Virtual Schools in the U.S. 2019

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Virtual Schools in the U.S. 2019
Executive Summary

Alex Molnar, University of Colorado Boulder
Series Editor

May 2019

In 2018 virtual schools continued to be a focal point for policymakers. As proponents continued to make the case that virtual education can expand student choices and improve the efficiency of public education, full-time virtual schools (also sometimes referred to as virtual charter schools, virtual academies, online schools or cyber schools) have attracted a great deal of attention. Many argue that online curriculum can be tailored to individual students more effectively than curriculum in traditional classrooms, giving it the potential to promote greater student achievement than can be realized in traditional brick-and-mortar schools. These claims are not supported by the research evidence; nonetheless, the promise of lower costs—primarily for instructional personnel and facilities—continues to make virtual schools financially appealing to both policymakers and for-profit providers. This report provides disinterested scholarly analyses of the characteristics and performance of full-time, publicly funded K-12 virtual schools; reviews the relevant available research related to virtual school practices; provides an overview of recent state legislative efforts to craft virtual schools policy; and offers policy recommendations based on the available evidence.

Virtual Schools in the U.S. 2019 is organized into three sections:

- Section I, *Full-Time Virtual and Blended Schools: Enrollment, Student Characteristics, and Performance*, documents the number of virtual and blended-learning schools, their student characteristics, and their performance.
- Section II, *What Virtual and Blended Education Research Reveals*, reviews the relevant available research literature.
- Section III, *Key Policy Issues in Virtual Schools: Finance and Governance, Instructional Quality, and Teacher Quality*, provides a review of recent policymaking related to virtual schools.

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As reported in previous NEPC virtual schools reports, the number of virtual schools in the U.S. continues to grow.

In 2017-18, 501 full-time virtual schools enrolled 297,712 students, and 300 blended schools enrolled 132,960. Enrollments in virtual schools increased by more than 2,000 students between 2016-17 and 2017-18, and enrollments in blended learning schools increased by over 16,000 during this same time period. Virtual schools enrolled substantially fewer minority students and fewer low-income students compared to national public school enrollment.

Virtual schools operated by for-profit EMOs were more than four times as large as other virtual schools, enrolling an average of 1,345 students. In contrast, those operated by nonprofit EMOs enrolled an average of 344 students, and independent virtual schools (not affiliated with an EMO) enrolled an average of 320 students.

Among virtual schools, far more district-operated schools achieved acceptable state school performance ratings (56.7% acceptable) than charter-operated schools (40.8%). More schools without EMO involvement (i.e., independent) performed well (59.3% acceptable ratings), compared with 50% acceptable ratings for schools operated by nonprofit EMOs, and only 29.8% acceptable ratings for schools operated by for-profit EMOs. The pattern among blended learning schools was similar with highest performance by district schools and lowest performance by the subgroup of schools operated by for-profit EMOs.

Recommendations Arising from Section 1

Given the overwhelming evidence of poor performance by full-time virtual and blended learning schools it is recommended that policymakers:

- Slow or stop the growth in the number of virtual and blended schools and the size of their enrollments until the reasons for their relatively poor performance have been identified and addressed.
- Implement measures that require virtual and blended schools to reduce their student-to-teacher ratios.
- Enforce sanctions for virtual and blended schools that perform inadequately.
- Sponsor research on virtual and blended learning “programs” and classroom innovations within traditional public schools and districts.

Section II reviews research relevant to K-12 virtual and blended learning schools. Research describing the experience of students enrolled in virtual or blended learning schools is sparse; therefore, relatively little is known about the instructional models, the nature of the curriculum, and the type and amount of programmatic support provided by these schools. Much of the research that is available is a-theoretical, methodologically questionable, contextually limited, and overgeneralized. As a result, despite the growth of virtual schools, the available research is of little value in guiding policy.

Recommendations Arising from Section II:

- The growth and geographic reach of full-time, taxpayer-funded virtual schools should be regulated. At present there are serious questions about the effectiveness of many models of virtual schooling. Until these questions can be adequately addressed, policymakers should limit or consider a moratorium on their growth.
- Given the lack of understanding of what is actually happening in virtual education (e.g., the nature of and amount of teaching in the instructional model, the specific curriculum that is used, the learning that occurs, etc.), policymakers should require that any virtual school operating in their jurisdiction be required to provide the necessary information to examine the effectiveness of the virtual education that is actually being provided.
- State and federal policymakers should create long-term programs to support independent research on and evaluation of virtual schooling, particularly full-time virtual schooling. More than twenty years after the first virtual schools began, there continues to be an inadequate research base of empirical, longitudinal studies to guide the practice and policy of virtual schooling.

In 2017 and 2018 there was a relative decrease in the amount of legislative activity related to virtual schools. As in past years, bills to increase oversight of virtual schools continue to be introduced. There is little evidence, however, that legislative actions are being informed by available research on virtual schools performance.

Recommendations Arising from Section III:

Policymakers should:

- Develop new funding formulas based on the actual costs of operating virtual schools.
- Develop new accountability structures for virtual schools, calculate the revenue needed to sustain such structures, and provide adequate support for them.
- Establish geographic boundaries and manageable enrollment zones for virtual schools by implementing state-centered funding and accountability systems.
- Develop guidelines and governance mechanisms to ensure that virtual schools do not prioritize profit over student performance.
- Require high-quality curricula, aligned with applicable state and district standards, and monitor changes to digital content.
- Develop a comprehensive system of formative and summative assessments of student achievement, shifting assessment from a focus on time- and place-related requirements to a focus on student mastery of curricular objectives.
- Assess the contributions of various providers to student achievement, and close virtual schools and programs that do not contribute to student growth.

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- Define certification training and relevant teacher licensure requirements specific to teaching responsibilities in virtual schools, and require research-based professional development to promote effective online teaching models.
- Address retention issues by developing guidelines for appropriate student-teacher ratios and attending to other working conditions (for example, student attendance) that may affect teachers' decisions about where to work.
- Work with emerging research to develop valid and comprehensive teacher evaluation rubrics that are specific to online teaching.
- Identify and maintain data on teachers and instructional staff that will allow education leaders and policymakers to monitor staffing patterns and assess the quality and professional development needs of teachers in virtual schools.
- Examine the work and responsibilities of virtual school principals and ensure that those hired for these roles are prepared with the knowledge and skills to be effective, particularly with respect to evaluating teachers and promoting best practices.

Section I
Full-Time Virtual and Blended Schools: Enrollment, Student Characteristics, and Performance

Gary Miron and Najat Elgeberi[i]
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May 2019

Executive Summary

This seventh NEPC Annual Report on Virtual Education provides a detailed overview and inventory[1] of full-time virtual schools and blended learning, or hybrid, schools. Full-time virtual schools deliver all curriculum and instruction via the Internet and electronic communication, usually asynchronously with students at home and teachers at a remote location. Blended schools combine virtual instruction with traditional face-to-face instruction in classrooms. Evidence related to inputs and outcomes indicates that students in these schools differ from students in traditional public schools. School performance measures for both virtual and blended schools indicate that they are performing poorly. Nevertheless, enrollment growth has continued. Dominant in this sector are for-profit education management organizations (EMOs) that operate exceedingly large virtual schools. School districts are becoming more active in opening virtual schools, although district-run schools have typically been small, with limited enrollment. This report provides a census of full-time virtual and blended schools. It also includes key findings related to student demographics and state-specific school performance ratings.

[i] The authors wish to thank Mr. Christopher Shank who assisted with merging of datasets. Chris, along with Ms. Caryn Davidson and Dr. Charisse Gulosino have contributed to and co-authored earlier editions of this report. Ms. Fanny Hernandez and Ms. Dung Pham also contributed to this report by assisting us with filling in missing data and correcting or updating contact information needed to communicate with the schools. Dr. Gulosino is from the University of Memphis while all others mentioned here are doctoral students in the Evaluation, Measurement and Research program at Western Michigan University.

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Current Scope and Growth of Full-Time Virtual Schools and Blended Learning Schools

- In 2017-18, 501 full-time virtual schools enrolled 297,712 students, and 300 blended schools enrolled 132,960. Enrollments in virtual schools increased by more than 2,000 students between 2016-17 and 2017-18 and enrollments in blended learning schools increased by over 16,000 during this same time period.
- Thirty-nine states had either virtual or blended schools. There were four states that allowed blended schools to operate but still have not allowed the opening of full-time virtual schools. A total of six states have full-time virtual schools but do not currently have full-time blended learning schools.
- Virtual schools operated by for-profit EMOs were more than four times as large as other virtual schools. Virtual schools operated by for-profit EMOs enrolled an average of 1,345 students. In contrast, those operated by nonprofit EMOs enrolled an average of 344 students, and independent virtual schools (not affiliated with an EMO) enrolled an average of 320 students.
- Although private (profit and nonprofit) EMOs operated only 34% of full-time virtual schools, those schools enrolled 64.4% of all virtual school students.
- Just under half of all virtual schools (46.5%) were charter schools, but together they accounted for 79.1% of enrollment. While districts have been increasingly creating their own virtual schools, those tended to enroll far fewer students.
- In the blended sector, nonprofit EMOs operated 32% of schools and for-profit EMOs operated 15.3%. Just over half (52.7%) of blended schools were independent. Blended schools operated by nonprofit EMOs were most numerous although blended schools operated by for-profit EMOs were largest in size (an average of 772 students per school). There were more charter blended schools (62%) than district blended schools (38%), and they had substantially larger average enrollments (529) than district blended schools (303).

Student Demographics

- Virtual schools enrolled substantially fewer minority students and fewer low-income students compared to national public school enrollment.
- The overall proportion of low-income students in blended schools was similar to the national average; however, those operated by nonprofit EMOs enrolled a substantially higher proportion of low-income students than their counterparts. Blended schools had a higher proportion of Hispanic students relative to national enrollments.
- Although special education data was available for relatively few virtual and blended schools, the proportion of special education students in virtual schools with data was higher than the national average, while blended schools with data enrolled slightly fewer children with disabilities relative to the national average.
- Both virtual schools and blended schools enrolled relatively few English language

learners (ELLs) compared to the national average.

- While the population in the nation's public schools was split nearly evenly between females and males, virtual schools enrolled more females (53.9%), and blended schools were nearly evenly split.

Student-Teacher Ratio

- The average student-teacher ratio in the nation's public schools was 16 students per teacher. But virtual schools reported having 2.7 times as many students per teacher (44) compared to the national average, and blended schools reported a little more than twice as many (34).

School Performance Data

- Many states continue to have frozen accountability systems or to have implemented new systems that do not include an overall rating. Therefore, overall school performance ratings assigned by state agencies were available for only 21 of the 39 states with virtual and/or blended schools. Overall, a surprisingly low proportion of virtual and blended schools had school performance ratings available: In the states with available school performance ratings, 56% of the virtual schools and 50% of the blended schools had no ratings assigned to them.

- Overall, many virtual and blended schools continue to show low performance ratings, although the proportion of schools with acceptable ratings was higher than reported in the previous year. Of the virtual schools with ratings, 48.5% received acceptable performance ratings. Among the blended schools with ratings, 44.6% received acceptable performance ratings.

- Among virtual schools, far more district-operated schools achieved acceptable school performance ratings (56.7% acceptable) than charter-operated schools (40.8%). More schools without EMO involvement (i.e., independent) performed well (59.3% acceptable ratings), compared with 50% acceptable ratings for schools operated by nonprofit EMOs, and only 29.8% acceptable ratings for schools operated by for-profit EMOs. The pattern among blended learning schools was similar, with highest performance by district schools and lowest performance by the subgroup of schools operated by for-profit EMOs.

On-time graduation rate data were available for 290 full-time virtual schools and 144 blended schools. The graduation rates of 50.1% in virtual schools and 61.5% in blended schools fell far short of the national average of 84%.

Recommendations

Given the overwhelming evidence of poor performance by full-time virtual and blended schools, we include the following recommendation for policymakers.

- Slow or stop the growth in the number of virtual and blended schools and the size of their enrollments until the reasons for their relatively poor performance have been identified and addressed.
- Implement measures that require virtual and blended schools to reduce their student-to-teacher ratios.
- Enforce sanctions for virtual and blended schools that perform inadequately.
- Sponsor research on virtual and blended learning "programs" and classroom innovations within traditional public schools and districts.

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Section I

Full-Time Virtual and Blended Schools: Enrollment, Student Characteristics, and Performance

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Over the past seven years, the National Education Policy Center (NEPC) has been active in documenting and researching virtual schooling at the primary and secondary levels.[2] Reports have examined who is enrolling in virtual charter and district schools and how those schools are performing; in addition, reports have focused on a wide range of policy issues specific to virtual schools. While the earliest NEPC reports included only full-time virtual schools, over the past three years, they have included both full-time virtual and full-time blended learning schools.

In the last year, there has been some evidence that the growth in virtual schools is slowing or plateauing. Launching of new virtual and blended schools has slowed, and fewer new virtual and blended schools are meeting our criteria for inclusion in the inventory. Although the growth in the number of schools has slowed, the average size of the schools continues to increase, resulting in net increases in enrollments in both virtual and blended schools. It is striking that growth continues despite overwhelmingly negative evidence relative to virtual and blended school outcomes. As researchers and as educators, we remain optimistic that these new modes of delivery can work, and while research is still limited, we believe they may already be working better as school or district programs rather than as stand-alone schools. We also recognize that there are many teachers across various school types who are innovating and implementing blended learning models that are possibly having far better outcomes than the results from their stand-alone counterparts.

This report contains detailed descriptions of full-time virtual and full-time blended schools operating during the 2017-18 school year. The annual inventory serves as a key research-based

effort to track developments nationwide.[3] This inventory helps detail the schools' student demographics, performance, and rate of growth or attrition. Research questions this report seeks to answer include:

- How many full-time virtual and blended schools operate in the U.S.? How many students do they enroll?
- What are the key organizational characteristics of these schools and who operates them?
- What are the demographic characteristics of students enrolled? How do demographic data for students enrolled in virtual and blended schools differ from those enrolled in brick-and-mortar schools?
- How do virtual and blended schools perform in terms of such school performance measures as state performance ratings and graduation rates?

Student demographics reported here include grade level, ethnicity, sex, socioeconomic status, special education status, and English language learner status. Data on school performance includes a comparison of aggregate performance ratings and national norms when available. We also include data on staffing, specifically on student-teacher ratios.

This report builds on earlier reports; we have updated earlier inventories with available data for the 2017-18 academic year.

Data Sources, Selection Criteria, and Aggregate Calculations

The findings presented in this report are based on publicly available data, collected, audited, and warehoused by public authorities. Data from the National Center for Education Statistics (NCES) was particularly helpful relative to key data on enrollment, student demographics and staffing. Data from state education agencies and from individual school websites provided supplemental data not available from NCES. After collecting data and assembling tables with school descriptors and outcomes, we sent two rounds of email invitations to all virtual and blended schools with available contact emails, inviting them to review the data and information we planned to publish. We are grateful for responses from scores of schools that helped us to correct information and also fill in some of the missing information evident in our tables. Detailed feedback was also provided by K12 Inc. and Connections Education.

The scope of this inventory is limited to full-time, public elementary and secondary virtual and blended schools in the U.S. These include virtual and blended schools operated by for-profit and nonprofit Education Management Organizations (EMOs) as well as virtual schools operated by states or districts. Private virtual or blended schools (funded in whole or in part by charging tuition and fees, rather than relying on a public funding program using tax dollars) are excluded due to absence of relevant data in state or federal data sets. Also excluded are schools offering a combination of programs, including traditional face-to-face programs as well as virtual or blended options, unless it was possible to separate data for the full-time virtual or blended school components.

Schools were identified by the unique school ID code assigned by the NCES or, for relatively new schools, by unique building or school ID codes assigned by state agencies. These criteria helped identify and exclude smaller district programs and schools not intended to be full-time, but simply to offer some virtual learning experience for a subset of students.[4] All schools included had evidence of enrollment in one of the past two years, although schools enrolling fewer than 10 students were excluded. Such restrictions allow for more confidence in attributing various outcomes to specific types of schools.

The primary sources for total enrollment and school performance data were state-level datasets, and school report cards for the 2017-18 school year. Data for grade level enrollment, race-ethnicity and sex were obtained from NCES (the Common Core of Data) and represent the 2016-17 school year, the most recent data available.

In many instances, aggregated data for virtual and blended schools reflect weighted means that have been calculated so that the influence of any given school on the aggregated mean is proportional to its enrollment. Comparisons were made to norms for all public schools in the United States.[5]

Exclusions and Additions Between 2016-17 and 2017-18

For the current study we have included a total of 501 virtual schools and 300 blended learning schools. The process to identify potential schools, review them, and make decisions to include or exclude them was complex and—at times—burdensome.

In the previous year, 376 schools were initially identified as possible virtual or blended learning schools but excluded from the inventory for various reasons. These 376 schools were reassessed this year to determine whether the exclusion remained valid. In 49 cases, schools excluded in 2016-17 because of closure or "program" status were found to be full-time virtual or blended schools enrolling students in 2017-18 and were therefore added to this year's inventory. Of the remainder of the schools that were excluded, 53 were identified with low enrollment (less than 10 students), 100 were confirmed closed or inactive, 44 were confirmed as programs, and 14 were positively identified as alternate names for schools already included. An additional 78 were part-time virtual schools that did not offer diplomas, 15 turned out to be brick-and-mortar schools, seven were schools with virtual and blended programs which could not be disaggregated, and one was a private virtual school and therefore outside this inventory's scope. The 64 remaining schools were either excluded because they were adult programs (to earn a degree), or because they charge tuition.

Of the 728 schools profiled for the 2016-17 school year, 639 were determined to merit inclusion in the 2017-18 inventory. Of those not included, 71 were identified as closed, two were part-time virtual schools, one school was a duplicate of an existing school, and one school was identified as going to open in 2017. In addition, 14 schools were not included because they did not meet enrollment requirements for the study.

In the 2017-18 revision of schools identified in the 2016-17 school search, it was noted that 10 schools had changed their names, and six schools had their virtual/blended status revised

(i.e., they changed management organizations or profit status). Many schools also had their profit status revised since last year; in most cases the schools have changed their relationship with outside for-profit and nonprofit EMOs and are now classified as "independent" since the services they may still receive from their former operator are limited in scope. Input from schools and EMOs improved our ability to accurately identify these important features; adjustments made due to the feedback from these entities notably improved the accuracy of the school inventory.

The school search for the 2017-18 school year yielded an additional 203 schools that had not been identified in prior years. Some of those schools were newly opened, and some were discovered after reviewing virtual tags assigned to schools by the National Center for Education Statistics. All new schools were evaluated for inclusion. After visiting schools' websites, contacting schools' personnel, investigating schools' promotional materials and handbooks, and comparing with state and federal school datasets directories, researchers determined that 111 of the newly identified schools met the standard for inclusion in the 2017-18 inventory. Of the 92 schools which were investigated but not selected for inclusion, 25 were not fully blended schools, 46 did not enroll sufficient students, seven were new schools for the 2018-19 school year, four were school programs, five were closed, three were not tuition-free, and two were private virtual schools and therefore outside this inventory's scope.

Out of the 111 schools identified as new to the dataset for 2017-18, 28.8% (32) were blended schools, while 71.2% (79) were virtual. Researchers searched all state department of education websites for schools not previously included in the inventory. Those schools were then directly contacted by phone, and designated personnel were asked to confirm the school status and verify all school data. New blended schools were further identified by examining school promotional materials and handbooks, by using external resources (for example, the Christensen Institute and the blended universe website), and by gathering input from schools and EMOs. The identification of blended schools was more challenging than that of virtual schools because many virtual schools clearly display their status and their unique curriculum delivery approaches on their websites. In addition, many states provide comprehensive lists of virtual schools operating in the state. While refinements to the identification of blended schools resulted in a notable increase in blended schools included in the dataset, it remains likely that there are blended schools that this inventory has missed.

Limitations

There are several general limitations that readers should keep in mind. Most of these limitations are experienced by other researchers in this area, although they are not always highlighted in reports.

Incomplete demographic, class size, and performance data. The tables and records in our inventory have several gaps that reflect missing data. Some states combine virtual school data with local district data in ways that make disaggregation impossible. For example, while data on student ethnic background and free and reduced-price lunch status is relatively complete, data reported at the district level (including, for example, special education

enrollment) is often unavailable. This was particularly problematic in states where charter schools are not considered Local Education Authorities or districts.[6]

Comparison groups. National aggregate results for all public schools provided the base for several comparisons in this report, which profiles 39 states having virtual and/or blended options.[7] While comparisons of two inherently different forms of schooling, each representing different geographic datasets, have some obvious weaknesses, national aggregate data is what state and federal agencies typically use in their reports and comparisons. Following the agencies' lead is intended to allow reasonable comparison of this report with others. An additional consideration is that, because the 39 states represented are among the largest and most densely populated, the national comparison is informative, if not perfect. It is perhaps also worth noting that the national data include data for full-time virtual and blended schools, although it constitutes a relatively small subset of the data used for this study.

Instability in virtual and blended schools. Full-time virtual and blended schools are rapidly evolving; the number of such schools, their demographic composition, and their current performance data could vary from the 2016-17 demographic data and the 2017-18 performance data presented here (the most recent available for each category). When the fluidity of the terrain is layered onto the scope of this attempt to compose a national portrait, some errors of inclusion and exclusion seem likely. Documented corrections to the data are welcome and can be submitted to the authors through the National Education Policy Center.

Growth and Current Scope of Full-Time Virtual and Blended Schools

Virtual Schools

An array of education services is delivered online. On one end of the continuum, individual courses are delivered to students who are otherwise enrolled in brick-and-mortar schools. The middle terrain includes a wide array of blended programs and schools serving students with a combination of face-to-face and online activities. On the other end of the continuum, full-time virtual schools provide all instruction online.

For the purposes of this report, blended schools are defined as schools in which all students experience the same blended instruction. There are variations across schools in how they combine virtual and face-to-face activities. Full-time virtual and blended schools are especially important to track because they receive full funding for delivering what is supposed to be a full school experience.

Although these schools still account for a relatively small portion of the overall school choice options in the U.S., they constitute some of the fastest-growing options. Virtual schools overlap with two other choice options: homeschooling and charter schools. Some students in virtual schools use this experience to supplement their homeschool experience. Further, 79 percent of virtual school student are enrolled in virtual charter schools, so these students can be counted as both virtual school students and charter school students. Appendix A

contains charts that depict the number of virtual and blended schools and students by state. During the 2017-18 school year, there were 29 states with both full-time virtual schools and full-time blended learning schools. While legislation for full-time virtual schools usually precedes legislation for full-time blended learning schools, there were four states that allowed blended schools to operate but still have not allowed the opening of full-time virtual schools: Hawaii, Illinois, New Jersey, and Rhode Island. A total of six states have full-time virtual schools although they still do not have full-time blended learning schools.[8] Note that three states (Connecticut, Missouri, and Wyoming) that had either a blended or virtual school included in earlier inventories had no schools included in this report, either because the schools were closed, reclassified as programs, or had too few students to be included in the inventory.

Beyond the 39 states with either virtual or blended schools, we recognize that other states also offer virtual education options, but in several other formats including, for example, the offering of individual online classes for some students or supplemental coursework facilitated online. It is important to note that this report tracks only full-time virtual and blended schools; outside the scope of this study are programs within districts and brick-and-mortar schools as well as other online offerings such as the delivery of individual online courses.

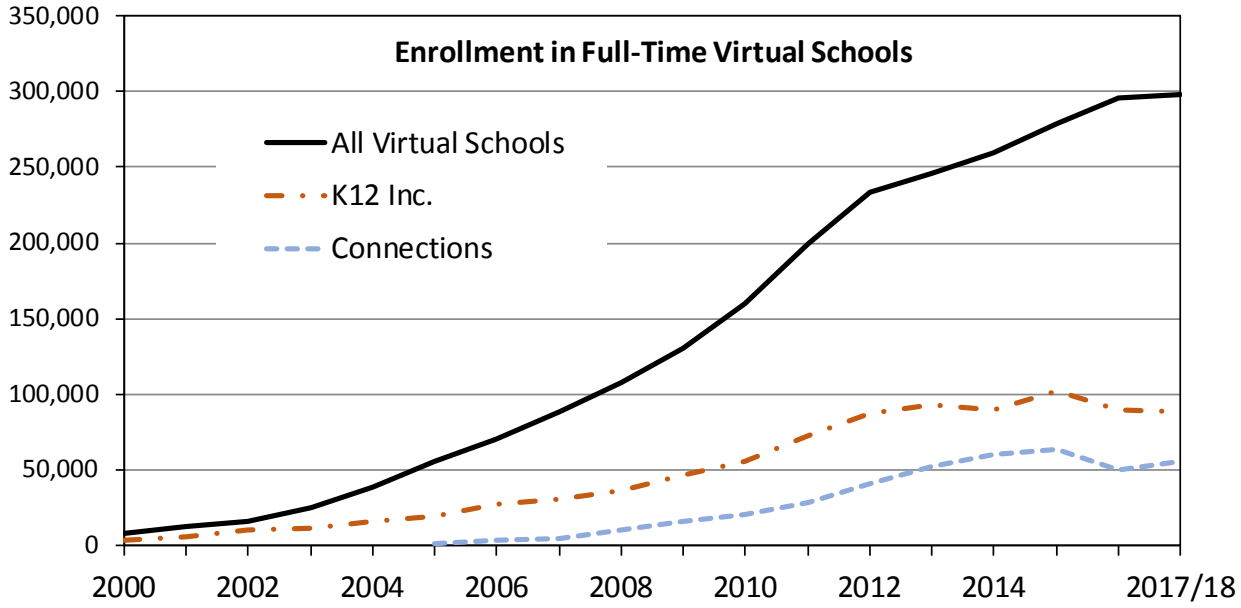
A total of 501 full-time virtual schools met the selection criteria for the 2017-18 school year.[9] These schools enrolled 297,712 students, indicating a net growth of just over 2,000 students over the past year. This represents a growth rate of just over 0.5%, which is the slowest growth recorded in this sector (see Figure 1).

A total of 300 blended schools met the selection criteria in 2017-18. These schools enrolled 132,960 students. While the number of blended learning schools meeting our criteria increased by only four schools, the net enrollment increased by just over 16,000 students.

Figure 1 illustrates the estimated enrollment growth in full-time virtual schools over the last 17 years.[10] Figure 1 also illustrates the proportion of students in full-time virtual schools operated by the two largest for-profit EMOs, K12 Inc. and Connections Academy. K12 Inc. schools accounted for 29.7% of all virtual school enrollments, a slight decrease from the prior year. It may be worth noting that K12 Inc.'s enrollment numbers were boosted in 2017-18 by the closure of a school (Electronic Classroom of Tomorrow—ECOT) in Ohio. ECOT and its for-profit operator (Altair Learning Management LLC) were mired in scandals and forced to close in January 2018. A large portion of the close to 14,000 students in this school shifted over to the Ohio Virtual Academy operated by K12 Inc. This boosted enrollment at this school to more than 20,000 students by the end of the school year. Connections Academy schools accounted for 18.7% of all enrollments. Overall, the market share of these two large companies dropped from their peak of 59.5% in 2015-16 to 48.4% in 2017-18.

As noted earlier, some of the changes we are seeing in this sector result from some schools shifting their relationship with these companies from "operators" (Education Management Organizations or EMOs) to vendors. A vendor relationship involves the school hiring outside companies or organizations to provide specific services or products, primarily access to the learning platform and curriculum provided by these EMOs.

Figure 1. Enrollment Trends in Full-Time Virtual Schools



New district-operated schools continue to add to the pool of full-time virtual schools, although they still tend to be small relative to virtual charter schools (see Table 1). While the proportion of district operated virtual schools increased by 1.1 percentage points between 2016-17 and 2017-18, the proportion of total enrollments in district run schools dropped by 3.4 percentage points.

There were 268 district virtual schools and 233 charter virtual schools in 2017-18. Between 2016-17 and 2017-18, there was an increase of 43 district and 29 charter schools. Interestingly, while the number of district schools increased more, net enrollment in these schools dropped by more than 10,000 students, while the charter schools increased their enrollments by more than 12,000 students. The districts now account for just over half of the total number of virtual schools, but their share of enrollments is only 20.9%, while the charter schools account for 79.1% of all students enrolled in virtual schools. While the district virtual schools are decreasing in average school size, the virtual charter schools have experienced growth in the average number of students per school (average of 1,011 students per virtual charter school). Contrast this with an average of 232 students per school in district-operated virtual schools. A possible explanation for this is that district schools are created to serve smaller targeted populations within district boundaries, while charter virtual schools are more likely to target statewide markets. Another possible explanation is that district virtual schools are seldom operated by for-profit companies that have larger school sizes designed for larger profit margins.

Table 1. Distribution of Virtual Schools and Students Across District and Charter Sectors, 2017-18

	Total Number of Schools in 2017-18	Percent of All Schools	Students	Percent of All Enrollment	Average Enrollment Per School
District	268	53.5%	62,169	20.9%	232
Charter	233	46.5%	235,543	79.1%	1,011
Total for All Virtual Schools	501	100.0%	297,712	100.0%	594

Private education management organizations (EMOs) operated 34% of all full-time virtual schools, accounting for 64.4% of enrollment. Both the nonprofit-EMOs and the for-profit EMOs have gained a little market share over the past year, while the total enrollments in "independent" virtual schools lost ground. Note that we use "independent" to refer to virtual schools that do not have a private EMO owner or operator. Both charter virtual schools and district virtual schools can be considered "independent" if they are not operated by a private company or organization.

Within the virtual school sector, private for-profit EMOs continue to play a prominent role. They operated 26.5% of all virtual schools, which together enrolled 60.1% of the student population (see Table 2). Generally, charter virtual schools were much more likely than district virtual schools to be operated by a for-profit EMO. Nonetheless, a total of 32 district virtual schools were operated by for-profit EMOs (primarily K12 Inc.).

K12 Inc. remains the largest EMO in this sector; in 2017-18, it operated 73 full-time virtual schools enrolling 88,329 students. Still, in the past year it continued a pattern with decreasing total numbers of schools, and a leveling off in the number of students enrolled. Connections Academy, the second largest for-profit EMO, operated 36 virtual schools enrolling 55,701 students, an increase of just over 5,000 students between 2016-17 and 2017-18. Connections saw a net decrease of two schools, so this growth is due to increasing school size.

It is important to note that this report's data on these private operators likely under-represents the role of for-profit EMOs. In addition to operating some schools as an EMO, K12 Inc. and Connections also had a vendor relationship with scores of others. When an EMO operates a school, it has executive control of the school, including curriculum and programs, as well as hiring of administrators and teachers. In vendor relationships, the private company typically leases to the school its learning platform and curriculum, while the school directly manages all other aspects of the school, including directly hiring teachers and administrators.

Nonprofit EMOs operated only 37 virtual schools in 2017-18 and increased enrollments from 7,319 students in 2016-17 to 12,745 in 2017-18. The largest of the nonprofit EMOs are Learning Matters Educational Group (six schools), Idaho Virtual Academy Inc., (five schools), SIA

Tech (three schools), and Compass Charter schools (three schools).

Aside from K12 Inc. and Connections Academy, a number of other for-profit EMOs have entered the marketplace. These included Calvert Education Services (six schools), Edison Learning (two schools) and Cyber Education Center (two schools). Mosaica Education Inc. and White Hat Management had already entered this marketplace, but in the last few years they lost contracts for schools or sold schools to other EMOs. During the 2016-17 school year, they operated two virtual schools each. Many of the White Hat schools were sold to Accel Schools during and after that school year. Given the relatively lucrative circumstances[11] under which full-time virtual schools can operate, it is likely that still more for-profit EMOs will expand their business models to include full-time virtual schools.

Independent virtual schools also showed growth in the last two years, with an addition of 56 schools, although in terms of enrollments there was a net decrease of just around 7,000 students. Independent virtual schools averaged 320 students, nonprofit EMO-operated schools averaged 344 students, and—in stark contrast—for-profit EMO-operated schools averaged 1,345 students. Variance in the for-profit sector's enrollments is great, with some for-profit EMOs operating schools with more than 10,000 students and one that enrolls more than 20,000 students in a single school unit.

Table 2. Distribution of Virtual Schools and Students by Operator Status, 2017-18

	Number of Virtual Schools	Percent of All Schools	Number of Students	Percent of All Enrollment	Average Enrollment Per School
Independent	331	66.1%	106,033	35.6%	320
Nonprofit EMO	37	7.4%	12,745	4.3%	344
For-profit EMO*	133	26.5%	178,934	60.1%	1,345
All Virtual Schools	501	100.0%	297,712	100%	594

*Note: K12 Inc. has 73 for-profit schools, enrolling 88,329 students. This accounts for 14.6% of all virtual schools and 29.7% of all enrolled students, with an average of 1,210 students per school.

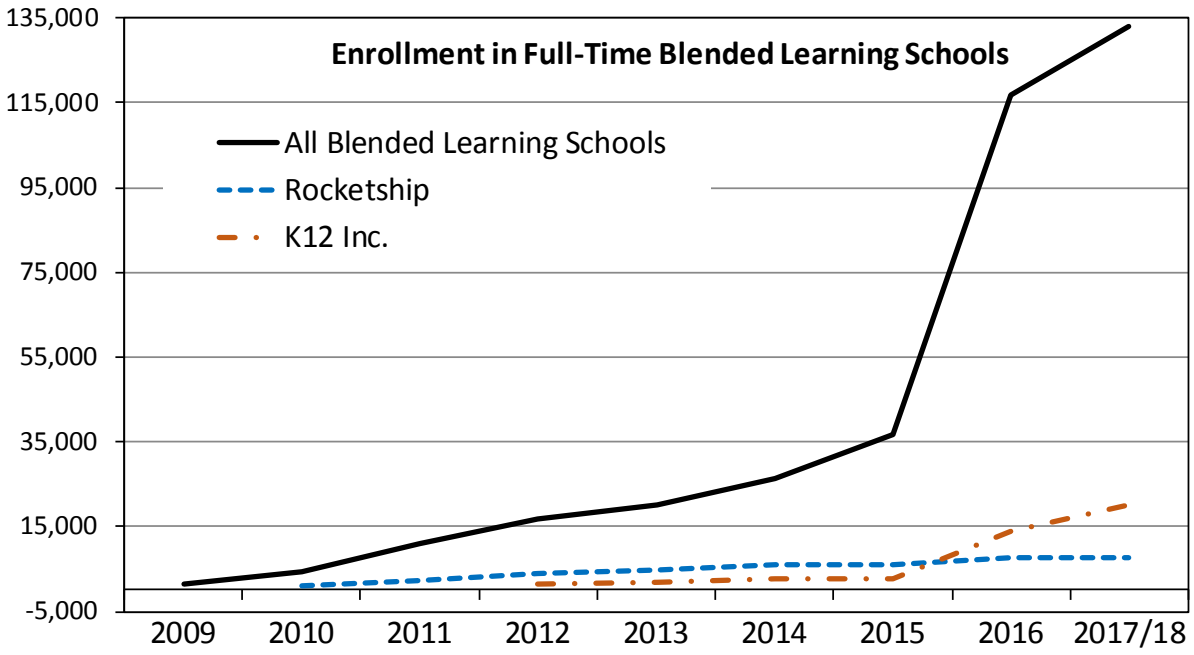
Connections has 36 for-profit schools, enrolling 55,701 students. This accounts for 7.2% of all schools and 18.7% of all students, with an average of 1,547 students per school.

Blended Schools

There were 300 blended learning schools that met our selection criteria for 2017-18; these schools enrolled 132,960 students. As Figure 2 shows, enrollments in blended schools have

grown sharply in the last few years. The growth is both due to new schools and an increase in average school size in schools operated by the EMOs. The pronounced jump in the number of blended learning schools between 2015-16 and 2016-17 was due to a large number of new schools opening as well as changes in our data collection methods, which helped us identify more schools that were previously under the radar of our annual inventory. Among larger EMOs operating in this sector, K12 Inc. is the largest for-profit operator and Rocketship Education the largest nonprofit operator.

Figure 2. Enrollment Trends in Full-Time Blended Schools



Between 2016-17 and 2017-18, we saw the number of blended charter schools decrease slightly and the number of district-operated blended schools increase. While the net number of blended schools meeting our inclusion criteria increased by only four schools, the net enrollments increased by more than 16,000 students. The average enrollments in both district and charter-operated blended learning schools increased substantially (across all blended learning schools, the average school enrollment was 394 in 2016-17 and this increased to 443 students per schools in 2017-18 [see Table 3]).

Table 3. Distribution of Blended Schools and Students Across District and Charter Sectors, 2017-18

	Total Number of Schools 2017-18	Percent of All Blended Schools	Students	Percent of All Enrollment	Average Enrollment Per School
District	114	38.0%	34,522	26.0%	303
Charter	186	62.0%	98,438	74.0%	529
Total for All Blended Schools	300	100.0%	132,960	100.0%	443

There were 114 district-operated blended schools in 2017-18 compared to 186 charter-operated blended schools. Enrollments in the charters are substantially larger (529 students per school) compared to those in district schools (303 students per school). While the charter blended schools account for 62% of all blended schools, their much larger size resulted in them accounting for 74% of all enrollment in blended schools.

Most blended learning schools are independent district-operated schools with smaller enrollments than those managed by private EMOs (see Table 4). Independents had an average of 363 students per school, while nonprofit EMO schools averaged 417 students and for-profit EMO schools averaged 772 students.

Table 4. Distribution of Blended Schools and Students by Operator Status, 2017-18

	Number of Blended Schools	Percent of All Schools	Number of Students	Percent of All Enrollment	Average Enrollment Per School
Independent	158	52.7%	57,403	43.2%	363
Nonprofit EMO	96	32.0%	40,051	30.1%	417
For-profit EMO	46	15.3%	35,506	26.7%	772
All Blended Schools	300	100.0%	132,960	100%	443

EMOs are largely responsible for enrollment growth in full-time blended learning. As in the virtual school sector, the most involved for-profit EMOs is K12 Inc. (eleven schools enrolling 20,200 students). Connections Academy has also been extensively engaged with blended learning schools and earlier referred to their schools with the Nexus name. Over the last two years, however, Connections has realigned their work in this sector allowing most schools to select more limited services and supports. For this reason, most of the blended schools affiliated with Connections now have a vendor relationship rather than an EMO relation-

ship. Connections is a subsidiary of Pearson Education and the reorganization of the school services now falls within the subsidiary referred to as Pearson Online and Blended Learning Services.

White Hat Management operated 13 blended schools in 2016-17, but most have now been sold to Accel Schools (led by K12 Inc.'s former CEO). Other for-profits operating in this sector include Success VLC (ten schools), Opportunities for Learning Public Charter Schools (five schools), Calvert Education Services (four schools), and Edtec central LLC (three schools).

Nonprofit EMOs, however, are much more prevalent in the blended sector than their for-profit counterparts. The two biggest nonprofit EMOs in the blended school sector are Rocketship Education and Alliance College-Ready Public Schools (both operate 15 schools). Other nonprofits in this sector include Summit Public Schools (11 schools), SIATech (seven), FirstLine Schools Inc. (five), Phalen Leadership Academies (four), Roads Education Organization (three), Pathways Management Group (three), Cornerstone Charter Schools (three), Education for Change Public Schools (three), and Method Schools (three).

Student Characteristics

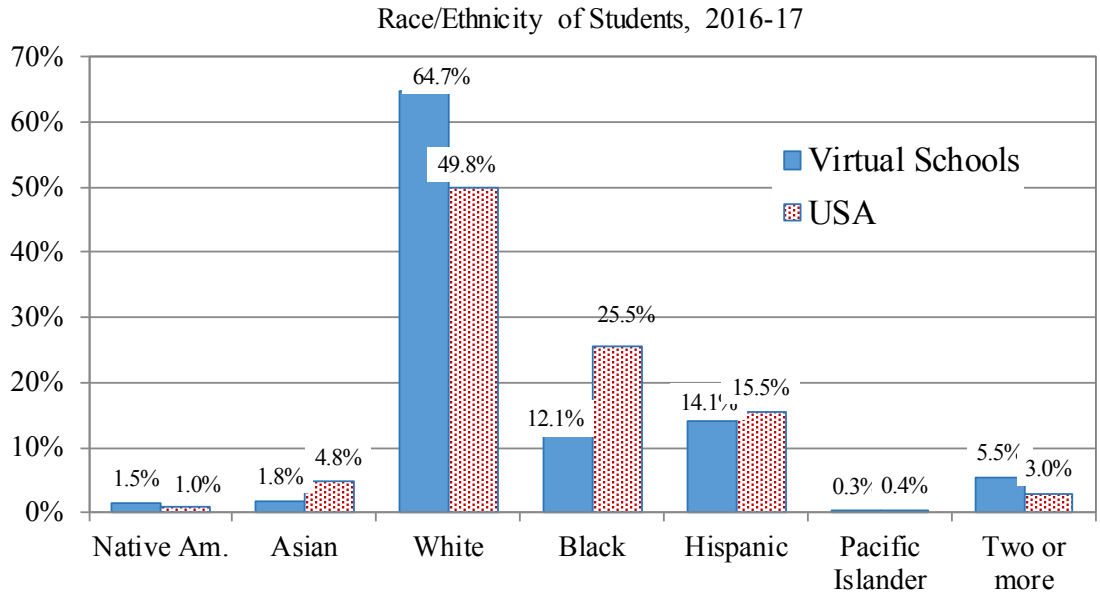
The following analysis of student demographics provides context for school performance data comparisons discussed later.

Race-Ethnicity

Data on demographics is from the National Center for Education Statistics; the most recent year with NCES demographic data was 2016-17. We relied on this federal source because data available from state sources for 2017-18 was less complete than what was available at the national level.[12]

The proportion of minority students in virtual schools had slowly increased a few percentage points leading up to our reference year of 2016-17. Over the past two years, however, the numbers remained largely unchanged except for a three-percentage-point drop in the proportion of Black students. Aggregate data on student ethnicity from virtual schools continues to differ substantially from national averages.[13] Nearly 65% of the students in virtual schools were White-Non-Hispanic while the national mean was 49.8% (see Figure 3). Not surprisingly, then, the proportion of Black and Hispanic students in virtual schools was noticeably lower than the national average. Only 12.1% of students in virtual schools were Black while the national average was 25.5%; 14.1% of students in virtual schools were Hispanic while the national average was 15.5%.[14]

Figure 3. Race/Ethnicity of Students in Virtual Schools Compared with National Averages, 2016-17

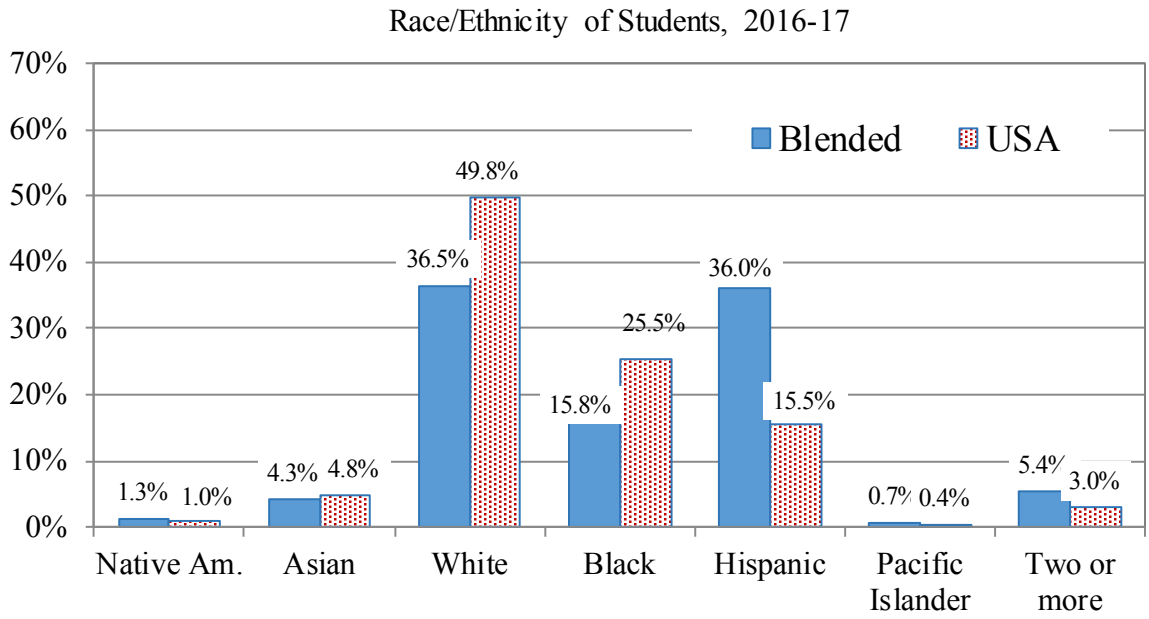


The fact that minority low-income families may have less access to technology may help explain underrepresentation of these groups, even though many of the virtual schools loan their students computers and often pay for internet access. There are other possible explanations for the over-representation of White students in these schools, such as White flight by urban families or the fact that virtual schools often present the only viable form of school choice in rural areas where minority students make up smaller portions of the school enrollment population. A recent study in Ohio found that students and families appear to self-segregate with low-income, lower achieving White students more likely to choose e-schools while low-income, lower achieving minority students more likely to choose brick- and-mortar charter schools.[15] These possible explanations warrant further exploration to determine whether they can explain underrepresentation of some ethnic groups in virtual schools.

Figure 4 displays demographics of students enrolled in blended schools. Relative to the student population of virtual schools, the blended school student population better matched national averages. One noteworthy difference is that Hispanic enrollment in blended schools is substantially higher than in traditional public schools. This finding may be explained by the fact that blended learning schools are concentrated in California and Colorado—states with larger concentrations of Hispanic students. As blended schools expand in other states, it is likely that the overall proportion of Hispanic enrollments will more closely resemble the national average.

It is interesting to note that, with the sharp expansion of blended schools in the past three years, the proportion of Black students increased by five percentage points while the proportion of white students dropped by close to seven percentage points.

Figure 4. Race/Ethnicity of Students in Blended Schools Compared with National Averages, 2016-17



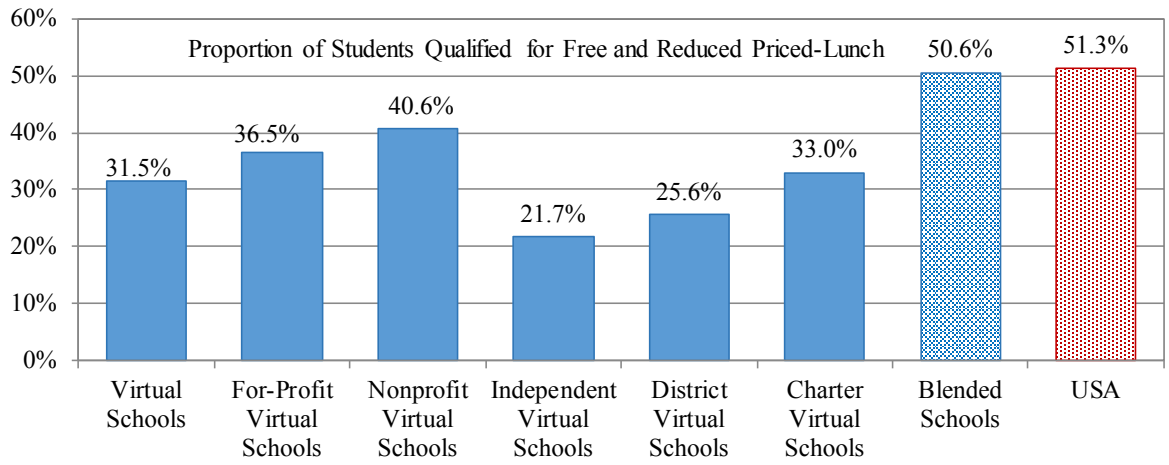
Virtual and blended schools operated by charter schools had slightly more minority students than district-operated virtual and blended schools. The virtual and blended schools operated by nonprofit EMOs served slightly more minority students than the schools operated by for-profit EMOs and schools classified as independent.

Free and Reduced-Price Lunch

As illustrated in Figure 5, in 2016-17 the proportion of students in full-time virtual schools with available data (480 schools) who qualified for free or reduced-price lunch (FRL) was 31.5%—20 percentage points lower than the national average of 51.3%. Within the virtual school sector, district schools had slightly lower proportion of low-income students (25.6%) than charters (33%), while for-profits had a slightly higher percentage (36.5%), and nonprofits had the greatest percentage (40.6%).

Blended schools with available data (280 schools) enrolled a much higher proportion of FRL students than virtual schools. In 2016-17, 50.6% of the students enrolled in blended schools qualified for free or reduced-priced lunch; just under the national average. For-profit blended schools enrolled 51.7% low-income students, independents enrolled 41.8%, and nonprofits enrolled a substantially larger 63.8%. The difference in this area is noticeable, and it may point to a genuine desire on the part of nonprofit schools to provide better learning opportunities to economically disadvantaged students.

Figure 5. Students Qualifying for Free and Reduced-Priced Lunch, 2016-17



Special Education and English Language Learner Status

As illustrated in Figure 6, the proportion of special education students attending full-time virtual (15.5%) exceeds the national average of 13.1%. Students in this population have an identified disability and an Individualized Education Plan (IEP) on record. The proportion of students with disabilities in virtual schools has grown rapidly—from 6.8% in 2010-11 to 13% in 2015-16 and then 15.5% in 2016-17. The proportion of students with special education needs in the blended learning was 12.1% in 2016-17 which was a slightly lower than the proportion in the previous year.

Our source of data for special education comes from the NCES. It is important to note that data was available for only 74 of the virtual schools and 40 blended learning schools. The overwhelming number of schools were excluded because they had no data or because the data reported for the schools was actually for the larger district in which the school resided.

Given that the weighted average we obtained is for only a portion of the schools, the actual proportion of students with disabilities may be much lower. (It is unlikely that the proportion would be higher since there is a strong financial incentive to report this data: categorical funding designated for special education students would noticeably increase revenues.)

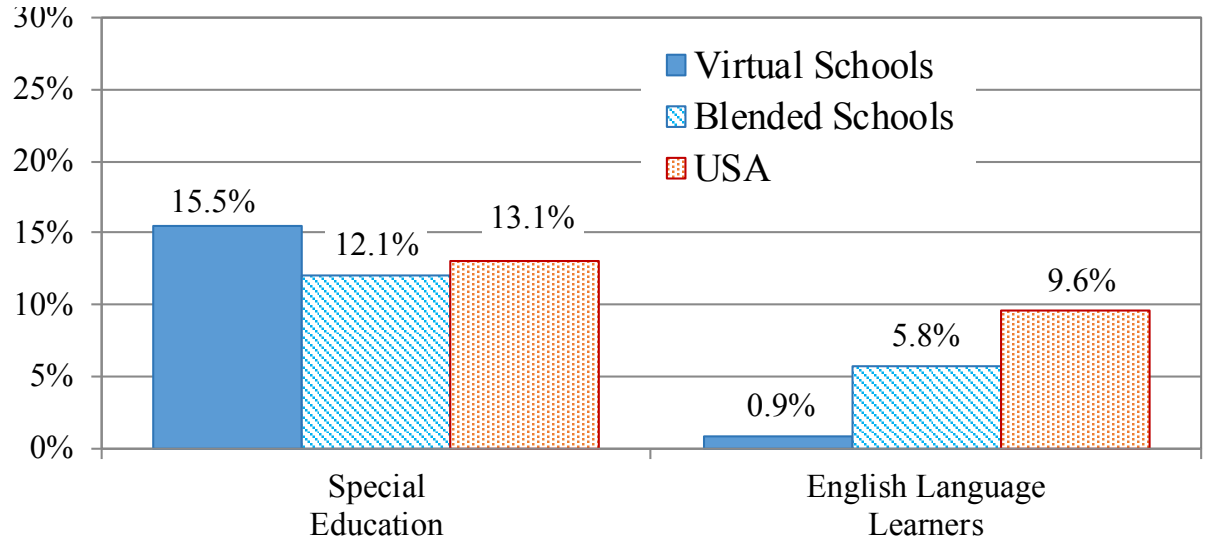
Although virtual schools and—to a lesser extent—blended schools appear to be enrolling a significant proportion of students with disabilities, it is not possible to determine the relative proportions of students with mild, moderate and severe disabilities, making a comparison with traditional public schools impossible. However, there is reason to believe that the populations likely differ substantially: Past research has established that traditional public schools typically have a higher proportion of students with moderate or severe disabilities, while charter schools are more likely to have students with mild disabilities that are less costly to remediate or accommodate.[16]

The overall proportion of students with IEPs in virtual and blended learning schools indicates that these schools are becoming more attractive for children with disabilities relative

to brick-and-mortar charter schools. Another possible explanation may be that these schools are labeling these children at a higher rate after they arrive. It may also be the case that the private companies operating many of these virtual schools are marketing to this population because of the additional federal and state funding that follows them.[17]

Aside from anecdotal evidence from special education teachers who have contacted us, little is known about how virtual schools deliver special education services online. A study from 2012[18] did indicate that while K12 Inc. had a higher proportion of children with disabilities relative to brick-and-mortar charter schools at that time, they were spending a fraction of what charter schools spend for special education teachers' salaries and benefits. This suggests that additional revenues for students with disabilities were not translating into increased spending on special education.[19]

Figure 6. Proportion of Students Classified as Special Education, or Classified as English Language Learners, 2016-17



English language learners (ELLs) represent a growing proportion of students in the nation's schools, especially in the states served by virtual and blended schools. Of the 46 full-time virtual schools with available data, only 0.9% of students were classified as ELL. Available data from 21 blended learning schools indicated that English language learners accounted for 5.8% of the student population. The exceptionally low proportion of ELL students in full-time virtual schools is a striking difference from the 9.2% national average[20] (see Figure 6).

Sex

While the population in the nation's public schools is nearly evenly split between females and males, the 2016-17 student population enrolled in both virtual schools (382 schools with data) and blended schools (235 schools with data) was skewed in favor of females (53.9% female) in virtual schools, and nearly even in blended schools (50.1% female). These ratios remained largely the same for charter, independent and for-profit schools. In district virtual schools, the proportion of females was slightly higher at 54.3%.

When sex relative to a school's grade levels was considered, some interesting patterns emerged. Virtual schools serving primary and middle school students tended to have a more balanced mix of females and males, whereas schools that served only grades 9-12 tended to have more female students enrolled. Several plausible explanations include that high schools may emphasize the needs of teen mothers, or that struggling males may be more likely to drop out of school entirely, whereas females may more often persist in an alternative format like a virtual school. More research on this area is needed. For blended schools, the ratio remained relatively balanced at all levels.

Enrollment by Grade Level

The National Center for Education Statistics (NCES) uses four school-level classifications: elementary, middle school, high school, or other. "Other" refers to grade configurations that cut across the other three levels. Sixty-three percent of virtual schools fell into the "Other" category because they were designed or intended to enroll students across two or more levels; in fact, many served students from kindergarten to Grade 12. A total of 10.7% were designated as primary schools, 2.8% as middle schools, and 23.8% as high schools. The figures for blended learning schools indicated that 33.1% were classified as Other, while 17.8% were elementary schools, 7.0% were middle schools, and 42.1% were high schools. While these classifications are generally useful for describing traditional public schools, they are less useful for describing student distribution in charter schools, which comprise a large segment of virtual and blended schools. Charters often have permission to serve all grades but may actually enroll students in a more limited grade range.

To illustrate the distribution of students in virtual schools as accurately as possible, Figure 7 details NCES data on actual student enrollment by grade for 2016-17; comparisons were based on national averages. A disproportionate number of students in virtual schools were in high school or upper secondary level, in contrast to the national picture where a relatively stable cohort of students was generally distributed evenly across grades, with a gradual drop from grades 9 to 12. This finding is interesting because brick-and-mortar charter schools were more likely to concentrate on the primary and lower secondary levels, which have lower per-pupil costs than the upper secondary level.

District-operated virtual schools served more students at the upper-secondary level than charter schools did. Nonprofit EMO-operated schools and independent schools both served many upper secondary students, unlike for-profit EMO schools. The for-profits, predominately by K12 Inc. and Connections Academy, not only served substantially fewer students at the upper secondary level but also showed stark enrollment drops after Grade 9.

Virtual schools operated by for-profit EMOs typically see steep declines after Grade 9, while many district-operated schools serve only students in the final few grades of high school, offsetting the decline in for-profit EMOs. This surprising decline in the grade cohorts in the for-profit EMO schools may be related to the low graduation rates of virtual schools: If dropout rates are high, then a portion of students do not persist into the upper grades.

Figure 7. Enrollment by Grade Level for Virtual Schools and U.S., 2016-17

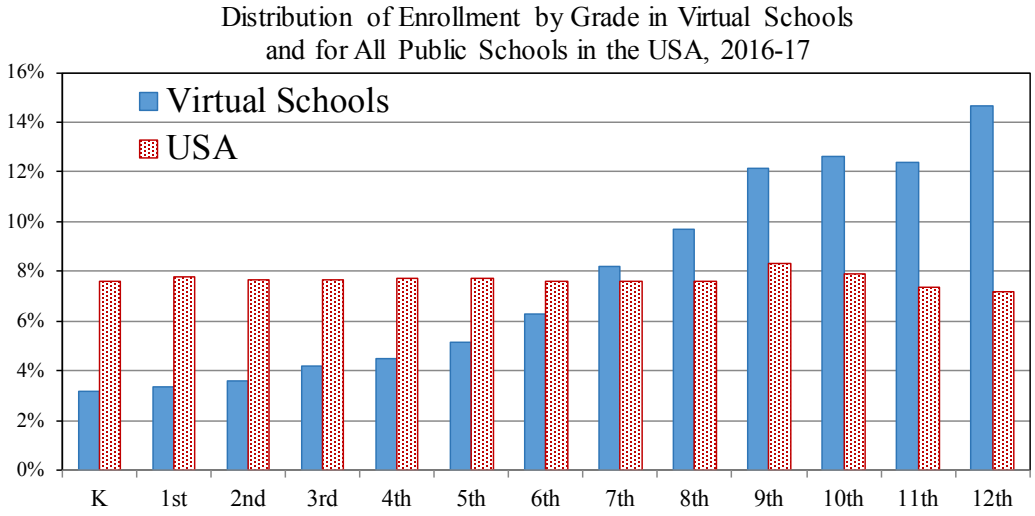
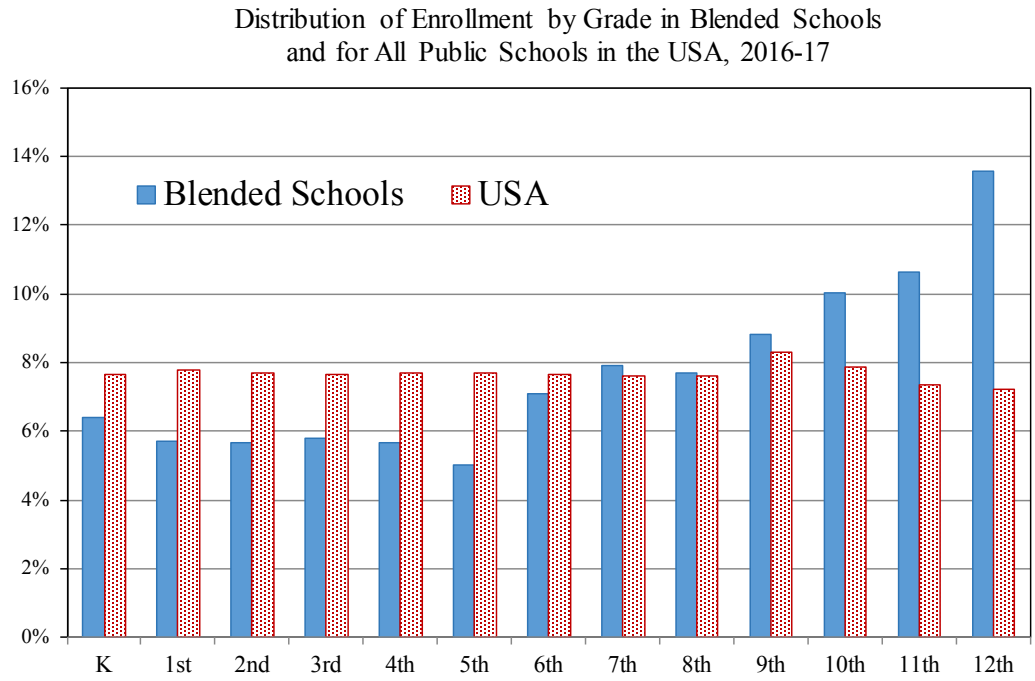


Figure 8 illustrates grade-level student distribution in blended schools. Blended schools have high concentrations of students at the high school level and fewer students at the elementary and middle school levels. The large concentration of students at Grade 12 may be due to students using blended schools for credit recovery or as an alternative for late graduation. Given that students at the upper secondary level are likely to be more technologically savvy, and given that more mature students are better able to self-regulate and work independently, it makes sense to see concentrations of students and blended schools in those grades. High schools may also have greater expertise and interest in blending learning.

Figure 8. Enrollment by Grade Level for Blended Schools and U.S., 2016-17



Student-Teacher Ratios

Far more schools reported demographic data for their students than reported student-teacher ratios. Due to a relative dearth of information on student-teacher ratio from state education agencies and from school report cards, the most recent and complete data available was NCES Common Core data for school year 2016-17.

While student-teacher ratio (S/T) was not provided as a calculated statistic in the NCES School Universe Survey data, enrollments and full-time equivalent teachers were made available. Therefore, for this report S/T was calculated as the number of students reported to the NCES for the 16-17 school year divided by the number of full-time equivalent teachers reported for the same year.

Group mean student-teacher ratios were calculated using 2016-17 enrollment as a weight. Weighting S/T ratios by total enrollment results in a mean ratio that represents the average class size that students experienced rather than the average class size that schools provided.

Table 5 contains key indicators related to student-teacher ratios in full-time virtual schools. While the average ratio was approximately 16 students per teacher in the nation's public schools, virtual schools reported nearly three times as many students per teacher (43.8). The district virtual schools had similar student-teacher ratios (44.6) to the charter virtual schools (43.7).

Among virtual schools, those operated by nonprofit EMOs had a substantially higher average student-teacher ratio (71.7). Note that among nonprofit EMO schools, a small number had an excessively high student-teacher ratio that inflated this mean score. Virtual schools operated by for-profit EMOs and independent virtual schools both had student-to-teacher ratios of 42.6.

Table 5. Student-Teacher Ratios in Virtual Schools, 2016-17

	Number of Schools with Data	Weighted Mean	SD	Min	Max
All Virtual Schools	355	43.9	81.9	0.0	1290.0
Independent Virtual	232	42.7	48.1	0.0	466.0
Nonprofit Virtual	20	71.7	283.8	13.7	1290.0
For-Profit Virtual	103	42.6	47.9	1.4	368.9
District Virtual	168	44.6	50.3	0.3	466.0
Charter Virtual	187	43.7	102.4	0.0	1290.0
National Average[21]		16.0[22]			

This number is heavily affected by unexpected outliers that reported substantially different numbers in the previous year. The data revealed considerable outliers, with some virtual schools reporting less than 1 student per teacher[23] and others reporting more than 700.

Table 6 includes blended school data by EMO, district and charter status. On average, the blended learning schools have surprisingly large student to teacher ratios (33.9 students per teacher)—lower than full-time virtual schools, but still more than twice as large as the national average. District blended schools reported 36.3 students per teacher, which was higher than the 30.5 students in charter blended schools.

Interestingly, independent and district blended schools had exceedingly high student-teacher ratios with 43.8 students per teacher and 51.8 students per teacher, respectively. Blended schools operated by nonprofit EMOs reported 25.8 students, and those blended schools operated by for-profit EMOs reported 23.3 students.

Table 6 includes virtual school data by EMO, district and charter status. On average, the blended learning schools have surprisingly large student to teacher ratios (31.7 students per teacher)—lower than full-time virtual schools, but still twice as large as the national average. District blended schools reported 36.3 students per teacher, which was higher than the 30.5 students in charter blended schools.

Interestingly, independent blended schools had the highest student to teacher ratios with 37.5 students per teacher. Blended schools operated by nonprofit EMOs reported 30 students, and those blended schools operated by for-profit EMOs reported 23 students. Table 6 also contains results for the three largest EMOs operating blended learning schools. The nonprofit EMO Rocketship had 35 students, while the for-profits K12 Inc. had 25.6 and Connections had 12.

Table 6. Student-Teacher Ratios in Blended Learning Schools, 2016-17

	Number of Schools with Data	Weighted Mean	SD	Min	Max
All Blended Schools	260	33.9	26.5	0.0	237.5
Independent Blended	145	43.8	32.6	1.8	237.5
Nonprofit Blended	75	25.8	10.6	0.0	60.4
For-Profit Blended	40	23.3	21.8	8.5	96.9
District Blended	104	51.8	32.3	3.8	237.5
Charter Blended	156	26.3	21.6	0.0	230.0
National Average		16.0			

School Performance Data

This section reviews overall school report card ratings and on-time graduation rates. General findings and trends are presented and discussed here, and findings by state appear in Appendix B.

The first decade of the new millennium provided little research into full-time virtual and blended school student achievement at the K-12 level, and results of existing research were not positive. A review of early evidence on the performance of virtual schools can be found in Miron and Urschell (2012[24]) and in last year's inventory of virtual and blended learning schools (Miron, Shank, and Davidson, 2018[25]). Additional evidence relative to the performance of virtual and blended learning schools can also be found in the second section of this report, Michael K. Barbour's *What Virtual and Blended Education Research Reveals*. The body of evidence is overwhelming in its critical conclusion that virtual schools are performing terribly with no signs of improvement. Aside from self-reported or self-funded evidence, the blended learning schools are only performing slightly better than the full-time virtual schools.

This overview of literature on the performance of virtual and blended learning schools reveals that most attention has been given to virtual schools. Now that blended learning schools are increasing in numbers and size, we can expect more evaluations and research in this area.

Methodology

In order to determine whether schools were performing acceptably or not, we looked at School Performance Ratings assigned by the state education agencies. These were typically found on school report cards. In some of our earlier reports on virtual schools, we also examined mean performance on state assessments. We chose to focus on school report cards this year because they provide a more holistic picture of a school's performance. A second and more compelling reason is that over the past two years, many states introduced new tests aligned with college- and career-ready standards, while others changed their cut scores or expectations for "proficiency," or they adopted a new scoring scale. When states took these actions, test results were no longer comparable over time. Moreover, some states now report limited or no school performance data from state assessments.

This year's performance data is limited by the availability of report cards for schools and districts. As a result of the changing and currently incomplete database, variations in school performance between this year and last year should be interpreted cautiously.

For several reasons, there are many gaps in report card ratings. Due to current flux in accountability systems resulting from new requirements under the Every Student Succeeds Act (ESSA) and flexibility waivers and extensions granted under the Elementary and Secondary Education Act (ESEA), many states have put their accountability systems on hold as they finalize new formats and transition to new standards and state tests. Several additional states do offer some school report card data but are not currently assigning an overall performance rating, and several more states do not have any current school report card data available and offer no explanation as to why. Finally, Wyoming does not count virtual schools as separate entities and assigns the students who attend these schools to the brick-and-mortar building that they would attend if they weren't attending a virtual school. The state produces a report on virtual schooling in aggregate but does not separate the achievement data of students attending virtual schools full-time from those taking one or two classes online. As a result,

overall school ratings for virtual and blended schools were available for only 21 of the 39 states included in this report.

This points to a larger story about school accountability as virtual and blended schools in the United States continue to expand. It is understandable that states are being cautious about holding schools accountable under new provisions; however, gaps in data make it difficult to assess the extent to which virtual and blended schools are successfully meeting student needs. Some states have reported data on individual measures to help parents make decisions about where to send their children to school, but others have not reported any data at all during current transitions.

State School Performance Ratings

As was the case in last year's report, annual state-assigned school performance ratings—usually obtained from school report cards or from datasets published by departments of education in different states—were used as our key measure of school performance. This makes the data comparable to that found in last year's report, although it still suffers from the same limitations as last year: a lack of available data for all states and a high-level look at performance. While annual school report cards often include multiple measures that vary from state to state, they tend to include student performance data in math and English/language arts, graduation rates, and achievement gaps. In some states, measures also include performance in science and social studies; percentage of students taking advanced coursework like Advanced Placement (AP), International Baccalaureate (IB) and dual-credit courses; performance growth; college and career readiness; attendance; staff retention; student and parent satisfaction; and/or ACT/SAT scores. Although the type, number, and weighting of such measures that go into calculating an overall school performance rating vary considerably from state to state, the state-assigned school performance ratings do reflect the educational values of a state. Therefore, overall school performance ratings provide a reasonable representation of an individual school's performance relevant to state expectations.

To determine academic performance, a coding system was used to aggregate results across states. One of three possible ratings was assigned to each school within the 21 states with available overall school performance ratings: "academically acceptable," "academically unacceptable," or "not rated" (meaning that the state assigned overall school performance ratings for 2017-18 but did not do so for that particular school). Information from state education agencies provided guidance about how to interpret the overall performance ratings by state. In cases where state agencies did not make clear what constituted an acceptable or unacceptable rating, we determined a cutoff score based on two factors: an interpretation of the scale being used and the number of schools receiving each rating. After applying this common coding system for individual schools, it was possible to aggregate findings within and across states.[26]

Overall school performance ratings for virtual and blended schools were available for only 21 out of the 39 states included in this year's report, either because an overall rating was not available due to the accountability system being on hold, because the state's accountability system does not include an overall rating, or because the overall ratings for 2017-18 had not

been released in time for the publication of this report. Given current conditions, the school performance results captured here should be interpreted cautiously, since they are inescapably based on limited data.

The 21 states which provided overall school performance ratings on 2017-18 report cards were: Alaska, Arkansas, Arizona, Colorado, District of Columbia, Florida, Georgia, Indiana, Iowa, Louisiana, Massachusetts, Nevada, New Mexico, North Carolina, Ohio, Rhode Island, South Carolina, South Dakota, Texas, Utah, and Wisconsin. This year we have an addition of seven states to the school performance ratings (Alaska, Arkansas, Arizona, District of Columbia, South Carolina, South Dakota, and Ohio), but we lost Pennsylvania due to the change in the rating system (no overall rating available anymore).

Therefore, performance ratings were potentially available for 320 (63.9%) of the 501 full-time virtual schools and 131 (43.7%) of the 300 blended learning schools with enrollment during 2017-18. A slightly higher percentage of both virtual and blended schools received academically unacceptable ratings from their state education agencies for 2017-18, relative to the previous year. Overall, 48.5% of full-time virtual schools were rated acceptable performance ratings, which is higher than last year's 36.4%. A total of 44.6% blended schools were rated acceptable. This is the first time in the last two years that blended schools perform less well than virtual schools.

Of the 320 virtual schools with available school performance ratings, 67 (48.5%) were rated acceptable (see Table 7). Of the 86 rated schools operated by for-profit EMOs, 14 (16.3%) were found acceptable. Of these, eight were K12, Inc. schools, five were Connections schools, and one was Calvert Education Services. Five out of 21 nonprofit schools rated were found acceptable, and 48 independently run virtual schools were rated acceptable (59.3: 56.7% and 40.8% rated acceptable, respectively.

Table 7. Percentage of Virtual Schools with Acceptable School Performance Ratings, 2017-18

	Acceptable		Unacceptable		Not Rated (or No Rating Reported)
	N	Percent of Schools with Ratings	N	Percent of Schools with Ratings	N
Full-Time Virtual	67	48.5%	71	51.5%	182
Independent	48	59.3%	33	40.7%	132
Nonprofit	5	50.0%	5	50.0%	11
For-Profit	14	29.8%	33	70.2%	39
Charter	29	40.8%	42	59.2%	60
District	38	56.7%	29	43.3%	122

The performance level of blended schools increased slightly from last year. 44.6% of blended schools were rated acceptable in 2017-18 compared to 43.1% in 2016-17 and a significant addition of so many blended schools to this year's dataset happened. Table 8 contains key

findings regarding state ratings of blended learning schools.

Unlike last year when almost all the nonprofit blended schools in the dataset were rated academically unacceptable, this year only 55.4% were. Less than half the independent blended schools had acceptable ratings this year (47.8%) unlike last year when the percentage was over the half (52.5%). Compared to 2016-17, this year the district blended performed better than the charter blended schools: 54.8% and 35.3% respectively (in 2016-17 the percentages were 42.1% and 43.6% respectively).

Table 8. Percentage of Blended Schools with Acceptable School Performance Ratings, 2017-18

	Acceptable		Unacceptable		Not Rated (or No Rating Reported)
	N	Percent of Schools with Ratings	N	Percent of Schools with Ratings	N
Full-time Blended	29	44.62%	36	55.38%	66
Independent	22	47.83%	24	52.17%	24
Nonprofit	5	41.67%	7	58.33%	19
For-profit	2	28.57%	5	71.43%	23
Charter	12	35.29%	22	64.71%	36
District	17	54.84%	14	45.16%	30

In addition to the 71 virtual schools that received unacceptable ratings, 182 virtual schools in these states were not rated at all. In some cases, states did not provide ratings because schools did not meet participation rate thresholds; in other cases, the lack of a rating was unexplained. In addition to the 36 blended schools that received unacceptable ratings, 66 blended schools received no rating at all.

Highlights from Select States

Specific numbers of acceptable and unacceptable ratings assigned by states are available and requests for this data sent to the authors will be considered.

Specific numbers of acceptable and unacceptable ratings assigned by states are available in Appendix B (and requests for school-level data will be considered by authors). There were some interesting findings by state that are worth mentioning. Most notable is that Pennsylvania this year didn't have any available overall rating. They stopped working with the previous system and currently their rating system is composed of three systems, State Assessment Measures, On-Track Measures, and College and Career Measures.

In Wisconsin, 24 virtual charter schools received performance ratings. Out of those 24 schools, (70.8%) had an acceptable rating, while (29.2%) had an unacceptable rating. Three schools received the highest rating possible, five received a middle rating, nine received alternative ratings and all of them had a satisfactory rating. This year the number of blended

learning schools dropped from 17 blended schools to seven blended schools, with 57.2% receiving acceptable ratings and 42.9% receiving unacceptable ratings. All of these blended schools were charter schools; three received alternative ratings (two of them were satisfactory and one needed improvement); two received the highest rating possible, and two received the lowest rating possible.

In Louisiana, all five (100%) blended schools received unacceptable ratings; all five were charter schools. Only one of eight virtual schools received an acceptable rating (12.5%), and it was the sole district virtual school in the state.

Finally, in Colorado, of the 23 virtual schools that received ratings, 57.14% were rated unacceptable and 42.86% acceptable. Of these, one charter school had an acceptable rating and the rest of the charter schools were not rated. Of 19 district schools, eight (42.1%) were rated unacceptable and only four (21.1%) acceptable. An additional six schools did not receive ratings, two of them because of the insufficient data. Of the 24 blended schools rated, 45.8% received acceptable ratings; the same percentage received unacceptable ratings. Of the 24 blended schools, six had a charter status. Two-thirds of charter schools were rated unacceptable, while a third were rated as acceptable). Seven (38.9%) of 18 district schools were judged unacceptable while nine (50.0%) were judged acceptable. Another two blended schools were not rated because of insufficient data.

In Florida, many options for virtual schooling exist. Students may enroll in the state-level Florida Virtual School (FLVS) either full-time or part-time (note that only FLVS Full-Time is included in this report), in a District Virtual Instruction Program (VIP), in a District Franchise of FLVS, in a virtual charter school, or in district-offered online courses (also not included in this report). This report includes a total of 74 virtual schools and five blended learning schools. All blended schools were charter schools operated by SIATech. Four out of the five didn't receive any rating and one had unacceptable rating.

Only 34 virtual schools (31 district and three charter schools) received ratings. Twenty-three (67.6%) were rated acceptable, and all of them had an A score as a rating. Compared to 22 district schools that were rated acceptable, only one charter school was rated acceptable. Available data thus suggests that Florida's virtual schools, especially district-operated schools, have a stronger pattern of success than is evident in other states. Still, because an additional 40 schools were not rated, it is difficult to tell whether these numbers are inflated or reasonably representative. Among the 40 schools not rated, five (13.2%) of the not-rated virtual schools were given a grade of I, because testing participation rates did not meet the state's 95% threshold. The other 35 were not listed in state's school grades data set.

Graduation Rates

Four-year graduation rates were obtained from state sources and scrutinized to ensure that each state's measure represented the percentage of all students who graduate from high school within four years after they started ninth grade. Some states distinguish between graduation rates for students receiving traditional diplomas and the rates for students receiving other types of diplomas; in cases where states distinguished between diploma types,

graduation rates representing the sum of all types of diplomas granted were used.

This year only five states had no graduation data available for 2017-18 (Alaska, New Hampshire, Kentucky, Louisiana, Texas). In the other states where graduation rates were available, some of the schools' graduation rates were masked because the number of enrollments was low. Many schools did not report a graduation rate because they do not offer high school grades (either elementary or middle schools); others are relatively new and have not had a student cohort complete Grades 9-12. Of the total 501 virtual schools in the inventory, information on graduation rates was available for 290 (57.9%); of the 300 blended schools, information was available for 144 (48%).

As Table 9 illustrates, the on-time graduation rates for full-time virtual and blended schools (50.1% and 61.5% respectively) were less than the national average of 84%. While still low, these rates suggest a notable improvement, especially for blended schools in comparison with the one reported in previous inventories. In 2016-2017, average graduation rates were 50.7% for virtual schools, which is similar to this year, and 49.5% for blended. The improvement in blended schools may be due in part to a more comprehensive approach to the collection of graduation rate data, but it nevertheless suggests a promising trend in school completion among students in virtual and blended schools.

Table 9. Graduation Rates, 2017-18

Virtual Schools	Number of Schools with Data	Graduation-Rate	Blended Learning Schools	Number of Schools with Data	Graduation-Rate
All Virtual Schools	290	50.1%	All Blended Schools	144	61.5%
Independent Virtual	194	52.8%	Independent Blended	84	60.7%
Nonprofit Virtual	26	49.2%	Nonprofit Blended	33	63.8%
For-Profit Virtual	70	48.5%	For-Profit Blended	27	61.4%
K12 Inc.	39	48.1%	K12 Inc.	6	68.3%
Connections	18	58.7%	Success VLC	10	19.3%
District Virtual	153	50.9%	District Blended	62	58.3%
Charter Virtual	137	49.9%	Charter Blended	82	62.8%
National Average		84%			84%

Current graduation rates across all subgroups of virtual and blended schools are poor compared to the 84% national average. Independently managed virtual schools had the highest rate, 52.8%, while independently managed blended schools have a rate of 60.7%. Rates in for-profit and nonprofit operated virtual schools were 48.5% and 49.2%, respectively. Within the subgroup of EMO-managed virtual schools, the graduation rate for Connections Academy was 58.7%, and for K12, Inc. was 48.1%. While these virtual school graduation rates were relatively close across sectors, rates of for-profit and nonprofit-managed blended schools diverged: 61.4% and 63.8%, respectively.

For the year 2017-18 the graduation rates for blended and virtual charters and districts were opposite to last year. The graduation rates in charter virtual schools were similar to those of

district-operated virtual schools, about 49.9% and 50.9%, respectively. The same comparison can be seen in blended schools where charter blended schools reported graduation rates of (62.8%) and district virtual schools reported (58.3%), which are very close percentages. For-profit and nonprofit virtual schools reported similar rates regardless of charter status, and that happened along the blended schools also, where the nonprofit operated schools had graduation rates of 63.8% and the for-profit blended schools, 61.4%. The performance of independently operated districts was different among virtual and blended schools (they were 52.8% and 60.7%, respectively). In 2017-18 school year, graduation rates for virtual independent, nonprofit, and for-profit operated schools were very close, 52.8%, 49.2%, and 48.5% respectively. For blended schools, the nonprofit operated schools had a small higher rate compared to for-profit and independent, which is similar to last year (2016-17) where independent and nonprofit were very close in graduation rates (55.3%, 57.1%).

Recommendations

Full-time virtual schools and blended learning schools represent promising ideas. Unfortunately, they are performing terribly. As these schools continue to expand they undermine our education systems in two ways. First of all, most students who choose these schools are negatively impacted when it comes to measureable learning. Further, the education system as a whole is hurt as an increasing portion of the public resources available for schools is being syphoned off to the virtual and blended schools, which are largely operated by private education management organizations.

Our study focuses only on full-time virtual schools and full-time blended learning schools. We understand that districts and individual schools are creating virtual and blended learning "programs". We also know that teachers within traditional public schools are innovating and increasingly engaging in blended learning. Although we know little about these programs and classroom innovations, it is assumed that they maintain lower and more suitable student-to-teacher ratios which would likely result in better outcomes. More research is needed to understand if efforts within districts and schools might demonstrate features or strategies that might yield successful outcomes.

Given the overwhelming evidence related to the poor performance of full-time virtual and blended learning schools, we include the following recommendations for policymakers.

- Slow or stop the growth in the number of virtual and blended learning schools and the size of their enrollments until the reasons for their relatively poor performance have been identified and addressed.
- Implement measures that require virtual and blended schools to reduce their student-to-teacher ratios.
- Enforce sanctions for virtual and blended schools that perform inadequately.
- Sponsor research on virtual and blended learning "programs" and classroom innovations within traditional public schools and districts.

Notes and References Section I

1 The authors will consider requests to obtain or review the school-level data sets from which findings are based.

2 Miron, G., & Urschel, J.L. (2012). *Understanding and improving full-time virtual schools: A study of student characteristics, school finance, and school performance in schools operated by K12 Inc*. Retrieved December 11, 2014, from https://nepc.colorado.edu/publication/understanding-improving-virtual;

Molnar, A. (Ed.); Miron, G., Huerta, L., Cuban, L., Horvitz, B., Gulosino, C., Rice, J.K., & Shafer, S.R. (2013). *Virtual schools in the U.S. 2013: Politics, performance, policy, and research evidence*. Boulder, CO: National Education Policy Center. Retrieved December 18, 2015, from http://nepc.colorado.edu/publication/virtual-schools-annual-2013;

Molnar, A. (Ed.); Rice, J.K., Huerta, L., Shafer, S. R., Barbour, M.K., Miron, G., Gulosino, C., Horvitz, B. (2014) *Virtual schools in the U.S. 2014: Politics, performance, policy, and research evidence*. Boulder, CO: National Education Policy Center. Retrieved December 18, 2015, from http://nepc.colorado.edu/publication/virtual-schools-annual-2014;

Molnar, A. (Ed.); Huerta, L., Shafer, S.R., Barbour, M.K., Miron, G., Gulosino, C. (2015). *Virtual schools in the U.S. 2015: Politics, performance, policy, and research evidence*. Boulder, CO: National Education Policy Center. Retrieved December 18, 2015, from http://nepc.colorado.edu/publication/virtual-schools-annual-2015;

Miron, G. & Gulosino, C. (2016). *Virtual schools report 2016: Directory and performance review*. Boulder, CO: National Education Policy Center. Retrieved December 4, 2016, from http://nepc.colorado.edu/publication/virtual-schools-annual-2016;

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Miron, G., & Shank, C., & Davidson, C. (2018). *Full-time virtual and blended schools: Enrollment, student characteristics, and performance*. Boulder, CO: National Education Policy Center. Retrieved November 20, 2018, from http://nepc.colorado.edu/publication/virtual-schools-annual-2018

3 The authors will consider requests to obtain or review the school-level data sets from which findings are based.

4 For example, school districts or schools offer online courses to cut costs or attract students from other schools/districts/states. These are not actually schools in the sense that they offer the complete state-mandated curriculum; they are just basically individual courses that students can take if they want to. Such a program would never receive an NCES ID no matter how many students enroll in these online courses because it's not a school. Although no systematic data is available, some speculate that districts may be using the virtual programs as a way to place or "park" students who are not succeeding in the face-to-face classes due to learning obstacles or disciplinary reasons.

5 We considered creating a comparison group by aggregating the data for the 38 states with either virtual or blended schools. We found in the NCES data set, however, that some key states were already lacking data on charter school since the states were not reporting the charter school data separate from the local district data.

6 Special education is an obligation of school districts (i.e., Local Education Authorities) and not necessarily individual schools. In most states, charter schools are considered LEAs and therefore their data on special education is included in the NCES district-level datasets. States in which charter schools are not classified as LEAs, such as Florida, do not have special education data attributable to individual charter schools.

7 Compiling an aggregate data set of the 39 states would have been possible, albeit time consuming. Unfortunately, focusing on data from the 39 states would have introduced other problems since a few of these larger

states were inconsistently reporting school level data for charter schools which serve most students in virtual and blended learning schools.

8 Iowa, Kentucky, Maine, Massachusetts, South Carolina, and South Dakota.

9 To be included in this inventory and considered in our analyses, a virtual school or blended learning school has to meet our selection criteria. First of all, it must be classified as a school and not a program. For example, it must be classified as a functioning school and not just a collection of individual optional courses. Online courses offered by school districts or schools to cut costs or attract students from other schools/districts/states, as referred to in Note 3, are therefore not included.

Additionally, when separating programs from schools, we look for the existence of unique NCES or State Education Agency ID codes that are designated for school units. We exclude blended schools, and we avoid schools that have both face-to-face instruction and virtual instruction. Further, in order to be included in our inventory, these virtual schools should have evidence of at least 10 students enrolled during one of the last few years. An important part of our analyses examines school performance; by including only full-time virtual schools, we are better able to attribute school performance outcomes to full-time virtual schools.

10 Estimates for 2000 to 2010 are based on two sources, the annual *Profiles of For-Profit and Nonprofit Education Management Organizations* from NEPC, and the annual *Keeping Pace* reports from Evergreen Education, a consulting group that prepares reviews of policy and practice for online learning.

11 Miron, G., & Urschel, J.L. (2012). *Understanding and improving full-time virtual schools: A study of student characteristics, school finance, and school performance in schools operated by K12 Inc.* Retrieved December 11, 2014, from http://nepc.colorado.edu/files/nepc-rb-k12-miron.pdf;

Woodard, C. (2013, July 3). Special report: The profit motive behind virtual schools in Maine. *Portland Press Herald*. Retrieved February 28, 2014, from http://www.pressherald.com/news/virtual-schools-in-maine_2012-09-02.html

12 Data on ethnicity are from 2016-17, the most recent year from which we could obtain NCES data. The NCES provides the most comprehensive data, all from a single audited source, which is why we relied on this source.

13 Note that we compare virtual and blended schools from 39 states with the national average representing 50 states. A comparison group of 39 states would likely be slightly closer to the distribution in virtual and blended schools. The eleven states that might be pulled out from the national average, however, are all very low population states and would have minimal influence on the national average. Ideally, it would be preferable to compare demographics for each virtual or blended school with the population in the actual catchment area from which they enroll students. Such analyses are beyond the scope and budget of this study.

14 Comparisons with demographic composition of charter schools in the nation are also relevant since the virtual schools that enroll most students are charter virtual schools. Thirty-six percent of all charter school students are white, 29.2% are black, 27.2% are Hispanic, 3.5 are Asian, and 3.2% are classified as "other."

15 Ahn, J., & McEachin, A. (2017). Student enrollment patterns and achievement in Ohio's online charter schools. *Educational Researcher, 46*(1), 44–57. https://doi.org/10.3102/0013189X17692999

An additional study also examines shifting enrollments in Pennsylvania virtual schools over time and some key financial consequences. See Mann, B., & Baker, D.P. (2019, February) Cyber charter schools and growing resource inequality among public districts: Geospatial patterns and consequences of a statewide choice policy in Pennsylvania, 2002–2014, *American Journal of Education 125*(2), 147-171.

16 Miron, G. (2014). Charters should be expected to serve all kinds of students . *Education Next 14*(4), 58-59.

17 For example, one Ohio school with an exceptionally high rate of special education student enrollment (22.1%) actively promotes their school environment for students with disabilities seeking a least restrictive environ-

ment. A post on the school website explains that a team of educators meets with each family of a child with disabilities to create an IEP outlining services to be provided by the school.

18 Miron, G., & Urschel, J.L. (2012). *Understanding and improving full-time virtual schools: A study of student characteristics, school finance, and school performance in schools operated by K12 Inc.* Retrieved December 11, 2014, from http://nepc.colorado.edu/files/nepc-rb-k12-miron.pdf

19 A recent study on this topic, apparently from smaller virtual schools, used a qualitative approach to explore the experiences of six online teachers teaching students with disabilities. This study found the teachers used a variety of strategies to accommodate students with disabilities, including modifying curriculum, adapting instructional practices, and drawing on outside resources for support. The study recommended that virtual schools should promote a teacher-focused approach to accommodating the needs of students with disabilities and their parents.

Crouse, T.M., Rice, M.F., & Mellard, D.F. (2016). *"How did I survive?" Online teachers describe learning to teach students with disabilities*. Lawrence, KS: Center on Online Instruction and Students with Disabilities, University of Kansas.

20 This statistic is based on NCES data from U.S. Department of Education, National Center for Education Statistics. (2015). The Condition of Education 2015 (NCES 2015-144), English Language Learners. Retrieved December 2, 2015, from https://nces.ed.gov/fastfacts/display.asp?id=96

21 *State Nonfiscal Public Elementary/Secondary Education Survey*, 2011-12 v.1a. United States Department of Education, National Center for Education Statistics, Common Core of Data (CCD).

22 The pupil/teacher ratios have remained consistently around 16 to 1 over the past several years. Projections also suggest that this ratio is likely to remain consistent for public schools.

NCES (2016). The Table 208.20. *Public and private elementary and secondary teachers, enrollment, pupil/teacher ratios, and new teacher hires: Selected years, fall 1955 through fall 2026*. Washington DC: National Center for Education Statistics. 2013-441. U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved December 1, 2014, from https://nces.ed.gov/programs/digest/d16/tables/dt16_208.20.asp

23 Such a low number of full-time equivalent teachers reported may be explained by the use of larger numbers of teachers who work part-time for the school.

24 Miron, G., & Urschel, J. (2012). *Understanding and improving full-time virtual school: a study of student characteristics, school finance, and school performance in schools operated by K12, Inc.* Boulder, CO: National Education Policy Center. Retrieved November 27, 2018 from https://nepc.colorado.edu/publication/understanding-improving-virtual

25 Miron, G., Shank, C., & Davidson, C. (2018). Full-time virtual and blended schools: Enrollment, student characteristics, and performance . Boulder, CO: National Education Policy Center. Retrieved November 20, 2018, from http://nepc.colorado.edu/publication/virtual-schools-annual-2018

26 It is important to note that states' respective standards & expectations vary, with some states setting high standards and others being more lenient.

Section II
What Virtual and Blended Education Research Reveals

Michael K. Barbour
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May 2019

Executive Summary

Section II reviews research relevant to K-12 virtual and blended learning. The available research has consistently found that students enrolled in full-time virtual schools perform at levels well below their counterparts in face-to-face schools. Recent research indicates that schools that provide a combination of virtual and face-to-face curriculum and instruction (i.e., blended schools) also perform at low levels compared to traditional brick-and-mortar schools. Finally, research also suggests that both virtual schools and blended schools may be more economical than traditional public schools.

Unfortunately, there is little research to describe the virtual or blended student experience, which has resulted in a lack of understanding of the actual instructional model, the nature of the curriculum, and the type and amount of support employed by these schools. This lack of research extends throughout the field of virtual and blended education – and much of this research is atheoretical, methodologically questionable, contextually limited, and overgeneralized. All of these factors make the research into virtual and blended education of little value in guiding policy.

Yet, even in areas where the literature has provided guidance, legislators and policymakers have consistently failed to pass bills or create regulatory regimes that would provide additional oversight and accountability to online and blended schools. Policy organizations and advocacy groups that have historically been supportive of virtual schooling have begun to question its effectiveness and are now calling for additional regulation. Nevertheless, at this point virtual schooling continues to expand, largely without effective oversight or regulation, despite the general lack of evidence that it is efficacious in most circumstances.

http://nepc.colorado.edu/publication/virtual-schools-annual-2019

Recommendations Arising from Section II:

- The growth and geographic reach of full-time, taxpayer-funded virtual schools should be regulated. At present there are serious questions about the effectiveness of many models of virtual schooling. Until these questions can be adequately addressed, policymakers should limit or consider a moratorium on their growth.
- Given the lack of understanding of what is actually happening in virtual education (e.g., the nature of and amount of teaching in the instructional model, the specific curriculum that is used, the learning that occurs, etc.), policymakers should require that any virtual school operating in their jurisdiction be required to provide the necessary information to examine the effectiveness of the virtual education that is actually being provided.
- State and federal policymakers should create long-term programs to support independent research on and evaluation of virtual schooling, particularly full-time virtual schooling. More than twenty years after the first virtual schools began, there continues to be an inadequate research base of empirical, longitudinal studies to guide the practice and policy of virtual schooling.

Section II
What Virtual and Blended Education Research Reveals

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May 2019

Over the past decade, the National Education Policy Center (NEPC) has produced annual examinations of the field of K-12 online and blended learning. In the first report in 2011, Glass and Welner wrote:

> Over just the past decade, online learning at the K-12 level has grown from a novelty to a movement. Often using the authority and mechanism of state charters, and in league with home schoolers and other allies, private companies and some state entities are now providing full-time online schooling to a rapidly increasing number of students in the U.S. Little or no research is yet available on the outcomes of such full-time virtual schooling.[1]

Seven years later, Miron, Shank, and Davidson wrote in the 2018 NEPC annual report:

> Full-time virtual schools and blended learning schools represent promising ideas… Unfortunately, the evidence is overwhelming that virtual schools as currently implemented are not working at primary and secondary levels of schools. This finding has appeared year after year. The evidence on full-time blended learning schools is still weak, but much of the available evidence indicates that full-time blended learning schools are not performing well relative to brick-and-mortar schools. Established models for both full-time virtual and blended learning schools have been influenced considerably by corporate interests and private education management organizations… As currently implemented, these models are not serving students well and these schools are not in taxpayers' best interest.[2]

It is clear that, to date, research in the field has not been an important driver of the practice

of K-12 online and blended learning.

In this section, the research and other literature is examined to determine themes where there is independent, systematic, valid data that can be used by policymakers in the development of legislation and regulation. Similarly, themes that have appeared in previous legislative and regulatory efforts are examined based on what research may exist to guide policymakers. Based on these goals, this section begins with a discussion of the terms used to describe virtual and blended schools in the literature. It continues with an examination of the research related to student performance in virtual and blended schools, how these schools are funded, and what it means to attend a virtual school.

Virtual Schools, Cyber Schools, Online Programs, Blended Programs, and Blended Schools

The International Association for K-12 Online Learning (iNACOL), the main professional association for practitioners of K-12 online and blended learning, as a part of *The Online Learning Definitions Project,* defined online learning as:

> ...education in which instruction and content are delivered primarily over the Internet. The term does not include print-based correspondence education, broadcast television or radio, videocassettes, and stand-alone educational software programs that do not have a significant Internet-based instructional component. Used interchangeably with virtual learning, cyber learning, e-learning.[3]

In the same document, the professional association defined cyber school as "a formally constituted organization (public, private, state, charter, etc.) that offers full-time education delivered primarily over the Internet; term used synonymously with the terms 'virtual school,' 'eSchool,' and 'online school'." [4]

For the most part, academic authors have used the term K-12 online learning to refer to the overall field. [5] Similarly, within the academic literature, the term virtual school is generally used when referring to supplemental forms of K-12 online learning (i.e., where students are enrolled in a brick-and-mortar school, but take one or more courses online to supplement their studies). The term cyber school is generally used when referring to full-time forms of K-12 online learning (i.e., where students are engaged in full-time online instruction and do not attend a brick-and-mortar school at all). However, these general conventions are not used consistently in the academic literature. For example, much of the early literature in the field used the term virtual school as a way to describe the general field of K-12 online learning.[6] Further, many scholars adopt the term in the legislation or policy in the jurisdiction where they are conducting the research. For example, policy in Pennsylvania uses the term cyber charter school and much of the research published on that state also uses that term.[7] Similarly, in many states full-time online schools are referred to as virtual schools in the legislation, and researchers working in those states will often use that term to describe a full-time online learning program.[8] Finally, as much of what is known about the K-12 online learning has come from non-academic organizations, various government agencies, and

even the popular media, it is important to note that authors are also inconsistent in how they use the terms online learning, virtual schooling, cyber schooling, or derivatives thereof—often using them interchangeably as synonyms.

Unlike K-12 online learning, which is easily distinguished by the geographic separation of the teacher and student, K-12 blended learning is a little harder to define. At its broadest level, blended learning simply refers to:

> any time a student learns at least in part at a supervised brick-and-mortar location away from home and at least in part through online delivery with some element of student control over time, place, path, and/or pace; often used synonymously with hybrid learning.[9]

Basically, if students are engaged in both face-to-face and online learning as a part of their formal studies, then they are engaged in some form of blended learning. This description is consistent with Graham's definition that "blended learning systems combine face-to-face instruction with computer-mediated instruction" (such as online learning).[10]

A factor that complicates the understanding of blended learning is the fact that in some instances it is applied to a complete school and in other instances it simply refers to the actions of one or more teachers. For example, the models of blended learning provided by Horn and Staker can be applied to both complete schools or to individual programs within a school.[11] Given the varied definitions of blended learning (i.e., blending some form of face-to-face and online instruction), the vast majority of blended learning may not be occurring at the school level. Therefore, researchers are quite limited in their ability to examine the effectiveness of blended learning – beyond instances where a full school is organized on one of these blended learning models. However, even within those complete school environments, researchers are still largely unable to discern the level of blending that is occurring, and in many cases scholars are forced to rely upon schools to self-identify as blended learning schools, or to have proponents of blended learning identify these schools based on their knowledge of the programming. In the latter case, many schools identified by proponents are often identified specifically for ideological or advocacy reasons.

For the purposes of this section, the examination of the research and literature will focus on virtual schools and blended schools as defined in the previous section by Miron and Elgeberi:

> ...full-time, public elementary and secondary virtual and blended schools in the U.S. These include virtual and blended schools operated by for-profit and nonprofit Education Management Organizations (EMOs) as well as virtual schools operated by states or districts. Private virtual or blended schools (funded in whole or in part by charging tuition and fees, rather than relying on a public funding program using tax dollars) are excluded due to absence of relevant data in state or federal data sets. Also excluded are schools offering a combination of programs including traditional face-to-face programs as well as virtual or blended options, unless it was possible to separate data for the full-time virtual or blended school components.[12]

In instances where other types of K-12 online or blended learning programs are referenced, the nature of the program will be described.

Performance of Virtual Schools and Blended Schools

In the 2012 NEPC examination of virtual schools, Miron and Urschel found the percentage of virtual schools that achieved adequate yearly progress was approximately half that of public schools (i.e., 27.4% of virtual schools vs. ~52% of public schools).[13] This result has been a consistent finding in each of the NEPC's subsequent annual reports into virtual schools. Section I of this report finds that the percentage of virtual schools achieving an acceptance school performance rating was lower than the percentage of brick-and-mortar schools. Further, it also reports that the four-year graduation rate for students attending virtual schools was significantly lower than the national average. These findings from the NEPC have been consistent with almost all of the additional research focused on the effectiveness of full-time virtual schooling. In fact, it has not mattered if the research was conducted by legislative audit divisions, investigative journalists, policy think tanks, or academic researchers – the results for virtual schools have been consistent (see Table 2.1).

Table 2.1. Summary of research related to the effectiveness of virtual schools (NEPC reports are shaded)[14]

Study	Finding
National (2019)	"Overall, 48.5% of full-time virtual schools were rated acceptable performance ratings... the on-time graduation rates for full-time virtual schools (50.1%)... fell far short of the national average of 84%."[15]
Ohio (2019)	"Students attending online charter schools have substantially weaker growth in both reading and math than the average TPS VCRs. The gaps translate to 47 fewer days of learning in reading and 136 fewer days of learning in math for online charter students."[16]
National (2018)	"Virtual schools continued to underperform academically, ...36.4% of full-time virtual schools received acceptable performance ratings. The graduation rate of 50.7% in virtual schools... fell far short of the national average of 83%."[17]
Michigan (2018)	Students enrolled in virtual schools had a pass rate of 49%, compared to the students' non-virtual course pass rate of 78%.[18]
National (2017)	"[Only] 37.4 percent of full-time virtual schools received acceptable performance ratings... The graduation rate of 43.4% in virtual schools [compared to a national average of 82.3%]." [19]
Michigan (2017)	Students enrolled in virtual schools had a pass rate of 53%, compared to the students' non-virtual course pass rate of 78%.[20]
North Carolina (2017)	"For the 2015-16 school year, both VCS received an overall School Performance Grade (SPG) of D which translates numerically to a 52 for Connections and 45 for NCVA respectively. Both VCS received a SPG of C in Reading and an F SPG in Mathematics. Comparatively, during the 2015-16 school year, traditional public schools had a lower percentage of schools with D and F (22.9%) than public charter school (27.7%)."[21]

Ohio (2017)	The students who started e-schools in the lower baseline academic distribution scored lower on state testing and had lower likelihoods of meeting high school graduation standards. Students with prior levels of high achievement also scored lower than their traditional public and charter school peers, but the difference was not as stark as those with lower prior levels of academic achievement.[22]
National (2016)	"Compared to traditional public school students, full-time virtual charter school students have much weaker academic growth overall. Full-time virtual charter schools perform worse than traditional public schools in most states. All subgroups of students have weaker academic growth in full-time virtual charter schools than in traditional public schools. The vast majority of full-time virtual charter schools perform worse than traditional public schools." [23]
National (2016)	"Of the 121 virtual schools for which data were available, 22 (18.2%) had proficiency rates above the state average; 82 percent had proficiency rates below state averages... The on-time graduation rate (or four-year graduation rate) for full-time virtual schools was half the national average: 40.6% for virtual schools and 81.0% for the nation as a whole."[24]
Michigan (2016)	Students enrolled in virtual schools had a pass rate of 52%, compared to the students' non-virtual course pass rate of 87%.[25]
Ohio (2016)	"Across all grades and subjects, students who attend e-schools perform worse on state tests than otherwise-similar students who attend brick-and-mortar district schools, even accounting for prior achievement."[26]
Tennessee (2016)	"The scores are generally lower [for the full-time cyber schools] than the scores of the districts that established the schools."[27]
National (2015)	"Across all tested students in online charters, the typical academic gains for math are -0.25 standard deviations (equivalent to 180 fewer days of learning) and -0.10 (equivalent to 72 fewer days) for reading."[28]
National (2015)	"Full-time virtual schools continued to lag significantly behind traditional brick-and-mortar schools... The on-time graduation rate (or four-year graduation rate) for full-time virtual schools was nearly half the national average: 43.0% and 78.6%, respectively."[29]
Georgia (2015)	"In 2013–14, none of Georgia's three statewide fully online schools: A) met all of the standardized assessment goals included in their respective charter contracts; or B) outperformed the state on the CCRPI 'achievement' component."[30]
Michigan (2015)	"Cyber enrollments had a 'Completed/Passed' rate of 54%... whereas Non-Virtual Learners had an 89% 'Completed/Passed' rate."[31]
Kansas (2015)	Online students (which included a combination of full-time and supplemental students) performed at similar levels in reading before and after controlling for student demographics, but that online students performed at lower levels in mathematics compared to their face-to-face counterparts.[32]
National (2014)	"Virtual schools' Adequate Yearly Progress results were 22 percentage points lower than those of brick-and-mortar schools... The on-time graduation rates for full-time virtual schools was close to half the national average: 43.8% and 78.6%, respectively."[33]
Colorado (2014)	"Online school performance on state assessments had been lower across all grade levels and content areas than that of its brick and mortar counterparts."[34]

http://nepc.colorado.edu/publication/virtual-schools-annual-2019

Ohio (2014)	"... [virtual] schools experienced lower student performance than their traditional counterparts."[35]
National (2013)	While 52% of brick-and-mortar district and charter schools met AYP, only 23.6% of virtual schools did the same.[36]
National (2012)	Virtual schools that achieved adequate yearly progress was approximately half the overall public school average (i.e., 27.4% of virtual schools vs. ~52% of public schools).[37]
Arizona (2011)	"...nearly nine of every 10 students enrolled in at least one statewide online course, all had graduation rates and AIMS math passing rates below the state average."[38]
Colorado (2011)	"Half of the online students wind up leaving within a year. When they do, they're often further behind academically then when they started."[39]
Minnesota (2011)	"Compared with all students statewide, full-time online students had significantly lower proficiency rates on the math MCA-II but similar proficiency rates in reading."[40]
Ohio (2011)	"...nearly 97 percent of Ohio's traditional school districts have a higher score than the average score of the seven statewide" online charter schools. Those schools in Ohio also underperformed brick-and-mortar schools in graduation rates.[41]
Pennsylvania (2011)	"In every subgroup with significant effects, cyber charter performance is lower than the brick and mortar performance."[42]
Colorado (2010)	"Online students consistently lag behind those of non-online students, even after controlling for grade levels and [almost every individual] student characteristic"[43]
Idaho (2010)	"Students in virtual charter schools generally achieve proficiency in reading and language arts at lower rates than students in non-charter public schools. Students in virtual charter schools consistently achieve proficiency in mathematics at lower rates than students in non-charter public schools. Students in charter schools generally achieve proficiency at higher rates in all subjects than students in virtual charter schools and non-charter public schools."[44]
Wisconsin (2010)	"Virtual charter school pupils' median scores on the mathematics section of the Wisconsin Knowledge and Concepts Examination were almost always lower than statewide medians during the 2005-06 and 2006-07 school years."[45]
Colorado (2009)	"...demonstrating a sincere commitment to student learning and a consistent effort to increase student achievement. It [was] also evident, however, that some programs [were] falling short of the mark."[46]
Ohio (2009)	Online charter school students experienced significantly lower achievement gains compared to brick-and-mortar charter schools in the state.[47]
Kansas (2007)	Full-time K-12 online students in Kansas scored lower on state assessments than traditional students, particularly in mathematics.[48]
Colorado (2006)	Online student scores in math, reading, and writing have been lower than scores for students statewide over the past three years.[49]

As Table 2.1 illustrates, the evidence in the literature consistently shows that students enrolled in virtual schools perform at lower rates compared to their face-to-face counterparts. The only research that reports positive results in favor of virtual schools have been produced

by advocacy organizations supportive of charter schooling and school choice or the for-profit corporations that operate many of these schools.[50]

However, it should be noted that even advocacy organizations such as Public Impact and the National Association of Charter School Authorizers, as well as organizations that have often used methodologies designed to favor school choice initiatives (such as the Center for Research on Education Outcomes), have all repeatedly found that virtual schools perform at lower levels than brick-and-mortar schools (as seen above in Table 2.1).

In fact, a 2016 report by the National Alliance for Public Charter Schools, the 50-State Campaign for Achievement Now, and the National Association of Charter School Authorizers, entitled *A Call to Action to Improve the Quality of Full-Time Virtual Charter Public Schools,* even stated:

> The well-documented, disturbingly low performance by too many full-time [online and blended] schools should serve as a call to action to state leaders and authorizers across the country. It is time for state leaders to make the tough policy changes necessary to ensure that this model works more effectively than it currently does for the students it serves. It is also time for authorizers to close chronically low-performing virtual charter public schools.[51]

While not presented in the form of a specific recommendation, the authors of the *Call to Action* report also wrote that, "states may need to consider governing full-time virtual charter schools outside of the state's charter school law, simply as full-time virtual charter schools."[52] This was an important acknowledgement – particularly from organizations whose sole purpose was to advocate for increased opportunities for charter schools, in that it recognized that educating a child in a largely independent, often home-based environment was critically different from, and should be regulated differently than, educating a child in a traditional face-to-face, brick-and-mortar school.

Interestingly, the research comparing student performance in supplemental K-12 online learning environments and the traditional classroom has been more mixed than student performance in full-time virtual schools.[53] However, Mulcahy and his colleagues have speculated that weaker students may have been self-selecting a less rigorous curriculum in order to avoid taking online courses.[54] Even when students who are struggling have engaged in supplemental forms of K-12 online learning (e.g., at-risk students engaged in online credit recovery courses and programs), research has found these programs can be at least as effective as other forms of credit recovery, but can actually hinder students' long-term understanding and success.[55] In terms of the supplemental K-12 online student, Rice concluded "that the effectiveness of distance education appears to have more to do with who is teaching, *who is learning*, and how that learning is accomplished, and less to do with the medium" (emphasis added).[56]

While there is ample research into the effectiveness – or lack thereof – of virtual schools, the same cannot be said of blended schools. In fact, to date the NEPC's annual reports represent the only systematic examination of the effectiveness of blended schools (see Table 2.2).

Table 2.2. Summary of research related to the effectiveness of blended schools

Year	Finding
2019	"A total of 44.6% blended schools were rated acceptable. This is the first time in the last two years that blended schools perform less than virtual schools…"[57]
2018	"…43.1% of blended schools received acceptable performance ratings… The graduation rate of 49.5% in blended schools fell far short of the national average of 83%."[58]
2017	"…72.7% acceptable ratings for blended schools… The graduation rate of 43.1% in blended schools fell far short of the national average of 82.3%."[59]
2016	"Blended schools tended to score even lower on performance measures than virtual schools… [Only] five out of 22 independent blended schools (22.7%) had a higher percentage of students rated proficient than the state percentage. The on-time graduation rate (or four-year graduation rate) for full-time blended schools was half the national average: 37.4% for blended schools and 81.0% for the nation as a whole."[60]

Beyond the NEPC's annual reports, the only data related to the effectiveness of blended education focuses on blended learning programs (i.e., to the actions of one or more teachers, but not the whole school),[61] and those study have often been isolated to a single program or failed to include a comparison group. As such, the NEPC annual reports represent the most comprehensive examination of the effectiveness of both blended learning and blended schools currently available in the literature.

Financing Virtual and Blended Schools

In Section III of this report, Huerta, King Rice, and Shafer state that "policy debates persist in some states over how to fund full-time virtual schools, both because of cost differences between virtual and traditional brick-and-mortar schools and because of other policy considerations."[62] One of the difficulties that exists with these debates is the understanding that costs in virtual schools vary widely compared to those in brick-and-mortar schools.[63] But that variance has rarely been documented. For example, Patrick, Myers, Silverstein, Brown, and Watson prepared a report on behalf of iNACOL (i.e., an organization devoted to ensuring that all students have access to blended and online learning opportunities) that examined the funding of virtual schools.[64] The authors outlined the funding that full-time online schools received, the proportion that funding represented in comparison to brick-and-mortar charter schools and in comparison to traditional brick-and-mortar schools, and the average funding traditional brick-and-mortar students received (see Table 2.3).

Table 2.3. Funding of online schools compared to traditional schools in select states

State	2012-13 per pupil funded for online schools	Online school funding compared to funding for brick-and-mortar charter schools	Online school funding as a percentage of average state funding for traditional brick-and-mortar schools	Average per pupil spending in traditional schools across the state
Arizona	$5,759	95%	72%	$7,968
California	$6,468	100%	70%	$9,300
Colorado	$6,462	92%	72%	$8,926
Florida	$5,182	81%	81%	$6,393
Georgia	$4,334	100%	46%	$9,432
Indiana	$5,245	87.5%	55%	$9,479
Iowa	$6,001	100%	62%	$9,748
Kansas	$4,030	100%	40%	$9,972
Louisiana	$8,395	100%	90%	$10,701
Minnesota	$8,807	100%	100%	$8,807
Nevada	$6,700	100%	80%	$8,376
Ohio	$5,745	92%	51%	$11,224
Oregon	$6,304	100%	68%	$9,268
Pennsylvania	$8,992	100%	71%	$12,729
Wisconsin	$6,445	100%	56%	$11,453
Wyoming	$6,500	100%	43%	$15,232

This type of analysis has often formed the foundation for providers of virtual schools themselves, and their main advocacy organizations (i.e., the Donnell-Kay Foundation, the Foundation for Excellence in Education, iNACOL, the Thomas B. Fordham Institute, etc.),[65] to argue that virtual schools should be funded at equal levels to brick-and-mortar education.

Interestingly, almost all of the literature that has examined the actual costs of virtual schools has found the opposite. For example, the Ohio Legislative Committee on Education Oversight reported that considering the actual costs, the five existing virtual schools in the state were able to operate with 65% of the funding provided to traditional public brick-and-mortar schools.[66] Similarly, Dodd reported a virtual school was able to meet Annual Yearly Progress with 65% of the funding provided to traditional schools.[67] Gillis found another virtual school was also able to operate at 65% of traditional funding.[68] Further, Barbour concluded that it only cost between 7% to 16% less to operate one district-based virtual school compared with a traditional school.[69] Finally, it is also worth noting that an analysis of virtual schools in Pennsylvania found that all but one reported "significant surpluses of revenue over expenses and [were] amassing significant net assets."[70] All of this literature has indicated that virtual school costs less to provide than face-to-face instruction.[71] This general finding is also consistent with the literature that examined the cost of or funding provided to supplemental K-12 online learning.[72]

Unfortunately, there has only been a single formal examination of the cost of blended schools. Butler Battaglino, Haldeman, and Laurans, basing their comparison on a national average overall per-pupil cost of $10,000 for traditional brick-and-mortar schools, suggested that the actual cost of virtual schools ranged from $5,100 to $7,700, while the actual cost of blended schools ranged from $7,600 to $10,200. However, they also cautioned that their estimates were expressed:

> ...as ranges rather than precise figures—and we pay ample attention to trade-offs, start-up costs, professional development, and other key variables... [and] much better data on both costs and outcomes will be needed for policymakers to reach confident conclusions related to the productivity and efficiency of these promising new models. [73]

The lack of systematic and independent data in terms of the actual costs of virtual and blended schools could be one of the reasons why policymakers have been largely reluctant in the past to legislate or regulate this issue.

A consideration that is often not discussed is the reality that public education is funded by taxpayers. Parents of students who are enrolled in virtual or blended schools do not pay a lower tax rate, but their children generally receive less per-pupil funding than students enrolled in traditional brick-and-mortar schools. A moral question that should be considered is whether students should be economically disadvantaged based on the form of schooling that they have chosen – for whatever reason. One of the obvious issues raised in the literature is the profit motive of many educational management organizations.[74] It is this potential profiteering, particularly when it represents corporate profits,[75] that has prompted legislators to propose reducing or limiting virtual school per-pupil resource allocations in eight states in 2017 and six states in 2018 (see described in Section III of this report). However, a simple reduction in the per-pupil funding has the potential to create a two-tiered education system if the issue of profiteering from public education funding is not addressed. The examples above from Dodd and Gillis demonstrate how virtual schools operated by for-profit educational management organizations are able to successfully operate with less funding. [76] Based on the analysis presented in Section III of this report, to date it has only been California that has proposed legislation aimed at eliminating profiteering in the virtual school sector. Beyond the issue of corporate profits, Barbour raises a second moral question: Even if a school district can provide an equivalent virtual or blended school experience at 75% of the funding provided for face-to-face instruction, how much better could that virtual or blended school experience could be if it received full funding? [77]

The Virtual School Experience

As the issue of funding is tied to student attendance in virtual schools, it is worthwhile to examine what is known about what it means to "attend" a virtual school. Unfortunately, there is almost a complete absence of research into the nature or quality of curriculum and student experience, nor is there research examining the unstated assumptions about the type of learning provided by the virtual education experience. What we do know about the daily life of a student attending a virtual school is both dated and often based on material pro-

vided by either the corporate educational management organizations themselves or secondhand reviews. For example, a 2005 book chapter describes that upon enrolling in a virtual school, the education process begins when the company "provides each eligible student with a textbook and instructional materials, computer, printer, and reimbursement for Internet connection."[78] Similarly, in a 2003 article in *Education Week*, a company executive reported that "each student enrolled in an online school managed by K12 receives a computer, a printer, and four to six boxes—or 90 pounds—of materials, including workbooks, textbooks, and 'manipulatives' to study language arts, mathematics, science, history, art, and music."[79] Fifteen years later one would expect there to be fewer physical materials, and potentially additional or, at least, somewhat different technology; but there isn't literature to confirm these expectations. The assumption that technology is provided is also not always accurate. In a recent court case in Missouri, a student was assigned to a district-based virtual school, but was not provided with a computer, Internet access, or technology of any kind.[80] The student in question was simply told to travel by bus to the public library where their time on the computer was restricted to two hours per day. As such, it may not be safe to assume that technology is always provided.

However, assuming that there are curricular materials and technology provided, once those items arrived, Klein wrote that "parents structure their days to accomplish the learning tasks required by the CAVA program [i.e., California Virtual Academy, a K12, Inc. managed school], but in accordance with their own beliefs, values, and scheduling priorities. CAVA presents sample daily and weekly schedules online to help parents."[81] Similarly, Connections Academy advised parents that as their child's "learning coach" they were partners with the virtual school's teachers and administrators, and provided guidance from other Connections Academy parents on topics such as: classroom setup, time management, motivation strategies, reward systems, managing multiple students, curriculum planning, students with special challenges, using technology, integrating the roles of parent and coach, and extra credit.[82] Setting aside the fact that this list of topics could easily be taken from the syllabus of some university's teacher education courses, Ohanian also pointed out that "no mention is made of how much time Mom must spend online to print out all the material."[83] Regardless, these examples highlight the reality that the role of the parent, or learning coach, is critical to the instructional model used by these virtual schools.

One of the best descriptions of the instructional model employed by virtual schools came as a part of a Wisconsin Appeals Court decision in the 2006 case of Johnson v. Burmaster. The case was to determine whether the Northern Ozaukee School District, through its operation of the Wisconsin Virtual Academy (WIVA) (a K12, Inc. managed school), was in violation of the state's charter school, open enrollment, and teacher licensing statutes. Judge McCormack wrote:

> The WIVA students, under the direction of their parents, study the materials and complete various assignments to demonstrate their understanding. The parents are provided with instructor's materials to assist the student's learning. The parents check the students' work on their assignments to determine whether the students have mastered the topic. A parent is required to devote four to five hours per day to the student's education.... WIVA's certified teachers... review samples of students' work to assess progress, and hold one

> to two twenty- to thirty-minute telephone conferences per month with each student and parent, during which they discuss and assess student progress. They correspond with students via email, and respond to parental requests for assistance via email and telephone. Certified teachers also conduct thirty- to forty-minute interactive online classes using online conferencing software; students participate in such classes two to four times per month.[84]

Based upon this description, the court found that parents were required to teach, and that "a public school, using public funds, that relied upon unlicensed individuals as the primary teachers of the pupils" was contrary to state law.[85] Essentially, the key finding – at least on this point – was that parents were the primary source of instruction for the students enrolled in the virtual school. This finding supported Bracey's earlier assertion that "although enrolled in 'virtual charter schools,' most children receiving the K12 curriculum are home-schooled."[86]

As Judge McCormack described above, the actual virtual school teachers in Wisconsin had biweekly or monthly telephone conferences with each student and parent, conducted weekly or biweekly interactive online classes, corresponded with students via email and responded to parental requests for assistance via email and telephone. This was consistent with Klein's description of another K12, Inc. program in California:

> Face-to-face meetings with families are scheduled once every 45 days. Teachers also monitor attendance and academic progress of the students, support families with instructional and learning needs, and complete report cards. They are responsible for providing parent and student workshops and outings throughout the year that are scheduled according to a traditional school calendar schedule.[87]

The lack of direct contact between the student and teacher in both of these descriptions is likely due to high student-teacher ratios. For example, a K12, Inc. internal memo from 2010 indicated that the student-teacher ratio could range from 60:1 to 72:1 at the elementary and middle school level that, and from 225:1 to 275:1 at the high school level.88 While not as extreme, in Section I it was reported that virtual schools – such as those managed by K12, Inc. – still had nearly three times as many students per teacher than the national average.[89] This is also assuming there is a virtual school teacher at all. The recent Missouri court case mentioned above revealed that students were assigned to a district-based virtual school, where the school district had contracted with a corporate vendor to provide access to a learning management system and online curriculum, but neither the school district nor the corporate vendor provided a teacher to interact with or monitor the progress of students enrolled in that virtual school. [90]

In addition to the reliance on the parent, guardian, or other family members as a part of the instructional team, virtual schools also rely upon their online curriculum to provide instruction to the student. In her examination of CAVA, Klein described the instructional model of the K12, Inc. curriculum using 18 screenshots to illustrate the steps a student would complete.

- The beginning screen provides an overview of the lesson components that are listed

on the left side; the objectives, notes, materials, and other options on the right side.

- Students are first taught new spelling words. They add these to their ongoing alphabetized collection and then are asked to focus on short vowels and beginning and ending blends. Whiteboards are used for phonemic and spelling pattern practice.
- Next, introductory proofreading is taught with practice in correct sentence punctuation, misspelled word correction, and addition of new words to students' written composition.
- Next, the guided reading selection is used to build vocabulary and comprehension skills. Answers to questions are available along with the audio pronunciation of *Josefina*, keyword definitions, and extension suggestions (e.g., additional reading resources and activities).
- This learning activity strengthens students' understanding of the story and allows for application and creative expression of the concepts that are emphasized.
- The assessment for this lesson is given orally to the students [by their learning coach] in order to determine if they are able to identify and describe the actions of the characters and name story problems and solutions.
- Finally, after the steps detailed above are taken, a read-aloud is recommended to conclude the lesson sequence. It can be completed at any time, as it is a recommended daily activity. A book list is provided for selection considerations.[91]

In this example, it is the learning coach that is responsible for determining if the student has successfully completed the outcomes of the lesson. In other instances, the "curriculum is mastery based so students must achieve 80% on lesson assessments. If necessary, students have the opportunity to go back and spend more time on the lesson in order to retake the exam and pass."[92]

In describing the natural outcome of this cycle, Ohanian wrote:

> Furthermore, the claim that lessons are adapted to the needs of each student is not borne out by the facts. If a student misses more than 20 percent of a lesson assessment, the parent is told the student must repeat the lesson. If the student again misses more than 20 percent, the instruction is to repeat the lesson again. And again. The so-called "needs of each student" is an endless loop of repetition of the same material.[93]

When the K12, Inc. curriculum was first released, one report described the curriculum as "typical worksheet-style computer lessons, with brief bits of animation or sound effects as rewards."[94] When asked by a reporter two years later, one Wisconsin parent uncharitably described the model as Pavlovian, saying that "young kids are being encouraged through technology to run a maze, ring a bell, and eat the cheese."[95] In referencing this quote, Bracey indicated that "although this parent actually means to refer to operant rather than Pavlovian conditioning, the message is clear: the curriculum is not interesting and it promotes a one-size-fits-all approach. The instruction is mechanical and the system does not encourage creativity."[96]

More recently, an article in *School CEO: The School Marketing Magazine*, in a section entitled "The Myth of Personalization," described the process as:

> Students start with a multiple-choice test on the material for the day. The instruction they receive in the lesson depends on which questions they miss on the test. For example, a student who misses two questions about reptiles in a biology lesson will then receive material about reptiles. Another student who misses questions about both reptiles and mammals will spent their lesson on not just reptiles, but also mammals. The material doesn't change per student; students just get more or fewer questions depending on what they get right and wrong. The differentiation only takes into account students' prior knowledge – not their unique needs or learning styles.[97]

This more recent description, almost twenty years after some of the descriptions above, seem to indicate that the instructional model used in the online curriculum remains consistent.

The K12, Inc. curriculum itself is based on the "Core Knowledge approach" by E.D. Hirsch, Jr., designed to impart a "cultural literacy."[98] Hirsch himself wrote that:

> The acculturative responsibility of the schools is primary and fundamental. To teach the ways of one's own community has always been and still remains the essence of the education of our children, who enter neither narrow tribal culture not a transcendent world culture but a national literate culture. For profound historical reasons, this is the way of the modern world. It will not change soon, and it will certainly not be changed by educational policy alone.[99]

The K-12 curriculum thus "emphasizes phonics-based reading and a great book approach in literature [and an early foundation in basic arithmetic]. In social studies, Western culture and history is emphasized."[100] According to Ohanian, this approach runs counter to commonly accepted developmentally appropriate practice, which believes that "that children learn more effectively in environments that allow them to work independently and with each other to construct their own knowledge."[101] Unfortunately, this is one of the only examples in the literature where an assumption about the type of learning provided by the virtual education experience is questioned. While not explicitly stated, many of the assumptions about both the nature of learning and the content of the curriculum in virtual schools are consistent with the assumptions described by Boninger, Molnar, and Saldaña in their recent examination of personalized learning.[102]

There are two main issues with this overall description. The first issue is whether it is an accurate description of the instructional model that is used by all virtual schools. It is important for the reader to notice that with the exception of one court case from 2018 and a single magazine article from 2019, every other piece of literature referenced in this section is a decade or more old. Is the description provided by these dated sources still applicable to the virtual school experience today? Further, in Section I of this report Miron and his colleagues have provided a detailed analysis of various types of virtual schools (i.e., district-based, charter, independent, nonprofit-EMOs, for-profit EMOs, etc.). Is the description above applicable to the virtual school experience in all of these structural variations? Is the descrip-

tion above even applicable to all virtual schools of one specific type (e.g., all for-profit EMO virtual schools)? Unfortunately, there is no available research to answer these questions.

The second issue with this description of virtual education is that policymakers – and the public at large – appear to have simply accepted the nature of this model of taxpayer-funded, virtual education. Virtual schools have consistently produced poor outcomes since researchers have begun to examine their effectiveness. Researchers and those involved in public education have a long history of questioning the efficacy of virtual education for children.103 Yet, virtual schools continue to proliferate, often due to a lack of regulation (as Huerta and his colleagues describe in Section III of this report). In examining the impact of this model of virtual education on public education, Fulton and Kober (2002) wrote:

> Less attention is paid to how these changes could affect the deeper purposes and principles underlying the… system of public education – in other words, the expectations and ideals that have shaped the… vision of public education for more than a century. These include such purposes as preparing students for life, work, and citizenship, and creating a cohesive society; and such principles as providing universal access and equity in education, and making schools responsive to their local community.[104]

Twenty years ago, Baker warned, "if curriculum and the tools of teaching (let alone schools themselves) are controlled by conglomerates… many of the virtues of public schooling might be lost," there was the potential for "the debasement of education as just another corporate product."105 Beyond the issues of the effectiveness of the virtual education, or the appropriate levels of funding that it should receive, is a more fundamental question that practitioners, scholars, and – most importantly – policymakers should be asking today. Is the current model of virtual education something we should aspire to for our children?

Research into the Design, Delivery and Support in Virtual and Blended Education

There is a growing body of research into virtual education, and an emerging body of research into blended education. Unfortunately, as Holloway described in the first edition of the *Handbook of Research on Educational Communications and Technology*, "there are excellent studies, but they are limited by short time spans. Since this is the state of educational research in general, it is a magnitude greater for educational technology."[106] Holloway continued this criticism stating, "the entire corpus of research in diffusion and adaption of educational technology seems less rigorous in technique and design and weak in causal findings." Essentially, Holloway was complaining about the fact that the research in the field of educational technology was often focused upon small samples, completed over a short time frame, and lacking in methodological rigor. The same critique can be made about research into virtual and blended education.

In the sole chapter on K-12 virtual and blended education in the *Handbook of Distance Education*, Barbour lamented that:

> beyond this body of comparative research, the remaining research has been methodologically limited. Much of it has been qualitative in nature, which can be quite useful for understanding K-12 online learning in a specific setting, but by definition is not generalizable to other jurisdictions. The remainder suffers from issue of over reaching (e.g., interviewing a group of hand picked teachers or developers and using their opinions to generate "best practices").[107]

To illustrate this point, Barbour described two representative studies: one into the effective design of online courses for high school students and one into best practices of online teachers. The first study produced 10, and later seven, principles of effective design for online courses.[108] Those principles were generated based on interviews with six individuals who had designed at least one online course for a single, supplemental virtual school. The researcher did not review the online courses those individuals created to determine whether the interviewees had actually incorporated the principles into their design. The researcher did not examine student performance in online courses that employed the principles compared to those where the principles were absent. The researcher did not interview the teachers who taught the online courses designed by those six individuals, or students who completed those courses, to determine their perceptions of principles or what those stakeholders felt constituted effective design.

Similarly, the second study produced 37 best practices for asynchronous online instruction.[109] Those best practices were generated based on interviews of 16 teachers employed by a single, supplemental virtual school. The 16 teachers were recommended, by the virtual school itself, as being effective based on a review of student evaluations of teaching. The researchers did not observe any of the teachers' online asynchronous instruction to determine if they actually employed the best practices themselves. The researchers did not examine student performance in courses where these best practices were enacted, compared to courses where the best practices were not present.

In both of these examples the researchers collected perception-based data from a single source, a small sample, and a specific geographic focus; with no verification of the opinions being expressed by those surveyed or interviewed. Ironically, both studies intended to report on "effective principles" and "best practices." This is not to suggest that these studies are bad research. Both studies adequately outlined the research problem, situated that problem within the body of literature that existed at the time, described a well-cited methodological plan to collect and analyze data, supported their results with examples from the data, discussed what they found in light of what was known, and provided implications for practice and suggestions for future research. Simply put, these two studies were isolated examples that represent the majority of research into virtual and blended education – case studies.[110] The generalizability of case study research underscores a fundamental misunderstanding of the differences between descriptive and inferential research. Descriptive research is designed to describe a specific group based on the data with no intention of generalizing the findings beyond that group. Inferential research is specific designed to collect data to allow the researcher to make generalized statements beyond the group being studied.[111] In order to conduct effective inferential research, researchers need to include multiple samples, from multiple contexts, over extended periods of time.

While the two examples above reported research conducted on supplemental virtual schools, the research into full-time virtual schools and blended school exhibit similar characteristics. For example, after cautioning readers that the results of their case study should not be generalized, Stevens, Borup, and Barbour recommended four generalized design principles they believed school districts should adopt to increase the readiness of teachers in blended learning environments.112 Conversely, in a case study that explored online instruction of students with disabilities, Crouse, Rice, and Melland couched their conclusions with specific references to "teachers in this study." However, based upon the six interviews conducted as a part of this case study, the authors still concluded their journal article by stating:

> Teachers may also benefit from targeted support that brings forward relevant traditional experience and builds on it for use within an online context. Therefore, teacher preparation programs might consider ways in which partnering and maintaining research relationships with online schools and experiences with students with disabilities will bring more prepared teachers to online learning and provide better support for sustaining these teachers in their work.[113]

Like the earlier studies focused on the supplemental context, this is not to suggest that these full-time virtual school and blended learning studies are examples of bad research. Only that much of the research is narrow case studies which can not be, should not be, but all too often are, used to draw generalized conclusions.

These examples are also not to suggest that all virtual and blended education research is descriptive in nature. An example of an inferential line of inquiry has been the Adolescent Community of Engagement (ACE) framework, designed to better describe how parents, teachers, and peers can influence online student engagement in the virtual environment. The initial development of the ACE framework began based on studies that used student and parent surveys to measure learning interactions and correlated them with learning outcomes at a single virtual charter school,114 followed by three rounds of data collection at the same virtual school that included teacher surveys and interviews;115 teacher focus groups and interviews, along with student interviews;116 and student and parent interviews.117 Research into the ACE framework was expanded to include data collection at an independent study distance learning program using surveys of students and interviews of students and parents.118 Finally, the ACE framework has been investigated using teacher and local school-based facilitator interviews, as well as student focus groups, in a supplemental virtual school.119 This line of inquiry included multiple rounds of data collection (e.g., surveys, interviews, focus groups, and student learning outcomes), data from various stakeholders (e.g., students, parents, teachers, and local school-based facilitators), in different virtual education contexts (e.g., a virtual charter school, an independent study program, and a state-run supplemental virtual school). These studies have allowed the researchers to refine and rebrand the framework to be the "Academic Communities of Engagement" framework, which focuses more on the actions that can support virtual learners (as opposed to the individual actors).[120]

From a policy perspective, one of the most striking examples of methodologically limited research guiding policymakers is the adoption of standards to measure the quality of virtual

and blended education. The iNACOL *National Standards for Quality Online Courses* were first released in 2007 based on reviews of existing standards and adopted the Southern Regional Education Board's standards from 2006,[121] with an addition due to iNACOL's involvement with the "Partnership for 21st Century Skills" initiative.[122] Over the next four years, a number of organizations and US states adopted these standards for formal use. iNACOL used feedback from various organizations, particularly the California Learning Resource Network and the Texas Agency's Texas Virtual School Network,[123] to update its existing standards in 2011.[124]

However, in a two-year, three-phase validation study, Adelstein and Barbour were unable to provide significant support for the iNACOL *National Standards for Quality Online Courses* from the research literature or panels of experts, and an application of even a revised version of the standards did not meet the expectations of inter-rater reliability.[125] The standards have been examined against the existing research and have failed that examination. The standards have been analyzed by experts in the field and have been found lacking. The standards have been utilized in a systematic way and found to not be valid. Yet, these methodologically flawed standards have been adopted by several states as a way to measure the quality of K-12 online and blended teaching, courses, and programs.[126] For example, Michigan uses the standards to review courses offered in a statewide virtual schooling catalogue.[127]

The review of research in the *Virtual Schools in the U.S.* reports traditionally focuses on student demographics and performance, finance and governance, instructional program quality, and teacher quality in virtual and blended education.[128] However, as the examples above illustrate, the methodological limitations of the research make it of little value in guiding policy.

The Problematic Nature of Research on Virtual and Blended Education

The lack of useful research that is available to guide policymakers is the responsibility of researchers in the field. While this report is primarily intended for those policymakers, it is important to examine the root of these problems with the research to assist researchers and, eventually, provide better research-based guidance for policymakers. In speaking about the field of distance education in general, Black wrote that:

> [A]lthough isolated studies of distance education in its original forms of correspondence study were undertaken in the early decades of the last century, scholarship in the sense of a sustained, growing body of knowledge generating theory through systematic research, really began in the 1950s."[129] Can the same be said for virtual and blended education? Has the literature moved from isolated studies to "a sustained, growing body of knowledge generating theory through systematic research?

To begin, it is important to outline a structure to examine the field. Graham, Henrie, and Gibbons explained, "well-established scholarly domains have common terminology and widely accepted models and theories that guide inquiry and practice, while researchers in less mature domains struggle to define terms and establish relevant models."130 Saba out-

lined four specific challenges that fields like virtual and blended education face as they mature: 1) confusing terminology, 2) a lack of historical perspective, 3) the absence of construct validity, and 4) a postmodern turn.131 The following subsections will briefly examine virtual and blended education research through the lens of these four challenges.

Confusing Terminology

Saba wrote that one of the limitations of the field of distance education in general was "the emergence of terms and phrases in the current literature that have received acceptance among different groups of practitioners, while they remain poorly defined, or undefined."[132] The same can be said of virtual and blended education. As shown in the earlier "Virtual Schools, Cyber Schools, Online Programs, Blended Programs, and Blended Schools" section, the literature has used a variety of terms such as online school, virtual school, cyber school, electronic school, Internet high school, K-12 online learning program, and so on. In some cases multiple terms may refer to the same type of program or school, and in other cases the same terms may refer to very different types of programs or schools. For example, Lueken, Ritter, and Beck published an article in the *Journal of Online Learning Research* entitled "Value-added in a Virtual Learning Environment: An Evaluation of a Virtual Charter School."[133] In the very next issue of the same journal, Borup and Stevens published an article entitled "Factors Influencing Teacher Satisfaction at an Online Charter School" that focused on the same kind of program.[134] Two issues after that, Borup and Stevens report a second study from the same program in an article entitled "Parents' Perceptions of Teacher Support at a Cyber Charter High School."[135] The illustration highlights how a journal with a specific focus on "research related to K-12 online and blended learning,"[136] published three articles over the span of a single year that used three different terms to describe the same type of virtual education. With both virtual learning and blended learning, confusing terminology leads to two problems: 1) researchers either cannot compare the results between studies from two different programs because they simply do not know if the same thing is being compared, and 2) this confusion, along with the potential that important literature may not even be found, leads to a field that fails to build on what is already known.

Lack of Historical Perspective

Saba summarizes this problem when he laments that "reading some of the articles, even in peer-reviewed journals, one comes to the inevitable conclusion that their authors, editors, and reviewers are not familiar with the historical origin and conceptual growth of the field."[137] Ferdig and Kennedy described the problem as researchers, particularly those who were new to the field, often approached virtual and blended instruction as if they were the first to write about their specific topic.[138] They speculated this situation was cause by the fact that scholars published in a wide variety of journals, many of which had nothing to do with virtual learning, distance education, or even educational technology. This observation was supported by Arnesen and her colleagues, who found their sample of 356 K-12 online learning articles came from 155 different journals, 102 of which only published a single article.[139] Additionally, an analysis using the data set provided by Arnesen and her colleagues reveals

10 articles published in 2015 or earlier that had never been cited and an additional 53 articles that had been cited fewer than five times.[140] Many of these 63 articles were authored by some of the most prolific authors in the field, published in journals featuring multiple K-12 online learning articles, and written on topics that were relevant to the field. Hence, there should be no apparent reason why many have not been cited in subsequent research.

It should be noted that the analysis of the historical perspective above was limited to journal articles. Yet, numerous scholars have described how virtual and blended education research available in journals was limited. For example, Barbour and Reeves stated, "much of the literature for virtual schooling has primarily been disseminated through private research centers, evaluations or doctoral dissertations."[141] Lowes and Lin described the various publication outlets in the field as including: journal articles, chapters in edited collections, and increasingly by research organizations; book-length academic studies; program evaluations; guidelines and standards; and popular media articles and reports designed for policy or advocacy purposes.[142] Further, program evaluation has had a significant impact on the early scholarship in virtual education, and continues to exert influence on the growing base of blended education literature.[143] This additional fragmentation of where and how scholarship is published further complicates researchers' ability to situate their own studies within the historical origin and conceptual growth of the field.

Absence of Construct Validity

At its basic level, construct validity is "the degree to which a test measures what it claims, or purports, to be measuring."[144] Unfortunately, within virtual and blended education there has been an absence of validated instruments. As Barbour noted the only systematic efforts to create a validated instrument were the Educational Success Prediction Instrument and the Parental Involvement Mechanisms Model.[145] Since the publication of this report, Graham and his colleagues have also undertaken an initiative to create a validated instrument to measure K-12 teacher readiness for blended learning.[146] As Barbour cautioned, without validated instruments, researchers must create their own instruments for each and every study, and there is no guarantee the instrument will measure what it is designed to measure or how well the instrument will reflect the complete reality of a particular context.[147] Validated instruments are the building blocks for models that can explain specific situations within the virtual and blended education context. "Models… are intended for building a theory of distance education that is inspired by current knowledge, research, and practice. They may be adopted by practitioners to guide program development, implementation, and evaluation."[148] Models also provide policymakers a level of trustworthiness that research can guide legislation and regulation.

The lack of validated instruments has caused a lack of theoretical underpinnings within the research in the field. As Saba explained, "for inclusion of these concepts in a theory of distance education, at the minimum, such constructs must be validated in experimental empirical studies."[149] The lack of validated instruments in virtual and blended education is reflected in the lack of theory development in the field. For example, Barbour wrote that the ACE framework was one of the few lines of original inquiry that has attempted to ground itself

theoretically or conceptually.[150] Barbour also reported that isolated studies that had made use of the existing social presence theory.[151] In a more comprehensive review, Lokey-Vega, Jorrín-Abellán, and Pourreau reported that only 137 of the 790 unique publications, or 17%, contained any reference to one of 26 different theoretical terms (although many would argue that several of the "theoretical terms" were not actual theories).[152] As Lokey-Vega and her colleagues concluded, "the work has just begun as we stretch our field to seek and understand instances of success and test well-supported historically-important distance learning theories, such that we can build a body of best-practice literature founded on theory."[153] Simply put, research in the field of K-12 online and blended learning is largely atheoretical.

Postmodern Turn

In describing the issue of postmodernism, Saba described two different types of post-modernism: 1) European postmodernism, which tends to search for the *different* in a seemingly endless process of deconstructing the components of a particular field; and 2) American postmodernism, which seeks to find relationships among different, even unrelated concepts to generate what we would call a systems approach.[154] The deconstruction of the field of virtual and blended education is probably best illustrated by the fact that the main professional association for practitioners of K-12 online and blended learning (i.e., iNACOL) has a current focus on separating online learning from blended education, and then advocating for a personalized learning approach that is assessed through a competency-based education model using the pedagogical strategies of blended learning.[155] This fragmentation can also be seen in the lack of historical perspective that exists within the research into K-12 online learning that ignores lessons from the research into other forms of K-12 distance education (e.g., instructional film, educational radio, correspondence education, educational television programming, educational satellites, and audiographics or telematics); and K-12 blended learning often ignores lessons from the research into K-12 online learning, as well as the research and literature that focuses on various forms of technology integration. Further, virtual and blended education does not have the basic building blocks (e.g., validated instruments, models/frameworks, theories, etc.) described in the previous subsection to create the explanatory systems that might help us understand the relationship between different aspects of virtual and blended education. This lack of a theoretical perspective to guide research is evidence that virtual and blended education is also lacking from the perspective of an American postmodern approach.

Summary and Recommendations

Over the past decade, the annual NEPC reports have established several trends that have been consistent with the literature in the broader field of K-12 online and blended learning. For example, the literature has consistently shown that students in virtual schools and blended schools generally underperform their brick-and-mortar counterparts. The literature has suggested that virtual schooling – and, to a lesser extent, blended schooling – is more cost effective than brick-and-mortar schooling. But the actual practice of virtual and blended education continues to outpace the availability of useful research, much of which is

methodologically flawed, contextually limited, or suffering from overreaching conclusions. However, even in areas where the literature has provided guidance, legislators and policymakers have consistently failed to pass bills or create regulatory regimes that would provide additional oversight and accountability to online and blended schools.

In this examination of the state of research into K-12 virtual and blended education, it has been suggested that the field is immature. First, there is considerable inconsistency in the way both virtual and blended education are defined and operationalized – often to the point that these terms have become meaningless as a way to provide a shared understanding for the reader. Second, the lack of a consistent terminology, as well as a belief that the medium has defined the starting point for the field, has meant that research has often not built on what is already known in the field, particularly the broader field. Third, there are few examples of validated instruments being used as data collection tools, and few researchers incorporate theory to guide their studies. Finally, the fragmentation of the field due to the confusing terminology that often prevents the historical perspective from being incorporated into research, as well as the absence of the basic building blocks – such as validated instruments and theory – to provide a systems view of the practice of K-12 online and blended learning, has created a postmodern failing. The bottom line is that the field of K-12 online and blended learning is found wanting in all of the measures of a mature discipline.

The current state of K-12 online and blended learning research makes it of little value in guiding policy. Based on this reality, recommendations arising from Section II:

- The growth and geographic reach of full-time, taxpayer-funded virtual schools should be regulated. At present there are serious questions about the effectiveness of many models of virtual schooling. Until these questions can be adequately addressed, policymakers should limit or consider a moratorium on their growth.
- Given the lack of understanding of what is actually happening in virtual education (e.g., the nature of and amount of teaching in the instructional model, the specific curriculum that is used, the learning that occurs, etc.), policymakers should require that any virtual school operating in their jurisdiction be required to provide the necessary information to examine the effectiveness of the virtual education that is actually being provided.
- State and federal policymakers should create long-term programs to support independent research on and evaluation of virtual schooling, particularly full-time virtual schooling. More than twenty years after the first virtual schools began, there continues to be an inadequate research base of empirical, longitudinal studies to guide the practice and policy of virtual schooling.

The first two recommendations focus solely upon virtual schools, and not blended schools, because the research related to K-12 blended learning is still too nascent to provide any guidance. In fact, beyond the past four annual NEPC reports (including this report), there has been little systematic, large-scale examination of K-12 blended learning. However, the findings with respect to blended schools in these reports should also begin to raise similar questions about the effectiveness of many models of blended schooling.

Notes and References Section II

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11 There are four main models of blended learning: rotation model, flex model, self-blend model, and enriched-virtual model (with the rotation model having four types of rotation: station rotation, lab rotation, flipped classroom, and individual rotation).

The rotation model is one where a program is organized around different learning modalities – one of which is online learning. Students can rotate between different modalities of instruction based on their individual needs (i.e., individual rotation), through each of the stations provides in a single classroom (i.e., station rotation), through different classrooms or labs through the school (i.e., lab rotation), or as a group through a flipped classroom model (i.e., flipped classroom).

The flex model is where students complete most of their instruction online, but may interact with their teacher and/or other students for tutoring, small group instructions or group projects.

The self-blend model is described in a manner that is consistent with supplemental K-12 online learning (i.e., student takes some courses online and some courses in the classroom).

The enriched-virtual model is similar to the self-blend model, except that there is both online and classroom-based instruction in each individual course (i.e., not some course online and some in the classroom).

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Barbour, M.K., Mann, B., & Melchior, S. (2018). *CASTLE Brief No. 2 – A virtual shortfall: How full-time online learning models are not living up to the promise*. Denver, CO: University Council for Educational Administration's Center for the Advanced Study of Technology Leadership in Education. Retrieved February 23, 2019, from https://static1.squarespace.com/static/528fd1d3e4b023ca755e1561/t/5c51dfe340ec9aeb41f03940/1548869604563/2018+-+CASTLE+Brief+02+-+Barbour+Mann+Melchior.pdf

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This is not to suggest that research conducted by virtual school corporations or their advocacy organizations

represents poorly conducted research. For example, Pearson Education released a report examining student outcomes at Connection Academy schools where the methods were independently peer reviewed by SRI International, while the raw data and data analysis were independently audited by PricewaterhouseCoopers LLP (Pearson Education, 2018). Further, Choi and Walters (2018) chose to publish the results of their exploration of discourse as a pedagogical strategy for mathematical problem solving in a peer reviewed journal. However, it is also important to acknowledge what has been described as the 'developer effect,' which Wolf et al. (2019) outlined in their examination of approximately 170 studies since 1984 from the What Works Clearinghouse. These researchers found studies that had been conducted or funded by the creator of the intervention often found greater benefits for students than research in truly independent studies.

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Table 2. Summary of research related to the effectiveness of supplemental K-12 online learning

Study	Finding
Ballas & Belyk (2000)	Performance of virtual and classroom students in Alberta were similar in English and Social Studies courses, but that classroom students performed better overall in all other subject areas
Bigbie & McCarroll (2000)	Over half of the students who completed FLVS courses scored an A in their course and only 7% received a failing grade
Barker & Wendel (2001)	Students in the six virtual schools in three different provinces performed no worse than the students from the three conventional schools
Cavanaugh et al. (2005)	FLVS students performed better on a non-mandatory assessment tool than students from the traditional classroom
McLeod et al. (2005)	FLVS students performed better on an assessment of algebraic understanding than their classroom counterparts
Barbour & Mulcahy (2008)	Little difference in the overall performance of students based upon delivery model
Barbour & Mulcahy (2009)	No difference in student performance based upon method of course delivery

Chingos & Schwerdt (2014)	FLVS students perform about the same or somewhat better on state tests once their pre-high-school characteristics are taken into account.

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Table 3. Methodological issues with the supplemental K-12 online learning samples in comparative studies

Study	Sample
Ballas & Belyk (2000)	Participation rate in the assessment among virtual students ranged from 65% to 75% compared to 90% to 96% for the classroom-based students
Bigbie & McCarroll (2000)	Between 25% and 50% of students had dropped out of their FLVS courses over the previous two-year period
Cavanaugh et al. (2005)	Speculated that the virtual school students who did take the assessment may have been more academically motivated and naturally higher achieving students
McLeod et al. (2005)	Results of the student performance were due to the high dropout rate in virtual school courses

Table 4. Description of supplemental K-12 online learner from the research

Study	Sample
Kozma et al. (1998)	Vast majority of VHS students in their courses were planning to attend a four-year college
Espinoza et al., 1999	VHS courses are predominantly designated as 'honors,' and students enrolled are mostly college bound
Haughey & Muirhead (1999)	Preferred characteristics include the highly motivated, self-directed, self-disciplined, independent learner who could read and write well, and who also had a strong interest in or ability with technology
Roblyer & Elbaum (2000)	Only students with a high need to control and structure their own learning may choose distance formats freely
Clark et al. (2002)	IVHS students were highly motivated, high achieving, self-directed and/or who liked to work independently
Mills (2003)	Typical online student was an A or B student
Watkins (2005)	45% of the students who participated in e-learning opportunities in Michigan were either advanced placement or academically advanced students

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Table 5. Research into student performance in online credit recovery

Study	Finding
Hughes et al. (2015)	Likelihood of a student earning a grade of C or better was higher when a course was taken online than when taken face-to-face
Heppen et al. (2016)	Students stated online course more difficult and had more negative attitudes about mathematics Online students had lower algebra assessment scores, grades, and credit recovery rates Long-term outcomes were not significantly different
Stevens et al. (2016)	Less than 60% of online students received passing grade Online students had lower passing rates than those who take multiple courses in a semester
Stallings et al. (2016)	Little difference between success rates of online credit recovery and other credit recovery options Online students who did not subsequently drop out were more likely than other credit recovery students to graduate on time

Heppen, J., Allensworth, E., Sorensen, N., Rickles, J., Walters, K., Taylor, S., Michelman, V., & Clements, P. (2016). *Getting back on track: Comparing the effects of online and face-to-face credit recovery in algebra I*. Chicago, IL: American Institute for Research. Retrieved February 23, 2019, from http://www.air.org/sites/default/files/downloads/report/Online-vs-F2F-Credit-Recovery.pdf;

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Section III
Key Policy Issues in Virtual Schools: Finance and Governance, Instructional Quality, and Teacher Quality

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May 2019

Executive Summary

This section draws from a comprehensive analysis of all proposed and enacted virtual school legislation in 50 states during the 2017 and 2018 legislative sessions, building on our earlier work detailing five years of legislative activity in the 2012-2016 sessions. We again focus on whether legislatures have been moving closer to or further from core recommendations advanced in this NEPC series, in addition to whether legislatures are informed by other research on virtual schools. Our analysis revealed a decrease in legislative activity in 2017 and 2018, yet state legislatures have continued to propose bills similar to previous years that attempt to increase oversight of virtual schools. However, we found little evidence to indicate that legislative actions are being informed by the emerging research on virtual schools.

Recommendations arising from Section III are for policymakers to:

- Develop new funding formulas based on the actual costs of operating virtual schools.
- Develop new accountability structures for virtual schools, calculate the revenue needed to sustain such structures, and provide adequate support for them.
- Establish geographic boundaries and manageable enrollment zones for virtual schools by implementing state-centered funding and accountability systems.
- Develop guidelines and governance mechanisms to ensure that virtual schools do not prioritize profit over student performance.
- Require high-quality curricula, aligned with applicable state and district standards,

and monitor changes to digital content.

- Develop a comprehensive system of formative and summative assessments of student achievement, shifting assessment from a focus on time- and place-related requirements to a focus on student mastery of curricular objectives.
- Assess the contributions of various providers to student achievement, and close virtual schools and programs that do not contribute to student growth.
- Define certification training and relevant teacher licensure requirements specific to teaching responsibilities in virtual schools, and require research-based professional development to promote effective online teaching models.
- Address retention issues by developing guidelines for appropriate student-teacher ratios and attending to other working conditions (for example, student attendance) that may affect teachers' decisions about where to work.
- Work with emerging research to develop valid and comprehensive teacher evaluation rubrics that are specific to online teaching.
- Identify and maintain data on teachers and instructional staff that will allow education leaders and policymakers to monitor staffing patterns and assess the quality and professional development needs of teachers in virtual schools.
- Examine the work and responsibilities of virtual school principals and ensure that those hired for these roles are prepared with the knowledge and skills to be effective, particularly with respect to evaluating teachers and promoting best practices.

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As evidenced in this series of policy reports, policymakers continue to struggle to reconcile traditional funding structures, governance and accountability systems, instructional quality, and staffing demands with the unique organizational models and instructional methods associated with virtual schooling. State legislatures continue to respond to challenges raised by virtual schooling, as evidenced by proposed bills that attempt to increase oversight of virtual schools; however, as we discuss below, fewer than 40% of proposed bills have been enacted. In addition, there is little evidence to support the view that legislative actions are informed by the emerging research on virtual schools.

This first section below will revisit the critical policy issues introduced in our previous reports, specifically:

- Finance and governance
- Instructional program quality
- High-quality teachers.

In the 2013 report we defined these critical policy areas and presented the emerging research evidence; then, in the 2014 and 2015 reports we shifted our focus to the legislative actions that illustrate how states are addressing evolving virtual school models. The last three annual reports analyzed legislation, examining all proposed and enacted virtual school legislation in 50 states from 2012 through 2016. The analysis in our early 2012 and 2013 reports served as a baseline that allowed us to identify and track trends in legislative activity

through more recent years in 2015 and 2016, and including the comprehensive analysis of all virtual school legislation introduced in 2017 and 2018, presented here. In addition, we draw on our own research, recent policy reports and research, and popular press accounts. As a reorientation, we reintroduce and provide updates to our earlier tables summarizing critical policy issues, relevant assumptions, and unanswered empirical questions. Lastly, we revisit our policy recommendations and examine multiple data sources to gauge legislative progress toward them.

Comprehensive Analysis of 2015 and 2016 Legislation

Our comprehensive analysis of all proposed and enacted virtual school legislation in 50 states during the 2017 and 2018 legislative session employed the LexisNexis State Net/National Conference of State Legislatures (NCSL) Bill Tracking Database. We identified legislation using the keywords cyber, virtual, online, technology, non-classroom-based, distance learning, digital learning and blended learning.[1] Our analysis of bills targets new, revised or revoked programs specific to K-12 virtual education. The comprehensive analysis of bills provides a richer understanding of how legislators are promoting, revising and curbing evolving virtual school models as compared to previous years. In addition, the analysis over the past five legislative sessions has allowed us to track whether legislative trends are moving closer to or further from core recommendations advanced in this NEPC report series.

Our exhaustive analysis of bills for the 2017 and 2018 legislative sessions yielded the following: In 2017, 85 bills were considered in 34 states; 28 were enacted, 54 failed and 4 are pending (see Appendix A, which provides a comprehensive listing as well as summaries of relevant bills). In 2018, 42 bills were considered in 23 states; 17 were enacted, 19 failed and 6 are pending. In total, 32% of bills proposed in 2017 and 40% of bills proposed in 2018 were enacted. The raw number of bills introduced has decreased compared to previous years,[2] especially in 2018 where we tracked a significant drop. However the substantive focus on specific themes has remained consistent compared to our previous analysis of 2015 and 2016 bills (outlined in more detail below).

The marked decrease in legislative activity might be explained by policy, practice, and political factors that have emerged as virtual schooling continues to evolve. This activity may be related to continued legislative efforts in some states to establish task forces and commissions that are charged with studying the challenges of operating virtual school models, including governance, accountability, and funding (outlined below and in previous NEPC reports). Also, recent empirical research continues to highlight how academic performance of virtual school students is "significantly negative and large" compared to students in brick and mortar traditional and charter schools.[3] In addition, charter school advocacy associations including the National Association of Charter School Authorizers and the National Alliance for Public Charter Schools have expressed concern about virtual charter school accountability issues and the poor student achievement of virtual school students, and recently issued a report that advances recommendations to legislators aimed at increasing accountability of virtual school operations.[4] Collectively, these recent activities may be influencing a decrease in legislative activity; however, the precise reason for the slowdown is

not evident.

In 2017, 34 states considered legislation and 20 states enacted at least one bill. Much of the legislative activity on virtual schools occurred within a relatively small number of states: Pennsylvania (10), Oklahoma (7), Florida (7), Texas (5), Oregon (4), and Arkansas (4). In 2018, 23 states considered legislation and 13 states enacted at least one bill. Most of the legislative activity on virtual schools occurred in Michigan (4), Missouri (3), Oklahoma (3), and Virginia (3).

As in previous years, proposed legislation ranged from narrow to sweeping. However, three prevailing trends in the foci of bills persisted in this new analysis. In both the 2017 and 2018 legislative sessions a significant amount of legislation focused on pilot programs, task forces, oversight commissions, and state boards to study and oversee the development of virtual schools. There was also an increase in the number of bills focused on virtual school funding issues, where most bills proposed a reduction in funding. Lastly, there was a continued focus on student data privacy issues.

In 2017, 10 states proposed 13 bills on pilot programs, task forces, oversight commissions and state boards to study and oversee the development of virtual schools and their implications (AR, FL, CT, KY, MO, OR, TX, NY, PA, WV) and in 2018 nine states proposed nine similar bills (CT, KS, MO, NM, OK, UT, PA, VA, WI).[5] For example, the legislature in Pennsylvania proposed four bills in 2017 and 2018 (PA S670, PA S766, PA H2514 and PA S806) that called for the establishment of commissions or task forces to conduct studies related to cyber school finances, the actual cost of educating a cyber charter school student, cyber charter governance and accountability, and cyber charter student achievement. One bill (PA S670) also proposed a moratorium on cyber schools while the study was being conducted and results were reviewed by the legislature. None of these bills were enacted. Similarly, in Oregon (OR H2720) proposed that the Department of Education conduct a comprehensive study of virtual schools, including an assessment of student achievement, governance, and financial relationships between virtual schools and their sponsor, and an assessment of best practices in other states. The bill failed. Of the 23 total bills proposed in this domain across all states, seven were enacted, 13 failed, and two are pending.

Finance and accountability were also a continued significant foci for legislation in 2017 and 2018, consistent with legislative trends in previous years. In 2017, 11 bills were introduced in eight states (FL, KS, MO, MI, NH, NM, OH, OK) and in 2018, six bills were introduced in six states (CO GA, LA, MO, MI, NJ), aimed at reducing or limiting virtual school per-pupil resource allocations.[6] For example, in New Mexico (NM H454) the legislature proposed a 25% reduction in state equalization aid for virtual charter schools. Similarly, in Oklahoma (OK S101) the legislature proposed a 24% reduction in state aid for full-time virtual charter schools. Both bills failed. Of the 20 total bills proposed in this domain across all states, 4 were enacted, 12 failed, and 4 are pending. In a related domain, five bills aimed at limiting profiteering by virtual school operators were proposed in five states in 2017 (CA, IN, FL, MN, PA).[7] One bill was enacted, four failed and one is pending. In 2018, only one bill aimed at eliminating profiteering was proposed in California (CA H407). The bill restricts for-profit companies who petition for a charter after July 1, 2019, from operating or managing any new charter school.

Lastly, a significant amount of proposed legislation calling for protection of students' online data continued in the 2017 and 2018 legislative session. Student privacy protections are an important factor in the growth and development of online learning. Depending on how legislation is written and implemented, it may either inhibit the sector's growth by limiting vendors' ability to use student data or promote the sector's growth by effectively allaying parents' anxiety. In 2017, 12 bills were proposed in 12 states (AZ, GA, IL, MN, NE, NH, NJ, NY, PA, TX, UT, VA) and in 2018, four bills were proposed in four states (CT, HI, IA, MO).[8] The bills aimed at preventing online product providers who contract with districts or states from selling, renting, or disclosing student information and identifiers; prohibiting Internet providers and online product providers from using student tracking information for targeted advertising to students; and requiring districts to develop security protocols linked to recordkeeping and maintenance of student records. Across 2017 and 2018, eight bills were enacted: Seven bills failed and one is pending.

Two charts in Appendix A highlight the main themes covered by select bills addressing the three policy areas of finance and governance, instructional quality, and teacher quality. Analysis of the substance of select bills is integrated into the following sections with a focus on states exhibiting significant legislative activity and bills that address the three policy areas. Each section concludes with an assessment of how legislative developments during the past five years have moved policy closer to or further from addressing the critical policy issues outlined in our recommendations.

Finance and Governance

Our analysis reveals that legislatures continue to advance bills proposing task forces and oversight boards charged with overseeing the implementation challenges raised by virtual schools. Despite increased attempts to improve oversight and accountability of virtual schools by identifying funding, governance and accountability mechanisms that would allow better control, such improvements continue to challenge policymakers and practitioners. Also, there is limited evidence that reveals how and whether legislatures have attempted to adjust regulations overseeing virtual schools based on the findings and recommendations of past task forces, state studies and empirical research. However, there is substantive evidence that shows how state audits and legal challenges have revealed important challenges of operating virtual schools, which have led to legislative changes aimed at addressing accountability and governance structures, and also curbing the operation of for-profit virtual schools. These types of actions are evidenced in recent virtual school controversies in California and Ohio. In later sections we will detail how California curbed the operations of for-profit charter schools after a State Attorney General's report found dubious reporting of student attendance and illegal financing schemes that misused public funding (highlighted in our previous report). Also, in Ohio, a recent audit of the ECOT virtual school, the state's largest virtual charter which had over reported its enrollment over 9,000 students, resulted in the school's closing and calls from both state and federal legislators to address accountability, governance and funding mechanisms for virtual charter schools.

Table 1.1 reintroduces the policy issues, assumptions and empirical questions related to virtual school finance and governance. Below, we update earlier information based on new research and introduce policy issues that have surfaced since the 2017 report.

Table 1.1 Finance and Governance Questions for Virtual Schools

Policy Problem	Assumptions	Empirical Questions
Linking funding to actual costs	Lower staffing and facilities costs outweigh higher costs associated with content acquisition and technology.	What are the costs associated with virtual schools and their various components? How do the costs change over time? How are costs affected by different student characteristics and contextual factors? What are the implications for weights and adjustments?
Identifying accountability structures	Existing accountability structures provide sufficient oversight of virtual school governance and instructional delivery.	What forms of alternative financial reporting might be useful to policymakers in monitoring the performance of virtual schools?
Delineating enrollment boundaries and funding responsibilities	School choice with open enrollment zones will increase competition and access to higher quality schools.	Are local district educators or state officials best suited to oversee virtual school operations? Who should ultimately be responsible for funding virtual students? How might state-centered vs. local funding lead to a more stable source of revenue?
Limiting profiteering by EMOs	Diverse educational management and instructional services providers will increase efficiency and effectiveness of virtual instruction.	How much profit are for-profit EMOs earning through the operation of virtual schools? What is the relationship between profits and quality instruction?

Linking Funding to Actual Costs of Virtual Schools

Policy debates persist in some states over how to fund full-time virtual schools, both because of cost differences between virtual and traditional brick-and-mortar schools and because of other policy considerations. Developing a comprehensive formula would involve gathering sound and complete data on virtual schools' costs and expenditures related to governance, program offerings, types of students served, operational costs, student-teacher ratios and other factors. As in previous reports we again highlight the work of Baker and Bathon (2013)[9] who developed a comprehensive methodology for estimating the actual costs of virtual schools. This research eclipses the limited recommendations made by other recent reports that have attempted to define a process for costing out virtual schooling.[10] Specifi-

cally, Baker and Bathon outline how costs in virtual schools vary widely compared to those in brick-and-mortar schools. For example, virtual schools have lower costs associated with teacher salaries and benefits, facilities and maintenance, transportation, food service, and other in-person services than their brick-and-mortar counterparts. However, virtual schools may have higher costs linked to acquiring, developing and providing the digital instruction and materials necessary for full-time virtual instruction; they also need to acquire and maintain necessary technological infrastructure. As yet, no state has implemented a comprehensive formula that ties funding allocation directly to virtual schools' actual costs and operating expenditures, despite attempts in many states to propose legislation that attempts to curb or limit funding. But new evidence shows states engaging in a more methodical approach to measuring cost differentials between virtual and traditional schooling models in the legislative directives outlined for task forces and state studies; such efforts could directly inform policymakers. In addition, charter school advocates have increased pressure by calling for state legislatures to increase accountability demands on virtual charters, including a call for legislatures to align per-pupil funding allocations with the actual costs of educating virtual school students.[11]

Activity in 2017 and 2018, as in previous years, shows that legislation has been introduced—and in some instances enacted—that revises virtual school funding; in addition, new task forces and oversight committees have begun to study cost differentials. These activities suggest sustained attention by state policymakers on virtual school funding as an area requiring serious consideration. For example, in Pennsylvania, the legislature proposed bills calling for two committees and studies: Charter School Funding Advisory Committee (PA S806) and the Legislative Budget and Finance Committee Study (PA S670).[12] Specific to funding related issues, PA S670 called for a study that reviews "all aspects of the funding, operation and performance of all cyber charter schools in this Commonwealth in addition to examining whether approving more cyber charter schools may have an impact on existing cyber charters."[13] The bill goes further and calls for a moratorium on the approval of new cyber charters for an 18-month period after the completion of the study, in order to allow time for the General Assembly of the legislature to review the study and take appropriate action. The bill failed in June 2017, but one month thereafter the senate introduced a new bill that included the development of the Charter School Funding Advisory Committee (PA S806) charged with examining all laws and regulations pertaining to charter school funding. The bill provides specific instructions to study the process by which cyber charters are funded and assess the actual costs of funding a cyber charter student, the cost of operations, facilities and management, and special education. The comprehensive instructions and charge to engage in an investigation of cyber charter funding and other accountability mechanisms, are consistent with recommendations advanced by the Pennsylvania Auditor General in previous performance audit reports,[14] who has continually recommended developing systems to increase accountability on cyber charter operations and eliminate incentives that encourage profiteering by for-profit cyber charter management companies.[15] In 2017 and 2018 the Pennsylvania legislature proposed 12 bills linked with cyber charter schools (more than any other state); none of the bills were enacted.

In New Mexico, reports from recent commissions[16] have led to increased scrutiny of virtual charter school operations and prompted additional audits and reports that have led

to a school closure.[17] The most recent report from the Legislative Education Study Committee builds on previous findings and makes explicit recommendations to the legislature, including: "Developing a scale adjustment factor that reduces formula funding for virtual charter schools due to lower staffing and plant operations and maintenance costs compared with brick-and-mortar schools, or an alternative funding mechanism for virtual charter schools."[18] This and other recommendations were included in NM S26 which requests that the Legislative Education Study Committee together with the Public Education Department form a Virtual Charter School Work Group that will study alternative funding mechanisms for virtual charters in addition to other accountability elements. The bill failed.

Active legislation specific to revising virtual school funding was a trend consistent with developments in previous years. Kansas (S19) enacted an extension in its reduction of funding for half-time virtual students beyond the 2016-17 academic year to the previously set reduction, from $4,045 per half-time virtual pupil to $1,700. Georgia (GA H787) enacted a bill where state charter special schools that offer virtual instruction (charters authorized by the State Department of Education) are now eligible for only 25% of the state-wide average total capital revenue per full-time equivalent, while brick-and-mortar charter schools are eligible for full statewide average total capital revenue.

Attempts to curb funding failed in several states. In Louisiana (LA S95) the legislature attempted to reduce virtual charter school funding provided through the minimum foundation program by 25%. In Oklahoma (OK S915) there was a proposal to reduce the calculation of state aid for full-time virtual schools by 25%. In New Mexico, two bills proposed funding cuts for virtual schools, including a 25% reduction in specific categorical funds (NM H454) and a 25% reduction in state equalization aid (NM S305). Two bills aimed to reduce virtual school funding were also proposed in Michigan. The first bill (MH S217) was proposed in 2017 and failed, then a second bill with similar language was proposed in the 2018 legislative session, and also failed. Both bills proposed a 20% reduction in per-pupil funding based on the state foundation allowance for cyber charter schools after their second year of operation.

We are beginning to see states like New Mexico draw on evidence resulting from their own state studies, in addition to evidence emerging from research studies, as justification for attempts to reduce or align virtual school funding based on real costs. However, little evidence exists that such considerations are used in other state decisions. Absent a wider empirical accounting of real costs associated with operating a virtual school, the legislative attempts to reconcile appropriate funding for virtual schools will continue to be fueled more by political motivation than by reliable evidence.

Identifying Accountability Structures

Accountability challenges linked to virtual schools include designing and implementing governance structures capable of accounting for expenditures and practices that directly benefit students. For example, it is important to have oversight for costs and the quality of staff, materials and instructional programs— including technological infrastructure, digital learning materials, paraprofessional services, and third-party curriculum. Oversight of other areas,

such as student attendance and learning transcripts, is necessary to identify and evaluate instructional time and outcomes.

Below, we outline how other states are attempting to address accountability challenges related to virtual school governance as well as limits on and boundaries for virtual school enrollments.

Governance: Several states focused on increasing accountability and oversight of operations unique to virtual schooling. For example, in Oklahoma (OK H1693) the state Board of Education is charged with developing alternative metrics and multimeasures of accountability unique to the virtual school model. In Indiana (IN H1001) virtual schools are now required to submit annual reports that include class size and ratio of teachers per classroom, as well as number of student-teacher meetings conducted in-person or by video conference. In Kentucky (KY H523) the legislature established the Digital Learning and Workforce Development Pilot Project that is tasked with identifying the new program's purposes, governance requirements, and student eligibility. The bill also limits expansion by permitting the authorization of only two new virtual school programs per academic year. And in Idaho (ID H279), new requirements for the process of starting or converting a new virtual charter school were implemented, including comprehensive accountability requirements linked to governance, teaching and learning mechanisms, teacher development, teacher-student interaction, and verification of student attendance. All four bills were enacted in their respective states.

A focus on who can authorize virtual charters and the specific accountability conditions that must be met by potential authorizers were considered in other states. For example, in Missouri (MO S360), district-level authorization would be limited to an accredited school district or charter school with a state annual performance report score of 70% or greater. In New Mexico (NM H454), new virtual charter schools cannot be authorized by a local school district, and existing virtual charter schools serving students outside their district boundaries would be required to renew their charters with the state commissioner. In addition, the bill proposed that virtual charter schools would be placed on probation if they do not meet at least a 35% of total possible points in annual student growth factors over three consecutive years. And lastly, in Colorado (CO S70), the legislature attempted to build on recommendations from the Online Education Task Force report[19] (whose charge was outlined in previously enacted bills). The new bill proposed that after January 1, 2018, the state Department of Education would no longer be the authorizer of multidistrict virtual schools, and instead authorizers could include "a school district, a group of school districts, board cooperative services, or the state charter school instate."[20] The bill would also require the Division of Online Learning to oversee a data collection effort to inform the new authorization process, including data on the operations of multidistrict authorizers, best practices in the field, and academic research on online education. All three bills failed in their respective states.

Enrollment limits and boundaries: Monitoring which virtual schools provide education services, and to which students, requires delineating enrollment zones and addressing capacity issues. Careful enrollment audits are also necessary to ensure that a student's resident district is forwarding appropriate local and state per-pupil allocations to a virtual school. Several bills in this analysis address these issues.

In Pennsylvania, two bills reintroduced provisions that attempted to address funding for cyber charter students who enroll in schools outside their resident district.[21] The first bill (PA H935) proposed that students who elect to attend a cyber charter outside their resident district, when a cyber charter already operates within their resident district, would not be eligible to receive Commonwealth or district funding and would be charged tuition. Another bill (PA H184) proposed that the Commonwealth provide funding for a virtual school student only if they attended a school district-sponsored virtual program, but would require parents to pay tuition if the student elected to enroll in a cyber charter school. Both bills failed.

Additional accountability and oversight issues complicated by enrollment boundaries surfaced in other bills. For example, in Arizona (AS H2077), attempts to preserve "academic integrity of pupils who participate in online instruction and allows a school district to challenge student examinations if not properly proctored by online school or online provider."[22] Specifically, if the resident district could determine that an exam was not properly proctored, it could require that the test be re-administered under appropriate proctoring protocols at the resident district. In California (CA A2011), a bill proposed lifting existing geographical restrictions for students attending a non-classroom-based charter school (virtual charter school). Existing law limits virtual schools enrollment from the county in which a virtual school operates and counties which share a contiguous border with the home county. Both bills failed.

The bills outlined in this section offer examples of attempts to slow or control the scaling-up of virtual schools while policymakers examine the issues virtual schools are raising, consistent with our report's recommendations. Overall, our analysis indicates that efforts to study virtual school governance issues in order to inform policy changes via task forces or commissions are becoming more common across several states. Charged with identifying best practices for governance and delivery of online instruction, the publicly funded task forces and commissions may yield important information for policymakers and practitioners. We will continue to monitor and highlight developments in our future reports.

Eliminating Profiteering by Education Management Organizations

In 2017 and 2018, legislators in several states responded to the complicated accountability issues and public controversies linked to for-profit education management organizations (EMOs) providing products and services to virtual schools—including software and curriculum, instructional delivery, school management, and governance. Virtual schools that have contracts with for-profit EMOs operated 28.9% of all virtual schools and served 63.9% percent of full-time virtual school student population.[23] K12 Inc. continues to be the largest of the for-profit virtual school providers, operating 72 schools and serving approximately 97,969 students in 2017-18—more than 31.8% of the estimated 308,437 full-time virtual school students in the U.S.[24] K12 Inc. profits in 2018 were a net $46.4 million and total revenues of $917.7 million[25], and profits in 2017 were a net $46.4 million and total revenues of $888.5 million,[26] compared to 2016 net profit of $21 million and total revenues of $872 million.[27]

Audits conducted by state legislative analyst offices and auditor generals, either mandated

by law or prompted by public calls for accountability, have uncovered important governance challenges in the for–profit virtual school sector. In previous reports we highlighted recent audits and the legal and policy challenges that ensued after results were consider by both policymakers and law enforcement. For example, the ongoing audits by the Auditor General of Pennsylvania have resulted in several school closures and criminal convictions of former cyber school operators.[28] In California, the State Attorney General's investigation of the California Virtual Academies (CAVA) operated by K12Inc. resulted in a legal settlement that required CAVA schools to return nearly $2 million dollars in taxpayers' funds to the state.[29] In the wake of the scandal, California enacted CA S406 in 2017, a bill that restricts for-profit companies who petition for a charter after July 1, 2019, from operating or managing any new charter school. The common thread in these widely reported audits and investigations is the lack of adequate accountability structures linked to how virtual schools account for instructional seat time and report student enrollment, which are used to calculate local and state funding for virtual school students. The slack accountability and perverse motivation of for-profit virtual school operators to capitalize on minimal state oversight has encouraged the profiteering that has resulted in these cases.

The latest in this string of cases is in Ohio and, like the other cases outlined above, the controversy centers around the electronic student seat time and enrollment accounting systems, known as login records. In September of 2016, the Ohio Department of Education completed an attendance audit of 13 e-schools (virtual schools) in Ohio, of which nine had over-reported enrollment.[30] The largest of these schools was the Electronic Classroom of Tomorrow (ECOT) virtual school, which had reported a full time equivalency (FTE) of over 15,322 students to the state.[31] However, the Department of Education attendance audit revealed that ECOT had over-reported their FTE by more than 9,000 students. All nine e-schools that were found to have over-reported enrollment appealed the attendance audit results. In October of 2016, the Department of Education sought repayment from the nine schools amounting to a collective $83 million dollars: The ECOT portion was more than $60 million.[32] The discrepancies discovered in the enrollment audits also triggered an additional audit in 2017, and in March of 2017, the Ohio Auditor of State began its own extended audit of ECOT and other e-schools in Ohio. Then in September of 2017, the Department of Education completed their 2016-17 academic year enrollment audit of ECOT and again found over-reporting of enrollment and ordered the school to pay an additional $19.2 million.[33] The Ohio Supreme Court agreed in September 2017 to hear the ECOT appeal, but in January of 2018, the ECOT School Board voted to close the school, stating that it was it was unable to pay the $80 million ordered by the Ohio Department of Education.[34]

The enrollment reporting dispute hinges on over-reporting of learning activities that the Ohio Department of Education permits to be counted as daily attendance, which includes "documented durational time for Internet and/or computer-based learning opportunities as non-classroom, non-computer-based learning opportunities."[35] In the ECOT case, the enrollment audit discovered that most students logged on for only one hour per day,[36] yet school administrators grossly over-reported daily hours engaged in learning activities in students' logs. The Ohio Auditor of State released its audit results of the 2016-17 academic year in May 2018, and echoed the Department of Education's earlier findings that ECOT administrators had over-reported enrollment. In the audit the state auditor firmly stated:

> Our auditors documented that ECOT officials had the ability to provide honest, accurate information to the state and they chose not to…by withholding information, ECOT misled state regulators at the Department of Education, and ECOT was paid based on that information. I believe this may rise to a criminal act.[37]

The state auditor also scolded the Department of Education for its incompetence in holding ECOT accountable and not requiring proof that students were actually engaged in learning, yet continuing to pay ECOT for 81.5 percent of its funding requests.[38] Lastly, the state auditor declared that "the department of education cannot be trusted to fix these problems. The General Assembly needs to act because what is happening remains unacceptable."[39]

The multiple audit findings prompted United States Senator from Ohio, Sherrod Brown, to urge the U.S. Department of Education Inspector General to investigate ECOT and seek repayment of $130 million in federal funds that had been paid to ECOT, as well as investigate the entire for-profit charter school industry.[40] He also expressed support of the Ohio Auditor of State's referral for criminal investigation of ECOT to the U.S. Attorney's Office for the Southern District of Ohio. Then in August, 2018, Senator Brown introduced federal legislation that would direct the U.S. Treasury Department to return any federal funds that might be recovered from ECOT to the school districts in Ohio that originally forwarded per-pupil funds.[41] Finally, Senator Brown urged the U.S. General Accountability Office (GAO) to investigate "policies and practices related to student experiences and outcomes in full-time virtual charter elementary and secondary schools."[42]

In 2018, new legislation proposed adjustments to the slack accountability issues that surfaced in the Ohio e-school audits. A bill that came to be known as the e-school safe harbor bill (OH H87) was enacted, which protects existing e-schools that are required to absorb thousands of displaced ECOT students from potential negative consequences associated with sudden enrollment increases. Specifically, e-schools whose enrollment increased by more than 20% in 2017-18 are exempt from counting the displaced students in their performance ratings for two years, in addition to not accounting for displaced student test scores if the school were to be subject to closing after three consecutive years of failing performance. The bill also ordered the superintendent of public instruction to establish standards for learning management software used by e-schools. A complimentary bill (OH S216) ordered the superintendent of public instruction to address the process by which to determine full-time equivalency for student enrollment, define student attendance, and define engagement in e-schools, including: documentation of online learning; idle time; educational and non-educational; participation; classroom. Lastly, the Ohio Auditor of State released an additional report in December of 2018 in which he recommended that a new system of funding e-schools be developed by the state.[43]

Other states also engaged the challenge of profiteering and advanced several legislative proposals. For example, Indiana (IN H 1382) enacted legislation similar to Ohio, calling for the adoption of a state student engagement policy for virtual charter schools. Virtual charter school governing boards are now required to adopt student enrollment policies that define attendance and the instructional activities that are counted as student engagement, including: online logins to curriculum or programs offered by the virtual charter school; offline

activities; completed assignments; testing; face-to-face communications with virtual charter school staff or service providers; meetings with virtual charter school staff or service providers via teleconference, videoconference email, text or phone.[44]

Other states attempted to curb profiteering by focusing on virtual school governance structures and explicitly defining financial and other conflicts of interest for administrators and governing board members. In Pennsylvania (PA H 97) a charter school administrator would be prohibited from receiving compensation from another charter school or an educational management service provider. In addition, no administrator or immediate family member could serve as a voting member on a charter school board of trustees, or participate in awarding a contract if a person has a conflict of interest. Another bill (PA S670) would explicitly prohibit a member of a charter school board of trustees from receiving payment for facilities lease arrangements between a charter school and a lessor. These bills reflect the recommendations of the Auditor General of Pennsylvania reports and attempt to address the profiteering that has been well documented and criminally prosecuted in Pennsylvania.[45] Both bills failed.

Legislative proposals aimed at curbing profiteering by for-profit virtual charter school operators have yet to resolve the needed accountability structures to disincentivize operators from capitalizing on their virtual school operation. Yet efforts by other state officials have shown some success. The actions of the state auditor in Ohio coupled with the resulting legislative action in 2018, as well as legislative proposals in other states, are consistent with our recommendation calling for policy or other actions by public officials to ensure that for-profit virtual schools do not prioritize profit over student performance.

Recommendations

While it is evident that some states have engaged in efforts to address the important finance and governance challenges of operating virtual schools, additional research is needed to identify funding and governance practices that will increase accountability, identify efficient and cost-effective best practices, and eliminate profiteering. Given the evidence detailed above, we reiterate our recommendations from previous reports.

Specifically, we recommend that policymakers and educational leaders:

- Develop new funding formulas based on the actual costs of operating virtual schools.
- Develop new accountability structures for virtual schools, calculate the revenue needed to sustain such structures, and provide adequate support for them.
- Establish geographic boundaries and manageable enrollment zones for virtual schools by implementing state-centered funding and accountability systems.
- Develop guidelines and governance mechanisms to ensure that virtual schools do not prioritize profit over student performance.

Instructional Program Quality

The previous reports on virtual schools in the United States asserted that accountability procedures for virtual schools must address not only their unique organizational models but also their instructional methods. Quality of content, quality and quantity of instruction, and quality of student achievement are all important aspects of program quality.[46] Here, we again review and update our earlier assertions. Table 1.2 reintroduces issues, assumptions and questions relevant to instructional quality.

Table 1.1 Instructional Program Quality Questions for Schools

Policy Problem	Assumptions	Empirical Questions
Requiring high-quality curricula	Course content offered through online curricula is an effective means for meeting individualized education goals.	How is the quality of course content best evaluated? How will the Common Core impact virtual school content and instruction?
Ensuring both quality and quantity of instruction	Instructional seat time is not an accurate measure of learning.	What is the best method of determining learning? What learning-related factors are different in an online environment? Should outcomes beyond subject-matter mastery be assessed?
Tracking and assessing student achievement	Students in virtual schools perform equal to or better than traditional peers and existing empirical work has adequately measured student achievement. Modest gains can be taken to scale.	As some states move to student choice at the course level, what do they need to implement quality assurance from multiple providers? What are effective measures of student achievement? How does course content affect student achievement?

Evaluating the Quality of Curricula

Virtual instruction holds the promise of efficient, highly individualized instruction, reaching students who seek access to quality courses. Online education has been referred to as a "disruptive innovation"[47] and Clayton Christensen, who pioneered this concept, predicted that by 2018, half of all high school courses would be taken online.[48] Like many disruptive innovation promises before it, this prediction did not become reality. Based on legislative activity in 2017 and 2018, the disconnect in the online education industry between a growth explosion and a legislative gap only widened. Data available in 2016 shows 200,000 students were enrolled in virtual schools across 200 schools in 26 states,[49] while approximately four million students enrolled in one or more supplementary online courses each year.[50] Current data indicate that in the 2016-17 school year, 429 virtual schools in 27 states enrolled approximately 300,000 students; 76 percent of those students were enrolled in fully virtual charter schools.[51] Contrast that growth with only eight bills (and only five enacted)

in the 2017 and 2018 legislative sessions focusing on instructional program quality, and the gap becomes a chasm.

To comply with 21st century learning standards that require technological literacy, states range from requiring students to complete at least one online course, to requiring students to have an online "experience," and to encouraging schools to buy digital content rather than textbooks. However, the legislative scan indicated no new bills in this area in 2017 or 2018.

Yet, given the variability of digital materials and formats, authorizers face numerous challenges in effectively evaluating course quality and monitoring student learning. Because the online environment is flooded with content developed by various providers—ranging from large for-profit organizations to local districts—and in various formats—ranging from individual courses to full grade-level curricula—authorizers and parents often have difficulty ensuring quality content in the current, highly decentralized environment. While growth in the online industry may serve many students who currently lack access to required, remedial or advanced courses, it leaves states scrambling to understand the trends and to provide proper guidance and legislation. According to a study by the Center on Reinventing Public Education (CRPE),

> The primary approaches to regulating online charter quality relate to entry barriers and oversight. States restrict the number of online schools permitted, regulate teaching credentials and other inputs, and impose additional application and oversight requirements. Few state laws provide charter authorizers with guidance to ensure robust performance outcomes or instructional quality in the online environment.[52]

In 2015 and 2016, legislators devoted some attention to mandating requirements for monitoring quality curriculum and providers in online environments. Like curricula in traditional schools, online curricula should be aligned with a designated set of standards to ensure that students' individualized online learning experiences provide the information and skills policymakers deem essential. In fact, a 2015 report states, "All states have included specific language to require that online school curricula align with state standards and assessments. This may be in response to the fact that many online charter providers operate across many states with different learning standards."[53]

In the 2017 report, we noted that several states were starting to focus on creating clearinghouses of reviewed and approved online courses and providers. In fact, in the 2015 and 2016 sessions, legislators considered 11 bills (five enacted, five failed, one pending) regarding clearinghouses. However, the focus on clearinghouses and online courses was not sustained, as there were no bills in this area considered in 2017 and 2018.

Ensuring Quality and Quantity of Instruction

Trends relating to the quality and quantity of virtual instruction include: seat time, competency-based education, course-level enrollment, blended learning, dual enrollment, credit recovery, and remedial coursework. However, legislative activity in these areas dropped sig-

nificantly in 2017 and 2018.

Seat Time: The national focus on higher standards, particularly a greater emphasis on critical thinking and skills-driven content, is creating ripple-effect shifts in other facets of K-12 education—especially a shift away from time, based on the Carnegie Unit, as a measure of learning.[54] Some states have moved away from "seat time" as an appropriate indicator of student learning, recognizing that simply being at a designated site for a particular number of hours does not guarantee student learning.[55] In fact, the 2015 Mathematica study finds that "three-quarters (76 percent) of online charter schools include courses that are self-paced rather than tied to the calendar. One-third of online charter schools rely exclusively on self-paced courses. Consistent with the prevalence of self-paced courses, the instructional method used most frequently in online charter schools is individualized, student-driven independent study. Schools reported that teacher-guided synchronous discussion (that is, students and teachers participating in discussion at the same time) is the next most frequently used instructional method for all grades. Collaborative learning is used less frequently, and lectures are not used frequently in more than one-fourth of online charter schools at any grade level."[56] "In most online charter schools, synchronous instruction occupies less time than it does in conventional schools. The difference is dramatic: students in the typical online charter school have less synchronous instructional time in a week than students in a brick-and-mortar school have in a day."[57]

The Ohio Competency-Based Education Pilot embraces this shift away from the Carnegie Unit of time, instead granting students credit based on demonstrated mastery, not on the amount of time focused on a subject. See discussion in the following subheading on the results of the Ohio pilot project.

In 2017 and 2018, it appears that the focus on seat time as a measure of engagement to promote learning shifted to a measure of enrollment and student participation to determine which students should be funded in the virtual schools in which they were registered. States have struggled with how to define attendance; a few methods for determining which students are enrolled include:

- Enrollment status: Students meet enrollment requirements such as, in Ohio, logging in "at least once every 105 consecutive hours" or in North Carolina, showing activity "in the past 10 consecutive days."[58]

- Login time: Students meet attendance requirements based on time logged into the school software program. Idaho calculates attendance based on the time a "student logs between 8am and 10pm Monday through Friday."[59]

- Student participation and engagement: Students meet enrollment requirements through evidence of participation or work, which may include "teacher contact, submitting assignments, participating in webinars or discussion, or attending tutoring sessions."[60] For example, in Colorado, virtual schools can track attendance based on participation and completion of tasks.

- Parent or learning coach report: This method is often used in conjunction with other reporting tools. For example, in South Carolina, parents must verify the annual number of educational hours.

- Performance or class competition: Students "must show progress toward specific weekly performance targets."[61] "In Idaho, attendance can be submitted as a percentage of the instructional program completed over a timetable set by the school."[62]

In 2017, four states took up legislation regarding enrollment in virtual schools:

- Indiana enacted legislation (IN H1382) that requires virtual charter schools to adopt a student engagement policy and specifies that a student who regularly fails to participate in courses may be withdrawn from enrollment.
- Oklahoma enacted legislation (OK S244) that addresses the attendance issue by directing schools to maintain attendance records for enrolled students and defining circumstances for student absences. Furthermore, it requires schools to submit a report upon a student accumulating a certain number of absences. For this definition, instructional activities include but are not limited to online logins to curriculum or programs, offline activities, completed assignments, testing, or interactions with school staff or service.
- Arizona enacted legislation (AR H1627) that requires a teacher to note daily attendance or absence of each student. It also mandates that students physically attend a brick-and-mortar school to take state tests and assessments required for the particular course.
- Wisconsin failed to enact legislation (WI S30) that would eliminate the requirement that a virtual school ensure its teachers are available to provide a minimum number of hours of direct pupil instruction and would prohibit the governing body of a virtual school from allowing a student to enroll in the virtual school during a semester in which the student has had four or more unexcused absences.

In 2018, only two enacted bills, both in Ohio, addressed seat time as a measure of enrollment and participation. Ohio S216 directs the superintendent to define full-time equivalency for students in an online school to determine student attendance and engagement. Working in conjunction with Senate Bill 216, Ohio H87, requires the use of learning management software to track student enrollment. This software can be used to assess moneys returned as a result of an audit of enrollment records.

This shift from a focus on seat time to assess student learning versus to determine enrollment has had significant consequences. For example, in 2016, the Ohio Department of Education modified its funding mechanisms for virtual schools.

> Previously, the state allocated money to virtual schools based on school-reported enrollment numbers. Now the state will only allocate funding for students who have documented coursework for at least five hours a day, either by being logged in to the online platform for five hours or self-reporting independent work offline.[63]

This change in funding allocations caused one of the state's largest virtual schools, Electronic Classroom of Tomorrow, to close in January 2018 when it could not repay millions after overcounting enrollment.

Competency-Based Education: Affecting both traditional and virtual schools, competency-based education (alternately called proficiency-based learning) is another continuing trend and is closely tied to the issues of seat time and individualization. Competency-based education refers to evaluating learning based on content mastery rather than passage of time. Competency-based education is certainly not limited to virtual schools and, in many ways, it is a perfect partner for virtual schooling with its AI-driven "mass customization" of education via computer. According to the National Conference of State Legislatures, "students advance and move ahead on their lessons based on demonstration of mastery. In order for students to progress at a meaningful pace, schools and teachers provide differentiated instruction and support."[64] Further, the International Association for K-12 Online Learning (iNACOL) and Council of Chief State School Officers (CCSSO) offered the following definition of competency:

- "Students advance upon demonstrated mastery.
- Competencies include explicit, measurable, transferable learning objectives that empower students.
- Assessment is meaningful and a positive learning experience for students.
- Students receive rapid, differentiated support based on their individual learning needs.
- Learning outcomes emphasize competencies that include application and creation of knowledge along with the development of important skills and dispositions."[65]

While not limited to virtual schools, challenges posed with competency-based education include a lack of flexibility with funding systems, data systems that were not designed for competency-based learning, local and state policies that define how credit is awarded based on traditional approaches to learning, and student data privacy concerns.

A scan of legislative data for 2016 and 2017 indicates no activity focusing on competency-based education strictly in online schools. However, in 2017, four states enacted legislation focused on competency-based education in general K-12 education: establishing grants (MI HB4313), pilot programs (NV AB110, SC HB3969), or a reimbursement program for early graduation (UT SB34).[66]

In 2017, we reported on enacted legislation in Ohio (OH H64), which established a Competency-Based Education Pilot to award $2 million in funding for five sites to design and implement competency-based models, defined as emphasizing "achievement over enrollment and encourag[ing] school districts to adequately address the personalized learning needs of each of their students."[67] The pilot further states, "Instruction is tailored to students' current levels of knowledge and skills, and students are not constrained to progress at the same rates as their peers. Competency-based education allows for accelerated learning among students who master academic material quickly and provides additional instructional support time for students who need it."[68] The December 2018 final report on the pilot study indicates inconclusive results based on an inconsistency in implementation and measurement methodology across the sites. However, the report provides positive indicators while acknowledging the evidence is not definitive regarding impacts on student academic outcomes.[69]

In Maine, a 2018 study of student-centered learning, again not focused strictly on virtual schooling, defined as encompassing "competency-based progression, personalization, flexibility in where and when learning takes place, and facilitation of key skills and dispositions such as agency and ownership" resulted in contradictory conclusions, most notably that exposure to proficiency-based learning had a positive association with increased student achievement but negative association with SAT scores.[70] Furthermore, the experiment in Maine faced widespread school, parent and legislative revolt and was eventually rolled back.

> Across the state, districts struggled to define what "proficiency" meant and teachers struggled to explain to students how they would be graded. Those challenges, plus strong backlash from parents, caused the state to scrap the experiment earlier this year, allowing districts the choice to return to traditional diplomas."[71]

Course-Level Enrollment: The issues surrounding quality and quantity of instruction may become more complex before they become clearer. The U.S. Department of Education has confirmed that many traditional high schools across the country do not offer the breadth and depth of courses required for college preparation and admission. In April 2018, the US Department of Education Office for Civil Rights released its 2015-16 Civil Rights Data Collection (CRDC), indicating significant inequities in access to a robust set of high school courses. Nationwide, 55 percent of schools do not offer calculus; thus, 25 percent of students nationwide cannot take calculus at their local school. In fact, one in five high schools do not offer Algebra I or higher and one in four schools do not offer biology or higher. These trends have become more dire since the 2017 report. Further, many rural schools cannot offer a wide range of AP classes or world languages. Therefore, to fill such unacceptable gaps, traditional schools are turning to online providers and driving growth in course-level virtual enrollment. In fact, as stated above, approximately 4 million students annually enroll in one or more online supplementary courses. Research indicates that "enrollments in language courses have grown more significantly than any other subject offered among state virtual schools and now account for about 12 percent of all state virtual enrollments."[72]A scan in 2017 and 2018 shows only one state-enacted legislation regarding Course Access. In 2018, Missouri enacted Senate Bill 603 to create the Course Access and Virtual School Program, which enables K-12 students to enroll in online classes through state-approved providers at the cost of their school district. The bill is intended to expand course access options for students, especially in rural and low socioeconomic districts.

While some states have initiated efforts to maintain an online catalog of approved courses, as discussed above, companies have also risen to the challenge. For example, Excel*in*Ed advocates Course Access, which is a blueprint for legislation and programmatic elements that states can use to expand course offerings across in class, online, and blended environments from multiple providers. The policies offer students "expanded curricular opportunities and alternatives that met their unique preferences, schedules and needs."[73] One element necessary for Course Access is that

> the state (or state-approved entity, or a consortium of states with reciprocity agreements) should maintain a web-based catalog of multiple providers and courses that have been approved based on demonstrated alignment to state

> academic standards, adherence to national quality standards, and course effectiveness data.[74]

Currently, 10 states (Virginia, Georgia, Florida, Michigan, Minnesota, Missouri, Louisiana, Oklahoma, Texas and Utah) have authorized by law and implemented a State Course Access program. Wisconsin and Indiana have authorized but not fully implemented Course Access while Rhode Island and Arizona have implemented programs similar to Course Access.[75]

Further complicating the issues surrounding quality and quantity of instruction and the legislation that guides education, course-level enrollment is also connected to Education Savings Account (ESA) legislation. According to EdChoice,

> Education savings accounts allow parents to withdraw their children from public district or charter schools and receive a deposit of public funds into government-authorized savings accounts. Those funds can cover private school tuition and fees, online learning programs, private tutoring, educational therapies, community college costs, and other higher education expenses.[76]

Currently, five states (Arizona, Florida, Mississippi, North Carolina and Tennessee) have enacted ESA legislation, beginning with Arizona in 2011. In 2019, just fewer than 19,000 students in these five states are using ESA funds for education.[77]

Blended Learning: Colorado has defined blended learning as "more than [a] technology-rich educational environment. Rather, blended learning is an instructional delivery model that provides students some control over their learning, whether it be the time, path, pace, or pace of learning, promoting greater personalization providing for deeper application of knowledge, and expanding opportunities for all students."[78] In Arkansas, the definition of blended learning has been extended to include students not interacting in-person with a teacher but meeting online with teachers twice per week for synchronous lessons and online class discussions.[79] According to Education Elements, "successful blended learning occurs when technology and teaching inform each other."[80]

Perhaps the strongest advocacy of blended learning legislation is found in Colorado law (CO H1222), enacted in 2016, the "Empowering Digital Learning for All Act." The legislation increases the investment in supplemental online courses and blended learning support, and it designates the Colorado Empowered Learning (CEL) organization to develop and administer a statewide plan for implementation through support for districts, schools and students. As a component of blended learning, Colorado is advocating supplemental learning, which it defines as "courses provided through digital content, led by a licensed teacher, and provided to students who are enrolled in traditional schools."[81] According to CEL, students in Grades 6-12 now have access to more than 200 courses in areas such as Advanced Placement, credit recovery, and career and technical education. CEL reports 1,858 course enrollments in the 2017-18 school year and projects more than 2,400 course enrollment in 2018-19.[82]

The legislative scan indicates minimal legislative activity in 2017 and none in 2018: One enacted bill in Texas (TX H2442) relates to calculating the average daily attendance for students in blended programs that supplement classroom time with applied workforce learning opportunities, such as internships and apprenticeships; one pending bill in New York (NY

A2265) seeking recommendations regarding the establishment of a statewide online and blended learning program; and one failed bill in New Mexico (NM H454) that would have codified only synchronous instruction in grades kindergarten through five.

Dual Credit: The proliferation of virtual courses has created greater opportunities for students to earn dual credit for both high school graduation and college credit. The legislative scan for 2017 and 2018 found no bills focused on dual credit.

Credit Recovery and Remedial Coursework: For students who have failed courses or fallen behind for other reasons, including illness, lack of family stability, teen pregnancy, or previous substance abuse, the opportunity to make up high school credits in a non-traditional setting is critical to earning a diploma. Further, some colleges offer remedial coursework through online options for students who need to master high school concepts before tackling college-level work. However, providing avenues for credit recovery and remedial coursework did not drive the legislative agenda in 2017 or 2018 as no new bills were considered.

Tracking and Assessing Student Achievement

As assessment of student achievement moves from a time-based to a demonstrated mastery-based system, documenting student proficiency becomes a primary concern. Issues requiring policy attention stem from the flexibility inherent in online education and the need for consistent performance evaluations.

State and federal policies that increase demands for demonstrated student achievement make the flexibility of online options an especially important consideration. State legislation allowing students to choose single courses from multiple providers, or to remain enrolled at a traditional school while supplementing coursework through online providers, generates a significant challenge for monitoring student achievement. State accountability systems must evolve accordingly. Ways must be found, for example, to track the combined accomplishments of students who take advantage of multiple learning options in a variety of venues. Research questions that arise include how to track outcomes from such varied providers and how to assess the contribution of a specific course to student proficiency.[83]

Advocates and for-profit companies have claimed that students in virtual schools perform equal to or better than peers in traditional schools.[84] However, the limited studies on the topic indicate otherwise. See Table 2.1, *Summary of research related to the effectiveness of virtual schools*, of this report for more detail on study findings. For example, a 2011 Stanford University-based Center for Research on Education Outcomes (CREDO) study used a matched pair sampling methodology and found that students in virtual charters in Pennsylvania made smaller learning gains over time as compared to both their brick-and-mortar charter and traditional school counterparts.[85] The 2015 CREDO study, which currently remains the definitive analysis on the subject, is a comprehensive analysis of achievement for students in online charter schools, and is even more dire. The report finds that

> the majority of online charter students had far weaker academic growth in both math and reading compared to their traditional public school peers. To

> conceptualize this shortfall, it would equate to a student losing 72 days of learning in reading and 180 days in math, based on a 180-day school year.[86]

The Center for American Progress conducted a study, published in 2018, that compares the outcomes of for-profit virtual charter schools in Colorado, Idaho, Nevada, Ohio, and Pennsylvania against outcomes for other students in the same states. At a high level, the study found the following for for-profit virtual schools:[87]

- The for-profit virtual schools graduate about half their students, placing them among the lowest performing schools in their respective states.
- The for-profit schools underperform the state average for third-grade English language arts and eighth-grade math proficiency. "The difference between the scores varied significantly across the five states studied for this report – from 4 percent to 19 percent – but the trend was consistent."[88]
- Student academic growth at these schools was significantly below expectations.

However, even though the low performance of online school students suggests the need for stronger accountability, the trend in virtual schooling may be toward less state-level policy oversight. Even as more online course options are being incorporated, fewer states are changing policy to support the shift; schools and districts can easily contract with online providers outside of a policy framework.[89] Other factors further complicate efforts to measure student achievement. Consistent data have become more fragmented as states withdraw from common assessments, and parents are increasingly opting their children out of state testing.[90]

In 2017, five states addressed student achievement in virtual schools (one enacted, four failed). Idaho (ID H279) codified accountability requirements for opening a new virtual school to include governance, teaching and learning mechanisms, professional development, teacher-student interaction, and verification of student attendance. However, Minnesota (MN S1554) failed to enact legislation to establish an Online and Digital Learning Advisory Council that would have been charged with policy recommendations for online learning, including quality of online learning providers, effective use of technology, resources to assist parents in selecting enrollment options, methodology to personalize or differentiate learning for students, and professional development for teachers. Further, Mississippi (MS H216) failed to enact legislation that would require the state to establish a program to provide pre-kindergarten instruction via the Internet, including the daily delivery of real-time instruction. Oregon (OR H2720) failed to pass legislation that would have studied the success rates for students in virtual schools based on academic growth, graduation rates, test scores, or ranking systems. Finally, not limited to virtual schools, Pennsylvania (PA S670) failed to enact legislation relating to charter school applications, including measures for student academic performance.

In 2018, one failed bill in Oklahoma (OK S1291) referenced measuring the performance of virtual charter schools based on student assessments.

Interestingly, in 2018, while state legislators failed to address the quality of online schools, two US senators, Sherrod Brown and Patty Murray, requested that the Government Ac-

countability Office (GAO) review the policies and practices of full-time virtual schools. The letter expressed significant concerns regarding accountability, student outcomes. and funding in these schools and specifically asked the GAO to examine the following issues related to student achievement:

- Relationship between the growth rate of virtual schools and the recruitment procedures used, as well as the schools' academic performance
- Student outcomes including for subgroups of students
- Additional supports and accommodations available to subgroups of students
- Academic rigor of courses, including criteria for course credit, assignments, grade matriculation and graduation
- Measurement of attendance and participation[91]

The legislative scan indicated a minimal focus on enforcing quality standards for student achievement.

Recommendations

The legislative focus on digital learning—including but not limited to virtual schools—has decreased significantly in 2017 and 2018, certainly not keeping pace with the dynamic online education marketplace. Our overall legislative analysis indicates little continued progress over the past two years in proactively addressing issues related to instructional program quality. Based on the preceding analysis, we reiterate our recommendations from the previous reports and add a recommendation regarding defining seat time versus enrollment. Specifically, we recommend that policymakers and educational leaders:

- Require high-quality curricula, aligned with applicable state and district standards, and monitor changes to digital content.
- Develop a comprehensive system of formative and summative assessments of student achievement, shifting assessment from a focus on time- and place-related requirements to a focus on student mastery of curricular objectives.
- Assess the contributions of various providers to student achievement, and close virtual schools and programs that do not contribute to student growth.
- Implement a nationwide longitudinal study across multiple providers and with interim data checkpoints to assess the quality of the learning experience from the student perspective.
- Delineate the definitions of adequate seat time to ensure subject mastery versus the conflation of enrollment and participation for the purposes of funding.

High-Quality Teachers

As technology continues to become part of the fabric of everyday life, teachers and students in all contexts need to develop the skills required to effectively utilize digital tools and online resources.[92] One would be hard-pressed to find a school in which technology plays no role in student learning or instructional delivery. As a result, technology use has been generally accepted as a key competency for educators, and the preparation and ongoing professional development of teachers reflects a greater emphasis on integrating technology into instruction.[93] That said, the context of virtual schooling in which students and teachers are typically separated in time and place introduces unique issues and challenges related to teachers and teaching. We still know little about how to identify quality teachers in virtual contexts, how to recruit and retain them, how to evaluate their effectiveness, and how to provide ongoing support to promote best practices. In all of these areas, practice continues to outpace the available empirical evidence.

Our previous reports have identified several policy issues, assumptions, and empirical questions that need to be answered (see Table 1.3). In this section, we revisit those topics in light of new empirical evidence and recent policy developments. We conclude with a set of recommendations.

Table 1.3. Teacher Quality Questions for Virtual Schools

Policy Problem	Assumptions	Empirical Questions
Recruiting and training qualified teachers	Instructional training and professional support tailored to online instruction will help recruit and retain teachers. Effective teaching in a traditional environment easily translates to an online environment. Teacher preparation programs and district professional development programs will re-tool to support online instruction demands.	Can sufficient numbers of qualified online teachers be recruited and trained to ensure the ability of virtual education to offer new opportunities to rural or underserved populations? Which professional skills and certifications for online teachers are the same as for traditional teachers? Which are different? What professional development is relevant for online teachers?
Evaluating and retaining effective teachers	Evaluation of online teachers can mirror that of teachers in traditional settings. Online teachers can support a large roster of students.	How well do evaluation rubrics for traditional settings translate to an online environment? How much direct attention and time is necessary for a student to receive adequate instructional support? What are the implications for teaching load?

Recruiting and Training Qualified Teachers

Teachers play an important role in virtual schools, despite the heavy reliance on technology and individual pacing in those learning contexts.[94] As a 2017 Evergreen report notes,

"Online schools have innovated in a variety of ways, but in most cases they remain based on teacher-student interaction, and in some cases student-student interaction."[95] The 2016 National Education Association's *Guide to Teaching Online Courses* identifies ongoing teacher presence and communication between and among students, teachers, and parents as key components of an effective online education environment.[96]

Since most online courses delivered by state virtual schools are led by teachers, the continued expansion of online education will require ongoing attention to recruiting teachers who are prepared to teach effectively in virtual environments.[97] Currently, most state virtual schools are disproportionately staffed by part-time teachers. In a 2017 report, 17 of the 19 state virtual schools reporting data on teacher type indicated that they rely more on part-time than on full-time teachers. Eight programs reported that they employ no full-time teachers, exclusively using part-time instructors.[98]

Evidence on virtual schooling identifies some of the factors that influence teachers' decisions to work in virtual schools as well as factors that virtual school administrators prioritize when hiring teachers. Based on survey responses from 325 online teachers, a 2015 study found that teachers working in virtual schools "tend to be self-motivated, place a high value on learning and education, and enjoy the challenge and the process of using technology for teaching."[99] Another 2015 study comparing online charter schools to brick-and-mortar charter schools affiliated with a charter school management organization found that in both types of schools, the top hiring priority is teachers' "willingness to work hard in support of the school's mission." The second most important factor in virtual schools is applicants' certification status, while in brick-and-mortar charters it is performance on a sample lesson.[100] Given that all states require that most online teachers-of-record be certified,[101] this finding suggests that there may be an undersupply of certified teachers applying for jobs in virtual charter schools, a situation that may be forcing virtual school administrators to focus more on basic qualifications than on other criteria related to quality and effectiveness (for example, experience teaching online courses, performance teaching a sample class, or college grade point average). More evidence on the adequacy of the supply of virtual teachers is needed.

The limited supply of virtual teachers may explain a finding from a 2017 report that many virtual schools use the online teachers available through the organizations that supply online courses and digital content to schools. However, some school districts, particularly those in larger metropolitan areas, are increasingly managing these personnel issues in an effort to control costs and build the capacity of their own teachers and administrative staff in the use of instructional technology.[102]

Recent research on the nature of teachers' work in online schools underscores longstanding concerns about how well the requisite knowledge, skills, and dispositions needed for teaching in traditional brick-and-mortar classrooms transfer to virtual settings. A 2015 study reported that online charter school teachers' responsibilities are more heavily weighted toward providing individual attention to students (identifying struggling students and grading student work, for example) rather than other tasks like developing curricula, planning lessons, and providing direct instruction. Purchased curriculum packages reduce many conventional teaching responsibilities because courses tend to be pre-designed, self-paced,

and involve few if any lectures.[103] According to the study, teachers in online charter schools spend an average of six hours or fewer each week on synchronous instruction, and even this is highly variable, making it difficult to pin down the nature of teacher work in an online environment and the training and professional development needed to support that work.[104] Further, the study found that few teacher preparation programs offer instruction and training in the methods for online teaching, and even fewer offer student teaching placements in online instructional environments. There are some exceptions. For example, Michigan Virtual University works with teacher preparation programs in the state "to shape pre-service teacher coursework and field experiences so that new teachers have the skills, attitudes, and dispositions to serve within this growing field."[105] And recent research indicates modest growth in online field experiences for teacher education students nationally, but these opportunities remain limited.[106]

As a result, most of the virtual school teacher respondents reported that any training that they received occurred after graduation, and most of the learning occurred on the job.[107] Nationally, 92 percent of online charters reported that their teachers participated in professional development, with more than half reporting online synchronous professional development sessions at least monthly. In a 2017 study of professional experiences of online teachers in Wisconsin, all virtual school teachers reported participating in training or professional development; most preferred unstructured professional development like mentoring and online forums over structured activities like graduate courses and workshops.[108] Teachers indicated that the unstructured professional development opportunities allow them to take "ownership of their own learning,"[109] but whether these unstructured experiences are effective is an open question.

Virtual school principals also have surfaced as a group warranting attention from researchers and policymakers. Principals are key to school effectiveness, in their roles both as managers and as academic leaders who evaluate and provide professional development for teachers and staff. A 2015 study found that almost half of online charter school principals reported that they had no prior experience teaching in an online setting, which raises questions about their ability to evaluate and provide instructional support to teachers.[110] We know very little about the supply, recruitment, and preparation of virtual school administrators.

In our review of 2017-2018 legislation, we identified a number of bills intended to enhance the technological skills of teachers through preparation programs and ongoing professional development. However, consistent with our analyses in previous years, much of the legislative activity applied generally to teachers in all settings, not specifically to teachers in virtual schools.

One set of bills in the analysis of 2017 and 2018 legislation addressed teacher pre-service preparation and licensure requirements. Few of these bills focused on programs specific to teachers in online schools (for example, WI A64 and AR H1646); rather, most of the legislation related more generally to including technology expertise in all teacher preparation programs. For example, an enacted North Carolina bill (NC S599) adopted professional educator preparation standards that require teacher candidates to demonstrate their ability to use digital and other instructional technologies to provide high-quality, integrated digital teaching and learning to all students. The bill also required proficiency in digital teach-

ing and learning in the requirements for licensure renewal. Interestingly, a failed North Carolina bill (NC H898) proposed that the University of North Carolina educator preparation programs collaborate with an experienced provider to develop and implement a comprehensive professional development strategy for teachers and for students in UNC educator preparation programs for the use of technology and digital resources as teaching tools for K-12 students. A bill passed by the Texas legislature (TX S 1839) requires the preparation of public school educators to include digital and technology literacy. An enacted bill in Oklahoma (OK H1576) requires coursework or training in the use of digital and other instructional technologies as a requirement for teacher education program accreditation. Lawmakers have also considered policy proposals to require the integration of instructional technology into teaching internships. For example, a failed Florida bill (FL S656) would have required "specialized training in clinical supervision and clinical educator training that includes content-specific strategies for integrating media and emerging technologies." While these bills focus on the training of all teachers, a bill enacted in Wisconsin (WI A64) addressed licensure for virtual teachers specifically, requiring that the governing body of a virtual charter school shall assign an appropriately licensed teacher for each online course offered by the virtual charter school. In contrast, a bill enacted in Arkansas (AR H1646) specified that "a highly qualified teacher who delivers digital learning courses under this subchapter is not required to be licensed as a teacher or administrator by the state board, but must meet the minimum qualifications."

As in past years, much of the legislative activity related to teacher proficiency in using instructional technology focused on promoting ongoing professional development to improve teachers' technological skills. Only a handful of states (for example, DC, ID, KS, LA, NC, and TX) require specialized professional development for online teachers,[111] and the majority of the bills considered during the 2017 and 2018 legislative sessions applied to the general teacher population. The Nevada legislature enacted a bill (NV S476) that provides high-quality professional development for teachers to improve pupil outcomes through the use of digital teaching and learning technology. An enacted bill in Oklahoma (OK H1576) adopts procedures to include digital teaching and learning standards in teacher professional development requirements to enhance content delivery to students and improve student achievement. As noted above, the failed 2017 North Carolina bill (NC H 898) would have required a collaboration between the University of North Carolina educator preparation programs and an experienced provider, to develop and implement a comprehensive professional development strategy for teachers and for students in UNC educator preparation programs to use of technology and digital resources. A failed Minnesota bill (MN S1554) would have required the Online and Digital Learning Advisory Council to study and make recommendations on development and support of effective online teaching using high-quality digital curriculum. A failed West Virginia bill (WV H2199) proposed that teacher professional development should include not only training on digital literacy solutions, but also integration of the solutions within the teaching and learning environment with the goal of improving student achievement. Enacted Utah legislation (UT H11) designates a grant program to support the development of teachers' digital teaching competency.

A handful of 2017 and 2018 bills recognized the importance of professional development on instructional technology for administrators as well as teachers. For example, an enacted bill

in Wyoming (WY S35) provides training and technical assistance to school districts, "including professional development for teachers and school administrators, for the delivery of distance and virtual education, and requires the specification of minimum professional development requirements for teachers utilizing virtual education methods to instruct students." A pending bill in Michigan (MI S2174) requires the Michigan Virtual University to allocate up to $500,000 to support the expansion of new online and blended educator professional development programs for teachers and school administrators. A failed West Virginia bill (WV H2199) proposed that professional development be included for administrators and curriculum directors, covering topics such as the best practices of creation, management, distribution, and maintenance of digital content within school systems.

As in our earlier reports, our analysis of legislative activity found little progress toward establishing and implementing requirements for the preparation, certification, and ongoing professional development of teachers working in full-time virtual schools. While policy reports have made recommendations for online teacher education and licensure requirements,[112] most of the 2017 and 2018 state legislation aimed at enhancing teachers' abilities to effectively use instructional technology applied to all teachers—a reflection of the proliferation of education technology in all types of schools. While recent research demonstrates that the responsibilities of online teachers are different than those of traditional classroom teachers, more work is needed to understand the specific roles of teachers in virtual schools and the preparation they need to be effective there. The same holds true for virtual school administrators. We also need better information on the demand for, and supply of, state-certified teachers working in online environments. In the current context where demand appears to exceed supply, virtual schools are likely to prioritize credentials over quality in teacher hiring decisions.

Evaluating and Retaining Effective Teachers

The issues of teacher evaluation and retention continue to receive much attention in policy and research related to traditional brick-and-mortar schools. Our previous reports have recognized the challenges of using conventional, albeit imperfect, tools for teacher evaluation in virtual settings. Due to factors like asynchronous instruction, limited (if any) face-to-face time, and student self-pacing,[113] neither standards-based evaluation tools with established rubrics to guide observation and evaluation of teachers' classroom performance,[114] nor value-added measures based on students' growth in standardized test scores, translate well to full-time virtual schools. Existing evidence does, however, provide some indication of how virtual teachers are monitored and evaluated. Most virtual schools report that their teachers are observed by peers (58%), master teachers (59%), or administrators (93%) at least once each year, though it is not clear how these observations are conducted in an online setting. Further, administrator observation of teachers in online charter schools occurs less frequently than in brick-and-mortar charter schools.[115] Existing research still offers little guidance on how best to evaluate the performance of virtual teachers, and the 2017 and 2018 legislation sessions saw no new legislative activity related to teacher evaluation in virtual schools.

Likewise, our analysis of teacher retention reveals limited empirical evidence and little legislative activity. The literature on traditional classroom teachers reveals that teachers who are more satisfied with their working conditions are more likely to remain in them. As a result, in past reports much of our attention to retention issues focused on factors identified in the literature as related to teacher satisfaction in virtual schools. That said, researchers have identified "a critical need to determine the job satisfaction of K-12 online teachers and identify the factors that influence satisfaction or dissatisfaction as they related to the teachers' intent to remain in the field of online teaching."[116] One notable factor in online settings is class size, but recent evidence also identifies other elements of workload and conditions for success as relevant.[117] Evidence based on teachers in one virtual school identifies three key factors that contribute to teachers' job satisfaction: (1) flexibility in when, where, and how they teach; (2) time to interact and communicate with individual students; and (3) conditions and support required for teachers to have a positive influence on student performance.[118] Given these findings, it is not surprising that a Wisconsin study identified student perseverance and engagement as the most pressing challenges for online teachers.[119] Likewise, teachers in the California K12 Virtual Academies have raised serious concerns about student attendance. One teacher, for example, indicated that "only a fraction of her 75 or so students regularly attend class, and she has no way of knowing if the others watch her recorded lessons."[120] This evidence is related to a broader finding based on national data that virtual school instruction tends to involve a "limited number of live contact hours and a lean staffing model."[121]

Generally speaking, class size and working conditions for teachers in virtual schools are not receiving policymakers' attention. On average, online charter schools continue to have substantially higher student-teacher ratios than their brick-and-mortar counterparts. A 2015 study reported average pupil-teacher ratio in online charter schools as 30:1 compared to 20:1 in brick-and-mortar charter schools and 17:1 in traditional public schools.[122] Class sizes in online schools are highly variable, with averages of 39 students per class in online elementary schools, 60 per class in middle schools, and 71 per class in high schools. According to a 2015 report, only five states (AR, CA, MN, NC, and OH) had imposed class size restrictions on online charter schools, and only one state required individualized learning plans for all students in those schools.[123]

Teacher compensation may also be a relevant factor in retaining online teachers. A recent study reports that

> part-time or adjunct teachers in state virtual schools are typically paid on a per enrollment basis, generally ranging from about $130 to over $200 per enrollment, based on factors such as experience and type of course. Full-time teachers are typically paid in a similar way and on similar scales as teachers in the traditional schools in their state.[124] Compensation policies and practices could have an impact on the recruitment and retention of online teachers.

The only 2017-2018 legislative attention to issues surrounding attendance and regular contact between students and instructional staff was a bill enacted in Idaho (ID H279) that revises requirements for the process of starting or converting a new virtual charter school, including comprehensive accountability requirements linked to governance, teaching and

learning mechanisms, teacher development, teacher-student interaction, and verification of student attendance. With respect to class size, one recent bill in Mississippi (MS S2622) that was not passed by the legislature limited the total number of students taught by an individual teacher in academic core subjects at any time during the school year to 150; however, the bill indicated that "a teacher who provides instruction through intradistrict or interdistrict distance learning or supervises students taking virtual courses will be exempt from the 150-student limitation."

Taken together, our analysis reveals some evidence on how virtual school teachers are evaluated and a broader notion of the factors that may contribute to their satisfaction (and perhaps retention). However, more empirical evidence is needed to understand how these activities are actually carried out in virtual settings (for example, how a teaching observation is conducted) and to identify how various practices might promote improved student outcomes. Largely absent from recent legislative agendas were issues of teacher evaluation, working conditions, and retention.

Recommendations

Quality teachers are a critical factor in realizing the promise of virtual education to improve both the efficiency and the equity of public education by harnessing technology's potential to provide cost-effective, broad access to high-quality instruction. But based on our legislative analysis, we conclude that little progress has been made over the past two years on issues related to teacher quality in virtual contexts. Given the increasing recognition of instructional technology's potential benefits, state legislatures have considered a number of bills related to the importance of educating all teachers in the effective use of technology and online resources. A number of states have enacted bills related to initial certification and, to a greater extent, ongoing professional development in these areas. That said, little attention has been given to the unique challenges related to ensuring an adequate supply of high-quality teachers in virtual schools.

Given the information above, we reiterate our recommendations from last year's report. Specifically, we recommend that policymakers, educational leaders, and researchers work together to:

- Define certification training and relevant teacher licensure requirements specific to teaching responsibilities in virtual schools, and require research-based professional development to promote effective online teaching models.
- Address retention issues by developing guidelines for appropriate student-teacher ratios and attending to other working conditions (for example, student attendance) that may affect teachers' decisions about where to work.
- Work with emerging research to develop valid and comprehensive teacher evaluation rubrics that are specific to online teaching.
- Identify and maintain data on teachers and instructional staff that will allow educa-

tion leaders and policymakers to monitor staffing patterns and assess the quality and professional development needs of teachers in virtual schools.

- Examine the work and responsibilities of virtual school administrators and ensure that those hired for these roles are prepared with the knowledge and skills to be effective, particularly with respect to evaluating and supporting teachers and promoting best practices.

Notes and References Section III

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2 In 2016, 113 bills were considered in 37 states; 33 were enacted, 60 failed and 20 are pending. In 2015, 98 bills were considered in 28 states; 36 were enacted and 62 failed. In 2014, 131 bills were considered in 36 states; 38 were enacted, 62 failed (31 were pending at end of legislative session). In 2013, 127 bills were considered in 25 states; 29 were enacted, 7 failed (92 were pending at end of legislative session). In 2012, 128 bills were considered in 31 states; 41 were enacted and 87 failed.

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5 In 2016, 11 bills focusing on pilot programs, task forces, oversight commissions and state boards to study and oversee the development of virtual schools were introduced in 10 states (CO, MD, MS, MO, NJ, NM, OR, PA, SC, WV). Coupled with the nine similar bills proposed in 2015.

6 In 2016, 12 bills introduced in nine states (AL, KS, LA, LA, MI, MN, NJ, OR, NC, PA, PA, PA) were aimed at reducing or limiting virtual school per-pupil resource allocations (seven failed and five are pending).

7 In 2016, five bills proposed in five states (PA, GA, NC, ID, CA) aimed to limit profiteering by virtual school operators (three were adopted, one is pending and one failed).

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