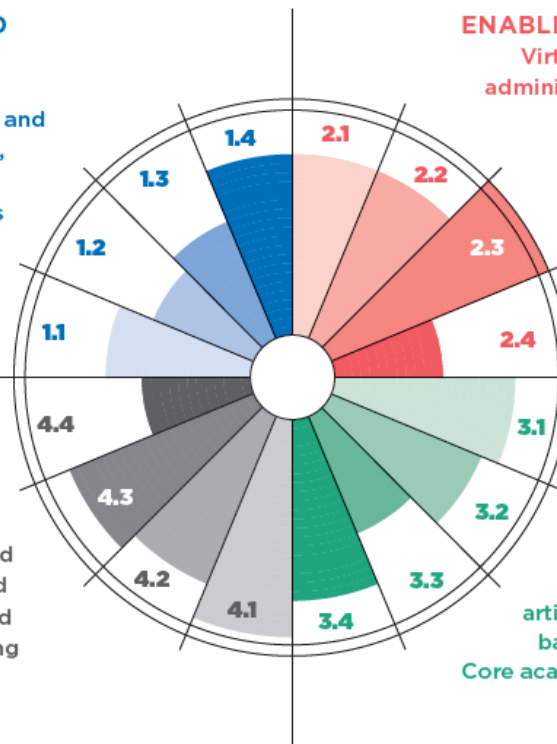
Virtual learning platforms and administrative tools capitalize on nearly universal access to internet and widespread device ownership.

HUMAN CAPACITY

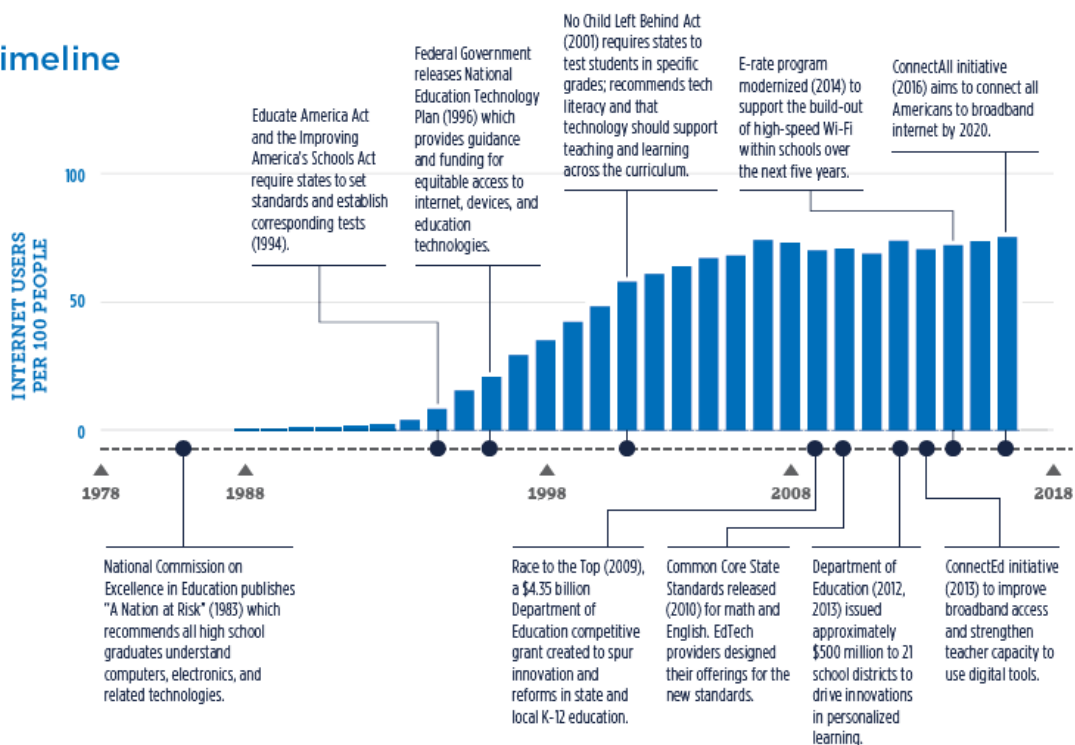
NGO partners and coalitions, empowered by visionary leaders and policy initiatives spread awareness, training, and support for transforming education through technology.

EDUCATION POLICY AND STRATEGY

Successful federal policies and initiatives articulated a vision for EdTech backed by funding. Common Core academic standards pressured districts to improve.



Timeline



Country Background

Society

The US is a federal republic composed of 50 states, a federal district, and several overseas territories. It is the fourth largest country by total land area and the third most populous country in the world, with a population of approximately 330 million people.⁶ Although the US population represents just 4.3% of the world total, it holds 33% of the world’s total wealth.⁷ Within the country, substantial income and wealth inequalities persist. According to a 2017 report from the US Census Bureau, roughly 40 million Americans live in poverty, 18.5 million live in extreme poverty, and 5.3 million live in conditions of absolute poverty.⁸

The size of the US economy and the amount of personal wealth held by a substantial proportion of its population have given rise to one of the largest philanthropic cultures in the world, with charitable giving amounting to approximately 2% of gross domestic product (GDP).⁹ In 2017, Americans gave an estimated USD 410.02 billion to charitable causes, with most donations made by individuals. According to Charity Aid Foundation (cited by the Philanthropy Roundtable), the proportion of the US’s GDP that is dedicated to charitable giving is approximately twice that of the country with the next highest proportion—Canada—and more than 15 times that of China (0.03% GDP). Furthermore, a substantial number of Americans are employed in the non-profit sector, and many more volunteer for charitable causes. In total, 14% of all donations in the US were directed toward education.¹⁰

Exhibit 3: United States Demographics

World’s largest economy	3.8 million square miles of territory
GDP (2010) US 17,305 billion	14% of charitable donations directed to education
Population 330 million	12% of population lives in poverty

Education System

Demographics

The Education in the US is compulsory for children from the age of 5 or 6 years to 16; in some states, it is compulsory until age 18. All children in the country have access to free public schools and are assigned to a school based on residential address. “School choice” programs are common and allow families to choose from among public, state-certified private, and charter schools¹¹ outside of their residential catchment area or participate in approved homeschooling programs.

Approximately 56.6 million students attend elementary and secondary schools in the US; of these, roughly 10% attend private schools,¹² 5% attend charter schools, and fewer than 3% are in homeschooling programs.¹³ Of the US’s 98,300 public elementary and secondary schools, 6,900 were

classified as charter schools in 2016–2017.¹⁴ To serve their students, public school systems employed approximately 3.2 million full-time-equivalent teachers in fall 2018, resulting in an average student/teacher ratio of 16:1. Approximately 3.6 million students are expected to graduate from high school in 2018–2019.¹⁵ A diploma or certificate is awarded upon graduation from secondary school based on successful completion of coursework requirements. Competency exams, such as the SAT and ACT, are not required for graduation but may be required for college and/or university admissions.

Exhibit 4: Education in the United States

3.2 million teachers	98,300 K-12 public schools, including 6,900 charter schools
56.6 million students	Ranked 25th in Science (PISA 2015)
USD 12,910 per student expenditure	Education spending is 4.9% of GDP

Funding

The federal spending for public elementary and secondary schools is projected to be USD 654 billion for the 2018–2019 school year, amounting to a per-student expenditure of USD 12,910,¹⁶ but variations in per-student expenditure among school districts are enormous. Funding for education is shared between federal and state budgets, in addition to other public and private contributions. However, most funding for public primary and secondary education is the responsibility of state and local governments. American school districts receive substantial funding from the communities where they are located through property taxes and voluntary contributions. As such, they often reflect the educational values and financial capabilities of their communities. This system has led to large variations among schools in terms of school resources, subject offerings, and other in-school or extra-curricular activities based on schools’ locations or individual needs and aspirations. Through the Elementary and Secondary Education Act (ESEA) in 1965 and its later amendments, additional federal funds are made available to support schools with high percentages of students from low-income families.

Standards and Curriculum

States have great control over what is taught in schools. A state-level Department of Education controls funding, personnel, and curriculum. States are then divided into school districts, which are managed by school boards comprising representatives from the local community and oversee policy and instruction congruent with the needs of the community. Individual schools have varying degrees of freedom in implementing district policies. Based on the concern that many children living in situations of vulnerability were not receiving the support they needed, President George W. Bush and, later, President Barack Obama signed legislation to make federal funding contingent on measurable academic performance. Under the No Child Left Behind Act (NCLB) and the Every Student Succeeds Act (ESSA), all American states must test students in public schools statewide every year from grades 3 through 8, plus once in high school to ensure that they are achieving the desired level of minimum education and show the required improvement from year to year.¹⁷ The results of state-level

assessments are not meant to track individual children into special programs or prevent them from advancing to the next grade level but rather to reflect an overall measure of school and instructional quality; to communicate with parents, school districts, and state and federal governments; and to apply for or report on grant funding. Many states are transitioning to computer-based standardized testing starting as early as grade 3, which requires basic computer literacy for all children taking the test.

Infrastructure

In 2016, 89% of all households had a computer (note that this proportion includes smartphones), and 81% had a broadband Internet subscription.¹⁸ As of year-end 2016, approximately 98% of the country had access to either fixed terrestrial service at 25 Mbps/3 Mbps or mobile LTE at 10 Mbps/3 Mbps, although this percentage was lower—89.7%—in rural areas.¹⁹ Access to technology in the US in general has greatly improved, but significant access gaps remain between population groups and geographic areas, with states on the Pacific Coast and most states in the Northeast showing higher percentages of broadband Internet subscriptions compared to those in the rest of the country.²⁰

In 2018, 88% of American schools met the Federal Communications Commission's (FCC's) short-term connectivity goal of 100 Mbps per 1,000 users, and 22% met the long-term connectivity goal of 1 Gbps per 1,000 users.²¹ In 2015, roughly 88% of eighth graders and 83% of fourth graders reported having used a computer at home; additionally, 80% of eighth graders stated that they had used a computer to complete their schoolwork on a weekday.²²

EdTech in the United States

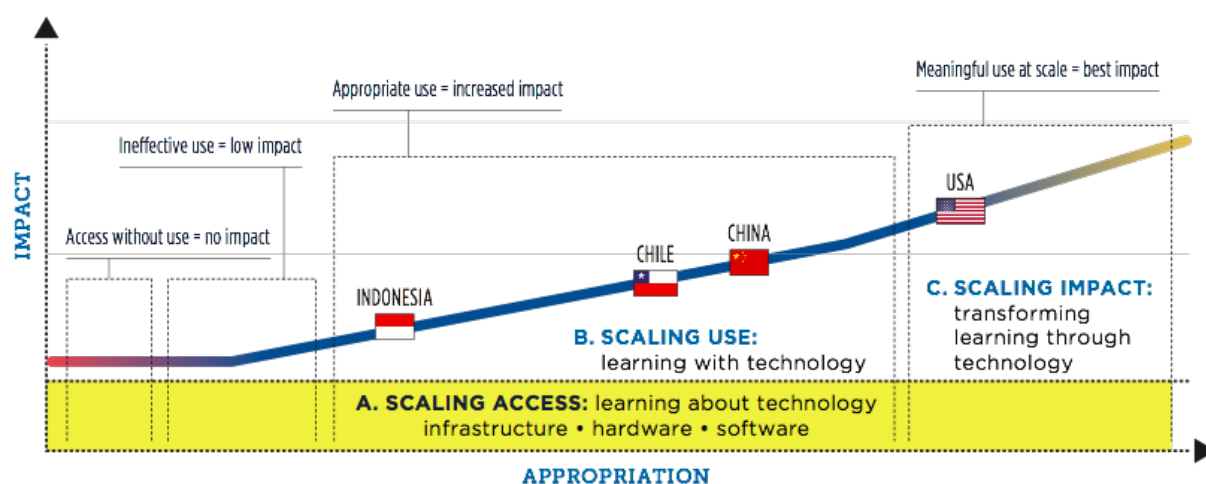
For decades, US educational institutions have been exploring how to leverage technologies to improve student achievement and prepare students for the workforce. In 1983, now 35 years ago, in the federal report *A Nation at Risk: The Imperative for Educational Reform*, the National Commission on Excellence in Education recommended that all high school graduates should “understand the computer as an information, computation and communication device; [be able to] use the computer in the study of the other Basics and for personal and work-related purposes; and understand the world of computers, electronics, and related technologies”.²³ While the initial efforts focused on putting computers in schools and providing hands-on time for students, programs have since evolved to support schools in providing all students with access to the Internet, devices, and tools aligned to their individual skills and interests. In 1996, the federal government released the first version of the **National Education Technology Plan (NETP)**. The NETP provides strategic guidance to state governments and school districts and has been accompanied by several grant programs and regulations to encourage and enable all schools to provide access to Internet, devices, and appropriate EdTech to all students—whether they come from families with very little disposable income, come from urban areas, or have vision or hearing impairments or require other assistive technologies. The NETP was updated every 5 years between 1996 and 2017, when the frequency was increased to annually.

This section looks at the evolution of EdTech scaling in the US across three main phases of change—access, use, and impact—as illustrated in **Exhibit 5** (for a more comprehensive discussion of the

Ecosystem Change Model, see the Global Report). A common error in EdTech is assuming that scaling a product will naturally result in its appropriate use. Scaling access (or even ‘opportunity to access’) does not equal use, nor does opportunity to use mean that the product will be used in a way that results in impact on learning outcomes at scale. The outcome of a strong EdTech ecosystem should be a steeper slope, indicating a more rapid transition to transformative use of technology.

This section describes several US examples of EdTech with a measure of success in scaling and identifies the factors that enabled this success.

Exhibit 5: Ecosystem Change Model



Scaling Access

Scaling access means there are EdTech products in the market, and users have the ability to adopt them because they have the technology (e.g., hardware, connectivity) to do so.

Government Initiatives

The NETP²⁴ released in January 2017 and titled *Future Ready Learning: Reimagining the Role of Technology in Education* celebrates progress made toward ensuring that every school has high-speed classroom connectivity. Federal programs such as E-Rate and Lifeline Learning help expand access in schools, communities, and homes. **E-Rate** provides discounts to help schools and libraries in the US obtain affordable telecommunications and [Internet access](#), particularly for schools and students in rural areas. When the program was modernized in 2014, the mandate was expanded to include support for high-speed Wi-Fi services inside schools and between classrooms.

The **Lifeline** program provides low-income consumers with a subsidy of just under USD 10 per month for phone and mobile broadband.²⁵ Both programs are funded through the Universal Service Fund (USF). The USF, in turn, is funded through a surcharge on telecommunication services, initially established to fund the build-out of telecommunications services in rural, less-populated areas. These federal government-funded programs triggered multiple initiatives at the state level. Within 5 years, the number of students with high-speed Internet access grew from 4 million in 2013 to more than 40 million in 2018.

E-RATE: Established formally the 'Schools and Libraries Program of the Universal Service Fund', was established in 1996 as part of the Telecommunications Act. This legislation originated not from the Department of Education but from the FCC. The act broadly aimed to address the digital divide by ensuring that all Americans had access to affordable telecommunications services. The legislation also provided subsidies capped at USD 2.25 billion to offset the requirement that telecommunications companies connect all public schools and libraries at discounted rates. These discounts could be as high as 90% off installation and services for schools serving high proportions of low-income families. The subsidies were funded through mandatory contributions from telecom providers to the USF (these costs were passed on to customers through increases in their monthly bill). The plan was updated (referred to as 'modernization') by the FCC in 2014 to enable affordable access to high-speed broadband and classroom Wi-Fi connectivity. Although not without its critics nor free from fraud and corruption, E-Rate has been called "the single most important educational technology program in the country," particularly in terms of leveling the playing field for all schools to begin integrating technology in the classroom equitably.

In 2013, President Barack Obama launched the **ConnectEd** initiative.²⁶ ConnectEd was a high-level vision and a challenge to school districts, government agencies, and the private sector to cooperate to achieve specific targets related to upgrading connectivity, improving teaching through training and new teaching resources, and harnessing private sector innovation to bring affordable, personalized learning to classrooms. The initiative was not a new source of funding but rather an umbrella vision under which existing funding (e.g., E-Rate, ESSA) could be channeled toward a common set of goals and standards. For example, ConnectEd allowed and encouraged ESSA funds to be used to train educators in technology integration and the implementation of computer-based assessments. The initiative gathered private sector commitments to offer affordable hardware and software that districts could apply for directly from the companies.²⁷ The ConnectEd website reported private sector commitments of equipment, software, services, eBooks, and professional training totaling USD 2 billion. Arguably, the emphasis on subsidizing connectivity and spreading private sector technology constituted an investment in the US economy as much as in educational quality improvement. The program's "Fact Sheet", for example, cites job creation and export opportunities valued at USD 1 trillion for global digital education content.²⁸

One-to-One Device Programs

The federal government made significant, long-term efforts to spread access to technology and train teachers as a first step toward education that is "increasingly interactive, individualized, and full of information."²⁹ States were able to capitalize on national standards and federal grant programs to design EdTech programs for their contexts. Many states chose 1:1 device programs, particularly for middle and high school students. Their goals were multiple and varied: improving equity in access to technology; encouraging student engagement 'anytime, anywhere'; increasing opportunities for communication and collaboration; encouraging learners to take ownership of and manage their learning—a model that came to be known as the 'flipped' classroom³⁰; meeting children where they

are with the devices that they are increasingly familiar with; and preparing children for the future of work.

As schools become connected to Internet at the classroom level, 1:1 computing programs become more practical than rotating students through computer labs. Consequently, this can enable shifts in pedagogy, such as connecting to smartboards, and teacher or administrator device management. Major hardware manufacturers, such as Apple, Microsoft, and Google, have been competing for market share in schools since the 1990s, given the obvious growth strategy based on economies of scale and brand loyalty for generations of computer users. Competition in the market drives costs down while improving product offerings. According to a 2017 report, 20 million Chromebooks were in use in the US among a K–12 population of 50 million students in public schools.³¹ However, in the race to provide technology and leverage public–private partnerships, some districts put access ahead of planning for use. The story of the Los Angeles Unified School District’s failed attempt to transform education by providing access to the Internet, devices, and curricula is instructive in demonstrating how access is necessary but not sufficient.

*In December 2014, the **Los Angeles Unified School District**, the second largest public school district in the US, officially ended its controversial Common Core Technology project. This project was estimated at USD 1.3 billion and aimed to equip all of the district’s 650,000 students, mostly from low-income families, with iPads from Apple bundled with digital curriculum from Pearson aligned with the new Common Core standards.³² As the name of the initiative implies, one of the main drivers for the use of EdTech was the standardized curriculum and assessments to be introduced in 2014–2015. Students were intended to use the tablets to prepare for and take standardized tests, do homework, study, play learning games, and more. However, soon after the contract was awarded to Apple, and iPads were rolled out to the first schools, problems surfaced. Devices broke. Students hacked the system to bypass the security filters. Teachers were ill prepared to integrate the iPads with their classroom instruction, and the digital curriculum was incomplete.³³ Secondary school students needed keyboards to actually work with the tools efficiently for writing. The technology procurement was stopped after a little more than a year and became an example of what not to do, such as exclude teachers and principals from the planning process, ignore total cost of ownership (i.e., recurring costs of software licenses, technical support, training, accessories, and repairs), and focus on technology ownership rather than evidence-based practice for putting it to use. Concerns about favoritism led to a federal investigation into the procurement process. At the time the investigation ended, 124,421 iPads were in use at a cost of USD 82.8 million but with little impact to show for it.*

Universal Access to Internet

States and the federal government are partners in the effort to provide high-speed Internet access for K–12 students. However, non-profit organizations can facilitate knowledge transfer among and across states about effective approaches to provide equitable access. Organizations such as EducationSuperhighway, the State Education Technology Director Association (SETDA), and the Consortium for School Networking (CoSN) have been mentioned repeatedly by study participants for their roles in compiling useful resources, such as toolkits and rubrics, and in working with state and district leaders to help them manage infrastructure, the more mundane—some might say—but critical side of EdTech scaling. As initial access hurdles have been overcome, more attention can be paid to

making educational technologies accessible to students with a wide range of learning abilities and ensuring that appropriate privacy and security measures are in place to protect student data.

Providing Internet access and scaling this access to broadband as usage scenarios change and needs increase are crucial to drive demand for learning technologies. Internet access in schools is a first step toward students and teachers becoming comfortable with tools and, subsequently, using them to transform teaching and learning. Internet access can also affect the ability of EdTech entrepreneurs to scale efficiently. As one expert told us, the ability to post one's software on a server that any school in the country can access is a huge benefit for distribution, access, and awareness. Even simply being able to market to teachers via e-mail is beneficial.

Scaling Use

As is the case with hardware, merely providing Internet access is not sufficient to improve student outcomes;³⁴ it is always important to look at how technology is used to determine impact. Best practice from the US and elsewhere suggests that whenever funds for EdTech purchases are allocated, a significant portion must be dedicated to training and support to enable effective use.

'Scaling use' is distinguished from 'scaling access' by emphasizing that just because one *can* access a product does not mean that one *will* do so. Progress toward EdTech use is considered observable when products show evidence of an active user base (i.e., subscriptions), and are facilitated for use in classrooms by trained educators, among others. There are also different levels of use, from basic to transformative, which depend on effective capacity building for EdTech integration.

The evolution from scaling access to scaling use and scaling impact is not necessarily perfectly linear—when the right ecosystem factors come together, access can be coupled immediately with appropriate use to achieve impact more quickly. For example, the ConnectEd government initiative mentioned above included a focus on teacher training and the utilization of a broader range of innovations in hardware and software to transform teaching. Based on the key informant interviews done for this study, certain factors seem to drive an increase in purposeful EdTech use, which are discussed in the following sections: the federal mandate for standardized testing (and, moreover, computer-based standardized testing) and targeted efforts to provide professional development, including packages of hardware coupled with training provided by manufacturers. Additionally, the growth in EdTech entrepreneurs and initiatives that curate and distribute affordable OER in innovative ways contributes to increased adoption and use of EdTech; using technology infrastructure to access OER or other online content portals is also a result of efforts to provide universal access.

Standards and Standardized Testing

The 2001 NCLB required annual state-level testing from grades 3 through 8, plus once in high school. Financial incentives and sanctions based on the results of these tests pressured districts to review instructional quality and how technology could impact outcomes. The harmonization of curricular content across states through the **Common Core State Standards**, released in 2010 for math and English language arts, made it much easier for EdTech entrepreneurs to benefit from economies of scale instead of designing for 50 different state standards. In 2009, in the midst of an historic economic downturn, the **American Recovery and Reinvestment Act (ARRA)** economic stimulus

package was signed into law. This act set aside approximately USD 5 billion in funding for states and school districts to advance education reforms in four areas: (1) equitable teacher distribution, (2) improving collection and use of data, (3) enhancing standards and assessment, and (4) supporting struggling schools. Within this package, the US Department of Education launched the first **RTT** competition to incentivize states and districts to improve performance and generate demand for innovative solutions. Some of the solutions involved better data management tools or better curriculum and assessments aligned with the common state standards. In 2012 and 2013, the US Department of Education issued approximately USD 500 million to 21 school districts under a district-specific funding pool (“RTT-D”) designed for the creation of personalized learning environments.³⁵ Use of technology was not a grant requirement but was considered to be one of the characteristics of a personalized learning environment. Many of the grantees purchased laptops or tablets, implemented teacher training in use of technology, established guidelines for selecting and using digital content, and used technology to connect to online communities and blended training models.

Professional Development

In addition to federal efforts, achieving more transformative use of technology means focusing effort and additional budget resources on professional development for teachers so that hardware and software efforts go beyond digital books. Technology companies are also recognizing that if they want to sell their product, their technologies must show measurable improvements in student achievement. To achieve this goal, they must engage teachers and help teachers learn how to use tools effectively. In the US, large computer manufacturers (e.g., Microsoft, Intel, Apple) and many successful EdTech startups have invested heavily in ongoing teacher training, offering online courses, hands-on workshops, extensive training materials, lesson examples, and certification programs to ensure widespread and sustained adoption of their products. They foster teacher communities and networks and highlight teachers who share innovative uses of the technology.

EXAMPLE: With federal funding, many school districts experimented with peer-to-peer coaching for teachers to drive the use of EdTech. Bellevue School District in Washington state is one such example. Bellevue School District, located a short distance outside of Seattle and close to Microsoft headquarters in Redmond, serves approximately 20,000 students. All schools in the district are connected with the same quality infrastructure and bandwidth. In high school, every student is equipped with a laptop with the Microsoft OS and digital inking capability (i.e., on-screen handwriting capture). In Bellevue elementary schools, a mix of desktops, laptops, and iPads is available at a ratio of one device for roughly 2.4 students. To ensure that all this technology makes a difference in teaching and learning, the district has scaled a peer-to-peer coaching approach: every elementary and some secondary schools have an Instructional Technology Curriculum Leader (ITCL) who is available to help peers integrate technology to achieve their instructional goals. ITCLs prepare lessons with teachers, assist in the classroom, and provide coaching until teachers feel comfortable using and integrating a new program in their classrooms. With this example, it is important to re-emphasize how education is funded locally in the US (see section: Country Background – Education System - Funding). The cost of equipping schools in Bellevue with this package is approximately USD 850 per student, reflecting the socio-economic levels of the families that live in that district and the amount raised via levies and property taxes.

Experts interviewed for the study mentioned the importance of peer-to-peer coaching for effective technology integration, despite this strategy's time-consuming nature. As mentioned above, some RTT-D grants went toward online learning communities. The US Department of Education recognized the need for additional teacher preparation in the 2017 NETP update and gathered commitments from teacher preparation programs nationwide to work toward implementing recommendations developed by the Office of Educational Technology (OET) in collaboration with teacher preparation innovators.³⁶ Additionally, the ESSA Title IV Part A program³⁷ recently changed the criteria so that no more than 15% of funds can be used on hardware purchases; thus, more goes to capacity building and evaluation.

Digital Content and OER

At the state level, legislative changes in textbook adoption processes and digital content requirements have created new opportunities for scale. In the past, states authorized a list of textbooks that state and federal funding could be used to purchase. Now, most states have abandoned statewide forced textbook adoption or reduced it to a few subject areas. In addition, states can request that a certain amount of funding be used for digital content. This gives districts flexibility to find locally relevant digital content and tools, sparking substantial innovation in EdTech.

According to the 2018 CoSN K–12 IT Leadership Survey, 73% of respondents said that OER are important to their district strategy, and 93% use OER to some extent, though proprietary materials remain the primary source of digital content for most.³⁸ These can be digital materials meant for use with technology or traditional materials intended for use in the classroom that are accessed using technology. OER lower the barrier for startup companies to enter the market and develop tools and services for education by eliminating the high production costs of original resources and content. Additionally, they offer school districts an opportunity to redirect money allocated to content licenses and textbooks from established publishers into professional development programs, including ones focused on how to use technology in the classroom or on how to source, use, and adopt OER. Some OER efforts spread through the work of visionary leaders seeking equitable access to resources, while others are the result of government policy requiring all content funded with government grants to be licensed with creative commons for reuse and adoption. In Washington state, 2012 legislation required the creation of a library of open-access teaching resources. The result is a curated OER Library³⁹ led by the Office of the Superintendent of Public Instruction with user reviews based on standards-based evaluation rubrics for math and English language arts. Non-profit organizations (e.g., OpenUp Resources⁴⁰, Iskme⁴¹, CK-12⁴²) are providing similar content curation services, including professional development, research, and implementation support.¹

Scaling Impact

Finally, although EdTech products may be accessed and used—even in the most robust and transformational way—at scale, scaling *the impact* of EdTech is a function of how EdTech is adapted for use in different ways by different populations. As such, the impact on learning is what is 'scaled' rather than just product use. This is the hardest phase of scaling to demonstrate, but specific efforts to

¹ Specific products and companies mentioned are neither exhaustive nor an endorsement by the authors; they are only meant to be illustrative of the types of products on the market.

evaluate and communicate impact, redesign and adapt products for different audiences, and identify mechanisms for choosing the right products for the right purposes are indicators that EdTech will be more likely to have equitable impact.

The case of the Miami Dade County School District (see the text box below) is one of careful planning coupled with professional development and frequent review of what works. It is an example of making EdTech work for a large and diverse population.

Miami-Dade County Public Schools in Florida is the fourth largest school district in the US. With more than 340,000 students representing 160 countries and speaking 57 languages across 2,000 square miles, Miami-Dade County serves one of the most diverse student populations in the country. Nevertheless, according to a 2016 study focused on education equality, two of the three major US cities with the smallest achievement gaps—Hialeah and Miami—are served by Miami-Dade County Public Schools. This district-level example is one of strategically planned scaling of access to hardware and infrastructure driven by a visionary leader and made possible through various funding mechanisms.

Alberto M. Carvalho, the Superintendent for Miami-Dade County Public Schools since 2008, is a strong ambassador for using EdTech to address instructional needs and reduce the achievement gap. In an interview with EdWeek Market Brief in 2017, Carvalho made it clear that the district's instructional needs, rather than blind enthusiasm for technology, were at the heart of any EdTech purchase decision. Only after extensive research, including experiences and impact studies from other school districts and other sectors, is a bid opened. Technologies are carefully tested to make sure they deliver on their promises. Experts from the district who were interviewed for this study also described how identified gaps in student learning and current instructional challenges (often linked to performance on statewide standardized assessments) drove the initial technology pilots.

The district also launched a 1:1 device-to-student initiative. This launch progressed slowly, but as of November 2018, 140,000 devices are in use by students with 30,000 access points ensuring wireless connectivity in all public schools. Devices are managed centrally, and dashboards track the use of all digital content on school equipment. To stay nimble and maintain leverage, the district decided early on to separate negotiations for devices and content and ensure that contracts would allow for later adjustments or cancelations. Miami-Dade only considered device providers with a local presence for service and support and content providers willing to work with the district to meet local needs.

The district's close partnerships with technology companies and research partners have created a launchpad for EdTech startups to finetune their products and scale. Several large EdTech companies have origins in Miami, including Nearpod⁴³ and Genius Plaza.⁴⁴ Miami EdTech is a local non-profit group supporting EdTech professional development, acceleration, and expansion. Their goal is to make Miami a global EdTech hub. A member of the organization who spoke with the study authors explained how partnerships with local NGOs can support meaningful integration of technology: "Partnerships provide alternative talent to teach the students. Teachers focus on developing the curriculum and on what teachers need to do. Imagine trying to keep up with industry standards around technology and technology skills. What we can do is translate those expectations from the workforce and bring it to the teachers and provide recommendations on which tools to focus."

The Role of Non-Governmental Organizations (NGOs)

NGOs, such as **SETDA**, **CoSN**, and other advocacy groups, also play an important role in building human capacity for effective use of EdTech. For example, SETDA provides a guide—*Transformative Digital Learning: A Guide to Implementation*⁴⁵—and helps leaders build skills and knowledge in not only leadership but also technology and innovation management. SETDA and EdTech Miami (see text box) are examples of advocacy groups that, in interviews for this study, described their roles as bridging the gaps between users, states, and federal policy to build common understanding. Examples of how they bridge these gaps include building the capacity of state leadership to bring state voices to federal quality debates and working with local districts to report needs and inequities up to the decision makers who can address them. NGOs also supply information on risks (e.g., privacy issues, cybersecurity), evaluate software, and provide catalogues that review and recommend solutions so that schools can focus on teaching. These are important steps toward achieving impact at scale. However, one risk was brought up during the interviews conducted for this work: these reviews and recommendations may not be truly independent. Most advocacy groups receive financial support from publishers, software providers, and others whose services they review.

Incentivized Grantmaking

The experiences with the federal grant programs described above positively impacted basic access and use. However, because federal grant programs in recent years have been structured as competitive block grants tied to performance, pressure to achieve impact from the investments has increased. For example, the RTT grants rewarded states who developed bold and comprehensive plans involving a range of stakeholders. RTT applications, reviewer comments, annual progress reports, and evaluations were all made public to improve transparency and learning. While not exclusively focused on EdTech, states awarded these grants used funds for online professional development, to establish education data systems, and to provide training on using data for performance monitoring and on using devices and software for learning. The US Department of Education, in its final report on RTT, titled *Fundamental Change*,⁴⁶ asserts that “the legacy of Race to the Top can best be found in the way that teachers, principals, administrators and others are working more collectively to solve pressing challenges”, including through the use of EdTech.

This kind of collective problem solving is evidence in the case of North Carolina, where schools in the state are benefitting from a well-established collaboration between law makers, policy makers, research partners, business partners, and practitioners to transform education. A USD 400 million RTT grant accelerated the development of an integrated technology platform and other evidence-based improvements of the education system in this state. In 2018, all students in all schools had access to broadband Internet with Wi-Fi in every classroom. The text box below provides an overview of the North Carolina experience.

Building on lessons learned from and demand created by RTT, the federal government further stimulated investment and innovation in public education through the **i3 program**. i3 supported local efforts by providing competitive grants totaling more than USD 1.3 billion⁴⁷ for activities designed to improve student achievement, retention, and graduation and teacher or administrator effectiveness. Awards distinguished between innovations’ stages of maturity—development, validation, and scale-up—depending on the evidence base underlying the idea. The awards could also be used for third-

party research to build the evidence base for impact beyond just inputs. Moreover, the program required education organizations to partner with the private sector for matching funds and non-profit organizations to apply alongside schools. Like RTT, i3 was not limited to technology, and funds could be used for projects designed to use technology to achieve instructional goals. The recognition of different stages of maturity is a useful framework for grantmaking.

Interoperability of EdTech Products and Services. In the past, established publishers, LMS providers, and other EdTech providers frequently succeeded in locking school districts into multi-year contracts, with extensions only available from the provider and connections to other systems costly, time consuming, and imperfect. Such an environment makes data analysis across systems within a district and across districts difficult and hinders the implementation of personalized learning, which requires data about different aspects of a student's school experience. This situation is changing. School districts are now requesting interoperability—the seamless, secure, and controlled exchange of data between applications—from EdTech providers. Additionally, advocacy groups such as Project Unicorn and several states that received i3 funding are implementing best practices and showcasing how a well-connected data system can support personalized learning.

Leadership and Knowledge Sharing

The federal grant programs described above included an emphasis on collaboration and knowledge sharing. The application process alone requires considerable capacity and leadership ability to bring together stakeholders under a common vision. Where EdTech has scaled at the district or state level with some measure of impact, it is likely that one will find a strong leadership team. To help principals in K–12 public, private, and charter schools implement the ConnectEd vision, the US Department of Education launched **Future Ready Schools** together with the Alliance for Excellent Education and more than 50 other partner organizations, such as foundations, publishers, Internet service providers, organizations for curriculum and content standards, and professional associations. This cross-industry network provides resources and training to superintendents and district leaders with a focus on improving communication with stakeholders, creating a shared vision, and using research to measure achievements in leveraging technology for education. The Future Ready Schools framework is a guide for technology implementation that emphasizes collaborative leadership, cycles of planning and evaluation, and seven core evidence-based practices: (1) curriculum, instruction, and assessment; (2) personalized professional learning; (3) robust infrastructure; (4) budget and resources; (5) data and privacy; (6) use of space and time; and (7) community partnerships. These frameworks and initiatives go beyond simply being a source of funding to supporting effective use and impact based on lessons learned.

State-Level Example: North Carolina

The story of North Carolina is one of state and local leadership supported by NGOs and a significant amount of federal and philanthropic funding directed toward equal educational opportunity. It is an example of a state-level program designed for impact from the start.

The timeline (reproduced with permission in **Annex 2**) shows a genesis point for EdTech in 2003 when state leaders formed the Business Education Technology Alliance (BETA) to address unequal access to educational opportunity across the state. A diverse team from the business, technology, government, and education sectors committed to putting technology in the hands of every learner and empowering teachers to be innovators in the classroom. The North Carolina Virtual Public School (NCVPS) was one of the first accomplishments in support of that goal. When NCVPS launched in 2005, the next statewide effort to create equitable access for all students was already underway. The School Connectivity Initiative (SCI) was a commitment to connect every school district and, later, every school to the broadband backbone that links North Carolina's colleges and universities. The modernization of the federal E-Rate program in 2014, which allowed funds to be used for Wi-Fi infrastructure within schools for the first time, making it possible to connect classrooms hosting 1.5 million students to the Internet through the NC Research and Education Network (NCREN).

In 2008, the state government and an in-state foundation—the Golden Leaf Foundation—initiated a 1:1 initiative. The Friday Institute, a policy and research institute within the College of Education at North Carolina State University, was chartered with gathering input from stakeholders and conducting research, evaluation, policy work, and professional development in support of the initiative. The Friday institute would become an important connector linking the foundation, the state government, and implementing school districts and assisting them in securing further funding and integrating lessons learned from research into new practice. In 2009, this collaboration led to a USD 400 million award from RTT that was directed toward increasing the effectiveness of NC teachers and principals, using data for decision-making, making a difference in the lowest-achieving schools, and updating the state's standards and accountability testing system. With this grant funding, North Carolina developed HomeBase, a platform that integrates information from 12 different sources to provide teachers, students, and parents with a range of tailored resources and information, such as curriculum-planning tools, lesson plans, assessment items, assignment tracking, and grade and attendance data.

Although EdTech was not the only subject of reform in the state at the time, achievement data show that graduation rates continued an upward trend that had begun before RTT grant implementation. Graduation attainment gaps narrowed. The achievement gap at graduation between white students and minority students was cut in half between 2009 and 2014, and the graduation achievement gap between economically disadvantaged students and their less-disadvantaged peers narrowed from 14.8 to 10.6 percentage points over the same period. In 2015, the Friday Institute released the NC Digital Learning Plan with recommendations for education leaders and policy makers on digital learning-related topics, such as infrastructure and devices, professional development, instruction and assessment, and funding.

This initiative is considered successful because from the onset, state leaders involved stakeholders across the educational system, built collaborative public–private partnerships, and took the time to develop a joint plan and a process to drive innovation and transform education.

Equity Focus

Government grant programs and non-profit and other efforts to equip schools or students with access at home and in their schools have been very successful. Funding access for disadvantaged youth in

living in low-income or rural communities is an integral part of all federal funding for connectivity initiatives and is even prioritized.

Although districts are still receiving funds from these programs and continuing to scale access to broadband Internet, devices, and digital content, they are also already implementing the next steps: making educational technologies accessible to students with a wide range of learning abilities and providing all students with highly interactive technology interactions, rather than simply consumption.

To ensure equitable support for students with disabilities, the Individuals with Disabilities Education Act (IDEA) mandates that schools provide assistive technology devices and services to all students with disabilities.⁴⁸ It also suggests that products and services should be developed following Universal Design for Learning (UDL) principles.⁴⁹ UDL provides strategies to ensure usability by people with a range of functional capabilities. Grants to state educational agencies and non-profit organizations support research, technology development, and other activities.⁵⁰

Summary

Exhibit 6 summarizes specific characteristics of the ecosystem that are relevant to scaling maturity in the US.

Exhibit 6: The Role of Existing Ecosystem Elements in EdTech Scaling in the United States

Category	Scaling Access	Scaling Use	Scaling Impact
Education System	Schools are well funded from the federal and local levels. Federal accountability requirements and assessments are connected to funding. Assessments are shifting to computerized formats.	Academic standards are challenging. Personal incentives for advanced curriculum or programs exist. Government provides strategic leadership.	Multi-year initiatives are focused on generating evidence. Incentivized funding is based on outcomes.
Enabling Infrastructure	Nationwide efforts to connect all individuals are implemented. School-specific funding is used.	The cost of devices, especially for one-to-one use, is decreasing. Pricing among manufacturers is competitive. Devices plus services are partially subsidized.	Networked platforms and communities of practice enable more informed choice of EdTech products and implementation support.
Human Capacity	Non-profit organizations help states/state leaders access federal funds and monitor progress.	Efforts to provide teacher training through EdTech providers, online training, and networks are ongoing. EdTech-specialized NGOs create and disseminate information, toolkits, rubrics, and other resources.	Capacity building for leadership and transformative use is implemented. State EdTech plans emphasize EdTech, supported by funding and guidance for districts. Media and advocacy groups bridge communication between government and users.

The EdTech Scaling Ecosystem

Key Ecosystem Elements

The study revealed several elements of the ecosystem in Indonesia that enable EdTech scaling; these elements have been integrated into the overall EdTech Scaling Ecosystem Model (see **Annex 1**) as the components indicated in the text boxes.

High level vision and strategy for EdTech, written into legislation:

- > The highest levels of government (federal, state, and district) articulate a clear vision for EdTech use, often even requiring the use of technology. This vision is not just spoken but also written into legislation that can carry on across changes in administration.
- > Initiatives (e.g., ConnectEd, Future Ready Schools) are well branded and communicated and become frameworks for funding and implementation opportunities.
- > Vision and strategy documents are written with impact in mind from the start, requiring essential components for scale beyond just access (e.g., professional development, counterpart funding, research and evaluation).

3.1 A clear vision and strategy for EdTech from the highest level of the education system serves as a collective roadmap.

EdTech funding opportunities:

- > The vision is backed by funded initiatives, such as RTT, that enable purchases of devices or implementation support services.
- > Philanthropies and other local sources, including state budgets, tax levies, and even, in one case, bank loans, are accessible sources of funding for EdTech purchases; philanthropies and grant funding also support EdTech advocacy organizations and NGOs.
- > Flexible decision-making at the district level allows textbook funds to be spent on digital content.

3.4 Equal opportunity sources of funding exist for EdTech purchases and implementation support.

Academic standards and standardized testing:

- > The Common Core and other academic standards make it easier for EdTech entrepreneurs to design for economies of scale, thereby creating revenue streams that can be reoriented into product improvement, implementation services, and research and evaluation, further impacting the ability to scale.
- > Accountability systems, including annual statewide assessments and non-federal tests (e.g., Teachers of English to Speakers of Other Languages [TESOL], SAT, ACT), create a large, standardized market for EdTech products and also incentivize schools and individuals to improve.

3.2 Performance standards set high expectations that incentivize improved performance and legitimize EdTech content development.

1.3 EdTech entrepreneurs have access to capital through appropriate business models, allowing them to survive and thrive.

Standards for connectivity and ICT skills:

- > The US government's official federal vision for EdTech began with and continues to include in policy documents and frameworks an emphasis on the need to develop digital skills to remain relevant and competitive in the modern workplace.
- > Computer-based standardized tests also create the necessity for basic computer literacy to take the tests and are a form of 'eAdministration' that also creates an environment for increased access to data and data dashboards, thereby furthering the utility of universal access to Internet, computer hardware, and businesses that cater to these services.

3.3 Education curriculum and policy include expectations for basic technology literacy for all teachers and students.

2.4 eGovernment (GovTech) initiatives connect schools through administrative platforms (i.e., EMIS, eProcurement) whose infrastructure can be harnessed for EdTech.

Government subsidized Internet connectivity (community and school):

- > Programs such as Lifeline and ConnectAll, which are funded through government subsidies, block grants, and USF funds, enable access to Internet connectivity in homes, schools, and community spaces (e.g., libraries).
- > Specific school connectivity initiatives (e.g., E-Rate, ConnectEd) enable connectivity at the school level.

2.2 There is universal access to Internet throughout the population through wireless, wired, or other means.

2.3 There are school-specific networking infrastructure initiatives for affordable, reliable school connectivity.

Mutually supportive public-private partnerships:

- > The vision and strategy mentioned above also create a framework by which public-private partnerships can contribute to school-level EdTech. The ConnectEd and Future Ready Schools initiatives are examples.
- > Hardware and software developers go beyond sales to schools to deliver packages of services and support.
- > Non-profit organizations and coalitions support implementation through training, guidelines, evaluation, and advocacy.
- > In the US, advocacy groups provide support for stakeholders in the education system to execute their respective roles in transformation and capacity building and to design for the future. Interest groups support the various stakeholders, and several initiatives (e.g., Future Ready Schools) have been launched with government funding and support.
- > Consortia and foundations are playing an important role in the ecosystem, bridging the gap between federal law, common standards, local aspirations, and classroom implementation. Note: The US context is unique in the extent to which NGOs can be sustained through private philanthropic funding or federal grants.
- > Requesting research and reports on impact was an integral part of federal grants, which drove insights and helped state and district leaders make evidence-based decisions.

1.4 Mutually beneficial, cross-industry, public and private sector partnerships support access to, use of, and impact of EdTech products and services.

4.3 Non-government coalitions and advocacy groups support quality EdTech scale up.

4.4 Communicating product effectiveness research, evaluation, and user experience.

Conclusions

The widespread use of EdTech in the US today is partially due to a range of federal policy initiatives and partially, as one interviewee said, attributable simply to the inevitable effect of “the march of technology” in our daily lives. The case of the US is instructive in terms of how high-level vision and initiatives have created a roadmap that states, districts, non-profits, and private sector entities can adhere to for legitimacy and coherence while implementing flexibly. The US has been successful in implementing policies and making funding available that encourage states and districts to accelerate the scaling of Internet access in schools and to implement and scale innovative, technology-supported approaches to teaching and learning. Making funds available based on demonstrated impact has helped to create best practice examples that increase the ease of adoption for other states and districts. Teacher training is considered a key factor by educators and education administrators for successfully scaling the use of EdTech in a transformative way. NGOs also play an important role in facilitating the capacity building and knowledge transfer necessary for scale.

Importantly, these high-level federal policies and initiatives were backed up by concrete funding opportunities for implementation. Replicating the scale of investment from government, philanthropies, and private sources evident in the US may be difficult elsewhere, but the lesson remains relevant: scaling EdTech requires both vision and funding. Similarly, NGOs, coalitions, and advocacy groups have been instrumental for knowledge transfer and capacity building, but these entities also operate based on philanthropic funding or act as partners to school districts receiving federal grants.

One challenge that remains in the US is how to provide decision makers in the EdTech space with helpful, unbiased evaluations and reviews of EdTech and content. No ideal, central, searchable hub through which to provide these insights exists, although there are individual sources of product reviews. Some attempts have been made to centralize and standardize reviews, such as the What Works Clearinghouse. This site has been found to be too complex for the average teacher to use efficiently, while others suffer from limitations or inconveniences that prevent them from having widespread impact. Ultimately, many participants in this study told us, their EdTech purchases are based on peer reviews or convincing direct sales and attractive licensing packages. The International Society for Technology in Education (ISTE), a non-profit organization, recently launched a new hub that aims to address these limitations, able to supply peer reviews to facilitate teacher selection and integration of EdTech to promote impact at scale.⁵¹

Annex 1. The EdTech Scaling Ecosystem Model

EDTECH SUPPLY AND BUSINESS MODELS

1.4 Mutually beneficial, cross-industry, public and private sector partnerships support access to, use of, and impact of EdTech products and services.

1.3 EdTech entrepreneurs have access to capital through appropriate business models, allowing them to survive and thrive.

1.2 There is an objective and simple way for users to select products that meet their needs.

1.1 Businesses have a cost-efficient marketing, sales, and distribution mechanism for reaching customers, whether business to government (B2G) or business to consumer (B2C).

4.4 There are multiple and varied ways of communicating product effectiveness research, evaluation, and user experience.

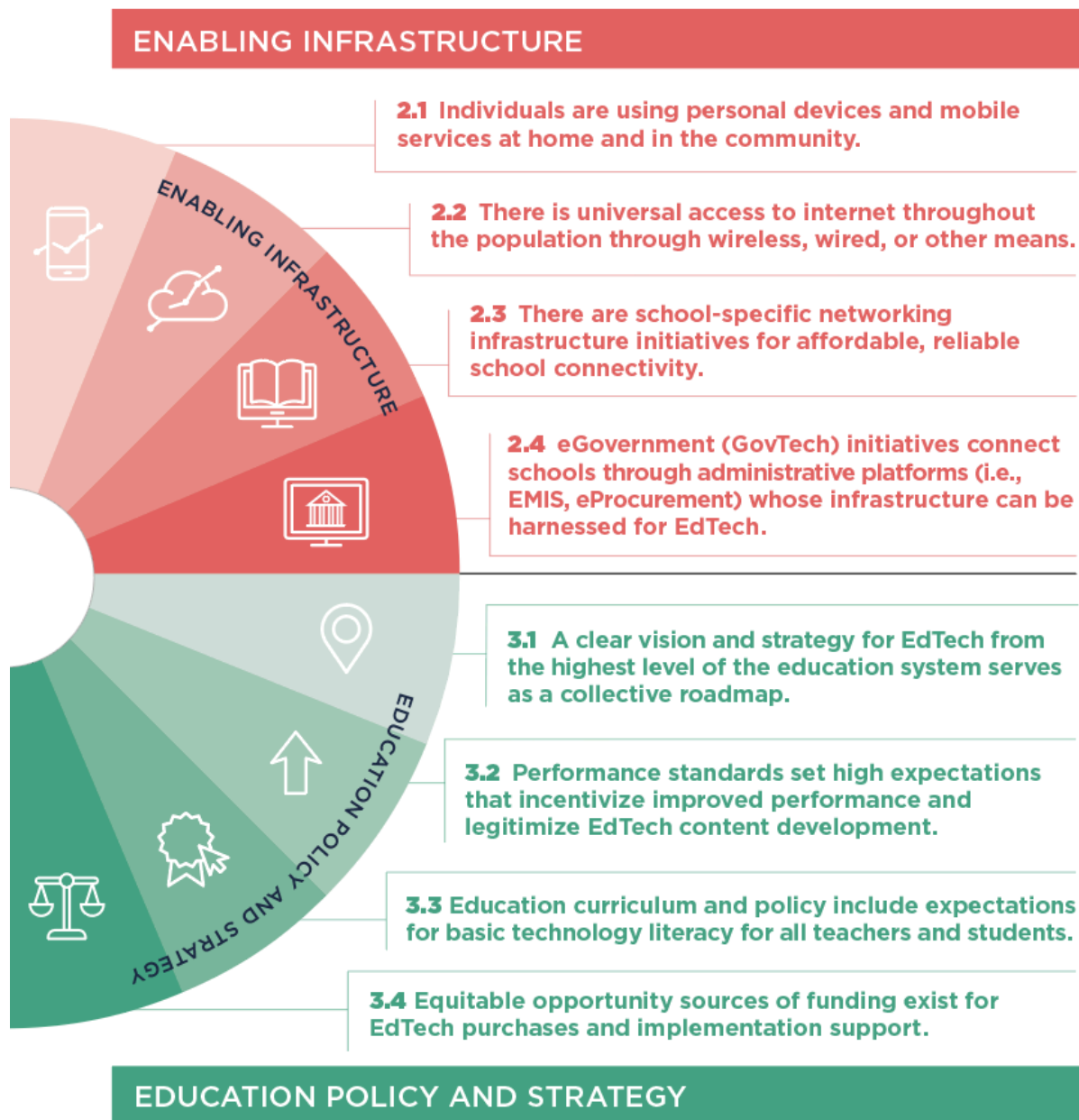
4.3 Nongovernment coalitions and advocacy groups support quality EdTech scale-up.

4.2 There are sufficient ongoing and equitable opportunities for stakeholder capacity building.

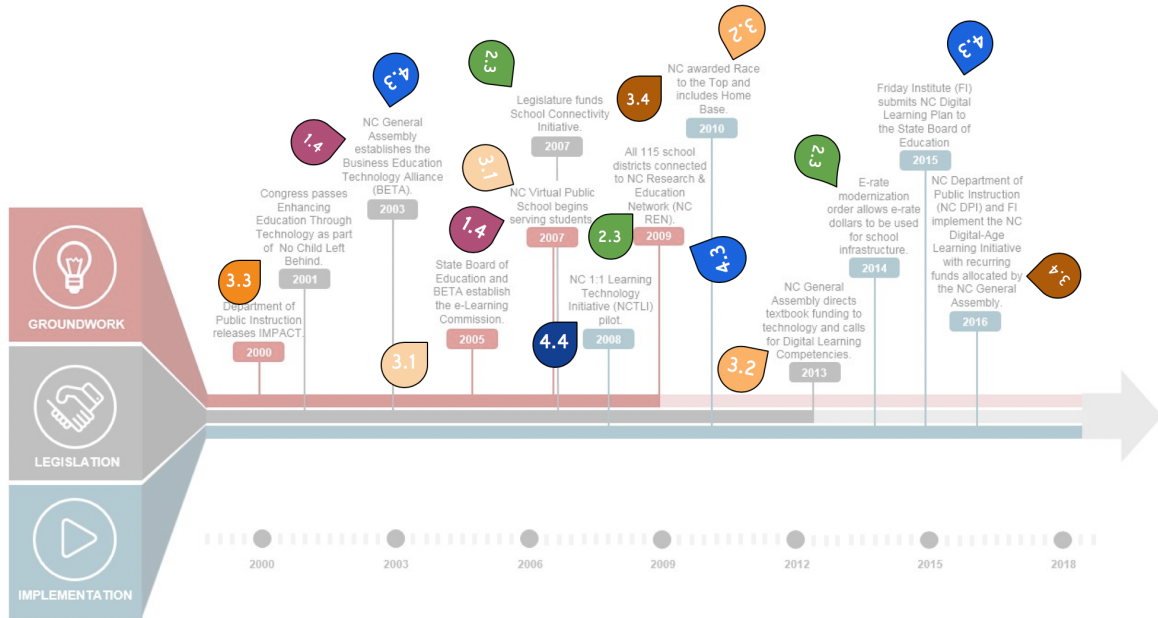
4.1 Local visionary leaders emerge to coalesce stakeholders around a bold common goal.



HUMAN CAPACITY



Annex 2. The Evolution of EdTech in North Carolina



Endnotes

ⁱ Jenny Perlman Robinson, Rebecca Winthrop, and Eileen McGivney, “Millions Learning: Scaling Up Quality Education in Developing Countries” (Washington D.C.: Brookings Institution, 2016). www.brookings.edu/wp-content/uploads/2016/04/FINAL-Millions-Learning-Report-1.pdf

ⁱⁱ J-PAL Evidence Review, “Will Technology Transform Education for the Better?” (Cambridge, MA: Abdul Latif Jameel Poverty Action Lab, 2019). www.povertyactionlab.org/sites/default/files/documents/education-technology-evidence-review.pdf

³ EducationSuperhighway. (2018). *2018 State of the states: Expanding digital learning to every classroom, every day*. Retrieved from <https://s3-us-west-1.amazonaws.com/esh-sots-pdfs/2018%20State%20of%20the%20States.pdf>

⁴ Futuresource Consulting, Ltd. (n.d.). *Education technology*. Retrieved from <https://futuresource-consulting.com/reports/categories/education-technology/>

⁵ For example, Pearson attributes part of its USD 2.5 billion profit loss to competition from digital publishers and resellers (Sweeney, 2017) and admitted “...we are taking more radical action to accelerate our shift to digital models, and to keep reshaping our business” (Grochola, 2018).

Grochola, K. (2018, February 26). The future of educational publishers. *eLearning Industry*.

<https://elearningindustry.com/future-of-educational-publishers>

Sweeney, M. (2017, January 18). Pearson profit warnings wipe almost £2bn off its value. *The Guardian*.

<https://www.theguardian.com/business/2017/jan/18/pearson-penguin-random-house-shares-dive-profit-warning>

⁶ US Census Bureau. (2018). *U.S. Census Bureau current population*. Retrieved from <https://www.census.gov/popclock/print.php?component=counter>

⁷ Credit Suisse Research Institute. (2017). *Global wealth databook 2017*. Retrieved from <http://rogerannis.com/wp-content/uploads/2017/11/Credit-Suisse-Global-Wealth-Databook-2017.pdf>

⁸ Semega, J. L., Fontenot, K. R., & Kollar, M. A. (2017). *Income and poverty in the United States: 2016—Current population reports* (pp. 12 & 17). Retrieved from

<https://www.census.gov/content/dam/Census/library/publications/2017/demo/P60-259.pdf>

⁹ Philanthropy Roundtable. (n.d.). *Statistics on U.S. generosity*. Retrieved from <https://www.philanthropyroundtable.org/almanac/statistics/u.s.-generosity>

¹⁰ Charity Navigator. (2017). *Giving statistics*. Retrieved from

<https://www.charitynavigator.org/index.cfm?bay=content.view&cpid=42>

¹¹ Charter schools are autonomous, state-authorized, public schools that can be founded by individuals, foundations, or for-profit or non-profit entities. Students are enrolled by choice, rather than by residential address. Although charter schools are held to the same standards of performance as other schools, they have more flexibility to provide alternative curricula, methods, and resource management.

¹² National Center for Education Statistics. (2018). *Fast facts: Back to school statistics*. Retrieved from

<https://nces.ed.gov/fastfacts/display.asp?id=372>

¹³ Ray, B. D. (2018). *Homeschooling growing: Multiple data points show increase 2012 to 2016 and later*.

Retrieved from <https://www.nheri.org/homeschool-population-size-growing/>

¹⁴ National Center for Education Statistics. (2017). Table 216.20. Number and enrollment of public elementary and secondary schools, by school level, type and charter and magnet status: Selected years, 1990-91 through 2015-16. *Digest of Education Statistics*. https://nces.ed.gov/programs/digest/d17/tables/dt17_216.20.asp

¹⁵ National Center for Education Statistics. (2018). *Fast facts: Back to school Statistics*. Retrieved from

<https://nces.ed.gov/fastfacts/display.asp?id=372>

¹⁶ *Ibid.*

- ¹⁷ US Department of Education. (2001). *NCLB executive summary*. Retrieved from <https://www2.ed.gov/nclb/overview/intro/execsumm.html>
- ¹⁸ Ryan, C. (2018). *Computer and Internet use in the United States: 2016*. Retrieved from <https://www.census.gov/content/dam/Census/library/publications/2018/acs/ACS-39.pdf>
- ¹⁹ FCC. (2018). *2018 broadband deployment report*. Retrieved from <https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2018-broadband-deployment-report>
- ²⁰ Ryan, C., & Lewis, J. M. (2017). *Computer and Internet use in the United States: 2015*. Retrieved from <https://www.census.gov/content/dam/Census/library/publications/2017/acs/acs-37.pdf>
- ²¹ FCC. (2018). *2018 broadband deployment report*. Retrieved from <https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2018-broadband-deployment-report>
- ²² National Center for Education Statistics. (2018). Executive summary. *Student access to digital learning resources outside of the classroom*. <https://nces.ed.gov/pubs2017/2017098/index.asp>
- ²³ National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform*. Retrieved from <https://www2.ed.gov/pubs/NatAtRisk/index.html>
- ²⁴ OET, US Department of Education. (2017). *2017 National Education Technology Plan update*. Retrieved from <https://tech.ed.gov/files/2017/01/NETP17.pdf>
- ²⁵ FCC. (n.d.). *Lifeline program for low-income consumers*. Retrieved February 20, 2019, from <https://www.fcc.gov/general/lifeline-program-low-income-consumers>
- ²⁶ OET, US Department of Education. (n.d.). *ConnectEd*. Retrieved from <https://tech.ed.gov/connected/>
- ²⁷ The White House. (2013). *ConnectED: President Obama's plan for connecting all schools to the digital age*. Retrieved from https://obamawhitehouse.archives.gov/sites/default/files/docs/connected_fact_sheet.pdf
- ²⁸ The White House. (n.d.). *ConnectEd Initiative*. Retrieved February 20, 2019, from <https://obamawhitehouse.archives.gov/issues/education/k-12/connected>
- ²⁹ The White House. (2013). *ConnectED: President Obama's plan for connecting all schools to the digital age*. Retrieved from https://obamawhitehouse.archives.gov/sites/default/files/docs/connected_fact_sheet.pdf
- ³⁰ Flipped classrooms are defined by an instructional strategy where students are introduced to a concept outside of the classroom, usually using digital resources, and then, the classroom serves to deepen that knowledge through activities, group work, questioning, and reflection in the classroom.
- ³¹ Carolan, J., & Gong, C. (2017). *A year in review: 2017 trends that fuel edtech innovation and investments*. Retrieved from <http://www.blended.blog/year-review-2017-trends-fuel-edtech-innovation-investments/>
- ³² Strauss, V. (2013, December 8). Education innovation: A case study in what not to do. *Washington Post*. <https://www.washingtonpost.com/news/answer-sheet/wp/2013/12/08/education-innovation-a-case-study-in-what-not-to-do/>
- ³³ Molnar, M. (2017, February 23). Feds drop investigation into Los Angeles district over \$1 billion iPad purchase. *EdWeek Market Brief*. <https://marketbrief.edweek.org/marketplace-k-12/feds-drop-investigation-los-angeles-district-1-billion-ipad-purchase/>
- ³⁴ See, for example: Hazlett, T. W., Schwall, B., & Wallsten, S. (2016). *The educational impact of broadband subsidies for schools under E-Rate*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2796048
- ³⁵ District Reform Support Network. (2016). *Transforming the culture of teaching and learning: Four Race to the Top-district grantees' implementation of personalized learning*. Retrieved from <https://rttd.grads360.org/#communities/pdc/documents/12121>
- ³⁶ US Department of Education. (2016). *Advancing educational technology in teacher preparation: Policy brief*. Retrieved from <https://tech.ed.gov/files/2016/12/Ed-Tech-in-Teacher-Preparation-Brief.pdf>
- ³⁷ ISTE. (n.d.). *Fact sheet: ESSA Title IV Part A: Understanding the flexible block grant*. Retrieved February 20, 2019, from https://www.iste.org/docs/advocacy-resources/title-iv-fact-sheet-for-essa_final.pdf
- ³⁸ CoSN. (2018). *K-12 IT leadership survey report*. Retrieved from <https://www.cosn.org/sites/default/files/final%20IT%20Leadership%202018.pdf>
- ³⁹ For more information on the OER Library, see: Office of Superintendent of Public Instruction, State of Washington. (n.d.). *Open educational resources (OER): Reviewed OER library*. Retrieved February 20, 2019, from <http://www.k12.wa.us/OER/Library.aspx>

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- ⁴⁰ OpenUp Resources. (n.d.). *OpenUp Resources*. Retrieved February 20, 2019, from <https://openupresources.org/>
- ⁴¹ Iskme. (n.d.). *Iskme*. Retrieved February 20, 2019, from <https://www.iskme.org/>
- ⁴² CK-12. (n.d.). *CK-12*. Retrieved February 20, 2019, from <https://www.ck12.org/>
- ⁴³ Nearpod. (n.d.). *Nearpod*. Retrieved February 20, 2019, from <https://nearpod.com/>
- ⁴⁴ Genius Plaza. (n.d.). *Genius plaza*. Retrieved February 20, 2019, from <https://www.geniusplaza.com/en/>
- ⁴⁵ SETDA. (n.d.). *Transformative digital learning: A guide to implementation*. Retrieved from <https://digitallearning.setda.org/>
- ⁴⁶ US Department of Education. (2015). *Fundamental change: Innovation in America's schools under Race to the Top*. Retrieved from <https://www2.ed.gov/programs/racetothetop/rttfinalrptfull.pdf>
- ⁴⁷ Klein, A., & Sparks, S. D. (2016, March 28). Investing in Innovation: An introduction to i3. *Education Week*. Retrieved from <https://www.edweek.org/ew/articles/2016/03/23/investing-in-innovation-an-introduction-to-i3.html>
- ⁴⁸ Individuals with Disabilities Education Act, 34 C.F.R. § 300.5 (2018). <https://www.govinfo.gov/content/pkg/CFR-2018-title34-vol2/pdf/CFR-2018-title34-vol2-part300.pdf>
- ⁴⁹ *Ibid.*
- ⁵⁰ US Department of Education, IDEA. (n.d.). *About IDEA: History of the IDEA*. Retrieved from <https://sites.ed.gov/idea/about-idea/#IDEA-History>
- ⁵¹ Cavanagh, S. (2018, November 26). ISTE, LearnPlatform create online hub for peer-to-peer reviews of ed-tech tools. *EdWeek Market Brief*. <https://marketbrief.edweek.org/marketplace-k-12/iste-learnplatform-create-online-hub-peer-peer-reviews-ed-tech-tools/>



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