State Digital Learning Exemplars

Highlights from states leading change through policies and funding

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ABOUT THIS REPORT

This report was developed by the Friday Institute for Educational Innovation at North Carolina State University in collaboration with the State Education Technology Directors Association (SETDA).

The mission of the **Friday Institute for Educational Innovation** at the NC State University College of Education is to advance education through innovation in teaching, learning, and leadership. The Friday Institute conducts research, develops educational resources, provides professional development programs for educators, advocates to improve teaching and learning, and helps inform policy-making. The Friday Institute is in the process of developing the North Carolina Digital Learning Plan, which includes a comprehensive asset and needs assessment of how schools and districts in the state can transition to digital learning to improve student outcomes. The plan includes an emphasis on human capacity, which builds upon the Friday Institute's extensive experience in providing and evaluating professional learning opportunities for state and district level leaders, principals, instructional coaches, and educators. http://fi.ncsu.edu/

Founded in the fall of 2001, the **State Educational Technology Directors Association (SETDA)** is the principal association serving, supporting, and representing US state and territorial educational technology leadership. Our mission is to build and increase the capacity of state and national leaders to improve education through technology policy and practice. SETDA's work is supported by state membership dues, private sector partner contributions and charitable foundations. http://setda.org/

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INTRODUCTION

Manufacturing and factories, which influenced subjects, teaching models and even classroom design have been replaced by an economy of creating, developing and selling across a vast array of platforms. The jobs of today, and tomorrow, will require an entirely new system of learning—online and offline, in traditional settings and in the real world, inside and outside walled classrooms.

–"Learner at the Center of a Networked World," The Aspen Institute

Technology impacts all aspects of our lives —it has changed and enhanced everything from how we socialize to how we interact professionally. It has changed how we plan personally, professionally, and financially. Similarly, technology has the potential to enhance educational experiences for students through digital learning. Schools that are infused with digital learning have found that technology is a critical component to meet the needs of all digital-age learners.

States, districts, and schools have made - and will continue to make — investments in devices, bandwidth, networking, digital content, and teacher training to promote digital learning. Many are upgrading and expanding the digital resources that serve as an integral part of specific initiatives such as a one-to-one program, online assessments, or school improvement goals. Others have broader digital learning initiatives like project-based learning, personalized learning, or competency-based education, which are enhanced by technology. With digital learning, teachers have the potential to personalize learning for all students. Students are more engaged in a digital learning environment, in part because it is more in line with how students learn and interact with the world. Further, digital learning represents how students will be expected to learn in college and career. Digital learning can increase access to high quality educational opportunities and contribute to narrowing the achievement gap.
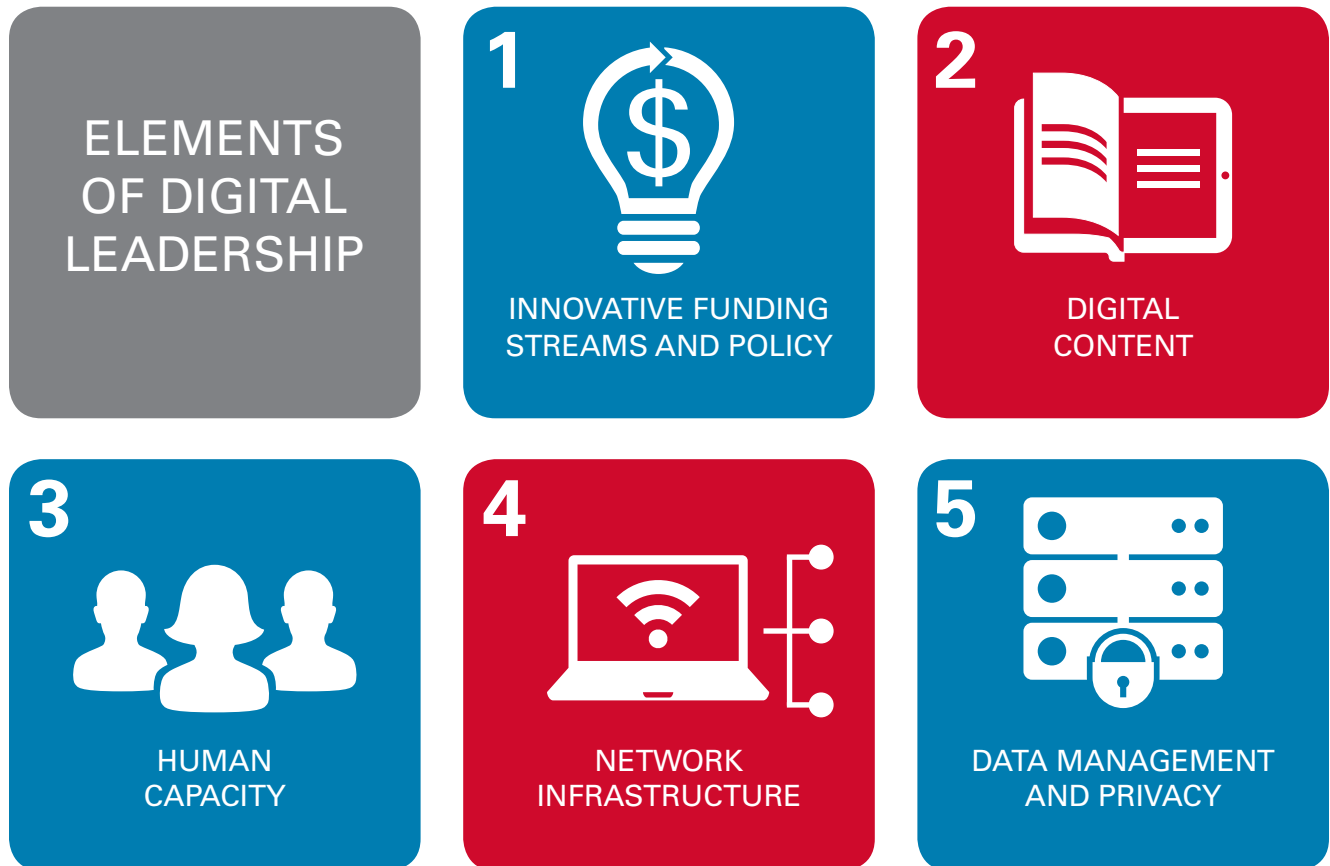
What is Digital Learning?

The Alliance for Excellent Education defines digital learning as "any instructional practice that is effectively using technology to strengthen the student learning experience. Digital learning encompasses a wide spectrum of tools and practices, including online and formative assessments, increased focus and quality of teaching resources, reevaluating the use of time, online content and courses, applications of technology in classrooms and school buildings, adaptive software for students with special needs, learning platforms, participation in professional communities of practice, access to high-level and challenging content and instruction, and many other advancements technology provides to teaching and learning."

Report Background

This report was developed by the Friday Institute for Educational Innovation at North Carolina State University in collaboration with the State Education Technology Directors Association (SETDA). Research was conducted by reviewing a variety of sources including the State Education Policy Center, Digital Learning Now, the Data Quality Campaign, the National Conference of State Legislatures, and individual state legislative and policy websites.

Many states are looking to support the expansion of technology tools and resources in K12 education through state policies, programs and funding in order to provide digital learning opportunities for all students. While much movement toward digital learning happens at the school or district level, state policymakers should consider several factors as these efforts are promoted, including:

ELEMENTS OF DIGITAL LEADERSHIP	**1** INNOVATIVE FUNDING STREAMS AND POLICY	**2** DIGITAL CONTENT
3 HUMAN CAPACITY	**4** NETWORK INFRASTRUCTURE	**5** DATA MANAGEMENT AND PRIVACY

Innovative Funding Streams and Policy: The degree to which state legislatures and state boards of education fund digital learning and pass policies to promote digital innovation.

Digital Content: The flexibility to include digital resources, including the vetting, deployment, and delivery of these resources to the classroom level.

Human Capacity: The positions and ongoing training necessary to ensure that teachers and leaders know how to leverage the technology provided in schools in a way that promotes student learning.

Network Infrastructure: The statewide infrastructure, broadband access, and relevant supports that are necessary for digital learning.

Data Management and Privacy: The development of data management and privacy policies design to protect students' personally identifiable information.

ELEMENTS OF DIGITAL LEARNING LEADERSHIP

While there has been progress toward digital learning nationwide, several states have emerged as leaders in embracing digital learning via state policies and practices in all five areas described above: Alabama, Indiana, Kentucky, North Carolina, and Utah. This report also highlights other states with significant progress in at least one of the specific five areas.

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This report presents evidence of what the nation's leaders in digital learning are doing at the state level. It is not intended to pass judgment upon progress, but rather to objectively share what is happening across the nation and to highlight select state models for digital learning. The goal is to present useful case studies and lessons from which others can learn.

In order to identify leaders in digital learning, data was pulled from several sources including the State Education Policy Center, Digital Learning Now, the Data Quality Campaign, the National Conference of State Legislatures, and individual state legislative and policy websites. To ensure consistency, we looked for the following during our research:

Research Category	Guiding Questions
Innovative Funding Streams and Policy	Has this state passed legislation, which promotes innovation across the state? How has the state leveraged existing funding streams or created new funding streams to support digital learning statewide?
Digital Content	Does the state have a legal definition of content, which moves beyond a paper textbook and allows for the use of digital resources? Does this state have a content repository and/or a vetting and adoption process for these resources? How does the state address Open Education Resources?
Human Capacity	How does this state ensure that there is capacity for digital learning in every school? What professional learning opportunities are available to support digital learning for current and future teachers?
Network Infrastructure	Has the state developed infrastructure to support broadband access at every school across the state?
Data Management and Privacy	Does the state have a comprehensive data security plan with procedures for breaches, restrictions on what data can be collected, and how data may be used by outside groups?

Innovative Funding Streams and Policy

Without strategic short- and long-term budgeting, it is difficult for states to provide ongoing, effective digital learning. Funding for digital learning should come from a consistent funding stream to ensure sustainability. Spending should align with the statewide vision for digital learning to promote effective and efficient uses of technological tools and resources.[1] State leaders are uniquely equipped to help districts and schools leverage consistent funding sources and provide flexibility to innovate. Thus, in reviewing the states, we consider what funding streams support digital learning on an on-going basis and how state leaders use legislation to promote innovation in districts.

Digital Content and Resources

Technology, infrastructure, and data management are necessary but not sufficient conditions for digital learning. States moving away from traditional textbooks and towards digital content are better suited to provide students with digital learning opportunities. As Digital Promise explains, "for the promise of learning technology to truly become reality for students and teachers, classrooms have to be equipped with tools that fit their needs."[2]

Digital content offers many advantages over traditional content. It is easy to update and access, and it provides multiple ways for students to engage. No longer must learning occur when a student is at school with the textbook in front of him or her—now, learning can occur anytime, anywhere; and students can learn from text, videos, graphics, animations, simulations, virtual labs, online assessments, and more.[3]

Therefore, in reviewing state programs, one major consideration was how the state defines a "textbook" and whether or not the legal definition provides the flexibility for schools to use more robust digital content and open educational resources. Additionally, it was important to consider whether or not the state has a place, such as an online content repository, to share high quality, vetted digital content with teachers.

Human Capacity

In a transition to digital learning, the success of a program can often hinge upon the effectiveness of the training that educators and administrators receive. As Learning Forward describes, "increasing the effectiveness of professional learning is the leverage point with the greatest potential for strengthening and refining the day-to-day performance of educators." In reviewing state policies and initiatives, it is important to consider how the state builds capacity for digital learning in every school by providing professional learning opportunities, making resources for professional learning available to teachers digitally, coaching, or through other methods.

In the digital learning world, professional learning can occur online through content repositories, communities, or courses. Online trainings allow teachers to access content when they need it and as they are ready for it, rather than having to attend the professional development sessions that are available and depending upon the availability of funds for a classroom substitute.

Network Infrastructure

Although devices and wireless access alone are not sufficient to create a true digital learning environment, digital learning cannot occur without a robust network and infrastructure. Well-planned deployment of broadband and devices can promote the kind of anytime, anywhere learning necessary for digital learning environments to thrive.[4]

The Federal Communications Commission's E-Rate program promotes the creation of infrastructure for internet access in all schools.[5] This lays the foundation for equitable access and works to close the digital divide. Each state is asked whether they provide the necessary statewide infrastructure to support access in every school and enable the deployment of devices.

Data Management and Privacy

Digital learning and technology make data more available and more robust on a regular basis in a consumable format. This data can greatly improve decision-making and information sharing at the state level. However, data must be safely accessible to the right people at the right time in order to maximize its use to improve student outcomes.[6] As a result, one major question researched for each state is whether or not the state safely collects, stores, and shares data and has a comprehensive plan that addresses breaches, restrictions, and procedures for sharing data.

STATE LEADERS

In the review of state policies and systems to support digital learning, some states have moved further along in their digital learning transitions than others. These states have policymakers that embrace digital learning and are implementing legislation and policies to provide funding and opportunities. These states have crafted a path for digital learning statewide for all students. The states listed seem to have provided support in the five key areas most comprehensively. As noted below, other states have taken leadership in at least one of the essential elements. As noted above, there is no one road for success; and each state addresses the various areas of digital learning differently. As leaders in other states make progress along their own digital learning transition, the following states might provide useful case studies from which policymakers can learn.

Alabama

Alabama has taken many steps toward developing a comprehensive and customized approach to digital learning. Alabama crafted several home-grown solutions for digital learning-specific challenges that appeal to educators and students across the state.

Innovative Funding Streams and Policies: Alabama's legislature and State Board of Education have been very supportive of digital learning; each of the initiatives described above has an accompanying supportive statute or policy. Students in Alabama must take one course online in order to graduate; however, given that home access is a challenge for many Alabama students, the state has modified this requirement to allow students to take online courses during school hours in an onsite computer lab. While not "anywhere, anytime" learning in its truest form, this solution provides all students with an opportunity to build digital competencies and learn in digital environments.

Digital Content: Alabama is also a leader in the quality and variety of digital content available to teachers and students. The Alabama Learning Exchange (ALEX) is a nationally recognized content repository filled with lesson resources, tools, and strategies for teachers. ALEX includes some OER materials recommended by the state through its OER specific vetting process. In order to curate these materials, Alabama conducts a three-tiered review panel for every resource. There is also a five-year review process for outdated materials.[7]

ALEX hosts quarterly or bi-annual Digital Content Summits during which teachers develop and submit OER content for the repository. The state is leading a new project to create digital textbooks on Alabama history in collaboration with several districts; Creative Commons Licensing is being considered for the Alabama history content.

Human Capacity: Alabama builds teacher and school capacity in two ways. The robust online learning portal for teachers, *ACCESS*, provides many opportunities for teachers to integrate professional development into their schedules. In addition, in 2014 the legislature appropriated funds specifically for supporting digital technology coaches in every school district.[8]

Network Infrastructure: According to *Digital Learning Now*, every school in Alabama has high-speed, broadband access via the *Connecting ALABAMA* initiative and the creation of the *Alabama Research and Education Network*.[9]

Data Management and Privacy: The Alabama State Board of Education adopted one of the most comprehensive privacy policies in the nation in October 2013.[10] This policy limits what data can be collected, how it should be stored, who can access it, and how it can be used. Alabama also created a new position, the Chief Privacy Officer for Education. These actions indicate a commitment to securing student data in the digital age.

Indiana

Indiana has promoted digital learning largely by modeling what it wants from schools and districts. Indiana's digital learning strengths lie in innovative funding and policies and in its teacher pipeline initiatives.

Innovative Funding Streams and Policies: The state has a tiered Innovative Planning Grants program that focuses on digital learning. This grant process allows districts that are in the early stages of their conversion to digital learning to apply for a small amount of money to create a leadership team to start planning strategically, learn from other districts, and create an action plan for successful implementation of a digital learning plan. Typically these are $30,000 grants, and 10 to 12 districts are selected per year. These districts also receive support from state team leaders to ensure planning is successful and realistic.

For those districts that are more advanced in their progress toward supporting fully digital learning environments, the state offers larger grants of approximately $100,000 each. These funds can be used to implement blended learning models or to innovate and try out newer models, depending on district and school readiness and interest.[11]

Digital Content: In 2009, the Indiana State Board of Education issued a blanket waiver to all districts that allowed them to purchase digital content or devices with part or all of the money they previously spent on textbooks. In 2011, the State Legislature demonstrated their support by codifying this policy in law.[12]

Human Capacity: The Indiana Department of Education's Office of eLearning provides a great deal of support for teachers, coaches, and principals as they move into digital learning environments. For example, they have created a "21st century lab" that hosts eLearning webinars, they were one of the first to create a statewide Twitter chat, and they have created online communities for administrators and coaches to better enable them to support teachers as they move to digital learning.[13]

Additionally, the Department of Education hosts the Summer of eLearning regional conferences to provide high quality, intensive professional learning experiences to educators across the state. The conferences are hosted by districts across the state, involving more than 40 districts in 2015.[14]

Network Infrastructure: According to *Digital Learning Now*'s 2013 report card, all schools in Indiana have high-speed broadband internet access.[15] The State Education Policy Center's survey reports that the state budgets $1.8 million for connectivity annually. The state distributes this money via a formula that supplements E-Rate to provide equitable funding across schools; however, the funding is only accessible to schools on the state network.[16]

Data Management and Privacy: State Code Section 1.IC 5-28-7-1 provides grants to eligible school corporations and charter schools to support cooperative arrangements with businesses for training students. The policy outlines requirements organizations must follow in the event of a data security breach.

Kentucky

Kentucky has more gradually implemented digital learning initiatives. However, the steady progress provided the foundation for ongoing growth. This approach has made Kentucky successful in promoting digital learning.

Innovative Funding Streams and Policies: Kentucky has a robust competitive grant program that allows districts the opportunity to receive various policy waivers. This program, called Districts of Innovation, encourages districts to consider school-wide innovations such as competency-based learning, multiple pathways to graduation, transformations in time and spaces for learning, and flexibility with school staffing and governance structures. Further, during the 2014 Regular Session of the Kentucky General Assembly, House Bill 211 was passed and signed into law by Gov. Steve Beshear. Among many other things the law did, it modified and expanded legislation passed in 2011 that created "Non-Traditional Instruction" opportunities, which now gives all school districts the option to conduct school through virtual or other non-traditional means on days that the district would have normally had to call school off. While these do not explicitly require for digital learning, the 2013 and 2014 participating districts have used the learning design to push forward in providing students with devices, putting wireless access points in buses, and to allow for personalized learning to occur anytime, anywhere.[17] Kentucky has also published and promoted Digital Learning Guidelines for schools and districts to reference when designing new learning experiences for students.

Digital Content: Kentucky code does not define digital content or OER by name. However, the definition of instructional materials is broad and encompasses many types of content, including digital content.[18] Kentucky has laid a lot of ground work to be able to implement digital and OER materials in the future. For example, although Kentucky has not yet recommended or endorsed OER materials; there is a process and a central distribution point (its online repository, the Continuous Instructional Improvement Technology System, CIITS) to support this in the future. Additionally, Kentucky is working with the Council of Chief State School Officers, Georgia, and North Carolina to identify English Language Arts and Math OER materials and they have adopted eight rubrics to ensure quality content.[19, 20]

Human Capacity: The Kentucky Department of Education provides support for teachers, coaches, and principals as they move into digital learning environments. For example, the Kentucky Student Technology Leadership Program (STLP™) uses project-based learning principles to empower student learning and achievement through the use (and creation) of technology-based solutions to school and community needs. Kentucky has nearly 24,000 students (over 9,000 reported female students) and about 900 teachers, in over 700 schools participating in regional and statewide events every year. The Digital Learning Team at the Kentucky Department of Education also provides digital integration guidance, technical assistance, resources, training, and identification of best practices in digital instruction for Kentucky students, schools and districts as a method to close achievement gaps. Additionally, the Department of Education hosts summer Digital Learning Symposiums to promote high quality, intensive professional learning experiences to educators across the state.

Network Infrastructure: In 2006 the state legislature agreed to provide funding for the deployment of the improved and enhanced Kentucky Education Network (KEN).[21]

According to Digital Learning Now's 2013 report card, as a result of KEN all schools have high-speed broadband internet access.[22]

Data Management and Privacy: Chapter 84 requires the state Department of Education to notify parents and community members when there is a data security breach.[23] Chapter 74 requires state agencies to implement, maintain, and update data security procedures and practices. This includes taking corrective action where necessary in order to proactively safeguard against security breaches.[24]

North Carolina

Ahead of the changes that will be included in the state's new Digital Learning Plan (to be released in 2015), North Carolina has already made substantial progress in bringing digital learning to every district across the state.

Innovative Funding Streams and Policy: State Law 2013-12 requires the North Carolina Department of Public Instruction (NCDPI) to assist districts in the transition from textbooks to digital materials by 2017. These materials must be effective for all learners and align with the curriculum and standards. Such a law promotes progress toward some level of digital learning statewide. Further, State Law 2013-11 and State Law 2013-226 call on the State Board of Education to develop and implement digital teaching and learning standards for teachers and administrators by July 2017. This ensures that all teachers will have some level of competency for leading digital learning environments.

The passage of these laws in 2013 represents statewide momentum to move to digital learning by 2017. To facilitate important first steps toward this goal, NCDPI asked the Friday Institute for Educational Innovation to comprehensively consider the changes required in a statewide transition to digital learning, the state's role in these changes, and to make recommendations via the NC Digital Learning Plan. Their expertise in the areas of network infrastructure, professional learning, and digital resources will come together in a comprehensive plan in the fall of 2015.[25]

Digital Content: As part of its Race to the Top grant, NCDPI implemented an instructional improvement system. The efforts connected to HomeBase strive to create a single login portal that will coordinate access to student records, teacher lesson plans, teaching resources, professional development resources, teacher-student communication tools, online student learning opportunities, and teacher evaluation tools. HomeBase is also one hub for OER across the state. Not only does DPI endorse OER materials on HomeBase, it has also created a series of resources including Crosswalks of state standards and other instructional resources that are aligned with the state standards. In addition, for more than ten years, the Digital Teaching and Learning division of NCDPI has offered NC WiseOwl as a free resource for districts statewide. NC WiseOwl provides several subscription databases to educators at no charge.

Human Capacity: NCDPI has a number of statewide initiatives designed to build capacity in state, district, and school level leaders, many of which are in partnership with the Friday Institute for Educational Innovation. The North Carolina 1:1 Learning Technology Initiative (NCLTI) is a partnership between the Friday Institute and the state's Board of Education. It is a strategic initiative designed to address pedagogy, technology/ infrastructure, policy, professional development, community engagement, funding, and organization as necessary components of a sustainable model for supporting future-ready students in North Carolina.[26]

NCDPI also supports the building of professional human capacity by offering trainings through a regional system of support. There are rich instances of online professional development as well as face-to-face options. North Carolina's partnership with Intel® Education offers varied strategies for education professionals across the state.

Additionally, the Friday Institute has partnered with the North Carolina Principal and Assistant Principal Association (NCPAPA) to provide the Distinguished Leadership in Practice - Digital Learning program (DLP-DL). DLP-DL is a professional development program geared toward principals. It coaches and guides principals as they create digital learning environments in their schools. The program uses a blended model for learning and is grounded in real school-based applications and best practices for leading a successful digital transformation.[27]

Offered through a partnership between the N.C. Department of Public Instruction, UNC School of Government's Center for Public Technology and MCNC, the Certified Educational Chief Technology Officer (CeCTO) program is one of the nation's first technology-centered certification programs for educators. The program features two components – one designed for superintendents and the other for technology directors. Superintendents participate in the "Leaders for the 21st Century" track – a 20-hour instructional course supplemented with required collaborative sessions with CeCTO candidates. Technology directors participate in 240 hours of instruction.

Network Infrastructure: Microelectronics Center of North Carolina (MCNC) is a technology non-profit that builds, owns, and operates a leading-edge broadband infrastructure for North Carolina's research, education, non-profit healthcare, and other community institutions. In 2010, MCNC was awarded two rounds of Broadband Technologies Opportunities Program funding to expand high-speed connectivity through the *North Carolina Research and Education Network*. As a result of their work in conjunction with the Friday Institute and NCDPI every school across the state has wireless broadband access.

Data Management and Privacy: SL 2014-50, passed in 2014, requires the NCDPI to notify parents of their rights regarding data collection, and it allows them to amend their students' data or opt out entirely. SL 2014-50 also establishes systems and requirements for data storage and transfer and defines who can access student data and how that data should be stored.
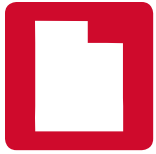
Utah

Utah has long been a leader in e-learning. The establishment of its virtual school and other early adoptions positioned it to be one of two states to receive an "A" on Digital Learning Now's annual rankings. Since the founding of its virtual school, state leaders in Utah have taken other steps in data management and privacy, as well as digital content, to continue to be leaders in providing digital learning opportunities for all students.

Innovative Funding Streams and Policies: Utah has passed a number of policies to further digital learning. First, SB 65 set the stage for Utah to become a leader in digital learning in 2011. This law established the statewide online learning program and, according to Governors Jeb Bush and Bob Wise, "put Utah and its students at the forefront of K-12 digital learning policy in the country."[28] More recently, Utah created the Smart Schools Technology Program. This program, signed into law in 2013, provides funds for selected schools to go one-to-one.[29] In 2013, Utah passed House Bill 393, Competency Based Education Amendments, which changed the state funding formula to distribute funds to school districts that establish competency-based education. This policy addresses a major challenge for competency-based learning and provides a legal basis for students to enroll in a class from any geographic location within the state.

Digital Content: Utah has a very robust approach to digital content including digital textbooks, OER, an online portal, and cross-state collaboration. Utah defines OER as "materials that have been created using content that is not copyrighted, and therefore restricted in use."[30] The Instructional Materials Advisory Committees evaluate OER materials submitted by publishers and then share recommendations with Instructional Materials Commission. The final recommendations then go to the State Board of Education. Utah's online OER portal includes items recommended by the state. The items are reviewed in Utah's online Recommended Instructional Materials Searchable database (RIMS) under "OER" as the publisher. Utah also participates in the K12 OER Collaborative, a national initiative led by a group of twelve states seeking to create open, comprehensive, high-quality OER aligned with rigorous learning standards.[31] Additionally, Utah collaborates with districts on projects especially in the process to review OER. Districts are also encouraged to run their own initiatives.[32]

Network Infrastructure: The Utah Education Network (UEN) connects all Utah districts, schools, and higher education institutions to a robust network and provides quality educational resources. The UEN offers three types of services: Networking, application, and support. These components provide statewide networks/infrastructure, content and applications for digital learning, and teacher training and technical support respectively.[33] All of these supports are available statewide.

Data Management and Privacy: State Board policy R277-487, Utah's data privacy law, outlines the requirements for Confidentiality of Student Data, creates a comprehensive list of who has access student data, outlines what to do with educator evaluation data, specifies what data may be used for research, and prescribes how the state agency should store survey data.[34]

Human Capacity: The state of Utah supports educators through the Utah Education Network (UEN). UEN hosts a professional development team providing professional learning coaching and trainings for schools and districts throughout the state. For on-going support, UEN hosts a weekly Twitter chat, weekly podcasts on new technologies and they sponsor an annual EdCamp. In addition UEN hosts the C-Forum, a community of technology staff developers from across the state of Utah to share resources and network with colleagues online and in-person. Utah also supports several local organizations that coordinate statewide technology conferences.

STATE PROGRESS IN SPECIFIC KEY AREAS

While the states above have made progress on multiple fronts, other states have made noteworthy steps in specific areas critical to digital learning, including innovative funding streams and policies, digital content, human capacity, network infrastructure, and data privacy.

Innovative Funding Streams and Policy

"Education is not only a ladder of opportunity, but it is also an investment in our future."

–Senator Ed Markey, Massachusetts[35]

In order to scale digital learning, state, district, and school leaders must come together to promote innovation at all levels. This is often accomplished through funding and policy of digital learning initiatives. Maine, New Hampshire, and Hawaii are three examples of statewide digital learning initiatives codified by law. However, other states have opted for a pilot approach, providing competitive grants to early adopters.

Hawaii

In 2013, Hawaii began a statewide, one-to-one pilot initiative called Access Learning. This pilot project was designed to allow state leaders to study the effect of technology/ digital learning on student learning. The goals of the project are to; provide educators with support and resources on instructional strategies that incorporate technology as a tool to engage students and promote collaboration and learning, build capacity while providing support for schools to deploy and manage technology and to provide educators with core digital curricular materials for English language arts and connect educators with school specific digital resources for all other content areas to support the integration of technology in learning. Schools participating in the pilot received personal devices for every student and teacher. The program "doesn't focus on the device, however, rather on how technology can be a tool to support teachers' efforts to personalize instruction and engage students."[36]

Maine

The state of Maine has supported both infrastructure and devices through state policies and funding streams. In 2001 Maine piloted the Maine Learning Technology Initiative (MLTI), the first statewide, one-to-one digital learning initiative. The program started by providing all 7th and 8th grade students with a personal device and expanded into the high schools, then later elementary schools, as well. Currently, 100 percent of 7th and 8th grade students and approximately 60 percent of Pre-K through 6th and 9th through 12th grade students have devices. The goals of the MLTI are equity; integration with the state standards, the Maine Learning Results; sustainability, teacher preparation, and professional development; and economic development. Core to the program and its success is its focus on professional development and teacher preparation.[37] This focus on a more holistic digital learning experience rather than merely devices was the result of thoughtful policy making and leadership.

In addition, the Maine legislature allocates funding to ensure a basic level of connectivity for all qualified schools and libraries in Maine. Overall, the evolution of the Maine School and Library Network, the creation of the Maine Telecommunications Education Access Fund (MTEAF), and Networkmaine were all driven by recognition of the value of high quality Internet connectivity for schools and libraries. Maine recognizes that by facilitating universal access to broadband services to schools and libraries, the deployment of necessary infrastructure to all communities encouraged the availability of consumer and business broadband services. http://www.maine.gov/connectme.

New Hampshire

In 2005, New Hampshire was the first state to take its first steps toward an entirely competency based education system. All high school courses had to have associated competencies by 2009. In 2013, the state abolished the use of the Carnegie unit, a measure which uses the time a student spends in his or her seat as a measure for learning. Instead, the state required high school students demonstrate a minimum level of understanding of the content to move on to the next grade.[38] The State Legislature updated Chapter 193-H, School Performance, and Accountability, to reflect this shift. It reads "Students best learn at their own pace as they master content and skills, allowing them to advance when they demonstrate the desired level of mastery rather than progressing based on a predetermined amount of seat time in a classroom will assure that students will reach college and career readiness."[39] They also established a set of graduation competencies, which would lead to earning a diploma based on mastery of competencies in a variety of content areas. High schools assess all students for competency and issue a competency based diploma by the 2016-2017 school year. In the K-8 Grades, competency based assessments must be in place no later that the 2017-2018 school year.

New Hampshire is also leading the nation in terms of accountability and assessment with its first in the nation Performance Assessment of Competency Education (PACE) program. The PACE strategy offers a reduced level of standardized testing together with locally developed common performance assessments. These assessments are designed to support deeper learning through competency education, and to be more integrated into students' day-to-day work than current standardized tests. Meaningful assessment is a key part of a strategy to ensure students are getting the most out of their education. This K-12 system will build on New Hampshire's competency work, including the development of statewide college and career ready competencies, and will be one component of the New Hampshire student assessment system. The US Department of Education recently granted NH approval for a PACE pilot program in four New Hampshire school districts. The PACE accountability option enables districts to emphasize meaningful content, high quality instruction, and deep student engagement. In the first year of the pilot PACE districts will report to the State on ELA, mathematics, science, and the Work-Study Practices. As New Hampshire develops further competencies, social studies, the arts, and other content areas will become a part of the PACE system.

Competitive Grants

Many states have used competitive grants to fund districts ready for innovation. Some of these grants focus explicitly on digital learning initiatives while others allow districts to more broadly innovate. States with competitive grant programs include: Colorado, Connecticut, Florida, Georgia, Hawaii, Indiana, Kentucky, Massachusetts, Minnesota, New York, Ohio, Texas, and West Virginia. Grant programs often provide states with small pilots for innovations to occur with a smaller investment. This is appealing to state legislatures for many reasons. First, the risk of a big innovation is reduced; second the idea of giving local leaders control over something innovative is appealing to many, and finally the opportunity to learn from the innovation before scaling makes this an attractive policy to those all over the country. Smaller amounts of money coupled with more sustainable funding streams can ensure that all students have a minimum level of access to digital learning while allowing for more innovations to occur statewide.

As an example, Connecticut is using competitive grants to promote state goals. After investing in infrastructure, Connecticut's Governor, Dannel Malloy, created a competitive grant process to encourage districts to invest in devices. This $10 million grant program calls districts to respond to a Request for Proposals which pushes district leaders to think about the types of devices needed to meet educational goals.[40]

Digital Content and Resources

"Armed with a cost-effective computing device and the kind of quality digital content that is becoming increasingly available, the benefits for student learning are many, including that fact that digital content can be more up-to-date and engaging, and it is flexible so that the content can be changed to fit students' needs rather than having the student adapt to the content."

–SETDA

Key to any transition to digital learning is the transition to use of digital resources. This does not merely refer to swapping a hard-copy book for a digital textbook. Rather, transforming to a digital curriculum means using a digital textbook as one piece of a broader, more dynamic curriculum. Digital resources allow students do be consumers and producers of content.

A number of states have addressed the issue of digital content in a variety of ways. Some have created online content repositories, and others have adjusted laws and legal definitions to account for the changing space. Many have moved to OER materials. States to investigate further include Florida, New York, Texas, Washington, Virginia, and West Virginia.

Florida

Florida is a leader in digital content in three ways. First, the state has created a legal definition of textbooks/content that promotes digital learning by broadening the definition of textbooks to go beyond paper copies of information. The broadened definition encourages and allows districts to use a variety of content provided in a digital format.[41]

Second, the state created the Digital Instructional Materials Work Group, which oversees the implementation of the transition to digital materials required in Florida Title SLVIII, Chapter 1006, Section 29. This law specifies that, by the 2015-16 school year, all school districts in Florida must expend at least 50% of their instructional materials allocation on digital, state-adopted instructional materials. This ensures that districts move toward digital learning environments and provides some flexibility to districts to gradually transition in a way that makes sense for local teachers and schools.

Finally, the state provides all educators with a robust online repository filled with relevant resources. *CPALMS*—the state's digital content repository—provides online resources for students (including some OER) and professional development for teachers. By making vetted resources easily available for teachers to use in the classroom, Florida has encouraged teachers to make their classrooms into digital learning environments. However, Florida does not have a vetting process for OER and has not collaborated with other states or with districts to make OER widely available.

New York

The New York State Department of Education has created and maintained a robust online content repository, EngageNY. EngageNY.org is one major way the state is supporting the State Board of Regents Agenda. It provides current materials and resources aligned with New York State P-12 Common Core Learning Standards, including the Common core Learning Standards, Teacher and Leader Effectiveness work, and Data Driven Instruction.[42]

As part of this work, New York has turned to OER. While New York does not have a formal, legal definition, the state general describes OER as "teaching and learning materials that you may freely use and reuse at no cost. Unlike fixed, copyrighted resources, OER have been authored or created by an individual or organization that chooses to retain few, if any, ownership rights. In some cases, that means you can download a resource and share it with colleagues and students."[43] The state encourages the

implementation of OER materials by using a Creative Commons Licensing process for educational purposes – this includes any resource posted on EngageNY.org.[44] In order to assure high quality content on EngageNY.org, the New York State Education Department has worked with Massachusetts and Rhode Island to develop a Virtual Learning Program evaluation rubric.[45]

Texas

The Texas Education Agency continues to provide online resources at no cost to all educators and students in Texas public schools and open-enrollment charters. The online resources include professional development courses, student lessons, formative assessment systems, and standards-aligned learning objects (referred to as Gateway resources). These resources are made available through the Project Share initiative. Project Share allows teacher to complete online professional development courses, assign supplementary lessons to students, and incorporate Gateway resources into classroom activities. The Gateway resources are also available to students and parents for additional practice beyond the traditional school day.

Virginia

Since 1989, the Commonwealth of Virginia has invested approximately $1 billion in infrastructure and hardware improvements in schools. The Web-Based Standards of Learning (SOL) Initiative, through which these funds have been made available to schools, is perhaps best known for its impact on Virginia's statewide assessment program. Less evident is the fact that the initiative was originally designed to also ensure adequate access for instructional and remedial needs. The Department of Education has also leveraged this infrastructure for instructional purposes by developing and/or supporting the development of resources that benefit all schools. The establishment of the Virginia Digital Textbook Marketplace was a natural step forward for the Commonwealth. Virginia's Digital Textbook Marketplace Pilot launched in January 2015. This project will make Virginia the first state in the nation to pilot a statewide digital textbook marketplace using a technology portal where divisions can purchase Virginia-approved digital textbooks and other digital learning resources. The Virginia-specific portal is being developed by a contracted Virginia vendor that created a somewhat similar system in Australia. The use of the marketplace will be voluntary, and divisions will not pay a fee to use it. The portal will allow teachers to choose pieces of several different textbooks or other resources and assign these to his/her class, group within a class, or individual student, differentiate instruction and track student use.

Washington

Washington is on the forefront of using OER to push digital learning across the state and uses the Hewlett Foundation's definition of OER: "OER are teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others."[46] In RCW 28A.300.803, the legislature called on the State's Department of Education to develop a collection of high-quality, openly licensed K-12 courseware that is aligned with the Common Core State Standards and to conduct an awareness campaign to inform school districts. After initial identification of concerns regarding OER, Washington decided to focus on the question of how to determine quality and alignment by reviewing OER in order to help educators select high quality materials, provide information for materials adoptions, and identify gaps in standards alignment that could be filled. By developing a reviewed library of openly licensed courseware and making it available to school districts free of charge, the state and school districts will be able to provide students with curricula and texts while substantially reducing the expenses that districts would otherwise incur in purchasing these materials. In addition, this library of openly licensed courseware will provide districts and students with a broader and more up-to-date selection of materials.[47]

Another effort that puts Washington on the cutting edge with regard to digital content is its use of grants to promote the implementation of open materials. As a follow up to OER review, the state developed a competitive grant program for districts interested in adaptation or implementation of OER — awarding grants to five school districts.[48] In order to maintain high quality content, Washington State uses the same vetting process for OER as it does for other Instructional Materials.[49]

Human Capacity

"Increased digital learning opportunities for students and educators demand a systemic approach to professional learning that supports teachers throughout their careers. Professional learning that takes place as an ongoing process, based on relevant research is the key to ensuring high-quality, relevant, college and career ready learning experiences to better address specific student learning needs"

–SETDA

In order to ensure that digital learning initiatives are successful, teachers and school leaders must be equipped to lead students through digital materials and to use technology to support instructional practices. Further, there must be a steady pipeline of talent to fill positions with educators ready to lead students in a digital learning environment. Many states have started to address one or both of these issues, including Georgia, Maryland, Michigan, and Oregon.

Georgia

Georgia has explored the use of badging on the *Teaching Open Online Learning* platform in partnership with the state Department of Education and Georgia Virtual Learning. Any registered member can work toward the badges, but teachers have to pay a small registration fee to have them authenticated. These badges focus on online educators and serve as professional development primarily for virtual school teachers.

Georgia has created a fellowship program to promote STEM teaching in partnership with five universities in the state. The Woodrow Wilson Foundation fellowship is an effort to place more high quality teachers with expertise in STEM subjects in classrooms across the state.[50] The hope is that this fellowship will attract high quality professionals into the field of teaching and that these professionals will share their knowledge with others in their school, building the capacity of teachers and leaders across the state.

Maryland

Maryland has tackled the human capacity issue in an innovative way at the state level by creating the Maryland Advisory Council for Virtual Learning in 2012. The council makes recommendations to state leaders about professional development for educators in order to prepare them for digital instruction.[51] This council considers all facets of digital learning when making the recommendations, from curriculum to infrastructure.

Michigan

Michigan builds human capacity by modeling at multiple levels. Michigan hosts a Digital Learning Conference annually. This conference builds human capacity by bringing noteworthy national leaders to Michigan and by elevating local leaders to share their experiences with digital learning.[52] The conference is hosted by the Michigan Association of Computer Users in Learning, or MACUL, a cohort of education technology leaders across the state of Michigan. In addition to hosting the conference, this group provides ongoing professional learning opportunities, creates a professional space for educational technology leaders to engage in, and elevates leaders in the field.[53] Michigan models anytime, anywhere learning for teachers through its online repository, the Michigan Online Repository for Educators (MORE), a part of the Michigan eLibrary. This repository not only has high quality, vetted resources for teachers to use in the classroom, it also has online professional development for teachers to access as they need it. It is free to all teachers and is routinely vetted and updated.[54]

Oregon
Oregon has partnered with OETC to create a [Cadre of Education Technology Leaders](). The aim of this group is to identify and disseminate best practices across the state, particularly those which innovate how to integrate technology into effective teaching and learning. They accomplish this and build capacity through interactive conferences, forums, by integrating technology standards with the Common Core State Standards, by highlighting exemplary staff development skills to promote improvements in educator effectives, by modeling effective instructional strategies, and by demonstrating emerging technologies.[55]

Network Infrastructure

"To provide students with the education they need to thrive in a globally connected world, we must find ways to design, fund, acquire, and maintain the infrastructure that will make connectivity a reality for every teacher and student in every classroom."

–Future Ready Schools: Infrastructure Guide

When discussing network infrastructure for digital learning, the availability of broadband in every school is paramount. Broadband is high-speed internet that is always on (compared to dial-up access). Broadband connections in schools are necessary for students to engage in digital learning experiences and to stream videos, access digital content, and learn anytime, anywhere.

Five additional states lead in terms of making broadband internet access widely available in schools: Arkansas, California, Idaho, Massachusetts and Rhode Island.

Arkansas

In April, 2015, Arkansas Governor Asa Hutchinson announced a commitment to invest in an update to the Arkansas Public School Computer Network. The state committed $13 million annually to increasing broadband internet connectivity and upgrading its fiber infrastructure. The initial call for partners led to 22 contracts which will expand broadband access in all but two of the state's districts. The state's goal is to have 100 Kbps per student, meaning that the capacity of the network would vary based on school district size, but would hopefully be sufficient for student needs, statewide.[56]

California

In 2004, the state legislature created the California K-12 High Speed Network (K12HSN) to assist with connecting K-12 schools to the California Research Education Network (Cal-REN), which is operated by the Corporation for Education Network Initiatives in California (CENIC). CENIC provides a high-bandwidth network dedicated to California universities, research institutions, and all of California's K-20 public education system, serving 20 million users. CENIC's education branch reaches all district offices and more than 10,000 schools statewide.[57]

To further assist schools with network infrastructure challenges, in 2014, Governor Edmund G. Brown proposed $26.7 million in one-time funding to the K12HSN to connect schools to high speed internet. Approximately 304 sites were identified through the Broadband Infrastructure Improvement Grant (BIIG). As s of April 2015, approximately 171 schools will received upgraded connectivity through the BIIG program, with a majority of sites connecting via fiber.

Idaho

For the upcoming school year 2015-16, the Idaho Legislature approved the funding reimbursement to school districts of grades 9-12 for their non-Erate portion of equivalent broadband service costs from prior year. The Idaho Department of Education will manage the reimbursement process to school districts.

Looking ahead to 2016-17, the Idaho Department of Education will pursue another state network broadband model, which will include all schools with grades K-12. The structure, accountability, and transparency is planned to be different from the old Idaho Education Network. The Idaho Department of Education believes there is a long term advantage for rural school districts to have affordable and reliable broadband connectivity to enhance and prepare students for the 21st digital learning environment and beyond.[58]

Massachusetts

Massachusetts used state bond funds to support districts as they build out the infrastructure necessary to move toward digital learning environments. The bonds, passed by the legislature, will be distributed in two phases. The first phase is $5 million for a subset of pilot school districts. These districts demonstrated readiness for digital learning and technology enhanced learning environments and have demonstrated a plan for sustainability moving forward. In phase two, the bonds will be available to more districts. These state dollars can only be used for increasing broadband infrastructure and require local matching funds (which can be used more flexibility for devices).[59]

Rhode Island

The Rhode Island Department of Education (RIDE) has several on-going initiatives to help ensure that students and educators have access to the appropriate technology tools to achieve these goals. The Rhode Island Telecommunications Access Fund ensures that Internet access is available and affordable for all schools and public libraries. The funds from this program supplement the federal E-Rate program consortium. The Wireless Classroom Initiative technology infrastructure bond provided $20 million to provide wireless access to all classrooms in Rhode Island. The bond financed a site survey of all Rhode Island schools and classrooms to determine the specific needs of each community. The bond also provided wireless access points for each classroom, as well as the necessary switches, wiring, and network controllers to bring wireless access to every school and every classroom in Rhode Island. See: Technology Access in Our Schools. A master price agreement and memorandum of understanding are in place to provide schools with a bundled technology solution including the technology device and software, support and maintenance, and extensive professional development opportunities. All schools are able to opt in to this opportunity.

All Rhode Island districts have been working diligently to create the necessary conditions for personalized and proficiency-based learning environments in their schools. Districts are at various stages of increasing the number of devices available to students. One third of Rhode Island districts are implementing one-to-one (1:1) programs, in which each student has access to a personal computing device. An additional third are in the planning stages and will be implementing 1:1 programs in the near future.

Data Management and Privacy

"Early adopters of these technologies have demonstrated their potential to transform the educational process, but they have also called attention to possible challenges. In particular, the information sharing, web-hosting, and telecommunication innovations that have enabled these new education technologies raise questions about how best to protect student privacy during use."

–Privacy Technical Assistance Center

In the advent of digital learning, storing and protecting student data is increasingly important. At the federal level, students are protected by the Family Educational Rights and Privacy Act (FERPA), the Children's Online Privacy and Protection Act (COPPA), and the Children's Internet Protection Act (CIPA).

FERPA gives parents certain rights when it comes to protecting their child's educational records.[61] COPPA applies to websites that are collecting information from children under the age of thirteen and limits what data can be collected and how it may be used by third party providers.[62] CIPA requires schools or libraries limit access to potentially harmful or obscene material in order to be eligible for e-rate funding.[63]

In addition to the federal laws, many state leaders have added regulations for student data. The Data Quality Campaign encourages states to establish who is responsible for data; ensure proper documentation of the laws, policies, and decisions related to data governance; clearly communicate policies to stakeholders; and to support capacity at the state level to ensure organizations can implement and sustain the data procedures. A few states stand out as leaders working toward this vision. Delaware, Louisiana, Colorado, and Wyoming are a few.
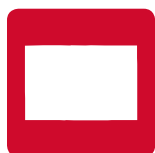
Colorado

Colorado's Student Data Privacy Act, passed June of 2014, requires the State Board of Education to be more transparent about the data collected about students. The Department of Education must publish an index of student-level data currently in the state's student data system. The Student Data Privacy Act also limits when the Department of Education can share student data with other organizations, requires the Department of Education use only aggregate data when publicly reporting, calls for the creation of a data security plan, and asks the Department of Education to provide a data security template for local agencies to use.[64]

Delaware

Delaware is one of only three states that have met all ten of the Data Quality Campaign's "10 Actions to Ensure Effective Data Use." This means that Delaware has policies that support, fund, and integrate student longitudinal data systems. Delaware schools leverage data to identify high-risk students, effective teachers, and to provide parents with information about financial responsibilities in college. Delaware parents have access to their child's data and know what is being collected.[65]

Louisiana

In 2014, Louisiana passed three major pieces of legislation related to student data. First, the Collecting and Sharing Student Information Act prohibits the school systems from collecting certain types of data without parental permission, prohibits school officials from sharing student information, and limits access to school computer systems that store personally identifiable information. The law also requires reports to disaggregate data from identifiable characteristics for all reports and to only do so when state or federal audits require it.[66] The second law

is the Transfer of Student Information Act, which requires the state and local Departments of Education to publicly post agreements regarding the transfer of personally identifiable student information.[67] Finally, Senate Bill 0622 requires the state Department of Education to develop a statewide educational technology plan. In completing this, the Department of Education must do a needs assessment of all technology in school districts and assess both how much technology is available and their readiness for a digital learning transition, including an evaluation of their data systems.[68]

Wyoming

Wyoming Statute 21-2-202(a)(xxxiv) took major steps toward protecting student data. It requires the state Department of Education to develop a data security plan which defines who can access student data, how access is authenticated, the standards for privacy compliance, what to do in the event of a data security breach, and how to store and dispose data. It also prohibits the selling of student data and the sharing of personally identifiable information.[69]

CONCLUSION

Digital learning has the potential to transform education for students nationwide. With digital learning, teachers are better able to personalize learning for all students; and students have instant access to high quality learning materials that meet their learning needs. No longer is student learning bound by what is available between the covers of their textbooks, technology allows students to learn anytime, anywhere and provides more equitable access to content.

Increasing the availability of digital and personalized learning requires that state leaders think strategically about the following key areas: funding and policy, digital content, and building human capacity network infrastructure, and data management and privacy. Strategic planning in each of these five areas is critical to the success of any digital learning program. In particular, ensuring equitable access to high quality digital learning requires a shared vision and leadership from state policymakers. Without building a shared vision, leaders in schools will not buy-in to the plan and will not necessarily make progress toward state goals.

This research shows that many states are making progress toward seamless digital learning environments and that models and lessons learned are continually evolving. Some critical areas for consideration that emerge include:

- **State Investment in funding and policy:** States leading in digital learning have stable funding streams which sustainably fund digital learning statewide. However, many also have other, more flexible streams of money available to districts ready for innovation. These more flexible funds often provide policy flexibility to support the innovation.

- **Digital Content:** Leaders in digital content have allowed for flexibility in terms of what "content" means. Policies permit districts to purchase various types of digital content and have in place high-quality, vetted repositories to share OER and other digital content with all teachers. Digital learning has evolved to include more dynamic resources that allow students to both consume material and to produce.

- **Development of Human Capacity:** Professional learning for leaders at the state, district, school, and classroom level is imperative for the transition to digital-age learning. States who are successfully building capacity are doing so through innovative programs that establish partnerships and build on local expertise. Further, these leaders are building buy-in by creating a shared vision which drives all learning.

- **Systemic Approach to Networks and Infrastructure:** Network infrastructure is necessary but not sufficient to digital learning. State leaders must think strategically about how to maximize resources to provide equitable access to devices and to ensure adequate infrastructure for digital learning. They must also plan to ensure that the technology supports excellent teaching practices.

- **Student Data and Privacy:** There is an increasing need for educational leaders to ensure that all of the appropriate stakeholders have secure access to relevant of student data. Transparent plans for collecting, sharing, and protecting student data are necessary steps toward preventing breaches of personal information.

Leadership at the state level is paramount. Without strong leaders crafting a vision, which includes all five focus areas described in this report, statewide progress toward digital learning is difficult. As policymakers consider investments in technological tools and resources, they should also consider their broader vision for digital learning for their students.

ENDNOTES

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