

# 29 United States

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This note provides an overview of the United States' digital education ecosystem, including the digital tools for system and institutional management and digital resources for teaching and learning that are publicly provided to schools and educational stakeholders. The note outlines how public responsibilities for the governance of digital education are divided and examines how the United States supports the equitable and effective access to and use of digital technology and data in education. This includes through practices and policies on procurement, interoperability, data privacy and regulation, and digital competencies. Finally, the note discusses how the United States engages in any initiatives, including with the EdTech sector, to drive innovation and research and development towards an effective digital ecosystem.

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## Key features

- In the United States, the provision, regulation, and governance of the digital infrastructure in education is primarily a state and school district responsibility. The federal government does not directly develop or operate digital tools for system management, nor does it directly provide digital teaching and learning resources, but it supports states and school districts in the development of their digital ecosystems through various funding programmes.
- The Federal Department of Education, supported by a range of federal agencies, supports the digital transformation of the education system. It devises and revises a national strategy for digital education and tries to mitigate potential digital divides through several equity-targeted mechanisms.
- The federal government also supports innovation and research and exploratory development in digital education, by monitoring the uptake of digital technology in schools, funding (or directly conducting) research on their use, and ensuring that researchers have access to relevant education data.
- The United States has a sectoral approach to data and privacy protection. There is no general data protection regulation, but sector-specific regulation, including for the education sector, as well as regulation concerning children data. States have the autonomy to set up their own data governance policies above and beyond federal regulations.

## General policy context

### *Division of responsibility*

Education is primarily a state and local responsibility in the United States. The federal department of education (and other federal agencies) funds about 8% of the expenditures in primary and secondary education. The establishment of schools (and tertiary education institutions), the development of curricula, the requirements for enrolment and graduation, the material conditions of teaching and learning are the responsibility of US states and their subnational governments as well as other public and private organisations. The reality of education in the United States is thus very diverse, with different mixes of public and private education, different educational requirements and legislations across states. Most of the time, states give local education districts a significant level of autonomy: in 2017, the US Census Bureau counted about 13 500 school systems in the United States. About 12 800 school districts operate as legal entities that do not necessarily overlap with municipalities while the remainder are operated by municipalities, counties, townships or states.<sup>1</sup> US states and school districts are typically responsible for the school infrastructure as well as the regulation and provision of digital tools and resources to schools, teachers and learners.

This devolved governance of most aspects of education policy to many separate systems highlights the potential (and actual) diversity of the digital infrastructure and governance within the United States. This note focuses on the responsibilities of the federal level and highlights the trends and commonalities in US education. This diversity does not imply that the federal Department of Education and US states' departments of education have no influence in supporting and leading the digital transformation in education. There are also many non-governmental organisations and foundations that have a harmonising role in the United States, as the “common core” or the Next Generation Science standards that were adopted by many US states showcase.

The US Department of Education's mission is “to promote student achievement and preparation for global competitiveness by fostering educational excellence and ensuring equal access”. Regarding equal access, the department of education has a specific role for students with special needs. In addition to its role of

awareness raising, idea generation and lesson sharing to influence the educational enterprise, the department operates a certain number of grant programmes for individuals but also to support and incentivise states in developing policies in certain directions. In the case of digitalisation, the department of education offers a series of earmarked (by law) and discretionary grant funding programmes that can be used to support states', US territories' or just school investments in digital tools and learning resources. The Office of Educational Technology provides a vision and guidance on how funds could be used towards expanding access to and effective use of digital learning technologies.<sup>2</sup> The Institute of Education Sciences (IES) of the department of education also funds research on education technology or initiatives such as the National Center of Education Statistics' (NCES) Statewide Longitudinal Data Systems (SLDS) programme to support US states and territories to develop their digital infrastructure.<sup>3</sup>

### **Digital education strategy**

As of 2023, the department of education was working on the *2024 US National Education Technology Plan* (NETP), the flagship educational technology policy document for the United States. Education technology plans have been published since 1996. The plan as of 2023 was designed in 2015 and updated in 2017.<sup>4</sup> It is structured around five pillars: learning (through technology); teaching (with technology); leadership (culture for innovation and change); assessment (measuring for learning); infrastructure (enabling access and effective use). The 2017 plan's update calls upon all stakeholders involved in US education to ensure equity of access to transformational learning experiences enabled by technology. When published, the 2024 NETP may have a different structure.

In terms of policy, the COVID-19 pandemic has led to an emphasis on the physical or hardware digital infrastructure. In 2023, the Office of Education Technology released guidance and future directions for federal funding and support of the educational technology landscape.<sup>5</sup> Through this COVID relief fund and other investments made over the last two years, the federal government has provided funding for broadband connection, Wi-Fi, Intranet servers and digital devices in schools, as well as for digital devices for children directly, especially for children with special needs. Funding included subsidies from the Federal Communications Commission and Universal Service Administrative Company's *E-Rate Universal Service Program for Schools and Libraries*. Through the *E-Rate* programme, eligible schools and libraries received discounts on telecommunications, telecommunications services, and Internet access, as well as Intranet connections, Intranet broadband services and basic maintenance of Intranet connections.<sup>6</sup> Furthermore, the 2021 US Secretary of Education's Supplemental Priorities lists "Providing students and educators with access to reliable high-speed broadband and devices" as a priority.<sup>7</sup> As such, the department of education has a broad emphasis on developing the US digital hardware infrastructure, while prioritisation of specific digital hardware resources occurs at the state and local levels, typically covering the provision of laptops or tablets for student use in institutions (and at home in some states or school districts) as well as Internet access.

To ensure a coherent use of digital technologies across different policy areas, the federal government has set up inter agency working groups on artificial intelligence and machine learning, cybersecurity, data privacy, etc. Such working groups are typically coordinated by the Office of Science and Technology Policy, placed under the Executive Office of the US President. The department of education has also appointed champions on these specific topics to promote a coherent use of digital tools throughout education systems.

### **The public digital education infrastructure**

The federal government does not directly provide many components of the public digital ecosystem in education.<sup>8</sup> As with other matters in education, states have significantly more responsibility in the provision (and regulation) of digital infrastructure in schools. Schools and teachers can then choose to acquire

additional elements to their digital ecosystem, either directly from the private sector or from other education stakeholders that release solutions and resources for free. This section reviews two aspects of the public digital infrastructure in the United States: digital solutions for system and school management, and digital learning resources for teaching and learning.

## ***Digital ecosystem for system and school management***

### *Student information and learning management systems*

The federal government does not operate a student information system at the national level, but it supports all states to develop and use such tools through its Statewide Longitudinal Data Systems (SLDSs) grant programme and provide a growing range of services and resources to this effect.<sup>9</sup> This programme has helped propel the design, development, implementation, and expansion of longitudinal student information systems, which are used in all US states.

According to the Data Quality Campaign survey, as of 2023 all student information systems contained a unique and longitudinal identifier. All states also include standardised assessment scores, though not always broken down by all federal required groups of students (e.g. 13 states did not share data broken down by gender).<sup>10</sup> In many states, student information systems provide real-time information and display both analytics (with limited access) and public dashboards. While collected and available at the state level, the federal department of education collects some of these data in aggregate format (attendance, test state scores, etc.) through its National Center for Education Statistics (NCES).<sup>11</sup> The provision of those data is required by law, as per the *Elementary and Secondary Education Act*. Many small school districts share their student information with their state authorities (as required by state law) before it is then passed on to the federal government.

In Colorado for instance, a first grant application for the SLDS programme was awarded in 2007, for an amount of USD 4 million. It fuelled the development of Colorado's Longitudinal Education Data Action Plan (LEAP) that built upon the foundation of their initial statewide student record system, initiated in 2002.<sup>12</sup> A first major initiative of this action plan aimed to expand the data warehouse with longitudinal projections and detailed student-level analysis, graduation and drop-out data, migrant and homeless data, teacher statistics, and special education statuses. A second pillar targeted the automation of data submission files, between local education agencies and the state, and between the state and the federal government. Finally, the third effort was to expand the local data analysis and reporting tools with wider access to data and professional development opportunities. In 2010, a new USD 17 million grant was awarded to Colorado to improve what had become *SchoolView*, the states' student information system, with better data collection features, cross-agency interoperability, and functionalities that ensure stakeholders could access understandable, timely and reliable information. Finally, in 2020, another USD 2 million grant aimed at further expanding the functionalities of *SchoolView*, with connection to the federal department of labour and employment and between agencies, expansion into adult education, and reporting tools for schools and districts.

While a few states do so, it is usually local districts that provide their schools with a learning management system (LMS). They can be publicly owned, notably in large school districts (such as New York City), but most of them are licensed from commercial providers. In smaller districts, schools will typically use the same learning management system, while in larger districts there may be more variability because of different needs, which may lead some schools to use the district-provided learning management system while others use others, for instance, *Google Classroom* or *Canvas*. Typically, learning management systems display analytics dashboards. A smaller proportion are interoperable with state system-level tools and other institution-level digital tools and provide learning and other content repository. Most do not offer communication tools, a functionality that is typically dealt with separately. At the level of the school district,

there are data elements that all learning management systems should track but others that vary across education jurisdictions.

### *Admission and guidance*

In primary and secondary education, the management of student admission is devolved to schools (or school districts). No student admission management systems are provided by US states, let alone the federal government. This does not prevent those processes to be conducted online in most cases, except in the smaller districts. Admissions are mainly based on students' place of residence and in some cases family preferences. In the case of students with disability, the largest determining factor is also the place of residence but if the indicated school cannot meet the students' needs, then they may be "outplaced" – following a human- rather than a technology-based decision. Charter schools, which are publicly funded but operate independently, may not have residence requirements on admission. Those schools typically use lotteries facilitated by technology, and applications are processed electronically. Magnet schools and competitive application schools under the public umbrella typically use the same process.

Similarly, no student or teacher career/study guidance platforms are provided and maintained by the federal government. Career and study guidance, whether online or not, would also typically be handled at the level of the school district, if any.

### *Assessments*

In the United States, one important education responsibility that remains at the federal level is the organisation of the *National Assessment of Educational Progress* (NAEP), overseen and administered by the National Center for Education Statistics. NAEP longitudinally assesses a representative sample of students at grades 4, 8 and 12 in a number of key subjects. The assessment is conducted online and a few subjects feature scenario-based questions. Results in reading and mathematics are representative at the national, state and district levels, while results in other subjects are only representative at the national, and sometimes state levels, and only for certain cohorts of students.

All US states administer their own yearly state-level assessments, initially as a school accountability measure mandated by the *No Child Left Behind Act* in 2001, that then evolved in further legislation but remained a mandated state practice.<sup>13</sup> Every year (except during the COVID-19 pandemic), US states assess all students in English and mathematics, usually for every single student in grades 3 to 8. These yearly assessments provide each state, district and school with very granular information about students' performance in those two subjects, which could in principle be used to inform teaching and learning in addition to its initial accountability purpose. While they usually remain traditional in format (non-adaptive, multiple-choice questions), the assessments are computer-based.

The federal department of education encourages the implementation of innovative assessment implementation by encouraging state education agencies (SEAs) to pursue the Innovative Assessment Demonstration Authority (IADA) and improve statewide assessments. Since 2018, Louisiana, New Hampshire, North Carolina, and Georgia have applied for the IADA programme, which has provided them with the authority to establish and operate an innovative assessment system in their public schools.<sup>14</sup>

### *Other types of digital management systems*

While not provided by the federal government, school districts and schools typically use a range of other digital tools to manage education. For example, according to government officials and other professionals working on digitalisation with states and districts, most US schools use knowledge and content management systems (to access digital learning resources, when not available in learning management systems) as well as administrative function systems to assist with staffing, pay, schedule, budget, and finance for instance.

Most schools use customer relationship management systems to communicate with parents and students – a functionality that is typically not featured in learning management systems. Communication systems allow to send text messages or email, to automatically translate content and provide simplified dashboards for parents, etc. Rather than being publicly procured or provided by US states or districts, those digital tools tend to be freemium products chosen by teachers.

Finally, most school districts provide their schools with some sort of early warning system. The majority have a basic model for flagging students at risk of dropping out, usually based on absenteeism. Fewer districts (but an increasing number of them) use more sophisticated early warning systems with predictive models, usually based on AI models, which build on interim assessments and other data elements to signal where extra support would be needed.

### ***Digital ecosystem for teaching and learning***

In the United States, the federal government's responsibility in the provision of digital resources for teaching and learning is often – though not always – limited to a support role, except for students with special needs.<sup>15</sup> Since 1965, it is forbidden by law for the federal government to set curriculum requirements or standards. States and districts are responsible and provide different types of digital teaching and learning resources aligned with their curriculum to their schools. They typically procure commercial resources, which schools, teachers and students can use and complete with external resources of their choice.

#### *Open-access resources*

While many Open Education Resources (OER) are accessible to people, students, teachers and schools, the federal government plays a limited role in their provision. Learning content curated by public TV and radio broadcasters and their corresponding social media channels are examples.<sup>16</sup> Substantial public investments in public libraries and museums, which curate part of their educational content online, can also be noted.<sup>17</sup> Additionally, online textbooks are openly licensed and funded by federal government programmes.<sup>18</sup>

The OER ecosystem for teaching and learning is supported by a variety of non-government actors, notably non-governmental organisations and philanthropy. For example, the OER Commons platform, which brings together thousands of OERs, is administered by the Institute for the Study of Knowledge Management in Education (ISKME), mainly funded by philanthropic foundations and donations (e.g. the William and Flora Hewlett Foundation).<sup>19</sup> Private US universities also contribute, as the Massachusetts Institute of Technology's (MIT) *Open Courseware* exemplifies.<sup>20</sup> The most famous platforms of massive open online courses (MOOC) (e.g. *Coursera* and *edX*) are commercial initiatives initiated in private US universities, offering a mix of fee-paying but also free-of-charge courses and self-paced learning resources<sup>21</sup>.

#### *Closed-access resources*

The role of the federal government in the provision of teaching and learning resources to teachers and students enrolled in the education system is limited to learning and support tools for students with special needs. This applies to digital tools as well. As mandated by the Individual with Disabilities Education Act (IDEA), the federal government subsidises the provision of digital learning tools and assistive technologies for students with disabilities, as well as online platforms for special education teachers.<sup>22</sup> The Office of Special Education Programs (OSEP) administers state and local grants for this purpose. As per the Assisted Technology Act, each state must have at least one centre providing knowledge, support and materials on assisted technology (e.g. screen reader, text to speech software).<sup>23</sup> The department of

education funds all those centres, which allow parents and teachers to test specific assistive technologies and assess whether they are functional before schools purchase them.

Apart from the federal support to ensure a degree of accessibility, the department of education does not directly provide or subsidise digital tools and resources for teaching and learning.<sup>24</sup> Instead, states and school districts may fund digital teaching and learning resources for their schools. Most recent statistics indicate that in the majority of public schools, teachers and learning have access to static and interactive digital learning resources of all sorts, as well as digital assessment resources and online platform for teacher development.<sup>25</sup> A survey conducted by the NCES in the 2019-20 school year indicates that 45% of public schools reported having a computer for each student, among which one-third were individually assigned. About half of public schools reported using interactive textbooks or self-contained instructional packages (Gray and Lewis, 2021<sup>[1]</sup>). Since the COVID-19 crisis, intelligent tutoring systems are also more and more prevalent in primary education.<sup>26</sup> Intelligent tutoring systems are used in classroom teaching – sometimes in the class, sometimes for homework – including by students with special needs.

### *Some central taxonomies*

There exists no national or predominant standard taxonomy for digital teaching and learning resources. As some states voluntarily follow the same curriculum framework for some subjects, notably the *Common Core State Standards* (for mathematics and English language arts) and the *Next Generation Science Standards* (for science), these provide a common taxonomy for digital learning resources to be tagged. As of 2023, 41 out of 50 states have adopted the *Common Core State Standards*,<sup>27</sup> while 20 out of 50 states have adopted the *Next Generation Science Standards*.<sup>28</sup>

## Access, use and governance of digital technologies and data in education

Providing some kind of public digital education infrastructure does not necessarily imply that stakeholders will use it. Different rules and policies can therefore ensure access to digital technologies in education, as well as support and govern their use.

### ***Ensuring access and supporting use***

#### *Equity of access*

At the federal level, the funding of digital infrastructure for education is directly tied to schools' socio-economic characteristics, covering public and government-dependent schools – although in principle, independent private schools also have access to earmarked federal funding for students with special needs. For instance, the E-Rate programme mentioned above uses reimbursement percentages which are based on percentage of children receiving free- and reduced-price school meals. Based on this, eligible schools and libraries may receive discounts that range from 20 to 90 percent of the initial prices. Rural schools and libraries also receive a higher discount.<sup>29</sup>

In addition, the *Bipartisan Infrastructure Law* (BIL) addresses digital equity through a USD 65 billion investment, which aims to provide learners, families, and caregivers with the connectivity they need to engage in technology-enabled learning opportunities. As part of the BIL, the *Digital Equity Act* calls on states to develop digital equity plans that identify barriers to digital inclusion and set measurable objectives to address them.<sup>30</sup>

Finally, schools that receive federal funding should provide inclusive access to students with special need so that they enjoy the same benefits as all students.<sup>31</sup>

Data collected by the OECD TALIS study across the 2017/2018 school year illustrate the pre pandemic access to digital hardware infrastructure across schools in the United States.<sup>32</sup> Before the COVID 19 outbreak, 19% of lower secondary principals reported that their schools' capacity to provide quality instruction was hindered by shortage or inadequacy of digital technology for instruction (compared to 25% on average across the OECD countries), and 17% of them noted that it was hindered by insufficient Internet access (while 19% was the average across the OECD countries). The COVID-19 pandemic exposed the disparities in accessing devices and good Internet connectivity: according to data collected by the US Census Bureau in 2018, 99% of households earning USD 150 000 a year had access to a personal computer, compared to 77% of households making less than USD 25 000. Broadband subscription rates differed by 30 percentage points across income groups. Homes with older householders, those with lower levels of education, or living in rural areas had lower levels of computer ownership and broadband access. Additionally, the survey showed that smartphone use has exceeded that of desktop and laptop use, with Black and Hispanic households more likely to be "smartphone only" homes, which has an impact on the types of tasks one can accomplish on the Internet.<sup>33</sup> Further data collected in 2020 during the pandemic note that around 20% of households reported as very or somewhat likely that their child will not be able to complete schoolwork because they do not have access to a computer at home or to reliable Internet connection.<sup>34</sup> A 2023 survey finds that 28% of state leaders identify "home access connectivity" as an "unmet technology need" in their state, far beyond other unmet needs (SETDA, 2023).

### *Supporting the use of digital solutions*

At the federal level, the United States uses direct and indirect incentives to support the access to, and use of, digital tools and resources at the state, school, and classroom levels – and thus support equity in use opportunities.

First, the federal government offers grants and other types of financial incentives to encourage the use of digital tools and resources, as illustrated by the SDLS grant programme that pushes states to develop their student information systems.

Second, the federal government can support the uptake of digital tools and resources in education. A share of the federal funding that public and government-dependent schools receive (about 7% of their funding) is earmarked, and may for instance cover the cost one-to-one programmes that impose the delivery of one digital device per student. This is for instance the case with a part of the fundings awarded through the *Student Support and Academic Enrichment Programme* (SSAE).<sup>35</sup>

States and school districts have full autonomy in their procurement choices and how much digital tools and resources they decide to provide, which can in principle lead to very differing access to technology across schools. However, they have to provide equitable access for students with disabilities, as required by the *Individuals with Disabilities Education Act* (IDEA); they also have to meet the security and privacy obligations of the *Family Educational Rights and Privacy Act* (FERPA), the *Children's Internet Protection Act* (CIPA), and the *Children's Online Privacy Protection Rule* (COPPA).<sup>36</sup>

In addition to legal criteria, the Office of Educational Technology offers guidance on procurement of educational technologies, which was revised in 2023.<sup>37</sup> In particular, it has developed a toolkit to help local education authorities prioritise evidence-based decisions on the adoption and use of educational technology in schools.<sup>38</sup>

### *Cultivating the digital literacy of education stakeholders*

Engaging all education actors in the digital transformation of the US education systems demands to develop digital literacy, and in particular teachers' and students' digital competencies. As the pre-service and in-service training requirements of teachers (as well as curriculum requirements) are exclusively set by states and school districts, there is some variation across states. Some states (such as California and



New York) mutually recognise the credentialling of their teachers. The federal government provides guidelines, about the digital competencies that teachers must acquire before and during their teaching service though, for example in the digital strategy and guidance documents mentioned above. At the state level, some curriculum requirements encourage specific uses of digital technology in class, while others incentivise education districts to integrate the development of student digital skills as a learning outcome of the curriculum.

All 50 US states are members of the NASDTEC organisation which aims to establish interstate agreements on teachers' training requirements, credentials, and professional development.<sup>39</sup>

## Governance of data and digital technology in education

The United States has taken a sectoral approach to data protection. There is no general data protection regulation, but sector-specific regulation. Education is one of the sectors with a data protection law. For example, the *Family Educational Rights and Privacy Act* (FERPA), the *Children's Internet Protection Act* (CIPA), and the *Children's Online Privacy Protection Rule* (COPPA) regulate different aspects of data protection and privacy. Because they concern children, the two latter laws also concern education.<sup>36</sup> States have the autonomy to set up their own general or specific laws or rules about data protection and privacy above and beyond the federal ones. For instance, California has a cross-cutting data protection Act. Commonly used digital tools (for example *Google Classrooms*) benefit from a FERPA exemption, according to which software providers can process student data on behalf of schools, even though those data cannot be transferred to any third party without explicit consent from the school district. In case of consent, any data must be de-identified and not be re-identifiable.

Teachers and school staff's data protection falls under the federal employment law and their employment contracts.

The federal government implements usual statistical rules about the access and use of the education administrative data it collects for public or private research and development. Federal policies have focused on increasing publicly availability of educational databases for research. This includes data available through the department of education, the Institute for Education Science, and the National Science Foundation, in addition to other federal agencies. Federal regulations include funder requirements for making data open access as well as guidelines for making data accessible.<sup>40</sup> Most states have similar regulation for access to their administrative data, although the levels of access and implementation rules vary from state to state.

Apart from the federal rules about data protection and privacy, no federal rule governs the access to digital tools and resources in education. The federal government provides guidelines, and states and schools districts enact their own regulation. For instance, during the COVID-19 pandemic, the state assessments were often taken remotely with digital proctoring, which forced states and school districts to publish related rules.

As of 2023, there are no federal rules about automated decision-making in education – and probably few states, if any, use such practice either. No state uses automated decisions that have high stakes for students. Individual states – such as California, a state with more data privacy legislation than others – can offer rules and guidance to inform access, use, and automation of digital technologies.<sup>41</sup> In 2023, Federal guidance by the White House and the department of education were issued on the use of automated decisions related to AI, and a bill of rights on AI was being prepared.<sup>42</sup> As of 2023, the blueprint for this bill focused on promoting safe and effective systems, tackling algorithmic discrimination protections, and ensuring data privacy. It also called on improving notice and explanation whenever an automated system was being used and on the impact it may have on certain outcomes; as well as on the “human alternatives” and the ability to opt out.

Likewise, interoperability in education is not federally regulated, but federal guidance exists. For example, the Common Education Data Standards (CEDS) encourages semantic interoperability by identifying the most commonly used education data elements to support the effective exchange of data within and across states (and for federal reporting). The initiative is led by the National Center for Education Statistics with the assistance of a CEDS Stakeholder Group that includes representatives from states, districts, institutions of higher education, state higher education agencies, early childhood organisations, federal programme offices, interoperability standards organisations, and key education associations and non-profit organisations.<sup>43</sup> Additionally, the Office of Educational Technology highlights the importance of interoperability in its *National EdTech Plan*, the *Developer's Guide*, and the *Infrastructure Guide*.<sup>44</sup> Finally, at the state and local level, multiple non-governmental organisations supporting state departments of education and school districts provide guidance on interoperability across systems.<sup>45</sup> For the most part, however, efforts towards interoperability are driven by voluntary efforts. Similarly, there is no federal rule on data portability in education.

### Support for innovation and research and development (R D) in digital education

Developing a national education technology ecosystem requires a vibrant education technology sector as well as robust research and evaluation of technology and its use in school. Providing incentives to support research and exploratory development (R-D), funding education technology start-ups, and funding academic research are typical innovation tools used by governments.

Through its annual Survey of Federal Funds for Research and Development, the National Centre for Science and Engineering Statistics provides a mapping of the federal agencies that conduct R D programmes through federal funding, several of which concern education.<sup>46</sup> In the last five years, federal fundings have notably supported academic research on the use of digital technologies to improve learning outcomes and student engagement, including students with special needs, to predict school dropout, to support teaching and school management functions, and to improve assessment and credentialing.<sup>47</sup>

The federal government also conducts monitoring and evaluation on the national digital infrastructure. One notable example is the *EdTech Equity* initiative undertaken by the NCES in 2019.<sup>48</sup> The initiative aims at bridging the relative gap that exists in the collection of data on certain issues at the intersection between EdTech access and equity – such as access to technology outside of school, how technology is integrated into learning, and students' technology related knowledge and skills. It has notably involved a study on the “use of educational technology for instruction in Public schools and the production of a dashboard on equity in education. Many organisations provide further information within the country. For example, at the state level, the *State Educational Technology Directors Association* (SETDA) produces a yearly “State EdTech Trends” report, the *Consortium for School Networking* (CoSN) provides further insights into the use of EdTech tools in primary and secondary education, and the *Centre for Assistive Technology Act Data Assistance* (CATADA) documents the provision of assistive technology to students with special needs.<sup>49</sup>

At the federal level, according to government officials the emphasis has been placed on attaching evidence requirements for tools and resources procured with some federal funds within states, districts, and schools. Priority should indeed be given to *Every Student Succeeds Act's* definition of “evidence-based”, which defines evidence according to a continuum between “promising” and “proven” by a randomised control trial.

The department of education's Institute of Education Science (IES) funds state education agencies, educational research universities and organisations, as well as R D, regional, and technical assistance laboratories and centres, as opposed to discrete EdTech companies, to develop digital learning resources and educational software that can be used across all levels of education.<sup>50</sup>

Federal regulations include funder requirements for making data open access as well as guidelines for making data accessible.<sup>40</sup> While this is not about data about digital education, which are scarce, this certainly improves educational research. The federal government provides documentation for the public administrative datasets it manages, albeit a tiny part of the US education administrative datasets, and communicates clear public R D priorities through its research programmes. Federal research programme (notably IES and NSF for science-related education programmes) are prestigious and well-funded, but they represent a minority of the funding for research in the United States, which is supported by philanthropic foundations, limited responsibility organisations and, de facto, universities.

In addition to conducting its own R D on digital tools and resources, educational authorities in the United States have established relationships with other education stakeholders, including non-profit organisations and companies from the private sector, to support digital innovation in education. Such partnerships generally take place at the state level, although the US department of education's Office of Educational Technology regularly engages with EdTech organisations, companies, and developers through ongoing collaboration, consultation sessions, and work related to specific projects.<sup>51</sup> The Office of Educational Technology is the primary department of education's office for outreach to the EdTech developer community. However, as pointed out above there is no funding or monetary incentives allotted by federal agencies to specific EdTech companies. The National Science Foundation also support various institutions to conduct research on specific learning technologies. For instance, the AI Institute for Engaged Learning conduct research on AI-driven narrative-centred learning environments, learning analytics and natural language processing. Digital Promise is another example of a global, non-profit organisation that aims to advance equitable education systems through research and development on technology. Such organisations cultivate local or national communities of practices as they regularly hold forums or consultations with education stakeholders and practitioners.

In its future activities, the US Secretary of Education's *Supplemental Priorities* put a broad emphasis on the effective use of technology in education, as well as on the development of online education platforms and resources. More granular prioritisation towards specific digital resources occurs at the state and local levels. Online education platforms and digital resource, but also classroom analytics, learning management systems, and student information system are widespread states' priorities.

In terms of research and development, the department of education established in February 2023 and began a process of promoting quick-turnaround high-reward scalable solutions by building federal education research and development infrastructure. This infrastructure will be based on the ARPA model. That R D model began with the Defense Advanced Research Projects Agency (DARPA), which is a federal agency that has helped guide technological innovation and breakthrough in technologies to the service of defence and national security for more than sixty years now.<sup>52</sup> The aim of this ARPA-style initiative in education would be to emulate ARPA-E (energy) and ARPA-H (health), and work within an innovation ecosystem that includes academic, corporate and governmental partners to nurture an environment conducive to an innovation culture in education.<sup>53</sup> Such an infrastructure would ultimately support state educational agencies and local educational agencies in their use of evidence-based educational practices – including those related to digital infrastructure in schools.

## References

- Gray, L. and L. Lewis (2021), *Use of Educational Technology for Instruction in Public Schools: 2019–20 (NCES 2021-017)*. [1]

## Notes

<sup>1</sup> [https://www2.census.gov/programs-surveys/gus/tables/2017/cog2017\\_cg1700org09.zip](https://www2.census.gov/programs-surveys/gus/tables/2017/cog2017_cg1700org09.zip).

<sup>2</sup> <https://tech.ed.gov/funding/>

<sup>3</sup> See <https://ies.ed.gov/topics/educationTechnology.asp> for research on education technology and <https://nces.ed.gov/Programs/SLDS/> for data systems.

<sup>4</sup> <https://tech.ed.gov/files/2017/01/NETP17.pdf>

<sup>5</sup> <https://tech.ed.gov/federal-funding-dear-colleague-letter/>

<sup>6</sup> For more information on the E-Rate program, as well as other congressional federal response programs, see <https://www.fcc.gov/consumers/guides/universal-service-program-schools-and-libraries-e-rate> and About USAC - Universal Service Administrative Company <https://www.usac.org/about/>

<sup>7</sup> For more information on the Secretary's Supplemental Priorities, see <https://www.federalregister.gov/documents/2021/12/10/2021-26615/final-priorities-and-definitions-secretarys-supplemental-priorities-and-definitions-for>

<sup>8</sup> See <https://www2.ed.gov/about/overview/fed/role.html> and <https://tech.ed.gov/funding/>

<sup>9</sup> Statewide Longitudinal Data Systems grant programme: <https://nces.ed.gov/Programs/SLDS/>

<sup>10</sup> Data Quality Campaign: <https://dataqualitycampaign.org/resources/flagship-resources/show-me-the-data-2023/>

<sup>11</sup> For information of federally available student information data please visit the National Center for Education Statistics: Statewide Longitudinal Data Systems Grant Program - Program Overview (ed.gov) <https://nces.ed.gov/programs/slids/>.

<sup>12</sup> SLDS in Colorado: <https://nces.ed.gov/programs/slids/state.asp?stateabbr=CO>

<sup>13</sup> No Child Left Behind Act: <https://www2.ed.gov/nclb/landing.jhtml>

<sup>14</sup> United States: Innovative Assessment Demonstration Authority: <https://www2.ed.gov/admins/lead/account/iada/index.html>

<sup>15</sup> Dear Colleague Letter: Leveraging Federal Funds for Teaching and Learning with Technology: <https://tech.ed.gov/federal-funding-dear-colleague-letter/>

<sup>16</sup> Created by Act in 1967, the Corporation for Public Broadcasting is the steward of the federal government's investment in public broadcasting and the largest single source of funding for public radio, television, and related online and mobile services <https://cpb.org/aboutpb/act>

<sup>17</sup> Museum and Library Services (imls.gov) <https://www.imls.gov/>

- <sup>18</sup> Examples: <https://osepideasthatwork.org/resources-grantees/program-areas/education-technology-media-and-materials-etechm2> / <https://www.cast.org/our-work/projects/corgi-2-enhancing-middle-school-stem-learning>
- <sup>19</sup> OER Commons: <https://oercommons.org/about>
- <sup>20</sup> MIT Open Courseware: <https://ocw.mit.edu/>
- <sup>21</sup> Coursera (<https://www.coursera.org/>) and edX (<https://www.edx.org/>)
- <sup>22</sup> Individual with Disabilities Education Act (IDEA): <https://sites.ed.gov/idea/>
- <sup>23</sup> The Assistive Technology Act Training and Technical Assistance Center: <https://at3center.net/state-at-programs/>
- <sup>24</sup> For information regarding the federal role in funding digital teaching and learning tools please visit: Funding Digital Learning - Office of Educational Technology <https://tech.ed.gov/funding/>
- <sup>25</sup> For currently available federal education technology statistics please visit: Use of Educational Technology for Instruction in Public schools: 2019–20 <https://nces.ed.gov/pubs2021/2021017Summary.pdf> / COE - Impact of the Coronavirus Pandemic on the Elementary and Secondary Education System <https://nces.ed.gov/programs/coe/indicator/tcb/covid-impact-elementary-secondary?tid=4> / COE - Children's Internet Access at Home (ed.gov) <https://nces.ed.gov/programs/coe/indicator/cch/home-internet-access> / COE - Rural Students' Access to the Internet (ed.gov) <https://nces.ed.gov/programs/coe/indicator/lfc/internet-access-students-rural?tid=4> / For State level educational technology statistics please visit: State EdTech Trends - Leadership, Technology, Innovation, Learning | SETDA <https://www.setda.org/priorities/state-trends/> CATADA | CATADA Charts <https://catada.info/at/?report=summary>.
- <sup>26</sup> Examples: <https://www.lexialearning.com/> and <https://www.ixl.com/>
- <sup>27</sup> To learn more about the Common Core State Standards, visit About The Learning Portal | ([ccsso.org](https://ccsso.org))
- <sup>28</sup> To learn more about the Next Generation Science Standards, visit NGSS Hub ([nsta.org](https://nsta.org))
- <sup>29</sup> For more information on the E-Rate programme, as well as other congressional federal response programs, visit <https://www.fcc.gov/consumers/guides/universal-service-program-schools-and-libraries-e-rate/>. About USAC, visit <https://www.usac.org/about/>
- <sup>30</sup> See the Digital Equity Act (P.L. 117-58 § 60301) and the Digital Equity Education Roundtables (<https://tech.ed.gov/deer/>). For more information about developing the US digital hardware infrastructure via the BIL visit <https://www.whitehouse.gov/briefing-room/statements-releases/2022/11/15/fact-sheet-one-year-into-implementation-of-bipartisan-infrastructure-law-biden-%e2%81%a0harris-administration-celebrates-major-progress-in-building-a-better-america/>
- <sup>31</sup> Title II of the ADA & Section 504 of the Rehabilitation Act.
- <sup>32</sup> TALIS : [Mending the Education Divide: https://www.oecd-ilibrary.org/sites/d8a3978a-en/index.html?itemId=/content/component/d8a3978a-en#section-d1e11602](https://www.oecd-ilibrary.org/sites/d8a3978a-en/index.html?itemId=/content/component/d8a3978a-en#section-d1e11602)

<sup>33</sup> Computer and Internet Use in the United States:

<https://www.census.gov/content/dam/Census/library/publications/2021/acs/acs-49.pdf>

<sup>34</sup> United States Census Bureau (2020), Household Pulse Survey: Measuring Social and Economic Impacts during the Coronavirus Pandemic, Education Table 3; <https://www.census.gov/programs-surveys/household-pulse-survey.html>.

<sup>35</sup> Earmarked funding as part of the Title IV, Part A (Title IV-A) Student Support and Academic Enrichment Programme (SSAE): <https://oese.ed.gov/files/2020/09/Title-IV-A-Program-Profile.pdf>

<sup>36</sup> Sectoral data protection regulation at the federal level:

FERPA: <https://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html>

CIPA :

[https://www.fcc.gov/sites/default/files/childrens\\_internet\\_protection\\_act\\_cipa.pdf#:~:text=The%20Children%27s%20Internet%20Protection%20Act%20%28CIPA%29%20was%20enacted,and%20provided%20updates%20to%20those%20rules%20in%202011.](https://www.fcc.gov/sites/default/files/childrens_internet_protection_act_cipa.pdf#:~:text=The%20Children%27s%20Internet%20Protection%20Act%20%28CIPA%29%20was%20enacted,and%20provided%20updates%20to%20those%20rules%20in%202011.)

COPPA: <https://www.ftc.gov/legal-library/browse/rules/childrens-online-privacy-protection-rule-coppa>

<sup>37</sup> Federal guidance on procurement: <https://www2.ed.gov/fund/grant/about/discretionary/2023-non-regulatory-guidance-evidence.pdf>

<sup>38</sup> EdTech Evidence toolkit: <https://tech.ed.gov/evidence/>

<sup>39</sup> Interstate agreements on teacher requirements: <https://www.nasdtc.net/>

<sup>40</sup> About the use and access to open data, see:

Breakthroughs for All: Delivering Equitable Access to America's Research | OSTP | The White House <https://www.whitehouse.gov/ostp/news-updates/2022/08/25/breakthroughs-for-all-delivering-equitable-access-to-americas-research/>

08-2022-OSTP-Public-Access-Congressional-Report.pdf ([whitehouse.gov](https://www.whitehouse.gov)) <https://www.whitehouse.gov/wp-content/uploads/2022/08/08-2022-OSTP-Public-Access-Congressional-Report.pdf>

08-2022-OSTP-Public-Access-Memo.pdf ([whitehouse.gov](https://www.whitehouse.gov)) <https://www.whitehouse.gov/wp-content/uploads/2022/08/08-2022-OSTP-Public-Access-Memo.pdf>

Microsoft Word - Public Access Memo 022113 FINAL ([archives.gov](https://www.archives.gov)) [https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/ostp\\_public\\_access\\_memo\\_2013.pdf](https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf)

Announcing November 29, 2022 Open Government Engagement Session on Increasing Federal Data Access and Utility | OSTP | The White House <https://www.whitehouse.gov/ostp/news-updates/2022/11/22/announcing-november-29-2022-open-government-engagement-session-on-increasing-federal-data-access-and-utility/>

Open Access Federal education data can be found here: Research & Statistics - ED.gov <https://www2.ed.gov/rschstat/landing.jhtml>

US Department of Education Public Data Listing <https://www2.ed.gov/about/data/list.html>

Data.gov <https://data.gov/>

Government Data Hubs | resources.data.gov <https://resources.data.gov/resources/govt-data-hubs/>

National Center for Education Statistics (NCES) Home Page, a part of the US Department of Education <https://nces.ed.gov/>

National Center for Education Statistics (NCES) - Data & Tools - Most Popular Tools <https://nces.ed.gov/datatools/>

ERIC - Education Resources Information Center <https://eric.ed.gov/?>

Open Government | NSF - National Science Foundation <https://www.nsf.gov/open/>

<sup>41</sup> Examples of regulation in California

Regulations - California Privacy Protection Agency (CPPA) <https://cppa.ca.gov/regulations/>

California statutes | Education Framework <https://educationframework.com/resources/student-privacy-laws/state-laws/California-statutes#:~:text=The%20California%20Student%20Online%20Personal%20Information%20Protection%20Act.as%20they%20developed%20their%20own%20student%20privacy%20policies.>

SOPIPA: Student Online Personal Information Protection Act - TermsFeed <https://www.termsfeed.com/blog/sopipa/>

<sup>42</sup> Blueprint for an AI Bill of Rights | OSTP | The White House <https://www.whitehouse.gov/ostp/ai-bill-of-rights/>

<sup>43</sup> For more information, please visit: Common Education Data Standards - <https://nces.ed.gov/programs/ceds/#:~:text=CEDS%20is%20a%20voluntary%20effort%20and%20will%20increase,CEDS%20website%20can%20now%20be%20found%20at%20http%3A%2F%2Fceds.ed.gov%2F>

<sup>44</sup> For more information, visit: Home - Office of Educational Technology <https://tech.ed.gov/>

<sup>45</sup> For examples and additional information, visit: What is Interoperability Anyway? Data Standards Improve Educational Outcomes (aemcorp.com) <https://www.aemcorp.com/educationdata/blog/what-is-interoperability-anyway-data-standards-improve-educational-outcomes>

<sup>46</sup> Survey of Federal Funds for Research and Development | NCSES | NSF <https://www.nsf.gov/statistics/srvyfedfunds/#sd&tabs-1>

<sup>47</sup> Academic research commissioned by the federal government's agencies in digital education over the last five years, search through the Institute of Education Sciences' collection (ERIC: <https://eric.ed.gov/?>)

and add “funded=y” to your search; as well as through the National Science Foundation’s collection (<https://www.nsf.gov/awardsearch/simpleSearch.jsp>)

<sup>48</sup> EdTech equity: <https://nces.ed.gov/resources/edtechequity/>

<sup>49</sup> Federal and state-wide monitoring of the US digital infrastructure:

NCES Ed Tech Equity <https://nces.ed.gov/resources/edtechequity/>

Use of Educational Technology for Instruction in Public schools: 2019–20  
<https://nces.ed.gov/pubs2021/2021017Summary.pdf>

Computer and Internet Use (census.gov) <https://www.census.gov/topics/population/computer-internet.html>

State EdTech Trends - Leadership, Technology, Innovation, Learning | SETDA  
<https://www.setda.org/priorities/state-trends/>

State of EdTech Leadership | CoSN <https://www.cosn.org/edtech-topics/state-of-edtech-leadership/>

CATADA | CATADA Charts <https://catada.info/at/?report=summary>

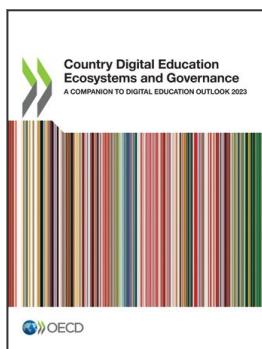
<sup>50</sup> Examples of educational software or resources whose development was funded by federal funds: <https://oese.ed.gov/offices/office-of-discretionary-grants-support-services/innovation-early-learning/education-innovation-and-research-eir/awards/>; [https://ies.ed.gov/sbir/success\\_stories.asp](https://ies.ed.gov/sbir/success_stories.asp); <https://www.xprize.org/challenge/digitallearning>; <https://ies.ed.gov/sbir/EdGamesExpo.asp>

<sup>51</sup> For more information, please visit: Home - Office of Educational Technology <https://tech.ed.gov/> and For Developers - Office of Educational Technology <https://tech.ed.gov/developers/>

<sup>52</sup> For more information: ‘DARPA for Education’ Is a Good Start. Now, Congress Must Do More – The 74 (the74million.org) <https://www.the74million.org/article/darpa-for-education-is-a-good-start-now-congress-must-do-more/#:~:text=But%20the%20seed%20of%20a%20bold%20new%20approach,Research%20Projects%20Agency%20%E2%80%94%20DARPA%20%E2%80%94%20for%20education>

<sup>53</sup> Potential ARPA programme in education:  
<https://www.federalregister.gov/documents/2023/10/12/2023-22482/request-for-information-on-potential-new-program-from-seedlings-to-scale-s2s>





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