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

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Foreword

Alex Molnar, Series Editor

Full-Time Virtual and Blended Schools: Enrollment, Student Characteristics, and Performance is the sixth in an annual series of NEPC reports on the fast-growing U.S virtual school sector. This year's report provides a comprehensive directory of the nation's full-time virtual and blended learning school providers. It also pulls together and assesses the available evidence on the performance of America's virtual and blended learning schools. It is intended as reference work for policymakers, educators, and the public.

Executive Summary

This sixth NEPC Annual Report on Virtual Education provides a detailed overview and inventory 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

i The authors wish to recognize Najat El Geberi, Fanny Hernandez and Kelly Ruder (all graduate students in the Evaluation, Measurement and Research program at Western Michigan University) who helped track missing data and update school contact information. We also thank Dr. Charisse Gulosino for contributing to the virtual school inventories in past years.

students in traditional public schools. In particular, school performance measures for both virtual and blended schools indicate that they are not as successful as traditional public schools. Nevertheless, enrollment growth has continued.

Compared to prior years, there has been a shift in source of growth, with more school districts opening their own virtual schools. However, these district-run schools have typically been small, with limited enrollment. Thus, while large virtual schools operated by for-profit education management organizations (EMOs) have lost considerable market share, they still dominate this sector.

This report provides a census of full-time virtual and blended schools. It also includes student demographics, state-specific school performance ratings, and—where possible—an analysis of school performance measures.

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

- In 2016-17, 429 full-time virtual schools enrolled 295,518 students, and 296 blended schools enrolled 116,716. Enrollments in virtual schools increased by 17,000 students between 2015-16 and 2016-17 and enrollments in blended learning schools increased by 80,000 during this same time period.
- Thirty-four states had full-time virtual schools and 29 states had blended schools. Four states had blended but no full-time virtual schools (Connecticut, Hawaii, New Jersey and Rhode Island). Nine states had virtual schools but no full-time blended learning schools. The number of states with virtual schools in 2016-17 is the same as in 2015-16, although there was an increase of eight states with full-time blended learning schools over the past two years.
- Virtual schools operated by for-profit EMOs were three times as large as other virtual schools. They enrolled an average of 1,288 students. In contrast, those operated by nonprofit EMOs enrolled an average of 407 students, and independent virtual schools (not affiliated with an EMO) enrolled an average of 411 students.
- Although private (profit and nonprofit) EMOs operated only 35.9% of full-time virtual schools, those schools enrolled 61.8% of all virtual school students.
- Just under half of all virtual schools in the inventory were charter schools, but together they accounted for 75.7% 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 30.4% and for-profit EMOs operated 22.6%. Nearly half (47%) of blended schools were independent. Blended schools operated by nonprofits were most numerous and substantially larger than others in the sector. Rocketship Education remained the largest nonprofit operator, with 16 schools that enrolled just over 7,700 students—almost 7% of all students in blended schools.

- Blended schools enrolled an average of 394 students, but blended schools managed by for-profit EMOs had a far larger average enrollment of 1,288. There were more charter blended schools (68.9%) than district blended schools (31.1%), and they had substantially larger average enrollments (456) than district blended schools (257).

Student Demographics

- Relative to national public school enrollment, virtual schools had substantially fewer minority students and fewer low-income students.
- Blended schools overall had a higher proportion of low-income students and of Hispanic students. Those operated by nonprofit EMOs enrolled a substantially higher proportion of low-income students than their counterparts.
- The proportion of special education students in virtual schools was close to the national average, while blended schools enrolled half as many children with disabilities (6.3%) relative to the national average (13.1%).
- Both virtual schools and blended schools enrolled relatively few English language learners (ELLs): 0.7% and 1.3% respectively, compared to the national average of 9.6%.
- While the population in the nation's public schools was split nearly evenly between females and males, virtual and blended schools enrolled more females—53.8% of virtual school enrollment and 50.7% of blended school enrollment.

Student-Teacher Ratio

- The average student-teacher ratio in the nation's public schools was 16 students per teacher. But virtual schools reported having close to three times as many students per teacher (45) compared to the national average, and blended schools reported having twice as many (32).

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 15 of the 38 states with virtual and/or blended schools. In total, 39% of virtual schools and 24% of blended schools had school performance ratings assigned to them.
- Virtual schools continued to underperform academically, including in comparison to blended schools, although the margins were much closer this year than last. Overall, 36.4% of full-time virtual schools and 43.1% of blended schools re-

ceived acceptable performance ratings.

- Among virtual schools, district-operated schools performed far better based on school performance ratings (53.8% acceptable) than charter-operated schools (20.7%).
- On-time graduation rate data were available for 247 full-time virtual schools and 152 blended schools. The graduation rates of 50.7% in virtual schools and 49.5% in blended schools fell far short of the national average of 83%.

The findings outlined in this report align with evidence from state auditors and new national studies by other organizations.

Recommendations

This report presents evidence that the lowest performing virtual and blended learning schools are excessively large schools and have high student-to-teacher ratios. To help ensure that poorly performing virtual and blended schools allocate more resources for instruction and improve student-teacher ratios, it is recommended that policymakers consider one or more of the following three measures.

- Specify a maximum student-teacher ratio for virtual and blended schools to ensure that all students receive adequate teacher support and attention.
- Specify that a proportion of public revenues be devoted to instructional costs, whenever staff in state education agencies believe they have sufficient insight into actual spending and sub-contracting practices.
- Require that teachers employed by virtual schools, and not parents, take primary responsibility for students' education. The widely practiced corporate model instead largely relies on the parent as teacher and provides contracted teachers with insufficient time to interact with students and to provide support for those who struggle or drift away.

Most virtual and blended school students are enrolled in schools operated by private EMOs and organized to maximize revenues and profit for their stockholders, owners, or executives. To help limit the involvement of private operators (both for-profit and nonprofit), it is recommended that policymakers take the following three steps.

- Require that public charter school boards be established before charter applications are submitted. If and when a charter is granted and an EMO is to be hired, require the board to consider multiple bids.
- Require charter authorizers and school district boards to review management agreements between private EMOs and charter or district virtual schools.
- Ensure transparency of school-specific data, pushing back on EMOs that consider information regarding the operation of the school to be proprietary. School

boards must have access to detailed budget data to hold private EMOs accountable. State education agencies and the public also must have access to school operating and outcome data similar to that available for traditional public schools in order to protect both children's and taxpayers' interests.

To help ensure that funding for virtual schools appropriately reflects services provided to students, it is recommended that policymakers do the following.

- Reduce per-pupil funding for students in virtual schools and virtual programs, modifying funding formulas to more closely reflect actual costs.
- Study and adapt Florida's resource allocation system for virtual schools, which provides funding only for students who were enrolled throughout the school year and who passed state assessments.

While the body of scholarly work on virtual and blended schools is expanding gradually, some research priorities deserve immediate and expanded attention. Therefore, it is recommended that policymakers and researchers give attention to the following six topics.

- *Special education*. How are virtual and blended schools serving students with disabilities? Data indicate that they are enrolling more and more students classified as having a disability. They are thus increasingly tapping into categorical funding for such students. However, little is known about how virtual schools are serving special education students and how they are spending the additional financial resources being provided.
- *School and class size*. Further research on optimal school and class size is needed for virtual schools and blended schools serving children at primary and secondary levels. Also needed is research on the optimal type and duration of contact between virtual school teachers and their students.
- *Teachers*. Just as in brick-and-mortar schools, teachers are critical for student success in virtual and blended learning schools. Therefore, a range of questions and issues related to teachers requires further inquiry. What constitutes good or acceptable teaching in fully online and blended learning settings? What are examples of best practices for teaching in these settings? How do we adequately prepare teachers (both pre-service and in-service) for teaching in online and blended learning schools? What standards or additional credentials would be suitable for those wishing to teach online or in blended learning settings? How will online and blended learning teachers be evaluated, especially given increasing evaluation activities required under teacher evaluation reforms?
- *Funding formulas*. More evidence is needed specific to revenues and patterns of expenditures in virtual and blended learning schools. Reframing funding formulas to more closely reflect actual costs is critical. Such research must be conducted by persons or entities with no vested interest in, and no relationship with, private EMOs.
- *Blended learning*. Smaller school sizes and existence of some face-to-face activ-

ities are a few features that suggest that blended learning models may be more successful at integrating technology, expanding school choice options, and still ensuring adequate care and support for students. While the available evidence on blended learning is less comprehensive than evidence regarding virtual schools, the evidence that is available is not promising. More research is needed to determine if there are particularly effective delivery models or particular states or jurisdictions in which blended schools may be working well. Because of variations in models, considerable research is needed to identify strengths and critical features of blended schools that can serve students successfully.

- *Research on existing virtual and blended learning programs*. The research undertaken by the National Education Policy Center and Western Michigan University has focused largely on legally defined individual schools, excluding programs that are housed in traditional brick-and-mortar schools or in districts. The advantage of the focus on discrete schools is that identifiable demographic and school performance data are readily available from public sources. It is much more difficult and time consuming to collect data on virtual and blended programs co-housed in traditional schools or based in districts, research on which would entail discriminating between data applicable to the program and that applicable to the traditional school or the district. While we know the current models for virtual and blended schools are problematic, it is possible that many full-time virtual and blended programs based in schools or districts may be more successful. For this reason, research providing a more inclusive overview of the number and scope of currently operating virtual and blended programs is needed. Further, more research is needed to increase our understanding of variations across existing programs, the students they serve, and the outcomes attributed to them.

Given the rapid growth of virtual schools and blended schools, the populations they serve, and the relatively poor performance of virtual schools on widely used accountability measures, four final recommendations are offered.

- Policymakers should slow or stop the growth in the number of virtual schools and in the size of their enrollments until the factors responsible for their relatively poor performance have been addressed.

- Policymakers should carefully and continuously monitor the performance of full-time blended schools since the evidence base is still weak.

- Authorities charged with oversight should specify and enforce sanctions for virtual and blended schools that perform inadequately.

- State agencies should (1) ensure that virtual and blended schools fully report data related to the student population they serve and the teachers they employ, and (2) make every effort to assign all virtual schools an overall school performance rating and explain each missing rating.

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Over the past six years, the National Education Policy Center (NEPC) has been active in documenting and researching virtual schooling at the primary and secondary levels.[1] Reports have examined who is enrolling in virtual charter and district schools and how those schools are performing; in addition, they 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 two years, they have included both full-time virtual and full-time blended learning schools.

In the last year, there has been continued enrollment growth in virtual schools across the country, although the number of schools overall and the proportion operated by private education management organizations (EMOs) have decreased. In contrast, blended learning schools have grown remarkably in the past year, both in overall number of schools and average size. It is striking that growth continues despite the fact that evidence relative to virtual and blended school outcomes has been overwhelmingly negative (see review of literature and evidence later in this report). As researchers and as educators, we remain optimistic that these new models can work, and while research is still limited, we believe they may already be working 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.

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This report contains detailed descriptions of full-time virtual and full-time blended schools operating during the 2016-17 school year. The annual inventory serves as a key research-based effort to track developments nationwide—which to date has included steady expansion. It 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. 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 2016-17 academic year. In addition, we have provided details on specific schools and states in Appendices A, B, C, and D which can be downloaded from the NEPC website (http://nepc.colorado.edu/publication/virtual-schools-annual-2018)

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.[2] All schools included had evidence of enrollment in one of the past two years, although schools enrolling fewer than 10 students were excluded.[3] 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 the Common Core of Data from NCES, state-level datasets, and school report cards for the 2016-17 school year. Data for grade level enrollment, race-ethnicity and sex were obtained from NCES and represent the 2015-16 school year, the most recent data available.

In many instances, aggregated data for virtual and blended schools reflect weighted means based on enrollment. That is, means 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.[4]

Exclusions and Additions Between 2015-16 and 2016-17

All of the 50 schools identified during the 2015-16 school search process as possible virtual schools but excluded from analyses were reassessed to determine whether the exclusion remained valid. In eight cases, schools excluded in 2015-16 because of closure or program status were found to be full-time virtual or blended schools enrolling students in 2016-17 and so were added to this study. Of the remainder, 35 were confirmed closed, two were confirmed as programs, and five were positively identified as alternate names for schools already included.

Also reassessed were 42 schools identified during the 2015-16 school search process as possible virtual schools and included in analyses with reservations (because of concerns about their active enrollment or program status). Of these, 34 were determined to be full-time virtual or blended schools enrolling students in the 2016-17 school year. Of the remainder, three were confirmed closed, two were identified as programs, two were identified as brick and mortar schools, and one was a duplicate of a school already included in the present inventory.[5]

In total, of the 668 schools investigated during the 2015-16 school search process, 510 were determined to merit inclusion in the 2016-17 inventory. Of those not included, 68 were identified as closed or otherwise no longer enrolling students, 32 were identified as programs, 17 were duplicates of schools already included in the present inventory, 14 were part-time virtual schools that did not offer diplomas to their students, 14 were brick and mortar schools, and three were private schools beyond the scope of our study. In addition, two schools were

not included because they consisted of several programs, including virtual, blended, and brick-and-mortar programs that could not be disaggregated, and nine schools were not included because they did not meet enrollment requirements for the study.

In the 2016-17 reappraisal of schools identified in the 2015-16 school search, it was noted that several schools had changed their names, virtual/blended status, management organizations, or profit status. 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 precision of the school inventory.

Of the 510 virtual and blended schools carried over from the 2015-16 school search, revisions were made to 24 school names. The virtual/blended status of 45 schools was revised; 10 schools previously listed as blended were recoded as virtual, and 35 schools previously listed as virtual were recoded to blended. The operating EMO of 86 schools was revised; 34 schools previously listed as independently operated were recoded as EMO-operated, while 23 schools previously listed as EMO-operated were recoded as independent. Twenty-two schools listed as operated by K12, Inc. were recoded as operated independently or by other EMOs, while seven schools listed as operated independently or by other EMOs were recoded as operated by K12, Inc. Between 2015-16 and 2016-17, six schools previously listed as operated by Connections Education were recoded as operated independently or by other EMOs, while 10 schools listed as operated independently or by other EMOs were recoded as operated by Connections Education. It is important to note that there have been substantial changes in the relationship between Connections Education and the virtual and blended schools they operate in 2017-18. Most of these changes occurred after the 2016-17 school year, the focus of this study. Generally speaking, we are increasingly seeing local virtual and blended school boards assuming more control for their schools, shifting from EMO management to vendor relationships.

Changes in profit status were made to reflect changes in a school's management. Two schools shifted management from a for-profit to a nonprofit EMO. All other changes to profit status were due either to independent schools (not affiliated with any EMO) hiring an EMO (profit or nonprofit), or schools previously identified as operated by EMOs being reappraised as independent.

During the 2016-17 school search process, an additional 420 schools that had not been identified in prior years were evaluated for inclusion. After investigation of school promotional materials and handbooks, comparisons with state and federal school datasets and directories, and conversations with school and EMO personnel, it was determined that 215 of the newly identified schools met the standard for inclusion in the 2016-17 inventory. Of the 205 schools which were investigated but not selected for inclusion, 78 were part-time virtual schools that did not offer diplomas to their students, 67 did not enroll sufficient students, 23 were new schools in the 2017-18 school year, 13 were school programs, 12 were brick and mortar schools, four had closed or were otherwise not enrolling students in the 2016-17 school year, four were schools with virtual and blended programs which could not be disaggregated, three were duplicates of schools already included in the inventory, and one was a private virtual school and therefore outside this inventory's scope.

Roughly 75% (156) of the 215 schools new to the dataset for 2016-17 were blended schools,

while 60 were virtual. The disparity in additions primarily reflects marked improvements in our ability to identify blended schools through heightened scrutiny of school promotional materials and handbooks, external resources (for example, the Christensen Institute), and input from schools and EMOs. Identification of blended schools can be difficult because while the majority of virtual schools promote themselves and their unique curriculum delivery approaches through, at a minimum, self-identification on their school websites, many schools using a blended approach do not. In addition, while many states provide resources for families curious about virtual approaches to schooling, and some even provide comprehensive lists of virtual schools operating in the state, monitoring of blended schools is in almost all cases much less developed. 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.

While the total number of virtual schools with enrollment data has dropped from 480 in 2015-16 to 429 in 2016-17, the difference can be primarily attributed to the reclassification of roughly 50 schools included in the 2015-16 dataset as programs or part-time schools. While some 60 schools included in 2015-16 were marked as closed in 2016-17, as many were added to the dataset as newly opened or newly identified. This suggests that while the raw count of schools identified as virtual has decreased by about 10% from 2015-16 to 2016-17, the actual number of virtual schools in the United States has remained relatively constant over that period. Once again, we are indebted to the many schools and EMOs whose communications helped us improve the precision of this inventory.

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 in the appendices 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 on free and reduced-price lunch status is relatively complete, data reported at the district level (including, for example, special education enrollment) is much less available. 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 38 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 38 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 performance data could vary from the 2015-16 demographic data and the 2016-17 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 in the appendices 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

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, although there are variations in how blended schools combine virtual and face-to-face activities. It is important to note that this report tracks only full-time virtual and blended schools, not any of the multiple other online offerings. 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 educational 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, overlapping with both homeschooling and charter schools. Appendix A contains charts that depict the number of virtual and blended schools and students by state. During the 2016-17 school year, there were 25 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: Connecticut, Hawaii, New Jersey, and Rhode Island. A total of nine states have full-time virtual schools although they still do not have full-time blended learning schools.[8]

Beyond the 38 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.

Virtual Schools

A total of 429 full-time virtual schools met the selection criteria for the 2016-17 school year. See Appendix B1 for a list of identified schools included in this inventory.[9] These schools enrolled 295,518 students, indicating a net growth of 17,000 students (just over 6% growth since 2015-16). See Appendix B2 for a list of identified schools.

Figure 1 illustrates the estimated enrollment growth in full-time virtual schools over the last 16 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 30.3% of all virtual school enrollments, a large decrease from 36.3% of the sector from the prior year. Connections Academy schools accounted for 17.1% of all enrollments, which was also a decrease from 22.9% in 2015-16. Overall, the market share of these two large companies dropped from 59.5% in 2015-16 to 47.4% in 2016-17.

As noted earlier, the decrease represents a number of 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.

Altair Learning Management LLC is a for-profit EMO that operates only one virtual school, although this happens to be the country's largest virtual school (Electronic Classroom of Tomorrow—ECOT) with close to 14,000 students enrolled in 2016-17. This school has been mired in controversy and legal battles as the state of Ohio has sought $60-$80 million reimbursement because the school was unable to adequately account for students it was paid to educate. It was closed in January 2018.[11] Because this school accounted for 4.7% of the nation's virtual school students, its closing will represent a shift away from for-profit operators; in addition, because it had consistently negative performance outcomes, it may result in improved assessments of virtual schools' overall performance.

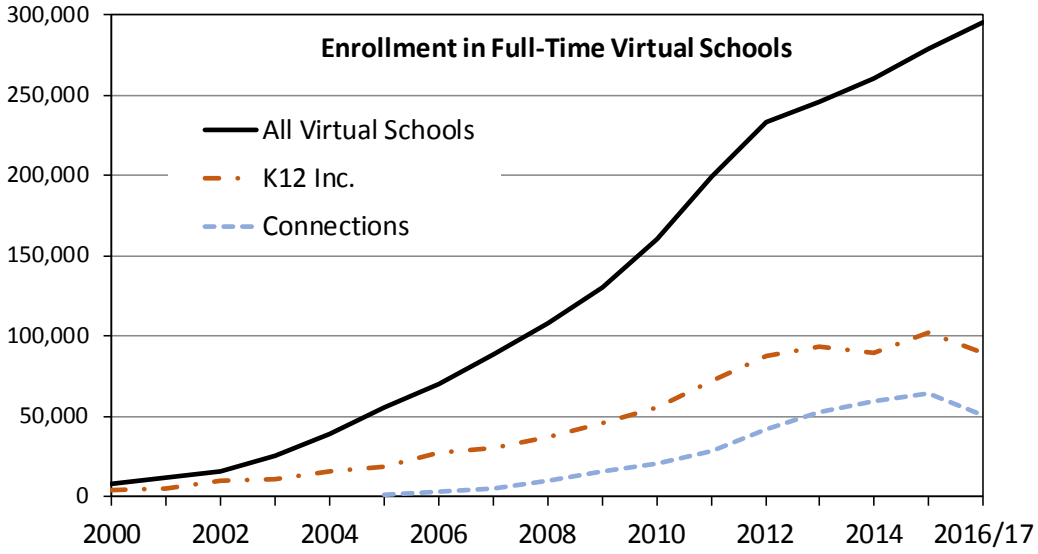


Figure 1. Enrollment Trends in Full-Time Virtual Schools

New district-operated schools continued to add significantly to the pool of full-time virtual schools, although they still tend to be very small relative to virtual charter schools (see Table 1). In 2015-16 district virtual schools accounted for 17.8% of all virtual enrollments; in 2016-17, this percentage grew to 24.3%. Generally, virtual charters play a larger role, comprising half of all full-time virtual schools and accounting for 75.6% of enrollments. Both district and charter virtual schools continue to grow in terms of average school size. Virtual charters remain much larger and have average enrollments that are three times the size of those in district-run schools: 1,096 students per school compared with 319 students per school. The average virtual district school increased by 104 students between 2015-16 and 2016-17 while the average virtual charter school increased by just over 200 students in that time.

The number of both district and charter virtual schools included in this inventory dropped notably between 2015-16 and 2016-17, largely due to some schools having too few students to meet the 10-student minimum for inclusion in the inventory. Another reason for the decrease in district virtual schools is some were found to be programs, not schools; in a few cases, the schools were reclassified as blended. Despite the decreasing numbers, the total enrollments in district virtual schools increased by more than 22,000 students. Concurrently, the enrollment in charter virtual schools decreased by 5,376.

There were 225 district virtual schools and 203 charter virtual schools in 2016-17. Although fewer, the charter virtual schools were much larger and enrolled a total of 223,634 students compared to only 71,884 students in district virtual schools. The average enrollment in charters was 1,096 students per school compared with an average of 319 students in district schools. A possible explanation for this is that district schools are created to serve smaller targeted populations 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, 2016-17

	Total Number of Schools in 2016-17	Percent of All Schools	Students	Percent of all Enrollment	Average Enrollment Per School
District	225	52.4%	71,884	24.3%	319
Charter	204	47.6%	223,634	75.7%	1,096
Total for All Virtual Schools	429	100.0%	295,518	100.0%	689

Private education management organizations (EMOs) operated 31% of all full-time virtual schools, accounting for 61.8% of enrollment even though number of EMO-operated schools dropped by 22 between 2015-16 and 2016-17. The nonprofit-EMOs gained a little market share, while the larger for-profit EMOs lost some market share.

Within the virtual school sector, for-profit EMOs continue to play a prominent role. They

operated 31.7% of all virtual schools, which together enrolled 59.5% of the student population (see Table 2). Still, the proportion of students enrolled in those schools dropped 10 percentage points from 2015-16, and the number of charter and district schools operated also dropped, from 155 to 136. Generally, charter virtual schools were much more likely than district virtual schools to be operated by a for-profit EMO.

As noted earlier, K12 Inc. remains the largest EMO in this sector; in 2016-17, it operated 76 full-time virtual schools enrolling 89,582 students. Still, in the past year it showed a sharp decrease in the number of schools it fully operates, and enrollment in those schools dropped by 12,418 students. Connections Academy, the second largest for-profit EMO, operated 34 virtual schools enrolling 50,409 students, a decrease of just over 13,000 students between 2015-16 and 2016-17.

Within the virtual school sector, for-profit EMOs continue to play a prominent role

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 the schools with which the K12 Inc. and Connections had an EMO relationship, they had a vendor relationship with scores of others. When an EMO operates a school, it has executive control of the entire school operation, 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 manages all other aspects of the school, including directly hiring teachers and administrators.

In contrast to decreases in the for-profit sector, nonprofit EMOs, which operated only 18 virtual schools in 2016-17, increased enrollment to 7,319 students, a gain of about 2,400 students over the previous year. Among nonprofit EMOs, the largest nonprofits are Learning Matters Educational Group (seven schools), Compass Charter schools (three schools), and Pathways Management Group (four schools).

Among for-profit EMOs managing virtual schools, several began operations. These included Calvert Education Services (five schools), Edison Learning (three 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 or sold schools to other EMOs. During the 2016-17 school year, they operated two virtual schools each. Many of the Whitehat schools were sold to Accel Schools during and after that school year. Given the relatively lucrative circumstances[12] 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.

Overall, independent virtual schools showed the greatest growth in enrollments over the last two years, adding a net total of 31,138 students and now enrolling 38.3% of all virtual school students. Even with these gains, average school enrollment remained relatively small. Independent virtual schools averaged 411 students, nonprofit EMO-operated schools averaged 407 students, and—in stark contrast—for-profit EMO-operated schools averaged 1,288 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 14,000

students in a single school unit.

Table 2. Distribution of Virtual Schools and Students by Operator Status 2016-17

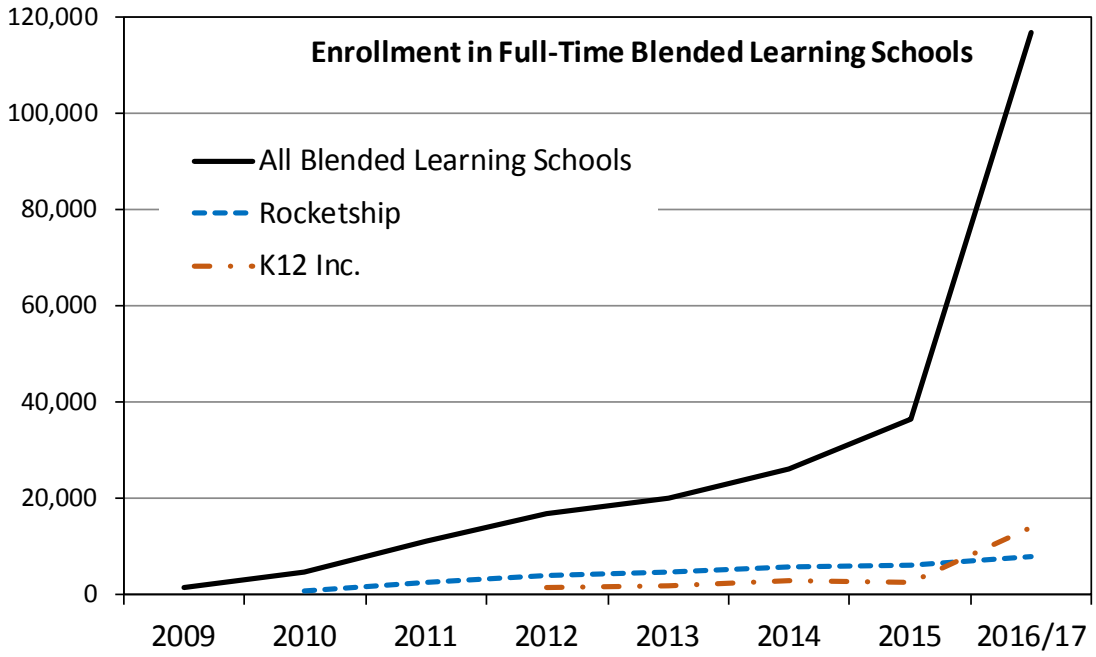
	Total number of schools in 2016-17	Percent of all Schools	Students	Percent of all Enrollment	Average Enrollment Per School
Independent	275	64.1%	113,038	38.3%	411
Nonprofit EMO	18	4.2%	7,319	2.5%	407
For-profit EMO	136	31.7%	175,161	59.3%	1,288
K12 Inc.	76	17.7%	89,582	30.3%	1,179
Connections	34	7.9%	50,409	17.1%	1,483
Total for All Virtual Schools	429	100.0%	295,518	100%	689

Blended Schools

A total of 296 blended schools met the selection criteria in 2016-17. These schools enrolled 116,716 students. The net increase in enrollments in blended schools since 2015-16 was 80,000—a surprisingly large increase of over 200% since the previous school year. It is important to note that a portion of this growth is due to the identification of schools in 2016-17 that were already operating during the previous year although they were not identified for inclusion. See Appendix B2 for a list of identified schools.

As Figure 2 shows, enrollments in blended schools have grown sharply in the last few years. Most of the growth comes from new schools and expansion of smaller EMOs. 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



Most blended school growth in the past year came from new independent schools. These numbered 139 in 2016-17, an increase of 103 schools from the previous year. For-profit EMOs operated 67 blended schools, and nonprofit EMOs operated 90.

The number of both district-operated and charter-operated blended learning schools increased sharply between 2015-16 and 2016-17, with charter schools increasing more in both the number of schools and total enrollments. Enrollments in the charters are substantially larger (456 students per school) compared to those in district schools (257 students per school) (see Table 3).

The average size of blended schools increased overall from 271 students per school in 2015-16 to 394 students per school in 2016-17. As indicated above, most are independent district-operated schools with smaller enrollments than those managed by private EMOs (see Table 4). Independents had an average of 349 students per school, while nonprofit EMO schools averaged 454 students and for-profit EMO schools averaged 409 students.

EMOs are largely responsible for the growth of full-time blended learning. As in the virtual school sector, the most involved for-profit EMOs are K12 Inc. (eight schools), and Connections Academy (seven schools). White Hat Management did operate 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 Opportunities for Learning Public Charter Schools (five schools), Carpe Diem Learning Systems (three schools), and edtec central LLC (three schools).

Nonprofit EMOs, however, are much more prevalent in the blended sector than their for-profit counterparts. Rocketship Education is the largest, operating 16 blended learning schools; Alliance College-Ready Public Schools operates 15. Other nonprofits in this sector

include Summit Learning (ten schools), SIATech (seven), FirstLine Schools Inc. (five), Roads Education Organization (four), Pathways Management Group (four), Matchbook Learning (three), Method Schools (three), Phalen Leadership Academies (three), and Education for Change Public Schools (three).

Table 3. Distribution of Blended Schools and Students Across District and Charter Sectors, 2016-17

	Total number of schools 2016-17	Percent of all Blended Schools	Students	Percent of all Enrollment	Average Enrollment Per School
District	92	31.1%	23,683	20.3%	257
Charter	204	68.9%	93,033	79.7%	456
Total for All Blended Schools	296	100.0%	116,716	100.0%	394

Table 4. Distribution of Blended Schools and Students by Operator Status, 2016-17

	Total number of schools 2016-17	Percent of all Blended Schools	Students	Percent of all Enrollment	Average Enrollment Per School
Independent	139	47.0%	48,472	41.5%	349
Nonprofit EMO	90	30.4%	40,862	35.0%	454
For-profit EMO	67	22.6%	27,382	23.5%	409
Total for All Blended Schools	296	100.0%	116,716	100%	394

Student Characteristics

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

Race-Ethnicity

The proportion of minority students in virtual schools had slowly increased a few percentage points between 2012-13 and 2014-15. Over the past two years, however, the numbers remained largely unchanged except for a 2.5 percentage point drop in the proportion of Black students. Aggregate data on student ethnicity from virtual schools continues to differ substantially from national averages. Nearly 66% 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 12.7% of students in virtual schools were Black while the national average was 25.5%; only 12.9% of students in virtual schools were Hispanic while the national average was 15.5%.[13] 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 overrepresentation 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 minorities are less prevalent. These possible explanations warrant further exploration to determine whether they can explain underrepresentation of some ethnic groups in virtual schools.

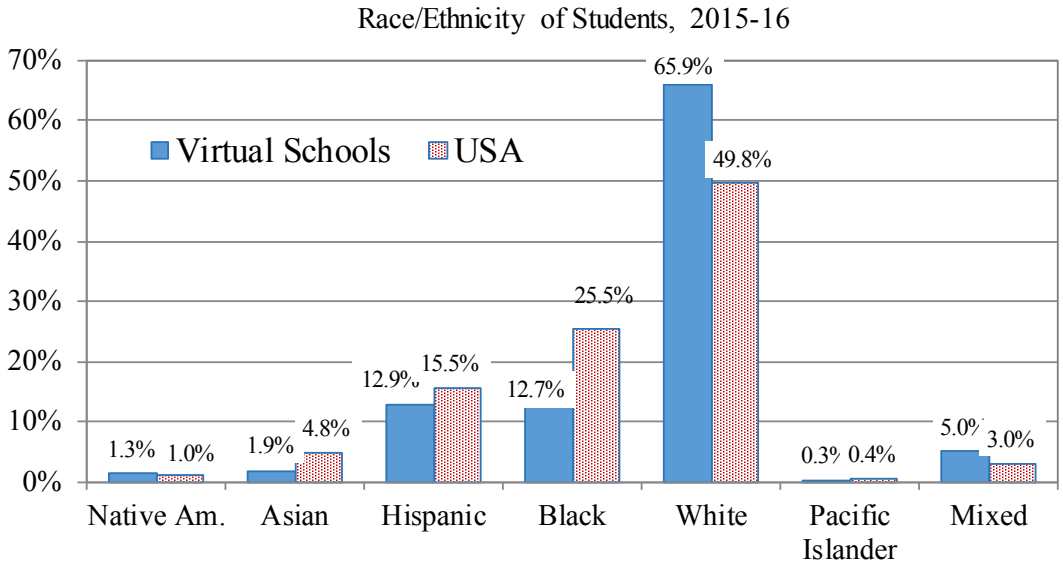


Figure 3. Race/Ethnicity of Students in Virtual Schools Compared with National Averages, 2015-16

Figure 4 displays demographics of students enrolled in blended schools. Relative to the student population of virtual schools, the blended school student population did better match 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 two years, the proportion of Black students increased by 15 percentage points while the proportion of white students dropped by 14 percentage points.

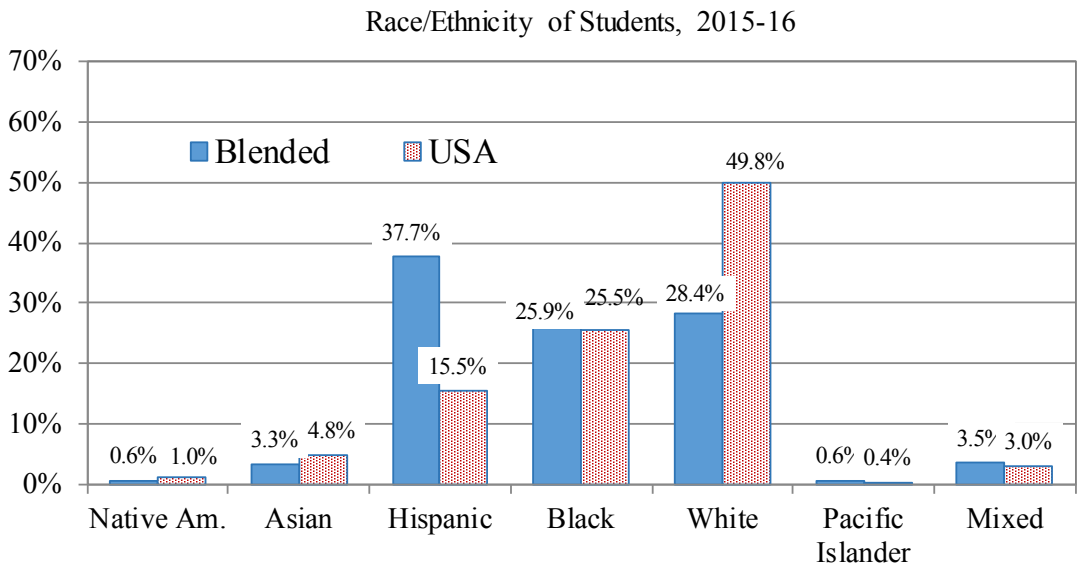


Figure 4. Race/Ethnicity of Students in Blended Schools Compared with National Averages, 2015-16

Data available from state sources for 2015-16 was less complete than the 2015-16 data collected from NCES[14] still, the pattern of distribution of students by race/ethnicity was largely unchanged except for a very small increase in minority students. Nonprofit EMO virtual schools had some distinct differences, although their very small share of enrollment makes drawing inferences difficult. Similarly, the differences in student ethnicity between district and charter schools and those between for-profit or independent virtual schools were also very small.

Free and Reduced-Price Lunch

As illustrated in Figure 5, in 2015-16 the proportion of students in full-time virtual schools with available data (359 schools) who qualified for free or reduced-price lunch (FRL) was 35.9%—15.4 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 (32.5%) than charters (36.8%), while for-profits had a slightly higher percentage (39%), and nonprofits had the greatest percentage (42%).

Blended schools with available data (262 schools) enrolled a much higher proportion of FRL students than virtual schools. In 2015-16, 63.7% of the students enrolled in blended schools qualified for free or reduced-priced lunch (12.9 percentage points higher than the national average). For-profit blended schools enrolled 59.4% low-income students, independents enrolled 55.6%, and nonprofits enrolled a substantially larger 77.2%. The difference in this area is stark, and it may point to a genuine desire on the part of nonprofit schools to provide better learning opportunities to economically disadvantaged students.

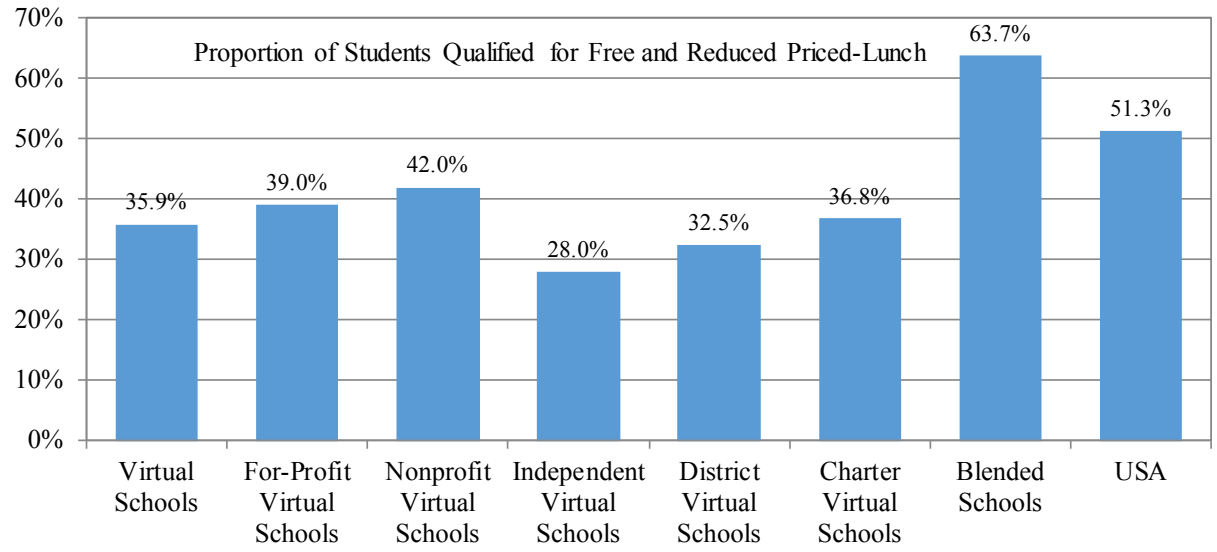


Figure 5. Students Qualifying for Free and Reduced-Priced Lunch, 2015-16

Special Education and English Language Learner Status

As illustrated in Figure 6, the proportion of special education students attending virtual and blended schools was just shy of 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. Even so, because nearly half of the virtual schools reported no special education data, 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.) Only 55% of virtual schools reported data in this area, as compared to 72.7% of the blended schools. In the 211 blended schools with data available, the percentage of students with disabilities was 6.3%.

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.[15]

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.[16]

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[17] 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.[18]

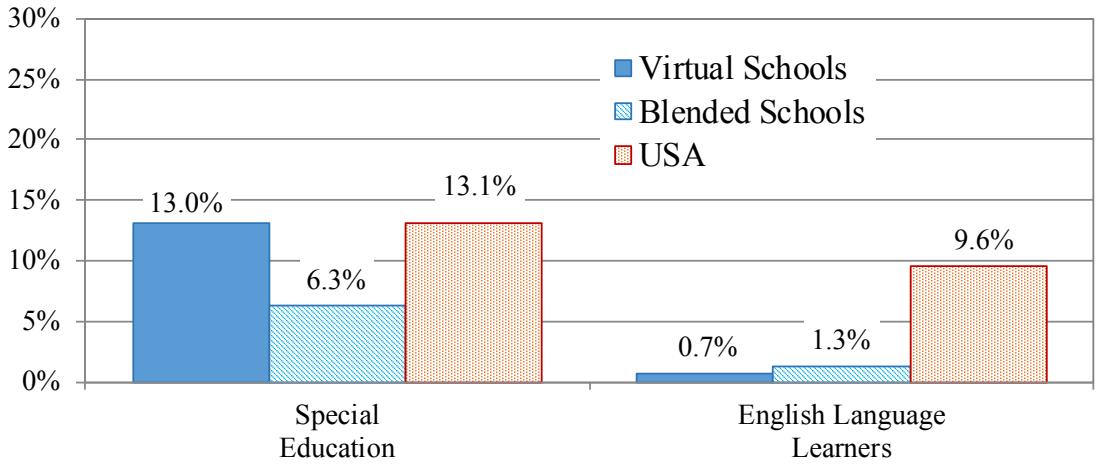


Figure 6. Proportion of Students Classified as Special Education, or Classified as English Language Learners, 2015-16

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 212 full-time virtual schools with available data, only 0.7% of students were classified as ELL. This is a striking difference from the 9.2% national average[19] (see Figure 6). Specific demographic data for each of the full-time virtual schools can be found in Appendix A.

Available data from 207 blended learning schools indicated that English language learners accounted for 1.3% of the student population. This very low percentage is surprising given that when high proportions of Hispanic students are enrolled—as is the case with blended learning schools—typically there are also higher levels of English language learners.

Sex

While the population in the nation's public schools is nearly evenly split between females and males, the 2015-16 student population enrolled in both virtual schools (528 schools) and blended schools (140 schools) was skewed in favor of females (53.8% in virtual schools, and 50.7% in blended schools). These ratios remained largely the same for charter, district, independent and for-profit schools. Interestingly, these numbers have flipped since 2010-11

when males were more prevalent (see Figure 7).

When sex relative to a school's grade levels was considered, some interesting patterns emerged. Virtual schools serving only grades K-5 (16) and schools serving only grades 6-8 (12) tended to have a more balanced mix of females and males with a near 50/50 split at each level, whereas schools that served only grades 9-12 (122) tended to have more female students enrolled (55% females and 45% males). 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 in the K-5 schools (16) and was at 52% female in middle schools (4). Similar ratios held in high schools (52), where females accounted for 53% of enrollment. Schools that served multiple levels (K-12, for example) were not included in these calculations; their numbers might have altered results.

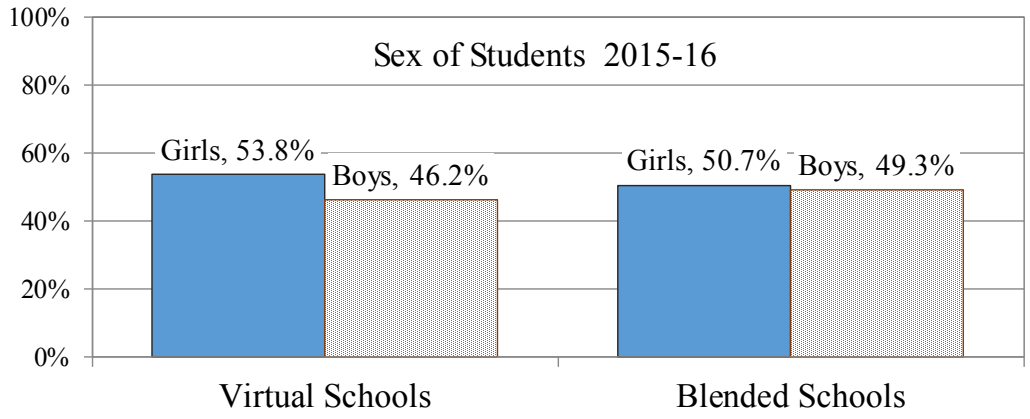


Figure 7. Sex of Students in Virtual and Blended Schools, 2015-16

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 9.3% were designated as primary schools, 2.8% as middle schools, and 24.5% as high schools. The figures for blended learning schools indicated that 33.8% were classified as Other, while 17.9% were elementary schools, 7.6% were middle schools, and 40.7% 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

8 details NCES data on actual student enrollment by grade for 2015-16; 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.

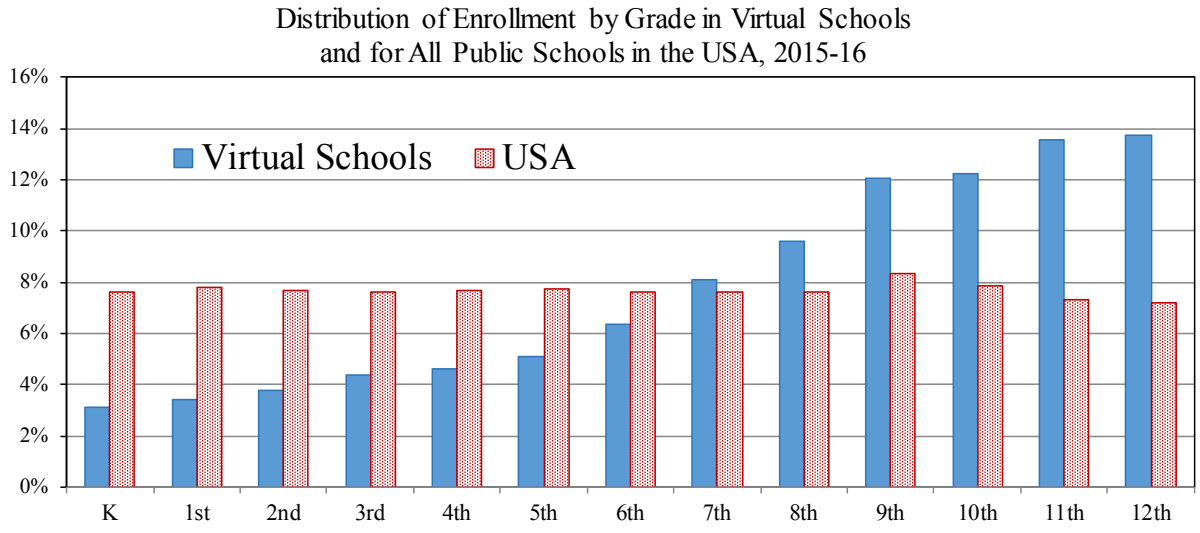


Figure 8. Enrollment by Grade Level for Virtual Schools and U.S., 2015-16

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.

Figure 9 illustrates the actual number of students served by virtual schools at each grade level. Enrollment increased steadily through grade 9 and then leveled off from grades 10-12. This summary masks some differences in subgroups. For example, virtual schools operated by for-profit EMOs saw steep declines after grade 9, while many district-operated schools served 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.

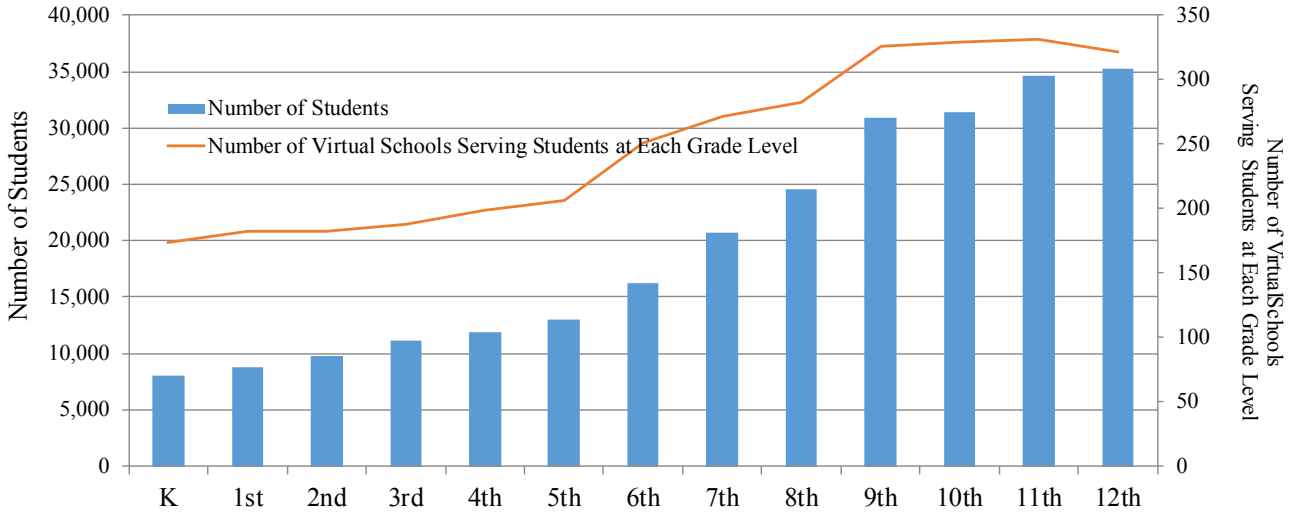


Figure 9. Number of Virtual School Students per Grade Level and Number of Schools that Offer Instruction at Each of the Grade Levels, 2015-16

Figures 10 and 11 illustrate grade level student distribution in blended schools. Interestingly, blended schools had 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 have been due to students using blended schools for credit recovery or as an alternative for late graduation.

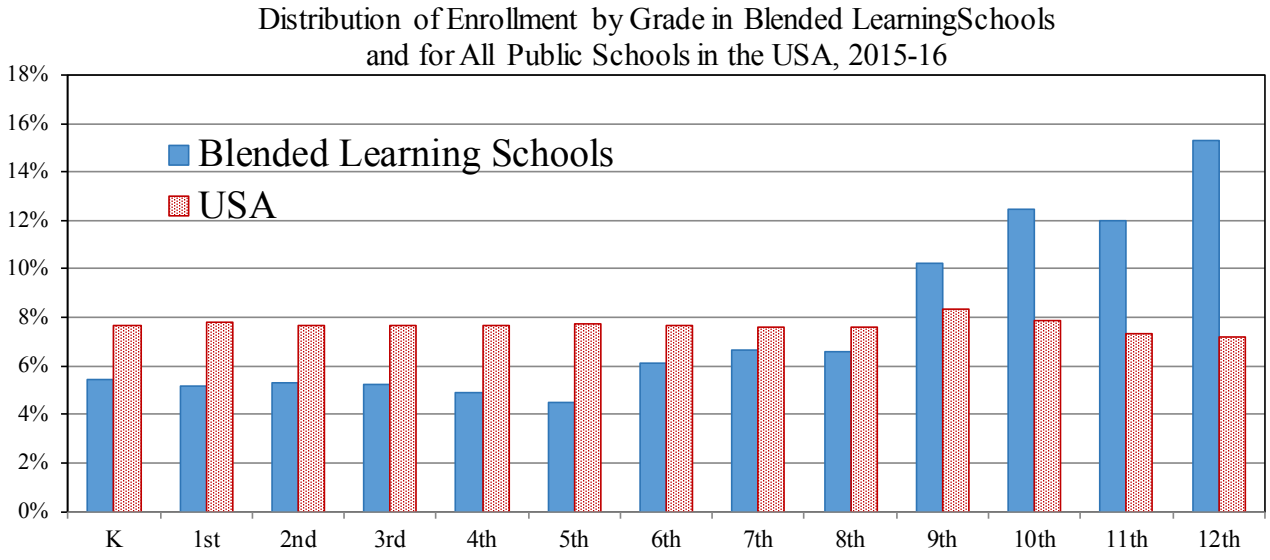


Figure 10. Enrollment by Grade Level for Blended Schools and U.S., 2015-16

Figure 11 indicates that most blended schools catered to high school students. Given that students at the upper secondary level are more technologically savvy and usually 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.

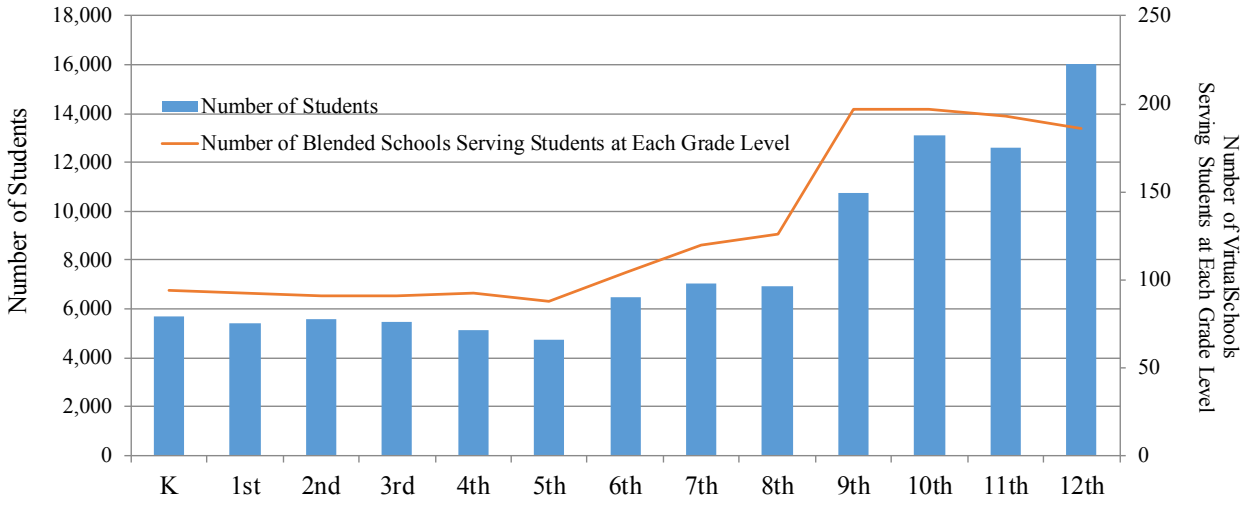


Figure 11. Number of Blended School Students per Grade Level and Number of Schools that Offer Instruction at Each of the Grade Levels, 2015-16

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 2015-16.

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 '15-16 school year divided by the number of full-time equivalent teachers reported; this calculated variable was spot-checked against the student-teacher ratio data provided by the NCES through its individual public school search tool to confirm that the calculation aligned with NCES practices.

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. Group medians are not weighted by enrollment; this allows for a comparison between weighted and unweighted measures of central tendency. While the unweighted medians illustrate the typical student-teacher ratio for schools, the weighted means indicates the typical student-teacher ratio experienced by students.

Table 5 contains key indicators related to student-to-teacher ratios in full-time virtual schools. While the average ratio was approximately 16 students per teacher in the nation's public schools,[20] virtual schools reported nearly three times as many students per teacher (45). The district virtual schools had lower student-teacher ratios (40.6) than the charters (46).

Among virtual schools, those operated by for-profit EMOs had a slightly higher average student-teacher ratio (48.4). Note that among nonprofit EMO schools, a small number had an excessively high student-teacher ratio that shifted the weighted average for this group to 114 students per teacher. Table 5 also contains results for the two main for-profit operators of virtual schools, K12 Inc. and Connections Education. While K12 Inc.'s number (42.7 students per teacher) was closer to the mean for all virtual schools, Connections had a noticeably lower student-to-teacher ratio (35).

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 one student per teacher[21] and others reporting more than 700.

Table 5. Teacher-Student Ratios in Virtual Schools, 2015-16

	Number of schools with data	Median	Weighted Mean	SD	Min	Max
All Virtual Schools	273	27.63	45.03	66.48	0.3	783.6
Independent Virtual	173	23.20	33.86	45.78	0.3	302.0
Nonprofit Virtual	5	43.16	114.00	335.42	20.0	783.6
For-Profit Virtual	95	31.76	48.44	55.32	0.7	463.5
K12 Inc.	55	27.49	42.75	27.16	0.7	194.9
Connections	23	34.22	34.96	7.53	16.2	50.8
District Virtual	123	27.50	40.60	50.38	0.3	302.0
Charter Virtual	150	27.69	45.93	77.38	0.7	783.6
National Average [22]			16.0[23]			

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. Teacher-Student Ratios in Blended Learning Schools, 2015-16

	Number of schools with data	Median	Weighted Mean	SD	Min	Max
All Blended Schools	257	21.29	31.74	22.58	3.8	281.0
Independent Blended	124	20.84	37.55	20.32	5.0	126.0
Nonprofit Blended	76	21.96	29.86	30.90	3.8	281.0
For-Profit Blended	57	20.22	23.02	11.36	6.1	54.3
K12 Inc.	9	20.28	25.59	9.52	13.9	45.1
Connections	7	10.76	12.01	3.98	6.1	18.0
Rocketship	13	35.13	34.99	2.30	28.2	36.8
District Blended	82	21.36	36.31	17.90	5.0	120.3
Charter Blended	175	21.09	30.54	24.51	3.8	281.0
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; findings by school appear in Appendix C and findings by state appear in Appendix D.

Background

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 (Miron and Urschell, 2012[24]). A study in California found that non-classroom-based charter schools had lower achievement than the traditional and charter schools they were compared to (Zimmer et al., 2003[25]), A study in Colorado found virtual students did not perform well on state tests, repeated grades more frequently, left the virtual schools at high rates, and dropped out altogether at higher rates than public school students (Office of State Auditor, 2006[26]). Pennsylvania students in virtual schools were shown to perform worse than comparison groups early in the decade (Miron et al., 2002[27]). A Wisconsin study showed virtual students outperforming public school students in reading and underperforming in math (Legislative Audit Bureau, 2010[28]). Finally, a study of eight different states (Zimmer et al, 2009[29]) showed either mixed or negative results in all when students in virtual schools were compared to their brick-and-mortar counterparts.

To date, the second decade hasn't produced much research either, and the scant research conducted has produced mixed results, with most findings being either neutral or negative. The results of the 2006 Colorado study were echoed in Hubbard and Mitchell's later study of Colorado virtual schools, which found dropout rates four times the state average (2011[30]).

In Minnesota, virtual students were also found to drop out at higher rates and to perform poorly on state tests (Office of the Legislative Auditor, 2011[31]). Charter students in Pennsylvania (one third of whom were in virtual schools at the time) were found to underperform their traditional public school peers on state tests (CREDO, 2011[32]). The state of Kansas found that virtual students performed similarly to their brick-and-mortar counterparts in reading and math before and after controlling for student demographics (2015[33]). However, these conclusions were based on 2012-13 state assessment scores involving an unknown number of students. Although the results do not show evidence against virtual schools, neither do they show evidence for them. A 2015 CREDO national report showed students attending virtual schools losing the equivalent of significant amounts of instructional time in both reading and math.[34] Using the "virtual control record" (VCR) method that creates twin pairs of online students and brick-and-mortar charter school students, researchers found that students in virtual schools lost the equivalent of 180 instructional days in math and 72 instructional days in reading. Whether one agrees with their equivalencies for instructional days or not, the results are definitively negative.

Lueken et al. (2015) found that students attending a virtual charter school in a southern state had initial negative effects in their first year of enrollment that dissipated in the second year and in some cases turned positive.[35] The study matched students from a K-8 online charter school with a "twin" in a traditional public school and compared their growth in math and literacy on state assessments between 2010 and 2012. The authors suggest that students experience difficulty in transitioning to the online environment but may eventually improve academically after they adjust, indicating that the online environment may be a good fit for some students if they are able to persevere. In a study of Ohio virtual schools, Ahn and McEachin (2017) found that "students in e-schools are performing worse on standardized assessments than their peers in traditional charter and traditional public schools."[36] This was true for elementary and middle school performance on math and reading achievement tests, with math showing the biggest differences; it was also true for 10th grade achievement tests in math, reading, science, social studies, and writing, with math and writing showing the largest discrepancies. Finally, in its legislative review of 2015-16 state achievement data, the Iowa Department of Education found that the Iowa Connections Academy and the Iowa Virtual Academy both substantially decreased in the number of students proficient in reading, math and science.[37] This report has consistently found virtual schools not performing well.

This report has consistently found virtual schools not performing well.

For blended learning, in a study of Next Generation Learning Challenge grant recipient schools implementing blended learning schoolwide, Pane et al. (2017) found that students, "experienced positive achievement effects in mathematics and reading, although the effects were only statistically significant in mathematics."[38] The findings were based on NWEA MAP assessment scores—that is, on scores from an adaptive computerized test that assesses a student's ability beyond grade level—for students in blended schools and for a matched group of students in traditional brick-and-mortar schools. This report also found blended schools, especially independently run blended schools, performed better than virtual schools; 72.7% of the blended schools included in the report were rated academically.

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 in 2015-16, 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, however, 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. States with accountability systems currently on hold are: Alaska, Arkansas, California, Colorado, Hawaii, Idaho, Illinois, Nevada, Ohio, Oregon, South Carolina and Washington. Some states (like Nevada and Hawaii) clearly communicate on their websites that the accountability systems are on hold and explain why, while other states have buried such information in a flexibility waiver posting (Colorado). 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 15 of the 38 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. Original ESSA mandates required that school report cards be finalized and reported for school year 2017-18, and if states continue on this trajectory a full picture may materialize then. Given current conditions, the school performance results captured here should be interpreted cautiously, since they are inescapably based on limited data.

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—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 15 states with available overall school performance ratings: "academically acceptable," "academically unacceptable," or "not rated" (meaning that the state assigned overall school performance ratings for 2016-17 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.[39]

Overall school performance ratings for virtual and blended schools were available for 15 out of the 38 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 2016-17 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 15 states which provided overall school performance ratings on 2016-17 report cards

were: Colorado, Florida, Georgia, Indiana, Iowa, Louisiana, Massachusetts, Nevada, New Mexico, North Carolina, Pennsylvania, Rhode Island, Texas, Utah, and Wisconsin.

Therefore, performance ratings were potentially available for 169 (39%) of the 429 full-time virtual schools and 71 (24%) of the 296 blended learning schools with enrollment during 2016-17. A slightly greater percentage of both virtual and blended schools received academically unacceptable ratings from their state education agencies for 2016-17. Overall, 36.4% of full-time virtual schools were rated acceptable performance ratings, down slightly from 37.4% last year. A total of 43.1% blended schools were rated acceptable, the second consecutive year in which they slightly outperformed virtual schools.

Of the 110 virtual schools with available school performance ratings, 40 (36.4%) were rated acceptable (see Table 7). Of the 37 rated schools operated by for-profit EMOs, 10 (27%) were found acceptable. Of these, five were K12, Inc. schools (27.8% of the K12 cohort) and three were Connections schools (23.1%). None of the four nonprofit schools rated were found acceptable, and 30 independently run virtual schools were rated acceptable (43.5%). District-operated virtual schools performed better than their charter school counterparts: 53.8% and 20.7% rated acceptable, respectively.

Table 7. Percentage of Virtual Schools with Acceptable School Performance Ratings, 2016-17

	Acceptable		Unacceptable		Not Rated (or No Rating Reported)
	N	Percent of schools with ratings	N	Percent of schools with ratings	N
Full-time Virtual	40	36.4%	70	63.6%	59
Independent	30	43.5%	39	56.5%	50
Nonprofit	0	0%	4	100%	0
For-profit	10	27.0%	27	73.0%	9
Charter	12	20.7%	46	79.3%	4
District	28	53.8%	24	46.2%	55

Although blended schools outperformed virtual schools again this year, their levels fell significantly from last year. Only 43.1% of blended schools were rated acceptable in 2016-17 compared to 72.7% in 2015-16. Much of this fluctuation may be attributable to the addition of so many blended schools to this year's dataset. Table 8 contains key findings regarding state ratings of blended learning schools.

Unlike last year when all the nonprofit blended schools in the dataset were rated academically acceptable, this year only 9.1% were. Just over half the independent blended schools had acceptable ratings this year (52.5%), and district and charter blended schools performed about the same (42.1% and 43.6% respectively).

Table 8. Percentage of Blended Schools with Acceptable School Performance Ratings, 2016-17

	Acceptable		Unacceptable		Not Rated (or No Rating Reported)
	N	Percent of schools with ratings	N	Percent of schools with ratings	N
Full-time Blended	25	43.1%	33	56.9%	13
Independent	21	52.5%	19	47.5%	8
Nonprofit	1	9.1%	10	90.9%	1
For-profit	3	42.9%	4	57.1%	4
Charter	17	43.6%	22	56.4%	4
District	8	42.1%	11	57.9%	9

In addition to the 70 virtual schools that received unacceptable ratings, 59 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 33 blended schools that received unacceptable ratings, 13 blended schools received no rating at all.

Highlights from Select States

Specific numbers of acceptable and unacceptable ratings assigned by state are available in Appendix D, but several states are worth mentioning. Most notable is Pennsylvania, where every single one of the state's 15 virtual schools received unacceptable ratings. Thirteen of these are charter schools and two are district schools. Additionally, five of these schools enroll extremely large numbers of students. Pennsylvania Cyber Charter School enrolled 9,723 students in 2016-17, Commonwealth Charter Academy enrolled 9,008, Agora Cyber Charter School enrolled 5,883, PA Leadership Charter School enrolled 2,361, and PA Virtual Charter School enrolled 2,299.

In Wisconsin, 19 virtual charter schools were nearly equal in terms of performance with slightly more receiving acceptable ratings (52.9%) than unacceptable (47.1%). Two schools received the highest rating possible, four received the lowest rating possible, and six received alternative ratings (four acceptable and two unacceptable). Ratios in Wisconsin's 17 blended schools were the same, with 52.9% receiving acceptable ratings and 47.1% receiving unacceptable ratings. All but one of these blended schools were charter schools. Four received alternative ratings (all acceptable); one received the highest rating possible, and one received the lowest rating possible.

In Louisiana, six out of seven (85.7%) blended schools received unacceptable ratings; five of

these were charter schools. Only one of seven virtual schools received an acceptable rating (14.3%), and it was the sole district virtual school in the state.

Finally, in Colorado, of the 18 virtual schools that received ratings, 61.1% were rated unacceptable and 38.9% acceptable. Of these, six charter school ratings were split evenly, half acceptable, half not acceptable. Of 12 district schools, eight (75%) were rated unacceptable and only four (25%) acceptable. An additional six schools did not receive ratings, two of them because there was insufficient data. Of the 23 blended schools rated, 43.8% received acceptable ratings while 56.3% received unacceptable ratings. Of these, charter schools were again evenly divided (three of six schools unacceptable, three acceptable), and six (60%) of ten district schools were judged unacceptable while four (40%) were judged acceptable. Another six blended schools were not rated, two of them because there was 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 72 Florida virtual schools.

Only 23 of the schools, including 20 district and three charter schools, received ratings. Seventeen (73.9%) were rated acceptable, and among these, 12 (71%) were rated A. While 85% of the district schools were rated acceptable, all three charters were rated unacceptable. 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 49 schools were not rated, it is difficult to tell whether these numbers are inflated or reasonably representative. Among the 49 schools not rated, 18 (39.1%) of the not rated virtual schools were given a grade of "I," incomplete, because testing participation rates did not meet the state's 95% threshold. Unrated schools include some with the highest enrollments in the state: OCVS Virtual Franchise (14,850 students), FLVS Full-Time 6-12 (4,557 students), and FLVS Full-Time K-5 (3,008 students). The other 31 were not listed in state's school grades data set. Some may not have met the state's enrollment threshold of ten. Or, they may have been district instructional programs (VIPs) serviced by a provider (Edgenuity, Connections, or K12, Inc.); in those cases, the state pools students by provider and grades the providers rather than the schools. Of the three service providers, K12 was rated a B for its service to 979 students while Edgenuity and Connections were unrated because of low testing participation rates.

Relationship between School Performance and School- and Class-Size

Two key factors discussed in earlier reports are poor performance of virtual and blended learning schools related to excessively large school sizes and shockingly high teacher-student ratios; Figures 12 and 13 illustrates these relationships. Some outliers are beyond the scales in the figures, and so do not appear in these charts; notes below each figure indicate how many such outliers do not appear. Smaller schools appear on the left side of the charts, and larger to the right; schools with fewest students per teacher appear near the bottom of the graph, and those with highest ratios appear on the top. Circle icons represent acceptable

ratings, and triangles unacceptable rating. While the figures provide a crude measure, they do indicate correlations between school performance and school and class size.

As is evident in Figure 12, virtual schools that are either very large or have very high student-teacher ratios all received unacceptable school performance ratings from their state education agencies. Virtual schools rated acceptable are visibly concentrated in the bottom left-hand corner, indicating that they had fewer than 60 students per teacher and enrolled fewer than 500 students. The figures reflect that better school performance correlates with lower enrollments and student-teacher ratios.[40]

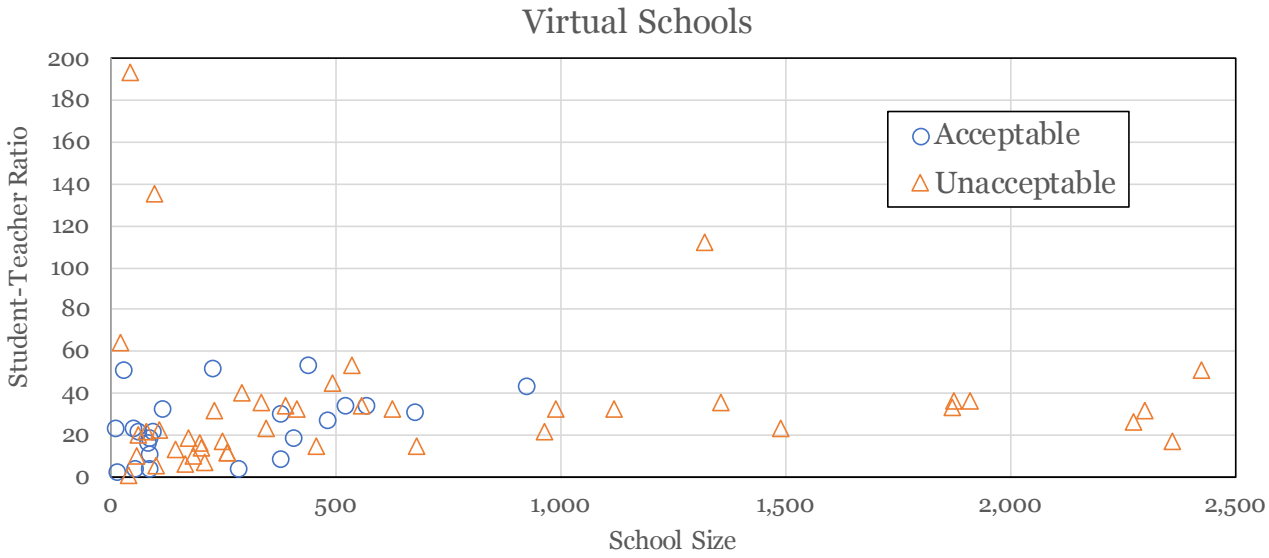


Figure 12. State Ratings of Virtual Schools and Their Relationship with School Size, Student-Teacher Ratios

Notes:

- Several outlier schools with extraordinarily large enrollments are excluded from Figure 12. Eight schools were removed because they had more than 2,500 students in the schools and extending the chart to this boundary made it difficult to see details. One of these schools, eCOT in Ohio, had more than 14,000 students; in 2016-17 it was rated unacceptable as in previous years. Only one of the 8 excluded schools was rated acceptable; it had fewer than 3,000 students.
- In order to create a legible scale in this figure, four other virtual schools were excluded because they had extraordinary large student-teacher ratios—more than 200 students per teacher; all were rated unacceptable.

Figure 13 illustrates the relationship between blended school performance and school and class size. Although correlations are not as pronounced as for virtual schools, the figure indicates that most outlier schools tended to be rated unacceptable.

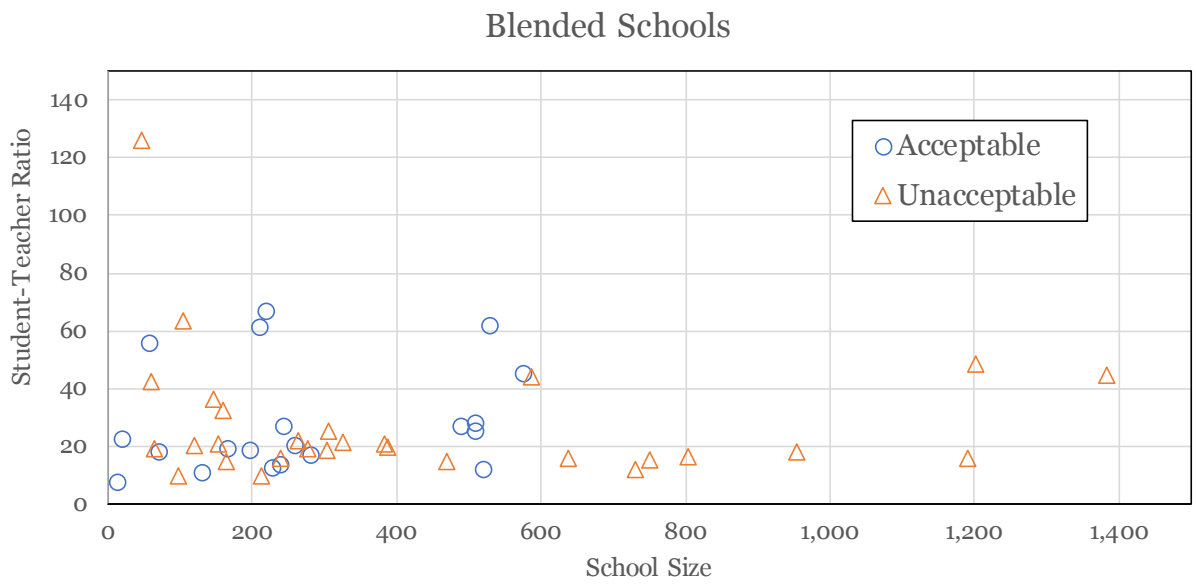


Figure 13. State Ratings of Blended Schools and Their Relationship with School Size, Student-Teacher Ratios

Note: One Colorado outlier with 3,764 students was excluded; it was rated acceptable. It is unusual to see blended learning schools this large because of the need to physically provide face-to-face instruction during part of the week. This particular school, GOAL Academy, delivers about 85% of the instruction virtually and only 15% working directly with teachers and peers.

Graduation Rates

While recent efforts to standardize reporting of graduation rates has led to many states' adoption of the "On-Time Graduation Rate" metric, the omission of this variable from federal databases, in conjunction with other states' unstandardized or incomplete reporting practices, hampers efforts to easily compare graduation rates across states. In order to ensure the reasonable aggregation of school completion data, 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 9th 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.

Because several states had not yet made graduation rate data for the 2016-17 school year available as this report was compiled, and because some schools reported receiving exemptions, gaps in the dataset were filled using rates for the 2015-16 school year. Although inadequate for longitudinal comparisons within schools, this data represents a realistic and comprehensive approximation for the purposes of this cross-sectional analysis. Of the total 429 virtual schools in the inventory, information on graduation rates was available for 247 (57.6%); of the 296 blended schools, information was available for 152 (51.4%). Many

schools did not report a graduation rate because they do not offer high school grades; others are relatively new and have not had a student cohort complete grades 9-12.

As Table 9 illustrates, the on-time graduation rates for full-time virtual and blended schools (50.7% and 49.47% respectively) were less than the national average of 83%. While still low, these rates suggest a notable improvement those reported in previous inventories. In 2015-2016, average graduation rates were 43.5% for virtual schools and 43.1% for blended. The improvement 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. Nevertheless, far larger gains are necessary for these schools to approach any threshold of acceptability.

Current graduation rates across all subgroups of virtual and blended schools are poor compared to the 83% national average. Independently managed virtual schools had the highest rate, 60.3%, while independently managed blended schools has a rate of 55.3%. Rates in for-profit and nonprofit operated virtual schools were 44.4% and 48.0%, respectively. Within the subgroup of EMO-managed virtual schools, the graduation rate for Connections Academy was 52%, and for K12, Inc. was 43.4%. While these virtual school graduation rates were relatively close across sectors, rates of for-profit and nonprofit managed blended schools diverged significantly: 37.9% and 57.1%, respectively.

Graduation rates in charter blended schools were similar to those of district-operated virtual schools, about 49.6% and 49.1%, respectively. However, charter virtual schools reported far lower graduation rates (47%) than district virtual schools (64.9%). For-profit and nonprofit virtual and blended schools tended to report similar rates regardless of charter status. Particularly noteworthy was the performance of independently operated district virtual schools: 112 schools reported an average rate of 72.55%. The reasons for this notable finding are unclear. It is possible that independently-operated district schools appeal more often to high-achieving students while for-profit and non-profit schools more often serve as dropout prevention or credit recovery programs. However, the relatively low graduation rate of independently operated district blended schools seems to cast doubt on that explanation. Alternately, it is possible, as acknowledged elsewhere in this report, that districts are more likely to retain low-performing students in internal virtual programs while referring high-achieving students to district-affiliated independently operated virtual schools to conserve resources and promote efficiency.

Table 9. Graduation Rates, 2016-17

VIRTUAL SCHOOLS	Number of schools with data	Graduation Rate	BLENDED LEARNING SCHOOLS	Number of schools with data	Graduation Rate
All Virtual Schools	247	50.7%	All Blended Schools	152	49.5%
Independent Virtual	167	60.3%	Independent Blended	75	55.3%
Nonprofit Virtual	12	48.0%	Nonprofit Blended	32	57.1%
For-Profit Virtual	68	44.4%	For-Profit Blended	68	44.4%
K12 Inc.	37	43.4%	K12 Inc.	6	41.1%
Connections	17	52.0%	Connections	7	53.4%
District Virtual	121	47.0%	District Blended	93	49.6%
Charter Virtual	126	64.8%	Charter Blended	59	49.1%
National Average[41]		83%			

Discussion and Recommendations[42]

Full-time virtual schools and blended learning schools represent promising ideas. Teachers are increasingly implementing blended models of learning in their classrooms. 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.[43] 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 leaning schools have been influenced considerably by corporate interests and private education management organizations (EMOs), most notably K12 Inc., Connections Academy (virtual schools), and Rocketship Education (blended schools). As currently implemented, these models are not serving students well and these schools are not in taxpayers' best interest. Nevertheless, the poor performance of current full-time virtual and blended learning schools does not mean that they should be abandoned. Instead, fundamentally new models need to be developed with input from a broader array of stakeholders. Although largely descriptive, this report seeks to provide relevant evidence to inform and guide options that policymakers should consider as they work to address prevalent concerns about the country's virtual school and growing blended school sectors.

Smaller Schools and Lower Student-Teacher Ratios

This report presents evidence that strengthens the claim that the lowest performing virtual and blended learning schools have excessively large enrollment and shockingly high student-to-teacher ratios. As designed and implemented, most virtual school are large, serving many students who largely work independently to retrieve content from a learning platform. Parents or an adult in the household—when available—serve as the teacher "in effect"

though not "of record," which enables the virtual schools to allocate fewer paid certified teachers relative to the number of students enrolled.[44]

Virtual schools have real and substantial cost advantages, especially due to very limited facilities expenses and the fact that they spend little or nothing on transportation, school meals, student support services, extracurricular activities, and so on.[45] With such cost savings, virtual schools should be able to divert resources to ensure more teachers to support students. While a closer financial analysis is needed, the estimate from previous NEPC reports[46] is that the cost advantages or savings should allow virtual schools to lower student-to-teacher ratios to 8-11 students per teacher, significantly lower than the national public school average of 16 students per teacher. Instead, recent data indicates that on average virtual schools have an average of 45 students per teacher and blended schools have 32, far exceeding the national average.

Virtual instruction does not have to mean that students learn in isolation, which is the most common situation because corporate models do not fully promote student engagement.[47] However, students at primary and secondary levels require adult support and interaction. While children in the early primary grades are increasingly effective with technology, it's likely that most cannot retrieve materials from and interact effectively with a learning platform by themselves. Further, many children lack the meta-cognitive skills to successfully learn on their own in the prevalent model of virtual schooling.[48] Class sizes have been limited for online classes in many universities, raising this question: Why is it that universities act to ensure smaller class sizes for virtual classes for older and more mature students, while state officials allow providers at primary and secondary levels to elevate class sizes by two to eight times the norms for face-to-face classes?[49] Research examining optimal class sizes for online schooling has been initiated (see Lin, Zheng, and Freidhoff, 2016)[50] although more research is needed on this topic.

Local, state, and national reports continually repeat that full-time virtual schools are failing (see our literature review in the school performance section above). Rather than taking steps to address problems with instruction, or the lack thereof, private operators appear to invest more resources in (i) advertising and recruitment to replace the large numbers of students who leave the schools,[51] and (ii) purchasing influence in state policy arenas to limit or prevent restrictive legislation.[52] Increased oversight and regulations should induce virtual school operators to address problems so that student outcomes in virtual schools serving primary and secondary schools more closely match the success evident at the tertiary level.[53]

Recommendations

This report presents evidence that the lowest performing virtual and blended learning schools are excessively large schools and have high student-to-teacher ratios. To help ensure that poorly performing virtual and blended schools allocate more resources for instruction and improve student-teacher ratios, it is recommended that policymakers consider one or more of the following three measures.

- Specify a maximum student-teacher ratio for virtual and blended schools to en-

sure that all students receive adequate teacher support and attention. Such regulation should specify the maximum number of full-time equivalent (FTE) students for each FTE teacher.[54] Intermediate steps might be considered to impose such a requirement only on schools that fail to meet state or agreed-upon standards. If schools can show a pattern of successfully educating students, it should be possible to allow them to increase the number of students per teacher as long as student success is maintained.

- Specify that a proportion of public revenues be devoted to instructional costs.

- This measure has been considered in some states, but a key concern is that virtual schools and blended schools operated by EMOs have considerable flexibility in changing the labeling of expenses to meet specified targets. Such a measure should be considered only if staff in the state education agency believe they have sufficient insight into actual spending and sub-contracting practices.

- Require that teachers employed by virtual schools, and not parents, take primary responsibility for students' education. The widely practiced corporate model instead largely relies on the parent as teacher and provides contracted teachers with insufficient time to interact with students and to provide support for those who struggle or drift away. In the current model, teachers report that they devote considerable time to monitoring student progress and serving as a resource for those adults who are involved in teaching the children. Shifting instructional responsibility to certified teachers would necessarily shift school allocation of resources toward instruction. In practice, this should increase substantially the number and duration of personal contacts that virtual school teachers have with their students.

Safeguarding Against Profit-Driven EMOs: Ensure Funding Goes to Instruction

Most virtual and blended school students are enrolled in schools operated by private education management organizations (EMOs) that are organized to maximize revenues and profit for their stockholders, owners, or executives.[55]

Since so many of the virtual schools are driven by profit, one option is to limit private owners and operators. Another option is to create and implement safeguards regarding private EMOs. To help regulate for-profit operators, it is recommended that policymakers:

- Require that public charter school boards be established before charter applications are submitted. If and when a charter is granted and an EMO is to be hired, require the board to consider multiple bids.

- Require charter authorizers and school district boards to review management agreements between private EMOs and charter or district virtual schools.

- Ensure transparency of school-specific data, pushing back on EMOs that consid-

er information regarding the operation of the school to be proprietary. School boards must have access to detailed budget data to hold private EMOs accountable. State education agencies and the public also must have access to school operating and outcome data similar to that available for traditional public schools in order to protect both children's and taxpayers' interests.

Measures to reduce profit margins will subsequently reduce the interest in virtual schools by for-profit EMOs. For-profits have dominated this sector, and some EMOs that have worked exclusively with brick-and-mortar charter schools are now entering the virtual school marketplace. To help ensure that funding for virtual schools appropriately reflects services provided to students, it is recommended that policymakers do the following.

- Reduce per-pupil funding for students in virtual schools and virtual programs, modifying funding formulas to more closely reflect actual costs.
- Study and adapt Florida's resource allocation system for virtual schools, which provides funding only for students who were enrolled throughout the school year and who passed state assessments.

A broader set of recommendations is presented and discussed in Miron (2012) and Molnar et al., (2017).[56]

Priorities for Future Research

While the body of scholarly work on virtual and blended schools is expanding gradually, some research priorities deserve immediate and expanded attention. Therefore, it is recommended that policymakers and researchers give attention to the following six topics.

- *Special education*. How are virtual and blended schools serving students with disabilities? Data indicate that they are enrolling more and more students classified as having a disability. They are thus increasingly tapping into categorical funding for such students. However, little is known about how virtual schools are serving special education students and how they are spending the additional financial resources being provided.
- *School and class size*. Further research on optimal school and class size is needed for virtual schools and blended schools serving children at primary and secondary levels. Also needed is research on the optimal type and duration of contact between virtual school teachers and their students.
- *Teachers*. Just as in brick-and-mortar schools, teachers are critical for student success in virtual and blended learning schools. Therefore, a range of questions and issues related to teachers requires further inquiry. What constitutes good or acceptable teaching in fully online and blended learning settings? What are examples of best practices for teaching in these settings? How do we adequately prepare teachers (both pre-service and in-service) for teaching in online and blended learning schools? What standards or additional credentials would be

suitable for those wishing to teach online or in blended learning settings? How will online and blended learning teachers be evaluated, especially given increasing evaluation activities required under teacher evaluation reforms?

- *Funding formulas*. More evidence is needed specific to revenues and patterns of expenditures in virtual and blended learning schools. Reframing funding formulas to more closely reflect actual costs is critical. Such research must be conducted by persons or entities with no vested interest in, and no relationship with, private EMOs.

- *Blended learning*. Smaller school sizes and existing of some face-to-face activities are a few features that suggest that blended learning models may be more successful at integrating technology, expanding school choice options, and still ensuring adequate care and support for students. While the available evidence on blended learning is less comprehensive than evidence regarding virtual schools, the evidence that is available is not promising. More research is needed to determine if there are particularly effective delivery models or particular states or jurisdictions in which blended schools may be working well. Because of variations in models, considerable research is needed to identify strengths and critical features of blended schools that can serve students successfully.

- *Research on existing virtual and blended learning programs*. The research undertaken by the National Education Policy Center and Western Michigan University has focused largely on legally defined individual schools, excluding programs that are housed in traditional brick-and-mortar schools or in districts. The advantage of the focus on discrete schools is that identifiable demographic and school performance data are readily available from public sources. It is much more difficult and time-consuming to collect data on virtual and blended programs co-housed in traditional schools or based in districts, research on which would entail discriminating between data applicable to the program and that applicable to the traditional school or the district. While we know the current models for virtual and blended schools are problematic, it is possible that many full-time virtual and blended programs based in schools or districts may be more successful. For this reason, research providing a more inclusive overview of the number and scope of currently operating virtual and blended programs is needed. Further, more research is needed to increase our understanding of variations across existing programs, the students they serve, and the outcomes attributed to them.

Other Recommendations

Given the rapid growth of virtual schools and blended schools, the populations they serve, and the relatively poor performance of virtual schools on widely used accountability measures, four final recommendations are offered.

- Policymakers should slow or stop the growth in the number of virtual schools and

in the size of their enrollments until the factors responsible for their relatively poor performance have been addressed.

- Policymakers should carefully and continuously monitor the performance of full-time blended schools since the evidence base is still weak.
- Authorities charged with oversight should specify and enforce sanctions for virtual and blended schools that perform inadequately.
- State agencies should (1) ensure that virtual and blended schools fully report data related to the student population they serve and the teachers they employ, and (2) make every effort to assign all virtual schools an overall school performance rating and explain each missing rating.[57]

Appendices

Appendix A1. Numbers of Virtual Schools and Students by State

Appendix A2. Numbers of Blended Learning Schools and Students by State

Appendix B1. Numbers of Full-Time Virtual Schools and the Students They Serve

Appendix B2. Numbers of Blended Learning Schools and the Students They Serve

Appendix C1. Measures of School Performance: State Performance Ratings, Adequate Yearly Progress Status, and Graduation Rates—Full-Time Virtual Schools

Appendix C2. Measures of School Performance: State Performance Ratings, Adequate Yearly Progress Status, and Graduation Rates—Blended Learning Schools

Appendix D. States' Assessment System, School Performance Ratings Summarized by States for their Full-Time Virtual and Blended Learning Schools

The Appendices as well as links to data sources are available for download as PDF files at http://nepc.colorado.edu/publication/virtual-schools-annual-2018.

Notes and References

1 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;

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;

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.), 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;

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;

Molnar, A., Miron, G., Gulosino, C., Shank, C., Davidson, C., Barbour, M.K., Huerta, L., Shafter, S.R., Rice, J.K., & Nitkin, D. (2017). *Virtual Schools Report 2017.* Boulder, CO: National Education Policy Center. Retrieved June 16, 2017, from http://nepc.colorado.edu/publication/virtual-schools-annual-2017

2 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.

3 See notes in the appendices for more details regarding inclusion criteria.

4 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.

5 It is worth noting that in the 2015-16 dataset, 46 additional schools from Alabama were initially identified as Virtual Schools through the errant inclusion of a virtual school indicator in the NCES School Universe Survey data. Inspection of these schools quickly revealed that they were in fact brick-and-mortar schools, and they were subsequently removed from the dataset.

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 38 states would have been possible, albeit time consuming.

Unfortunately, focusing on data from the 38 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, Missouri, North Carolina, South Carolina, South Dakota, and Wyoming.

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 25 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 See http://nbc4i.com/2018/01/18/ecot-sponsor-votes-to-suspend-sponsorship-school-to-close-friday/

12 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

13 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.”

14 Data on ethnicity are from 2014-15, the most recent year from which we could obtain NC6S data. The NCES provides the most comprehensive data, all from a single audited source. We also pulled together data on race/ethnicity, sex, free- and reduced-price lunch status, English Language Learner status, and special education status for 2015-16 from state sources and from school report cards. The data from NCES for the 2014-15 was more complete which is why we report this data even though it is one year older than our general enrollment numbers.

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

16 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 environment. 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 (https://www.ohdela.com/media-center/blog/ohdela-fits-all-student-needs.html)

17 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

18 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.

19 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

20 This finding is based on NCES data from the *Conditions of Education 2015*. Retrieved December 2, 2015, from http://nces.ed.gov/pubs2015/2015144_highlights.pdf and http://nces.ed.gov/programs/coe/indicator_clr.asp

21 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.

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

23 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

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 April 24, 2018, from http://nepc.colorado.edu/files/nepcrbk12miron.pdf

25 Zimmer, R., Buddin, R, Chau, D., Gill, B., Guarino, C., Hamilton, L., Krop, C., McCaffrey, D., Sandler, M., & Brewer, D. (2003). *Charter school operation and performance: Evidence from California*. Santa Monica, CA: RAND.

26 Office of the State Auditor (2006). *Online education: Department of Education Performance audit*. Denver, CO: Author.

27 Miron, G., Nelson, C., & Risley, J. (2002). *Strengthening Pennsylvania's charter school reform: Findings from the statewide evaluation and discussion of relevant policy issues*. Harrisonburg, PA: Pennsylvania Department of Education.

28 Legislative Audit Bureau (2010). *An Evaluation: Virtual Charter Schools*. Madison, WI: Author.

29 Zimmer, R., Gill, B., Booker, K., Lavertu, S., Sass, T.R., & Witte, J. (2009). *Charter schools in eight states effects on achievement, attainment, integration, and competition*. Santa Monica, CA: RAND Corporation. Retrieved April 24, 2018, from http://www.rand.org/content/dam/rand/pubs/monographs/2009/RAND_MG869.sum.pdf

30 Hubbard, B. & Mitchell, N. (2011). *Online K-12 schools failing students but keeping tax dollars*. I-News Network. Retrieved May 30, 2012, from http://www.inewsnetwork.org/special-reports/online-k-12-schools/

31 Office of the Legislative Auditor. (2011). *Evaluation report: K-12 Online Learning*. St. Paul, MN: Author.

32 CREDO (2011). *Charter school performance in Pennsylvania*. Palo Alto, CA: Center for Research on Education Outcomes (CREDO), Stanford University. Retrieved June 14, 2011, from http://credo.stanford.edu/reports/PA%20State%20Report_20110404_FINAL.pdf

33 Legislative Division of Post Audit (2015). *Performance audit report – K-12 education: Reviewing virtual schools costs and student performance*. Topeka, KS: Author. Retrieved April 24, 2018, from http://www.ksde.org/Portals/0/TLA/Graduation%20and%20School%20Choice/Virtual/Final%20LPA%20Report%20on%20Virtual%20Schools%202015.pdf

34 Center for Research on Educational Outcomes (CREDO). (2015). *Online charter school study*. Stanford, CA: CREDO.

35 Lueken, M., Ritter, G., & Beck, D. (2015). Value-added in a virtual learning environment: An evaluation of a virtual charter school. *Journal of Online Learning Research, 1*(3), 305-335. Retrieved April 24, 2018, from http://www.learntechlib.org/d/150993

36 Ahn, J., & McEachin, A. (2017). Student Enrollment Patterns and Achievement in Ohio's Online Charter Schools. *Educational Researcher, 46*(1), 44-57.

37 Iowa Department of Education. (2017). *Legislative Report: Virtual Schools in Iowa Annual Report*. Des Moines, IA. Retrieved April 24, 2018, from https://www.educateiowa.gov/documents/legislative-information/2017/01/virtual-schools-legislative-report-january-31-2017-2

38 Pane, J., Steiner, E., Baird, M., Hamilton, L., & Pane, J. (2017). *Informing Progress: Insights on Personalized Learning Implementation and Effects*. Santa Monica, CA: RAND Corporation. Retrieved April 24, 2018, from https://www.rand.org/pubs/research_reports/RR2042.html

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

40 Future research is needed to explore these relationships. We did consider running logistic regression but unfortunately the current data set did not currently link with key independent variables.

41 Note: The national figure is for 2014-15. https://nces.ed.gov/programs/digest/d16/tables/dt16_219.46.asp

42 This section builds upon findings in this report as well as evidence and arguments included in a report prepared for the Michigan Virtual Learning Research Institute in 2017;

Miron, G. (2017). *Improving Virtual Schooling in Michigan: Recommendations and Policy Options*. Lansing, MI: Michigan Virtual Learning Research Institute. Retrieved January 22, 2018, from http://media.mivu.org/institute/PDF/Miron_Improving_Virtual_Schooling_in_MI.pdf

43 Barbour, M.K., Miron, G., & Huerta, L. (2017). *Virtual schools in the U.S.: Case studies of policy, performance, and research evidence*. Lansing, MI: Michigan Virtual University. Retrieved July 18, 2017, from http://media.mivu.org/institute/pdf/VSCase-17.pdf;

Woodworth, J., Raymond, M., Chirbas, K., Gonzalez, M., Negassi, Y., Snow, W., & Van Donge, C. (2015). *Online Charter School Study, 2015*. Palo Alto, CA: Center for Research on Education Outcomes, Retrieved August 5, 2017, from http://credo.stanford.edu/pdfs/Online%20Charter%20Study%20Final.pdf

44 Given current regulations and current funding mechanisms, there are assumptions that certified teachers in the virtual schools would still be teaching or instructing students and they would have some personal contact with students, even if this communication was undertaken with computer and information technology.

Instead, it appears that teachers in the larger corporate virtual schools spend more time monitoring progress rather than instructing and supporting students.

45 Baker, B.D. & Bathon, J. (2012). *Financing Online Education and Virtual Schooling: A Guide for Policymakers and Advocates*. Boulder, CO: National Education Policy Center. Retrieved June 14, 2017, from http://nepc.colorado.edu/publication/financing-online-education;

Miron, G., & Urschel, J.L. (2010). *Equal or Fair? A Study of Revenues and Expenditures in American Charter Schools*. Boulder, CO: National Education Policy Center. Retrieved June 14, 2017, from http://nepc.colorado.edu/files/EMO RevExp.pdf;

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.* Boulder, CO: National Education Policy Center. Retrieved June 14, 2017, from http://nepc.colorado.edu/publication/understanding-improving-virtual

46 This estimate is based on patterns of expenditures identified for full-time virtual schools in two earlier publications (Miron & Urschel, 2010; and Miron & Urschel 2012, see full references above)

47 Borup, J., West, R.E., Graham, C.R., & Davies, R.S. (2014). The adolescent community of engagement framework: A lens for research on K-12 online learning. *Journal of Technology and Teacher Education, 22*(1), 107–129. Retrieved July 14, 2017, from http://www.editlib.org/p/112371

48 Lowes, S. & Lin, P. (2015). Learning to learn online: Using locus of control to help students become successful online learners. *Journal of Online Learning Research, 1*(1), 17-48;

Minnaar, A. (2012). Meta-cognition in Distance Education. In L. Visser, Y. Visser, R. Amiroult, & M. Simonson (Eds.) *Trends and Issues in Distance Education*, 2nd Edition. Charlotte, NC: Information Age Publishing;

Nelson, T.O., & Narens, L. (1990). Metamemory: A theoretical framework and new findings. In G.H. Bower (Ed.), *The psychology of learning and motivation* (pp. 1–45). New York, NY: Academic Press.

49 At Western Michigan University, the graduate school recognized the extra burden on teachers trying to maintain closer contact and support for students in full-time virtual courses. A maximum of 18 students is permitted in virtual classes while the maximum students for face-to-face students can vary from 20-25. The university achieves cost savings with virtual provision, mainly through savings on facilities. Universities also see virtual courses as a method for extending their reach;

Dr. Miron (lead author) typically teaches one to two virtual classes per year at the graduate level. Because the class size is limited to no more than 18 students, he is able to integrate students into real-time virtual classroom activities, including breaking the students into three to five groups so that they can work in smaller groups and then report back to the main class when he brings them back together on the learning platform. Instruction also includes pre-recorded lectures and asynchronous activities. Students participate regularly on a discussion board, and complete online assessments similar to what students in traditional classes complete. Monitoring progress and maintaining regular contact is possible with small class sizes. Even though graduate students are disciplined and motivated learners and even though they are able to self-regulate and effectively manage their time, it is not possible to teach virtual classes for graduate students with class sizes that are common in virtual primary and secondary schools.

50 Lin, C-H., Zheng, B., & Freidhoff, J. (2016, March). *Does class size matter in online K-12 classes?* Paper presented at the Society for Information Technology and Teacher Education International Conference, Savannah, GA.

51 Toppo, G. (2012, November 28). Online schools spend millions to attract students. *USA Today*. Retrieved June 15, 2017, from https://www.usatoday.com/story/news/nation/2012/11/28/online-schools-ads-public-/1732193/

52 Prothero, A. (2016, November 3). Outsized Influence: Online Charters Bring Lobbying 'A' Game to States. *Education Week*. Retrieved June 16, 2017, from http://www.edweek.org/ew/articles/2016/11/03/outsized-influence-online-charters-bring-lobbying-a.html

53 Means, B., Toyama,Y., Murphy. R., Bakia, M., & Jones, K. (2009). *Evaluation of Evidence-based Practices in Online Learning: A Meta-analysis and Review of Online-learning Studies*. Washington, DC: U.S. Department of Education.

54 Note that FTE consideration is necessary to correctly account for the instructional commitments of the many part-time teachers employed by most virtual schools.

55 Note that many of the district-operated virtual schools are designed to generate revenues that can be used to support the operations in the districts' other schools. Some district-operated virtual schools are set up specifically to draw in home-schooled children to increase their official headcount data and state revenues based on student headcount.

56 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.* Boulder, CO: National Education Policy Center. Retrieved June 14, 2017, from http://nepc.colorado.edu/publication/understanding-improving-virtual;

Molnar, A., Miron, G., Gulosino, C., Shank, C., Davidson, C., Barbour, M.K., Huerta, L., Shafter, S.R., Rice, J.K., & Nitkin, D. (2017). *Virtual Schools Report 2017.* Boulder, CO: National Education Policy Center. Retrieved June 16, 2017, from http://nepc.colorado.edu/publication/virtual-schools-annual-2017

57 In 2016-17, performance ratings of schools were available in only 15 of 38 states considered in this study. In these 15 states, 35% of the virtual schools and 18.3% of blended schools had no performance rating assigned. This lack of data for virtual and blended schools furthers their ability to operate without accountability;

Our analysis of data from state assessments and state-assigned school performance ratings suggest that virtual schools go unrated due to low testing participation rates. This allows their performance to go largely unchecked. States need to consider test participation rates in their overall performance rating rather than allowing a low participation as an "out."