**Virtual Learning Research Brief**

*Prepared for the Virginia Board of Education*

*Compiled by the VDOE Office of STEM and Innovation*

Source: **Arizona State University** (Research study)

Title: [***Digital Divides: K12 Student Profiles and Online Learning* (September 6, 2021)**](https://epaa.asu.edu/ojs/index.php/epaa/article/view/6351)

Overview: Online learning for primary and secondary students has expanded significantly in the US as schools and districts respond to the pandemic. Research examines the relationship between student traits and academic success in a statewide online learning program. The first-level digital divide influences education because students cannot learning without the appropriate tools. The second-level influences education as students with ineffective online skills will not learn course material. The third-level influences education because even if students have adequate access and skills but are still not learning, there exists a divide based on use patterns.

Key Points: The purpose of this article is to consider how student profiles relate to academic performance in K12 online learning. First, the findings expand on the academic conversation about the digital divide. Administrators may need to establish learning mitigation strategies even with adequate infrastructure and tools for students to learn online. Student access and skills development is not enough to assure that online learning unfolds in an equal and equitable manner. As online education continues in a post-pandemic world, leaders should consider digital divide issues in future online learning placements.

Source: **Association for Educational Communication & Technology** (Research study)

Title: [***Technologies, Challenges and Needs of K-12 Teachers in the Transition to Distance Learning during the COVID-19 Pandemic*** **(June 26, 2021)**](https://link.springer.com/article/10.1007/s11528-021-00625-5)

Overview: The purpose of this survey research study is to determine technology resources and strategies K-12 teachers have used in this transition. Additionally, this study examines the difficulties teachers experienced, along with support they wish they had during the transition. Findings indicate that a wide variety of websites and applications were used to provide academic continuity, the majority of which were familiar to teachers. In the transition process, teachers were faced with various challenges, including difficulty engaging students and parents, a lack of school/district guidelines, and student Internet and computer access issues. Recommendations to prepare for future emergencies include making clear plans for emergencies and incorporating online components and training within current face-to-face classes and professional development.

Key Points: The purpose of this survey research study is to gain a clear picture of how K-12 teachers have transitioned to distance learning during the COVID-19 pandemic. This study addresses the following questions:

1. What websites and applications have participants used to support distance learning as a result of the pandemic?

2. What strategies have teachers used and what difficulties have they encountered when shifting to distance learning?

3. What support do teachers wish they had in adapting to distance learning?

In times of uncertainty, distance learning methods become essential to support academic continuity, as school districts need to plan for the possibility of shifting from face-to-face to distance learning. The plans should include actions based on how much learning should occur, what technologies teachers should use, and what standards students should be expected to learn. These plans should be communicated to parents and students as well as the greater school community. Parents should be guided on how to support their children’s learning and how to provide

a structured environment at home that is conducive to learning. Any district plan will also need to consider the level of computer and Internet access that students have at home, and seek to mitigate circumstances in which only some students have full computer and Internet access for learning.

Source: **Aurora Institute** (Issue Brief)

Title: [**Mere Engagement: Reflections about the Connections Between Online Learning, Student Agency, and Student Engagement**](https://aurora-institute.org/blog/mere-engagement-reflections-about-the-connections-between-online-learning-student-agency-and-student-engagement/)

Overview: The title of this brief, *Mere Engagement*, invites reflective thinking as we rise to the challenges of schooling during the pandemic, including student agency and student engagement. What evidence shall we use to ensure that the educational methods are working? What feedback or cues should we be looking for to determine whether students are engaged? How can we ensure student agency is promoted and supported as lessons are designed? We need to provide additional incentives and support to help students move from compliance to authentic engagement during these transitional times. During a transition to remote or distance learning, students need a renewed sense of agency. They must understand what they are to learn and how to demonstrate their learning.

Key Points: Plan for a mix of synchronous and asynchronous communication. You should not expect your students to be online and available all the time, but scheduling times for whole class and small group work in advance is very helpful. Being available and in touch with students and families builds a lot of credibility and enhances relationships. Remote and blended learning partnerships require significant and detailed connections with parents, mentors, or significant support system people. Establishing systems that frequently check for learning, with an intensified use of feedback loops with each student, can provide insight into the level of engagement. We must be on watch for those students who are struggling or absent due to a lack of resources. We must become advocates to close the equity gaps to ensure that no opportunity for learning is lost.

Source: **Carnegie Melon University** (Handbook)

Title: [***Handbook of Research on K12 Online and Blended Learning* (ETC Press, 2018)**](https://press.etc.cmu.edu/index.php/product/handbook-of-research-on-k-12-and-blending-learning-second-edition/)

Overview: This handbook is meant to be a resource for anyone interested in research, practice, or policy in the field of K-12 online and blended learning. Broad headings of research include the following.

1. A Background and Historical Perspective – *What are the important background and historical markers that help contextualize research in K-12 online and blended environments?*

2. Research on Learning and Learners – *What does the research say about learning in K-12 online and blended environments?*

3. Research on Teaching – *What does the research say about preparing and mentoring current and future teachers?*

4. K-12 Online & Blended Learning in the Content Domains – *What does the research say about similarities and differences within content areas?*

5. Research on Student Support Structures – *What does the research say about the role of the preparing and mentoring others who support K-12 online and blended environments?*

6. Research on Instructional Design *– What does the research say about effective design for K-12 online and blended learning?*

7. Research on Learning Environments *– What does the research suggest about new learning environments that will transform how we conduct and think about teaching and learning in K-12 online and blended learning?*

8. K-12 Online Learning Around the World – *What does the research say about how K-12 online learning is implemented around the world?*

9. Emerging Issues – *What are some of the emerging issues in K-12 online and blended learning research, policy, and practice?*

Key Points: The value of this handbook is to move beyond collecting the research to also providing syntheses of those studies. The goal is to offer an understanding of where we have been and what research still needs to be conducted. One example of possible benefits of guided didactic conversation for K12 online learning is on page 75-78 which includes time management and teacher workload, management of course content, content accessibility for students, student isolation, and student motivation. Another discussion is personalized learning refers to instruction in which the pace of learning and the instructional approach are optimized for the needs of each learner. Learning objectives, instructional approaches, and instructional content (and its sequencing) may all vary based on learner needs. In addition, learning activities are made available that are meaningful and relevant to learners, driven by their interests and often self-initiated.

1. Getting online learners involved: Motivation and personal responsibility of K-12 online learners is still a challenge in our field. Using Connectivist principles, we could design and research programs that provide a learning experience in which students are challenged. This could be facilitated by creating opportunities for exploration beyond the standard curriculum of the course, partially controlled by the students. Letting students find creative solutions to real problems based on their interactions with multiple resources and learners in different settings.

2. Creation of online communities of learners: For knowledge connections to occur, it is relevant for our students to realize that they live in an interconnected world in which they are part of a greater community of online learners. This way, communicating with others in a didactic manner is key to helping our students solve the daily challenges derived from learning in a distance fashion. Setting up (and researching) opportunities for discussion with other learners in different contexts, learning similar content, will also help cultivate meaningful connections and learning.

3. Promoting the use of Open Educational Resources (OER): K-12 online education could take advantage of existing platforms of Open Educational Resources, and new ones collaboratively created by in-service teachers, as a way to incorporate divergent perspectives into the curriculum. Moreover, teachers and students can become active producers of content, shifting from a passive role in the learning/teaching process, to a more active one.

Source: **Christensen Institute** (Brief)

Title: [***Breaking the Mold: How a global pandemic unlocks innovation in K–12 instruction* (January, 2021)**](https://www.christenseninstitute.org/publications/online-learning-survey/)

Overview: This brief highlights interesting findings from the first survey, discusses trends in instructional practice that could redefine education in years to come, and offers theory-based insights and recommendations for both powering through the pandemic and evolving toward a more student-centered future. Whereas classroom-based instruction is inherently a live experience, remote instruction can involve varying degrees of synchronous or asynchronous interaction.

Key Points: When we asked teachers how much of their instruction is synchronous vs. asynchronous, nearly half of them reported teaching via live synchronous instruction each day for the equivalent of a regular school day. Additionally, the materials and technologies teachers use tend to be those geared for synchronous instruction. Only 22% of teachers use commercial materials designed for remote instruction—which tend to cater to asynchronous learning. Instead, most teachers come up with their own resources, adapt conventional classroom curriculum for remote instruction, or curate materials from various online sources. Likewise, the technologies teachers use most are the types of technology most often used for migrating conventional classes to the cloud—such as learning management systems and video streaming. In contrast, tools for facilitating student centered practices such as mastery-based learning and individualized learning pathways are far less common. Page 6 shows charts with statistics of online instruction.

The first pathway involves helping more teachers make incremental steps toward student-centered learning. As the survey results show, most teachers will tend to adapt conventional classroom-based practices for remote instruction. As they do this, however, student-centered practices can make it into their teaching repertoires if new practices offer pragmatic ways to help teachers better cover their material and engage their students.

For example, administrators might encourage teachers to record the lessons they present during video calls and then post those lessons online where students can review the lessons at their own pace.

As the challenges of the pandemic continue, teachers will feel compelled to either radically change their instructional models. One practical solution is to increase educators’ access to the resources that support student-centered practice—such as quality curriculum designed for remote instruction, adaptive learning software and assessment tools, and learning management systems that support mastery-based progression.

Source: **Department of Educational Technology (US)** (Briefs and Technology Plan)

Title: [***Advancing Educational Technology in Teacher Preparation: Policy Brief* (December, 2016)**](https://tech.ed.gov/files/2016/12/Ed-Tech-in-Teacher-Preparation-Brief.pdf)

Overview: Our students deserve to have teachers, including novice teachers, who are fully prepared to meet their needs. In today’s technology rich world, that means educators need to be prepared to meaningfully incorporate technology into their practice immediately upon entering the classroom. Our nation’s motivated and committed pre-service teachers deserve to be trained by faculty using technology in transformative ways that thoughtfully support and measure learning gains.

Key Points:

TPACK is a framework consisting of Technological, Pedagogical, and Content Knowledge that provides educators with a model to determine how their knowledge, based in the three areas, intersects to effectively use technology to support student learning.

**Content Knowledge (CK):** This component of the framework focuses on educator knowledge about the subject matter, including the “deeper knowledge fundamentals of the disciplines” an educator teaches.

**Pedagogical Knowledge (PK):** This component of the framework focuses on the practice of teaching, specifically the knowledge of learning theories, teaching methods, strategies for student assessment, and applications to the learning environment.

**Pedagogical Content Knowledge (PCK):** This component, which merges the elements of pedagogical knowledge and content knowledge, focuses on an educator’s ability to represent the subject matter in a way that considers student learning preferences as well as prior knowledge related to the content with the ultimate goal of increasing student understanding.

**Technological Knowledge (TK):** This component of the framework highlights educator knowledge of available technological tools and their ability to achieve selected tasks.

**Technological Content Knowledge (TCK):** This component of the framework highlights educator ability to understand how specific technologies can be used to effectively support student learning within the content area.

Title: [***Reimagining the Role of Technology in Education – 2017 National Education Technology Plan Update* (January, 2017)**](https://tech.ed.gov/files/2017/01/NETP17.pdf)

**Ensure students and educators have broadband access to the internet and adequate wireless connectivity, with a special focus on equity of access outside of school.**

Although connectivity itself does not ensure transformational use of technology to enable learning, lack of connectivity almost certainly precludes it. Working with federal programs such as E-rate through the FCC, as well as with nonprofit partners such as CoSN, EducationSuperHighway, EveryoneOn, and others, states, districts, and postsecondary institutions should make sure technology- enabled learning is available for all students, everywhere, all the time.

**Ensure that every student and educator has at least one internet access device and appropriate software and resources for research, communication, multimedia content creation, and collaboration for use in and out of school.**

Only when learners have the tools necessary to complete these activities are they able to realize the potential of education technologies fully. States and districts should make sure such device purchases are funded sustainably with a plan for device refresh.

**Support the development and use of openly licensed educational materials to promote innovative and creative opportunities for all learners and accelerate the development and adoption of new open technology–based learning tools and courses.**

Similar to those leading state and local efforts under way in California, Illinois, and Washington state, administrators and policymakers at all levels and in formal and informal spaces should consider the diversified learning paths and potential cost savings inherent in the use of such openly licensed resources.

**Draft sustainability plans for infrastructure concerns that include upgrades of wired and wireless access as well as device refresh plans and sustainable funding sources while ensuring the safety and protection of student data.**

As state and local education institutions work to bridge the existing digital divide, they concurrently should be drafting plans for the upgrade of infrastructure necessary to meet the needs of increased user demand as well as speeds necessary for the use of evolving technologies. These plans should include specific systems and strategies for protecting student data, be drafted with cross-stakeholder groups, and include special consideration of funding sustainability and possible partners.

**Create a comprehensive map and database of connectivity, device access, use of openly licensed educational resources, and their uses across the country.**

To understand the digital divide better and progress toward bridging it, researchers, state and local officials, and district administrators should work in concert with one another to test connectivity speeds in schools and homes and to identify the kinds of devices to which educators and students have access and the ratios of devices to users within education institutions. The building of such a map and database would allow for the visualization of inequities of access and targeted interventions to alleviate them. In addition, the level of engagement with openly licensed learning materials should be made transparent as an indicator of progress toward equitable access and effective allocation of resources.

**Include cybersafety and cybersecurity training for students, teachers and parents as part of district and school “Responsible Use Policy” training.**

Crimes against children and youth and the tactics to ensnare them are becoming more sophisticated. Because children often use devices both in and outside of school, cyber-safety and cybersecurity should be incorporated into Responsible Use policies and trainings.

Source: **Education Commission of the States** (Policy Snapshot & Virtual Schools: State Policy Landscape)

Title: [***Virtual School Policies* (December, 2019 and April, 2021)**](https://www.ecs.org/virtual-school-policies/)

Overview: This document provides an overview of legislative sessions from several states during 2017-2019, and it addresses important areas that impact operations of virtual schools and programs.

Attendance and Engagement: increasing student participation and completion and facilitating student and parent engagement.

Authoring and Governance: improving authorizer and governing body oversight and accountability.

Funding: amending virtual school funding provisions to improve school quality.

Key Points: According to the Education Commission of the States’ 50-state comparison of charter school policies, 21 states explicitly permit virtual charter schools to operate in the state. In recent years, virtual charter schools have dominated the virtual school policy discussion. Although, they make up less than half of all full-time virtual schools in operation, they enroll nearly 80% of full-time virtual school students. Based on a review of state statute, states fund virtual schools in various ways, including at an equivalent or lower rate than brick-and-mortar schools, through general allocation, or using a performance-based funding model.

A literature review released as a part of the Annenberg Institute’s Ed Research for Recovery series highlighted best practices specific to virtual learning programs, including:

• Access to necessary technology.

• Differentiated instructional methods.

• Direct student-teacher contact time.

• Targeted professional development and planning time for teachers.

• Student social and emotional supports and opportunities for peer engagement.

Source: **International Association for K12 Online Learning** (iNACOL) Handbook

Title: [***National Standards for Quality Online Courses* (v2 October, 2011)**](http://www.aurora-institute.org/wp-content/uploads/national-standards-for-quality-online-courses-v2.pdf)

Overview: iNACOL organized a committee of experts with various backgrounds in the field of K-12 online learning to take the lead in refreshing this standards document. The document provides guidance that online learning is providing the content, pedagogical approach and integration of digital tools and resources that now support new models of teaching and learning, including blended learning, personalized instruction, portable and mobile learning.

Key Points: Page 7 includes a chart identifying the varied forms of blended learning and characteristics of instructional models. The handbook further provides guidance on important topics of online learning including the topics, along with rubrics.

Course content – *The course provides online learners with multiple ways of engaging with learning experiences that promote their mastery of content and are aligned with state or national content standards.*

Instructional design – *The course uses learning activities that engage students in active learning; provides students with multiple learning paths to master; the content is based on student needs; and provides many opportunities for interaction and communication — student to student, student to instructor and instructor to student.*

Student assessment – *The course uses multiple strategies and activities to assess student readiness for and progress in course content and provides students with feedback on their progress*.

Technology – *The course takes full advantage of a variety of technology tools, has a user-friendly interface and meets accessibility standards for interoperability and access for learners with special needs.*

Course evaluation and support – *The course is evaluated regularly for effectiveness, using a variety of assessment strategies, and the findings are used as a basis for improvement. The course is kept up to date, both in content and in the application of new research on course design and technologies. Online instructors and their students are prepared to teach and learn in an online environment and are provided support during the course.*

Source: **Journal of Computing Education** (Research Study)

Title: [***Blending asynchronous and synchronous digital technologies and instructional approaches to facilitate remote learning* (July 5, 2021)**](https://link.springer.com/article/10.1007/s40692-021-00195-8)

Overview: This study, using an online survey of elementary and secondary school English language collectively explores how teachers in Hong Kong adapted their instruction to online teaching in responses to COVID-19. The findings indicate that teachers used a variety of asynchronous and synchronous digital technologies and instructional approaches to facilitate students’ learning, assess learning, and communicate with students and parents remotely.

Key Points: The findings suggest that a blend of asynchronous and synchronous modes are seen as optimum to support student learning online. A five-stage model is proposed on how teachers can blend asynchronous and synchronous digital technologies and instructional approaches within a sequence of learning.

Source: **National Education Association (NEA) (**Guide document)

Title: [***Guide to Teaching Online Courses* (July 5, 2021)**](https://www.cstu.org/files/onlineteachguide.pdf)

Overview: The purpose of this guide is for policymakers, administrators, educators, and others engaged in selecting, hiring, training, and supporting teachers to provide quality online instruction to students, or in making policy choices affecting online education. It is designed to provide an overview of the development of an effective online education system, focusing particularly on the skills teachers need to teach effectively online, the professional development necessary to acquire those skills, and the models schools need to evaluate and improve online teaching. Section IV on pages 19-23 provides an overview of skills for online teachers.

Key Points: Beyond the extra resources available online for teachers, online teaching can provide another important element of teacher learning: it makes the process of teaching public and extends it beyond the school walls. In online courses, the curriculum, the teacher’s daily lesson plans, the interaction in the classroom, are all on display, available for capture and replication.

• Communication between and among students and teachers that can be asynchronous or synchronous giving students “voice”.

• Appropriate and timely feedback as teachers should address specific student concerns and reply promptly to student questions.

• Adapt online tools, curriculum and materials to support effective instruction.

• Student progress assessed by both formative and summative standards, and student achievement and results reported.

Source: **Quality Matters** (Handbooks)

Title: [***National Standards for Quality Online Courses* (Third Edition, 2019);**](https://www.nsqol.org/wp-content/uploads/2019/02/National-Standards-for-Quality-Online-Teaching.pdf)

[***National Standards for Quality Online Programs* (Second Edition, 2019*); and National Standards for Quality Online Teaching* (Third Edition, 2019**](https://www.nsqol.org/wp-content/uploads/2019/02/National-Standards-for-Quality-Online-Teaching.pdf)**)**

Overview: Designed to complement one another, the National Standards for Quality have been the benchmark for online programs, districts and state agencies to help evaluate and improve online courses, online teaching and online programs. These standards will allow for a variety of program types, full-time virtual schools, blended, competency-based, or other learning strategies being employed.

Key Points: Key sections in the handbooks outline topics such as digital pedagogy, communication, student engagement and citizenship, online instructional design, assessment and measurement. Each standard is accompanied by a set of indicators including explanations and examples that will be particularly helpful for districts adopting the standards and indicators to fit their unique needs.

Source: **RAND Corporation** (Research – American School District Panel ASDP)

Title: [***The Rise of Virtual Schools* (July, 2021)**](https://www.rand.org/pubs/research_reports/RRA956-5.html#:~:text=Key%20Findings&text=One%2Dquarter%20of%20surveyed%20districts%20plan%20to%20run%20a%20virtual,only%20after%20the%20pandemic%20began.)

Overview: This Data Note series is intended to provide brief analyses of educator survey results of immediate interest to policymakers, practitioners, and researchers. Given the flare of delta variant cases in the United States over the summer, relatively few districts, as of June 2021, planned to offer a temporary remote option to students during only fall 2021—in some cases, likely because of state mandates requiring in-person instruction. Yet districts have also documented a large uptick in long-term remote instruction in the form of virtual schools.

Key Points: This anticipated rise in virtual school enrollment underlines the need for states to develop regulatory policies to ensure that various forms of remote instruction—ranging from fully online courses to stand-alone virtual schools—are of acceptable quality.

• Districts’ interest in virtual schools is high across all district types.

• One in five district leaders said parental demand for a fully remote schooling option in 2021–2022 is strong. We found no relationship between perceived parental demand for and planned district provision of fully remote instruction in fall 2021.

• As of June 2021—before the delta variant significantly increased the number of COVID-19 cases nationally—district leaders expected low participation in temporary partial or fully remote instructional options in fall 2021.

• Only 10 percent of surveyed districts are newly offering fully online courses in 2021–2022. This is in addition to the 26 percent that already did so prior to the pandemic and will continue to do so in 2021–2022. These online courses are most often provided for credit recovery.