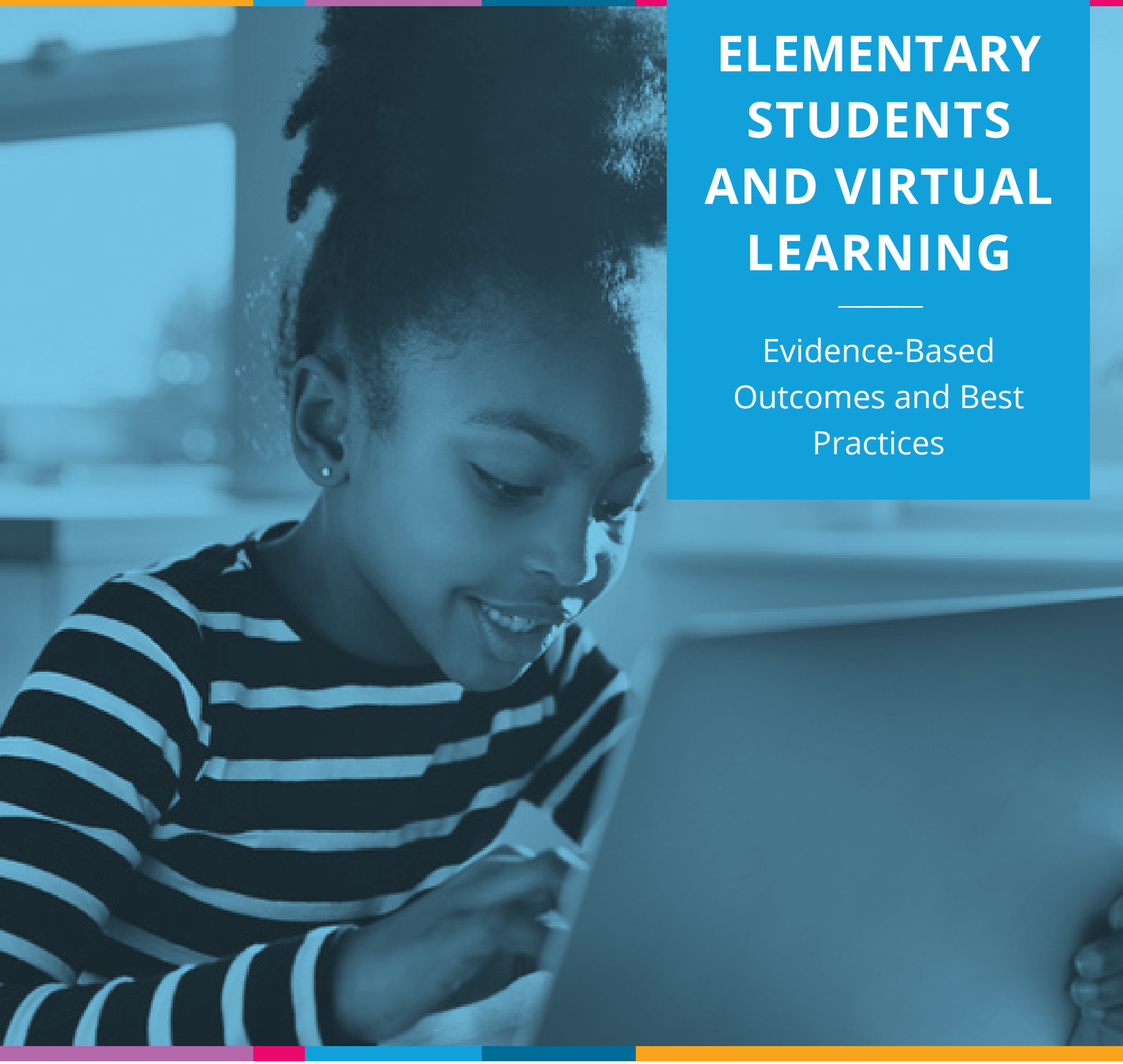


ELEMENTARY STUDENTS AND VIRTUAL LEARNING

Evidence-Based Outcomes and Best Practices

edmentum™

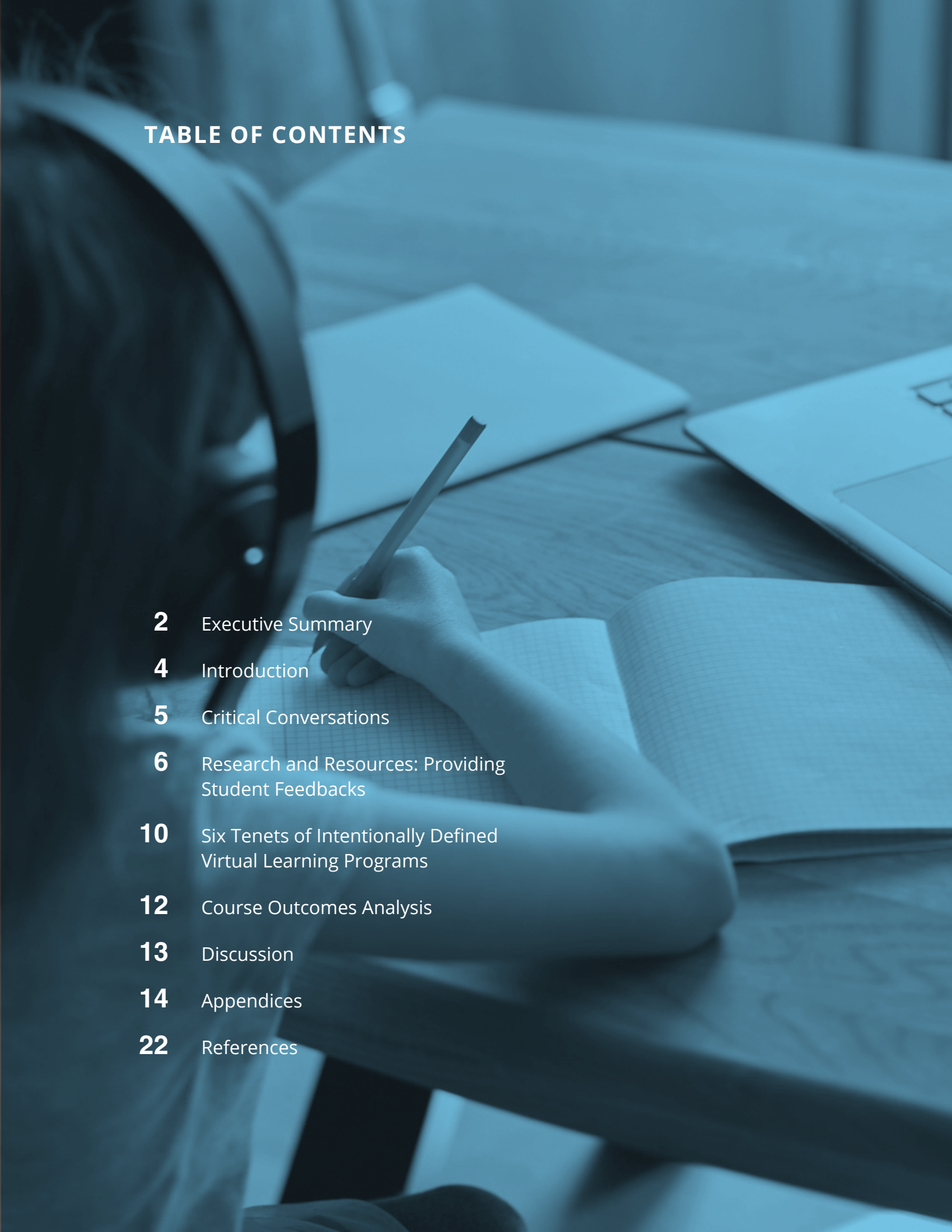


TABLE OF CONTENTS

Dear Colleagues

Since March of 2020, a global pandemic forced schools, teachers, administrators and families to dramatically change their approach to teaching and learning. Opportunity gaps widened, unfinished learning mounted disproportionately, and teacher morale took a toll.

After centuries of in-person instruction, districts scrambled to stand up remote learning models. Never have so many educators, students and families been so disrupted. Teachers moved lesson plans online and learned to utilize different technology and tools, often for the first time in their careers. At home, families had to make space to set up "classrooms" where they could find room – on the kitchen table, in a living room chair, or in the corner of a bedroom.

This emergency remote learning, more often than not, attempted to translate traditional in-person teaching practice to a non-traditional virtual setting. That may have been adequate in the early days of a public health crisis, but it is not sustainable or sufficient. This is especially true for our youngest students, who are developmentally less independent as learners. In a virtual setting, these learners require a system with structured time, consistent communication, meaningful relationships, and a reimagined role for parents and teachers.

Amidst this uncertain time, we see reason for hope. Edmentum, with a 60-year history of innovation and decades of expertise in virtual teaching and learning, was especially well-equipped to address this urgent need. This case study looks at learning outcomes from over 1,500 students and nearly 6,000 course enrollments throughout the entire 2020–21 school year. The results highlighted in this paper show that despite the context of a global pandemic this group of students achieved extraordinary success.

We know that disruption can lead to innovation and as educators we now have a profound once-in-a-lifetime opportunity and perhaps an obligation to reimagine what education and success looks like in the future. Nowhere is this obligation more important than it is for our youngest learners.

—— DAVE ADAMS, CHIEF ACADEMIC OFFICER

Acknowledgements

We are grateful for the time provided by Edmentum's educators who shared their insights. Thank you in particular to Krista Lasky, Sarika Simpson, Thelma Forte, Tiffany Barlow, Esther Zanovitch, and Kara Rippe for participating in extensive interviews. In addition, Edmentum's Data Science and Research teams have played critical roles in helping to extract and analyze thousands of academic performance and student demographic data points as part of this process. To build on these data-driven insights, Jean Sharp, in association with Sharp Solutions and Services Group, Inc., conducted interviews with elementary program and school leaders. Geoff Decker Communications provided writing and editorial support. Finally, the research and work of several associations, scholars, and organizations helped inform this paper, which are fully cited in the references section.

Executive Summary

Welcome to the EdOptions Academy (EOA) elementary school, a virtual program with roots as an early pioneer of modern homeschooling. This case study goes under the hood of the EOA K–5 program during the 2020–21 school year, one of the most disruptive and challenging years in the history of American education.

We examine the EOA model by hearing directly from several members of the instructional team, which has expanded dramatically to meet growing demand due to school disruptions beginning in 2020–21. They share insights on five themes for engaging students in high-quality virtual programs. In particular, they discuss EOA's system of communications, a foundation for meaningful relationships with students and parents.

National enrollment data for traditional district schools have shown steady enrollment decreases, with elementary grades seeing the largest declines. (Blagg & Gross, 2021). By contrast, EOA saw significant increases in enrollment in the 2020–21 compared to the previous school year, a trend seen nationally among established virtual programs. But it was hardly predictable or steady. In this case study, a timeline of student enrollments at EOA show the significant fluctuations in enrollment as schools reopened and vaccinations became available. Despite the tumultuous year, students achieved at high levels, with a median final course grade of 91.7% across the four core elementary subjects.

Finally, we look at the EOA's learning design, presenting a framework for high-quality, sustainable virtual learning programs in elementary schools. We identify the tenets of intentionally designed virtual learning programs, as well as high-impact practices that support these tenets. In addition, we seek to draw a clear distinction between intentionally-designed virtual programs and "emergency remote learning" a term that was adopted early in the pandemic to recognize that many of the online learning practices and policies did not reflect best practices and weren't sustainable. As the pandemic enters its third year, district schools that seek to maintain or expand their virtual offerings should understand these differences as they seek to move beyond the "emergency remote" models that have been adopted since early spring 2020.

Introduction

Dr. Tiffany Barlow had 16 years of brick-and-mortar experience as a teacher and instructional specialist, most recently helping English language learners.

"Then we had this thing called COVID happen," Barlow recalls. "It changed our world."

Concerned about returning to the classroom amidst a global pandemic, Barlow began searching for virtual teaching options and joined EdOptions Academy as part of a rapidly-growing K–5 instructional team. As a parent, she was also concerned about the safety of in-person learning for her elementary-aged daughter, and decided to enroll her in the EOA school. The experience has given her a unique perspective of what a sustainable high quality virtual program looks like. With a balance of synchronous and asynchronous learning incorporated into the day, a key tenant is flexibility, which affords students and their families voice and choice.

"My child loves the fact that her schedule is flexible," Barlow said. "She does not have to be up at the crack of dawn, getting dressed, and she still learns."

Barlow joined a team of seasoned educators that has embraced continuous learning. To better understand the experience of teaching and learning in a growing virtual school, seven EOA elementary virtual teachers–including Barlow–shared their insights as part of a series of interviews.

Intentionality	"We talk about intentionality and being flexibly in how we give students choices and voice in what they do."
Culture and climate	"You have to create a culture and a climate where it's alright to give the wrong answer. The minute we tell a kid that's the wrong answer, they're never going to raise their hand again. So, the intentional focus is the risk-free learning environment. If you fall, we have a safety net over here."
Caregivers as Partners	"We're not just teaching students, we are teaching the family. The role of the learning guide is key in supporting student learning, both in terms of content and technology. Particularly in K-2, the learning guide serves as a 'teaching assistant' to provide immediate help to the student in navigating the platform and answering student questions as they're engaged with the lesson. Teachers have had to get accustomed to having adults in their live lessons and intervention lessons every day and teaching them the platform and programs as well."
Relationships	"Students have to know that I care whether or not they're successful. So, making sure they know that you are there as the teacher and you're not just someone on the computer that's grading their work. And that comes with building those relationships and connections as well. So, number one, they have to know that there is someone who cares about their success."
Professional Learning and Instructional Support	"I call the other teachers my learning family. We were put in a situation where everything was new for a lot of us. And we're all learning from each other, including the leadership. That's what sets apart EOA from anywhere else I've been. Everyone wants to learn and we feel safe to make mistakes. That to me — just that culture — is what makes this place so special."

Critical Conversations

How Communication Elevates Virtual Learning for Students

One of the most effective aspects of EOA's virtual learning environment, teachers said, was an intentionality around how they develop trust and build relationships with students and families. As a result, the frequency, type, and efficacy of communications with students and families were a particular area of focus for this case study.

"Families see that we're not holograms, we're real people," said Thelma Forte, EOA K–5 Instructional Leader. "We're excited on the first day of school and cry on the last day of school. We build relationships with the kids and their families. We learn their pet's name."

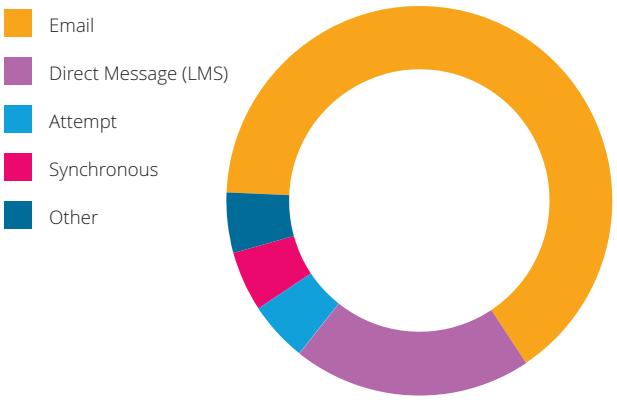
Forte is one of the most experienced brick-and-mortar educators on the staff, with a 29-year career that included stints as a superintendent, principal and mentor. She says that the flexibility and choice provided to parents or caretakers stands out as a feature that helps make virtual popular with some parents. "A lot of the things we did in brick and mortar schools can be transferred over to virtual, but only if you're very intentional and if you make sure each small step you take is met with quality control and fidelity."

An analysis of the 2020–21 digital and live teacher-student-parent communications shows the extent to which regular and personalized outreach is a weekly feature of virtual learning.

On any given day during the 2020–21 school year, EOA teachers were exchanging hundreds of messages via email, text messages, phone, or bi-weekly family video conferences. A total of 179,918 interactions for students enrolled over the entire school year were exchanged, according to an analysis. As Figure 1 shows, email communication was, by far, the most popular communication channel, but K–5 virtual teachers said that text and direct messages have become increasingly effective ways to quickly touch base and engage with families.

"A lot of times you're communicating with the adults just as much as the students, which is different than in brick-and-mortar schools," added Krista Lasky, an EOA elementary teacher with seven years of experience as a virtual instructor. "So good communication skills and flexibility are key" to being an effective online teacher in elementary grades.

Figure 1: Total communications between teachers and students/families in 2020–21, by communication type.



Anatomy of an Email: What's in a message?

Figure 2: A sample email communication demonstrating the different types of feedback to provide students

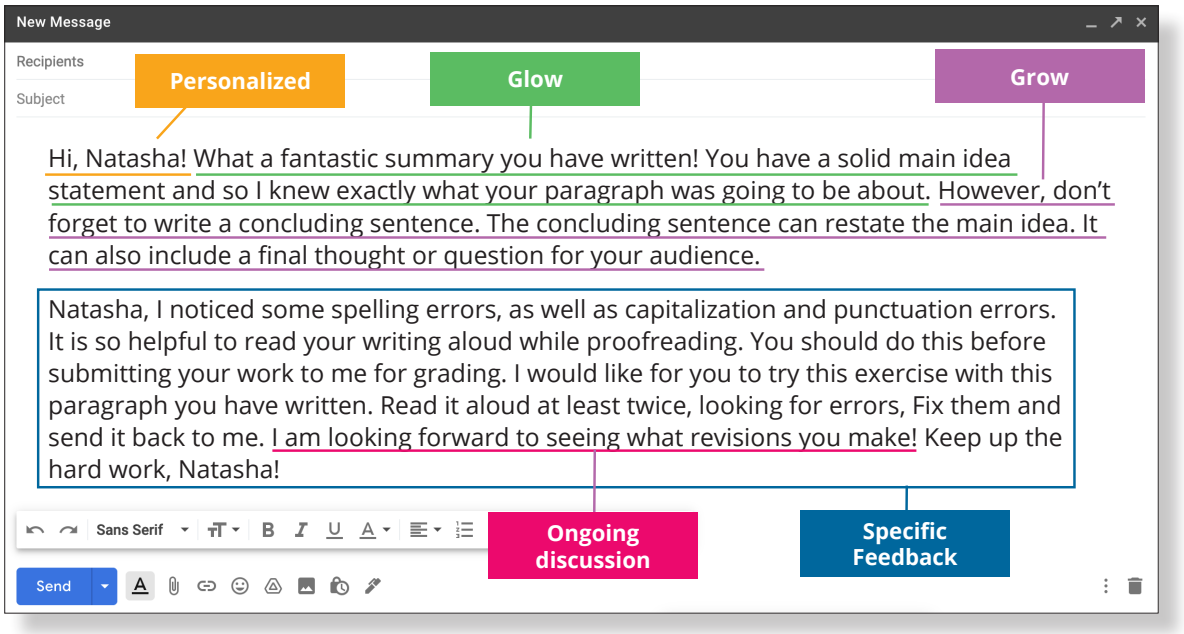


Figure 3: Total weekly teacher communications by student grade (2020–21)

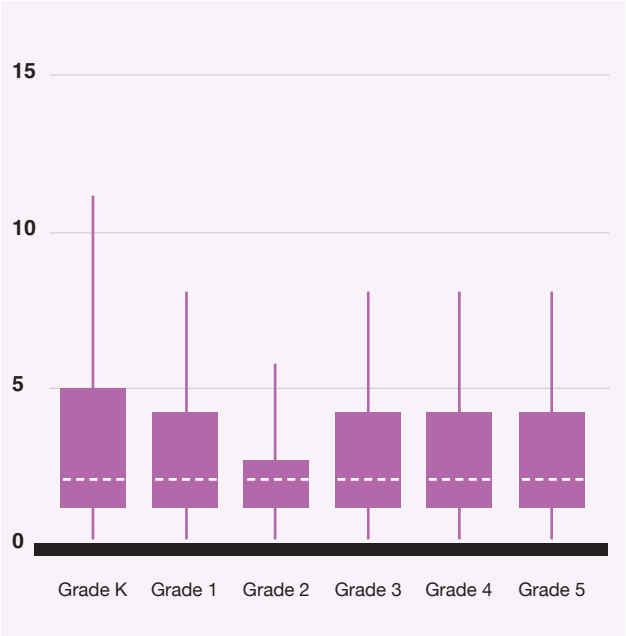


Figure 4: Total teacher communications by student grade (2020–21)

Figure 3 and Figure 4 show distributions of the weekly and total communications occurring outside of the regular classroom schedule. The colored bars show the 25th–75th percentile, while the solid line represents the median number of communications. The data show that a majority of students receive at least one communication from their teacher on a weekly basis, more frequently in kindergarten, where some families correspond with teachers on a daily basis. A majority of students received at least 75 total messages, with some students in younger grades exchanging upwards of 130 messages.

Research and Resources: Providing Student Feedback

Providing effective feedback to students on assignments is another proven form of in-class communication that has demonstrated positive outcomes. Research shows that students who received personalized feedback from their instructors felt more satisfied in the learning experience and achieved larger academic gains than students who did not (Gallien & Oomen-Early, 2008).

In a longitudinal survey of 7,652 EdOptions Academy students from 2019–21, 94 percent of students felt their teacher provided the support needed for them to be successful, and 96 percent said their teacher cared about their success (Edmentum, 2021b).

K–5 Virtual Best Practices for Engaging Students and Offering High Quality Feedback

When class is in session, communication strategies can help build relationships with students and improve engagement. “In my experience it is a lot easier to be animated in person whereas you’re more restricted in front of a screen,’ said Kara Rippe. “So, I think really communicating that through facial expressions, through your voice, your smile – all that really goes a long way with building relationships with your students.”

Here are seven strategies for providing effective student feedback in a K–5 virtual learning environment. (Lasky et al. 2020).

- Address students with **personalized** comments
- Acknowledge effort and always **include a ‘glow’**
- Help students identify skill gaps and **include a ‘grow’**
- Maintain a constructive, **supportive written tone**
- Provide **specific examples** from the student’s work
- Avoid **vague statements**
- Encourage students to initiate **additional discussion**

Engaging Caregivers in Virtual Learning

Learning Guide at the Side: The Role of Parents and Caretakers

In the world of virtual learning, making connections is a key ingredient to success (Edmentum, 2021c). In interviews with Edmentum's veteran virtual K–5 teachers, connections are especially important when it comes to building relationships with a young learner's parents or caretakers.

"If you don't have someone at home who is engaged with the student, it makes it tricky," said Krista Lasky, who is one of two founding teachers of Edmentum's newly launched K–5 virtual academy in 2019 (Read more about the integration of Calvert Digital project-based curriculum into the Edmentum model below). Lasky, who has worked in elementary education for 17 years, including seven in virtual learning, said that one of her biggest challenges as a virtual instructor has been finding strategies to engage caregivers. "If the students don't have engaged family members at home, they won't be coming to our live lessons and that makes it very difficult for them to succeed."

Known as "learning guides," caregivers of children enrolled in Edmentum's K–5 program are as much a part of the teaching and learning equation as anyone. Lasky said learning guides play a few key roles. First, they need to be familiar with the curriculum. They also need to help their children with everything from logging onto live Zoom sessions, to maintaining a presence during synchronous portions.

The teachers said that parent engagement is one of the biggest challenges they face when it comes to success in a virtual program. One of the ways to effectively encourage increased engagement is by building meaningful relationships. Lasky said that weekly and bi-weekly calls, regular and consistent email and text message communications, and consistently scheduling office hours are a few ways to increase engagement.

5 Virtual Strategies for Engaging Caretakers

Krista Lasky shares five strategies for increasing parent engagement in K–5 virtual learning.

1 Set up virtual office hours: Structured video conferences and specific times for teachers to meet with caregivers to check-in, collaborate, and plan lessons

2 Create and share a schedule: Parents, especially those new to virtual learning, should receive a calendar with a set schedule for their child's synchronous classes.

3 Create short videos: These short-format instructional videos (less than 15 minutes) are primarily for students, but should be understandable and engaging for caregivers.

4 Build routines to set clear expectations: Tools like digital checklists can set clear and consistent timelines for required assignments and activities.

5 Be flexible: It is easy for caregivers to get overwhelmed, especially if virtual learning is new to them, so maintain flexibility that reflects the spirit of virtual learning.

Virtual Issue Spotlight: Changing Enrollment Trends

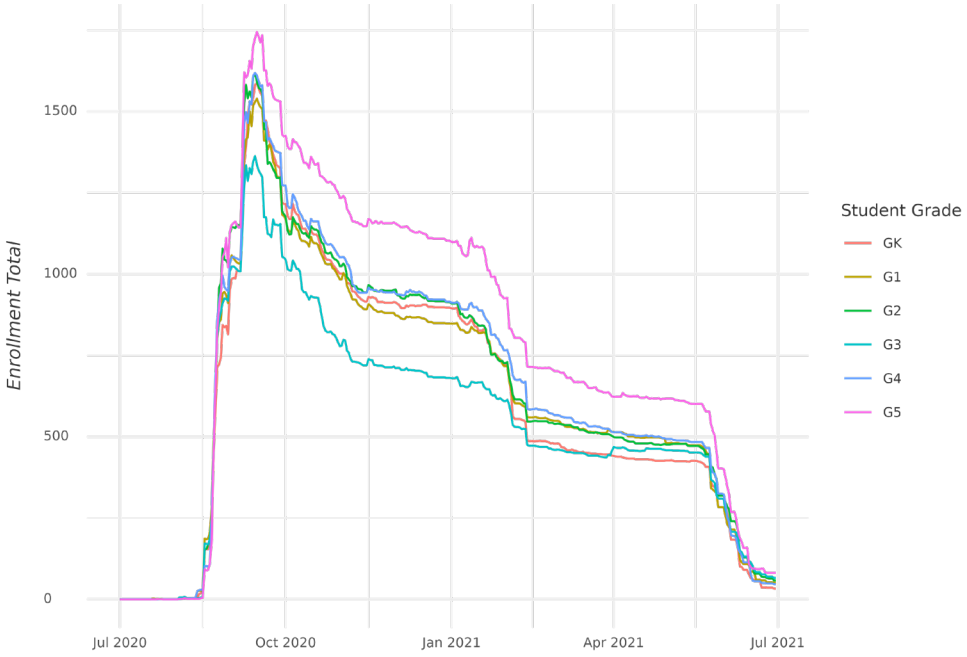
In March 2020, nearly all schools across America's 13,000 districts shuttered in response to the unpredictable and rapidly-spreading COVID-19 pandemic. Younger students in particular were less likely to receive instruction and feedback, and the burden of students' learning fell on parents and guardians. While there were some obvious signs of improvement during the 2020–21 school year few districts were fully prepared to meaningfully improve remote instruction (CPRE, 2021).

National reports on enrollment in traditional brick-and-mortar schools have consistently shown decreases at historically significant rates. The decrease has been seen across grade levels, socioeconomic status, and race/ethnicity, but the change has been most profound in elementary school grades (Chu, 2021). Many of the brick-and-mortar departures have ended up with increased enrollments in virtual schools. And while virtual school enrollment increased during the pandemic, it has been primarily in states with established programs (Blagg & Gross, 2021)

At EOA, 2020–21 enrollment increased significantly in the late summer and early fall of 2020. Some had safety concerns for their children in in-person settings, while others were dissatisfied with their districts reopening plan.

Figure 5 shows the EOA K–5 enrollment trends for the 2020–2021 school year during the heights of the COVID-19 pandemic. As school districts initially set up virtual programs in the early fall, EOA saw a dramatic spike in enrollments. Then, in the early spring, as vaccinations became available and COVID rates dropped, EOA enrollment dropped as schools reopened and some students returned to in-person learning.

Figure 5: Charting enrollment during the pandemic



Six Tenets of Intentionally Designed Virtual Learning Programs

Virtual learning for elementary schools is not "brick-and-mortar on the computer." There is, unquestionably, a great deal of overlap when it comes to evidence-based teaching concepts and strategies. Active learning, getting to know your students, and promoting growth mindsets are all strategies that in-person classes have embraced for years.

But there are also many distinctions.

The school day looks different for every student in the EOA virtual academy. While there are structured schedules, students have more flexibility to make choices that fit their learning needs. Designated parents or caretakers have an official role—learning guides—and help their child utilize voice and choice when shaping their learning experiences. Early-risers might choose to attend an early live mathematics class at 8:00am, take a break, then join an English language arts class before lunch. Others might choose to rewatch video recordings or practice new skills before they demonstrate mastery.

The teacher's role also looks different in virtual environments. A self-paced learning platform, supported with personalized digital curriculum, can address the different levels of academic readiness and unique competencies that each student brings to class. Virtual teachers spend more of their time getting to know their students, developing relationships with families, and focusing relentlessly on ensuring students are gaining knowledge and mastering new skills.

THE CALVERT DIGITAL FRAMEWORK

Calvert Learning is Edmentum's specialized elementary curriculum. The Calvert Digital Framework is based on the principles established by a large body of research around how students learn, integrate, and retain concepts.

Also known as the PLUS Framework, Calvert Learning consists of four elements to deliver high-quality curriculum: project, learn, use, show

High-impact instructional practices identified in John Hattie's meta-analysis of over 800 evidence-based educational research studies are foundational to Calvert Digital's learning design (Hattie, 2009, 2015). The research summary below briefly describes the evidence basis for many of the teaching practices embedded into the program.

1 Explicit Instruction
A direct approach that prioritizes "clarity of language and purpose" (Hughes et al., 2017). Effective instructional elements include establishing clear learning objectives, teaching in "small steps" to break down complex concepts, organizing course content from a student's POV, modeling decision-making processes, and clearly-defined grading rubrics (Archer & Hughes, 2011).

2 Project-Based Learning
Projects motivate students and provide authentic opportunities for sustained inquiry, reflection, revision, and sharing.

3 Active Learning
Active learning occurs when students have opportunities to activate their prior knowledge on a topic. Students must retrieve, respond to, and manipulate new information. (Mayer, 2004, 2009; Mayer et al., 2009; Hattie 2012). Examples include integrated assessment, interactive "checks for understanding" and formative questioning techniques.

4 **Scaffolding**

Scaffolding is a process in which temporary supports are provided to help students master new content and are then strategically removed as students gain advanced knowledge (Hattie, 2015, p. 129). This instructional practice is effective at helping students meet task requirements and develop executive functioning skills (Volman & Beishuizen 2010). Tools for scaffolding include fillable graphic organizers, math manipulatives, word banks, and sentence frames.

5 **Providing Feedback**

Feedback from a teacher or a learning system in response to student work draws student attention to a gap in knowledge and fosters improvement. Feedback can address processes, information, misunderstandings, or motivation to lead students to success (Hattie & Timperley, 2006). Research demonstrates that students who received personalized feedback from their instructors felt more satisfied in the learning experience and achieved larger academic gains than students who did not (Gallien & Oomen-Early, 2008).

6 **Evaluation and Reflection**

Research underscores the importance of helping students evaluate their work, identify mistakes, and create a plan to improve (Nuckles, Hubner, & Renkl, 2009). According to Hattie (2012), "students can use prompts to monitor and reflect on their own learning approaches." Within the lessons, reflections prompt students to think critically about their process and resulting work (e.g., Was the problem in your experiment solved?). Similarly, each lesson contains Use for Mastery guidelines that ask students to evaluate the quality of their response before submitting for grading. Finally, a Project rubric prompts student self-evaluation and reflection of their work.

Time Machine: Distance Learning During an Epidemic

In 1906, Virgil Hillyer was faced with a public health crisis that may sound familiar to school leaders today. A whooping cough outbreak was rapidly spreading across Baltimore, where Hillyer was headmaster at the Calvert Primary School, forcing many ill students home. Determined to allow them to continue learning while they recovered, Hillyer and his staff reimagined their school's delivery of curriculum and instructional services.

In the process, they invented modern homeschooling.

Calvert's Home Instruction Department was a first-of-its-kind homeschool program that packaged together detailed lesson plans for parents to teach from home. The experiment proved successful, with some at-home students reported to have outpaced their in-school peers upon returning. Hillyer, a nationally and internationally renowned innovator in primary and elementary education, soon made the program more widely available to other young children and their families seeking at-home learning options.

Over the next century, the Calvert Education model continued to innovate in the virtual and blended learning space, growing to serve more than 600,000 students in all 50 states and in more than 90 countries around the world. In 2019, Calvert was acquired by Edmentum and the virtual learning leaders joined forces to design a research-based framework and digital learning experience.

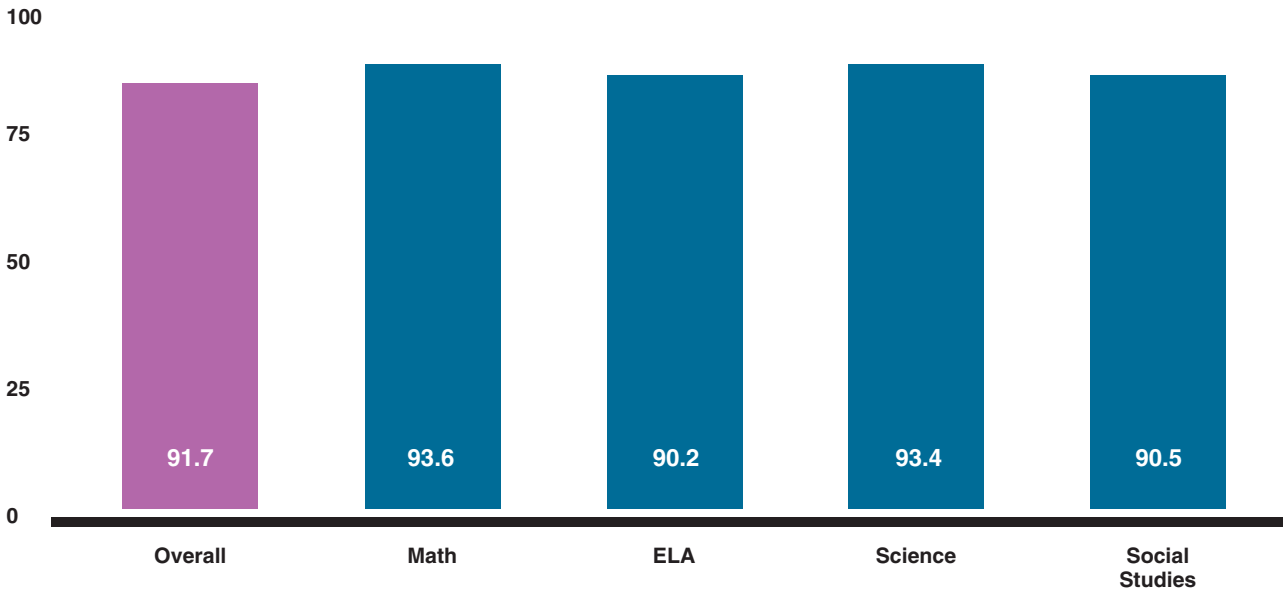
Course Outcomes Analysis

Academic outcome data were analyzed across four categories at the individual course level in four subject areas. They include formative and summative assessment scores, course grades, project grades, and percent of course assignments completed. (See Appendices for detailed breakdowns of each subject and category descriptions). The analysis sample includes 5,967 course enrollments. **The median course grade — 91.7% — shows that a majority of students enrolled in Edmentum K–5 courses mastered the grade-level skills and achieved exemplary final grades across all four core elementary subjects**.

"Families see that we're not holograms, we're real people. We're excited on the first day of school and cry on the last day of school. We build relationships with the kids and their families.

THELMA FORTE,
EOA K–5 Instructional Leader

The median course grade across all K–5 course enrollments (2020–2021)



Discussion

Nationally, the impact of the pandemic on elementary student learning was significant. Measures of unfinished learning, which capture accumulated disruptions to a student's grade-level learning opportunities, shows that elementary school students fell behind by an average of five months in mathematics and four months in English. Students of color and low-income students were disproportionately affected, analysts have found. (Dorn, et al., 2021). According to the Center for Reinventing Public Education, which has closely tracked district and state actions related to school reopenings, one in three districts in the spring of 2020 required teachers to provide their students with remote instruction or track engagement and academic progress. (CPRE, 2020). While district remote learning plans showed obvious improvements headed into fall 2020, there was still an absence of clarity around academic expectations, diagnostic assessments, and grading. An analysis (Dusseault & McCann, 2020) of 86 school district remote learning plans showed that:

- 36% of remote plans had clear expectations for student grading.
- 48% of remote plans stated clarity for tracking student attendance, participation, or engagement.
- 29% of remote plans mentioned diagnostic assessments.
- 49% of remote plans specified how students' academic progress would be monitored throughout the year.

This case study was an opportunity to present findings and insights about EdOptions Academy virtual elementary program during an unprecedented school year — 2020–21. While unfinished learning mounted for students in emergency remote plans, students enrolled in EOA's virtual academy achieved high academic achievement. Further research is needed to better understand the causal and correlations between program components and student outcomes.

In interviews, EOA teachers identified key themes that exemplify sustainable high-quality virtual programs for elementary schools.

- **Intentionality:** A balance of synchronous and asynchronous learning, affording flexibility to students.
- **Culture and Climate:** A singular focus on student learning progress, with opportunities for feedback and intervention.
- **Caregivers as Partners:** The caregiver role serves as a "teaching assistant."
- **Relationships:** Virtual instruction is intentional about building relationships and connections with their students.
- **Professional Learning and Instructional Support:** Providing teachers with comprehensive support and ongoing professional learning opportunities.

EOA enrollments peaked at the beginning of the 2020–21 school year. School re-openings beginning in December, followed by vaccine availability, prompted an enrollment shift back to in-person learning through the winter and early spring. Still, the year-over-year growth in student enrollment was significant and has steadily increased during the 2021–22 school year.

As part of this case study, we also took a closer look at the role that communication plays in EOA's learning design. Analyzing nearly 180,000 messages in 2020–21, we saw that intentional communications in virtual learning must be frequent, consistent, and multimodal. Further research is needed to examine the role of communications in a student's academic engagement and success in the virtual program.

Appendix A

DATA AND MEASURES

For the course outcomes analysis, K–5 students were included who spent the full school year in EdOptions Academy, enrolling before October 1, 2020 and exiting no earlier than May 1, 2021.

Student Course Outcome	Description
Course Grade	This is the subject specific final course grade, calculated on a scale from 0–100.
Percent Assignments Completed	Courses contain course-level assignments and activities that measure students' ability to complete tasks.
Mastery Grade	Each instructional unit within a course is divided into lessons, and each lesson includes a mastery test that measures the specific objective of that lesson.
Project Grade	A project rubric prompts student self-evaluation and reflection on their work. Woven throughout a unit, projects gives students an extended opportunity to apply what they have learning. A scoring rubric communicates key objectives and serves as the basis for the project grade.
Quiz Grade	Each semester course is divided into instructional units, and each unit includes a unit post-test that measures the objectives within that unit.

MEDIAN STUDENT OUTCOMES BY SUBJECT (MEDIAN VALUES)

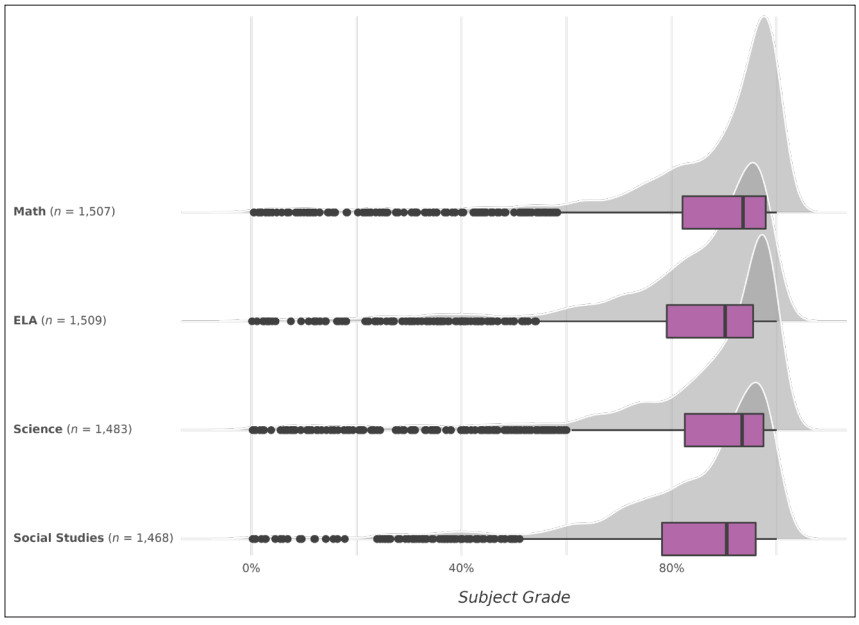
Student outcomes shown in Tables A1–A5 and Figures A1–A5 were analyzed based on 9,967 course enrollments for EdOptions Academy elementary students enrolled for the full 2020–21 school year. Individual students could be enrolled in multiple courses. Table A1 shows median student outcomes by subject, aggregated across student grade, while Tables A2–A5 show median student outcomes by subject and grade. Outcomes analyzed were course grades, assignment scores, and the percent of the course completed, as well as enrollment counts. Figures A1–A5 show a visualization of the distribution of final course grades for each subject by student grade, with Figure A1 by subject and Figures A2-A5 by subject and student grade. The black lines in the figure represent the median grade, and the purple rectangle ranges from the 25th-75th percentile of the student grade distribution.

Table A1 and Figure A1 shows that median course grades are high, ranging from 90.2% in ELA to 93.6% in Math. Students are completing most of the curriculum, with the overall median value equal to 98.7%.

Table A1: Median values

Course	Course grade	Percent completed	Mastery grade	Quiz grade	Project grade	N
Math	93.6	98.3	100	93.8	100	1507
ELA	90.2	98.8	100	90.0	100	1509
Science	93.4	99.3	100	94.4	100	1483
Social Studies	90.5	98.1	100	92.3	100	1468
Overall	**91.7**	**98.7**	**100**	**92.9**	**100**	**5967**

Figure A1: Median values



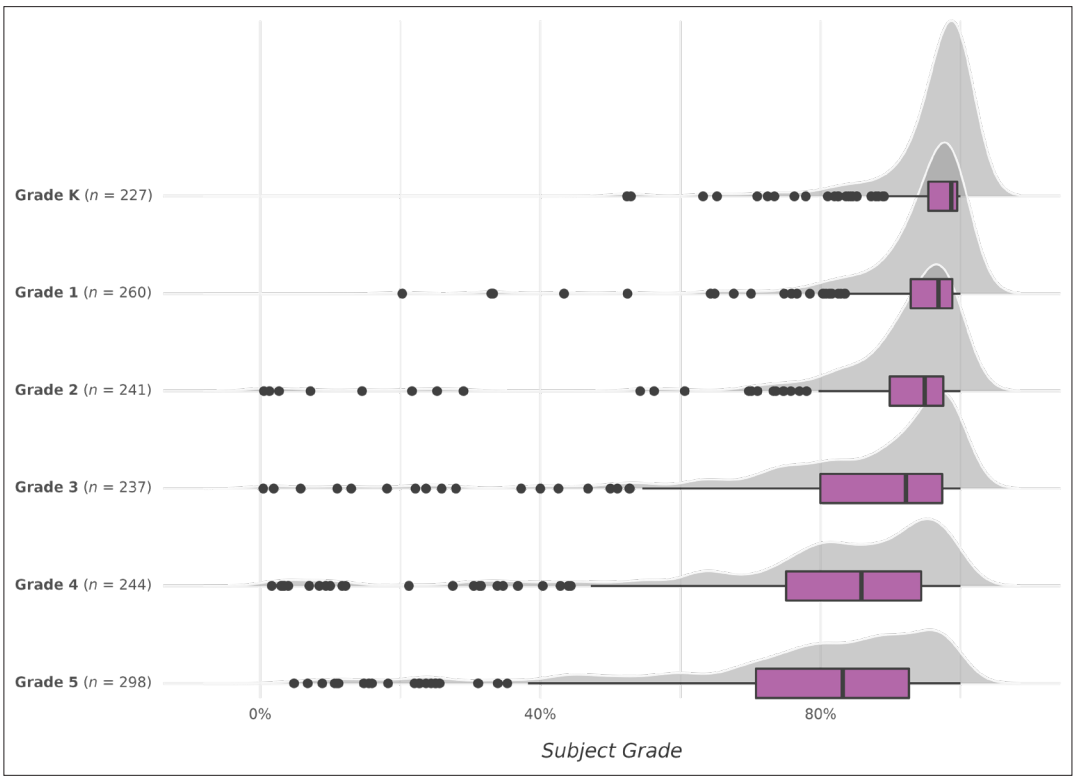
MEDIAN STUDENT OUTCOMES BY SUBJECT AND GRADE — MATHEMATICS

Median math outcomes by grade shown in Table A2 and Figure A2 show that students completed significant proportions of the curriculum and achieved at high levels, with median grades ranging from 83.2 in 5th grade to 98.7 for kindergarten.

Table A2: Mathematics (median values)

Grade	Course grade	Percent completed	Mastery grade	Quiz grade	Project grade	N
Grade K	98.7	98.8	100	100.0	100	227
Grade 1	96.9	98.8	100	100.0	100	260
Grade 2	94.9	98.8	100	94.1	100	241
Grade 3	92.2	98.2	100	89.3	100	237
Grade 4	85.8	97.1	100	84.6	100	244
Grade 5	83.2	98.2	100.0	81.2	100	298

Figure A2: Mathematics (median values)



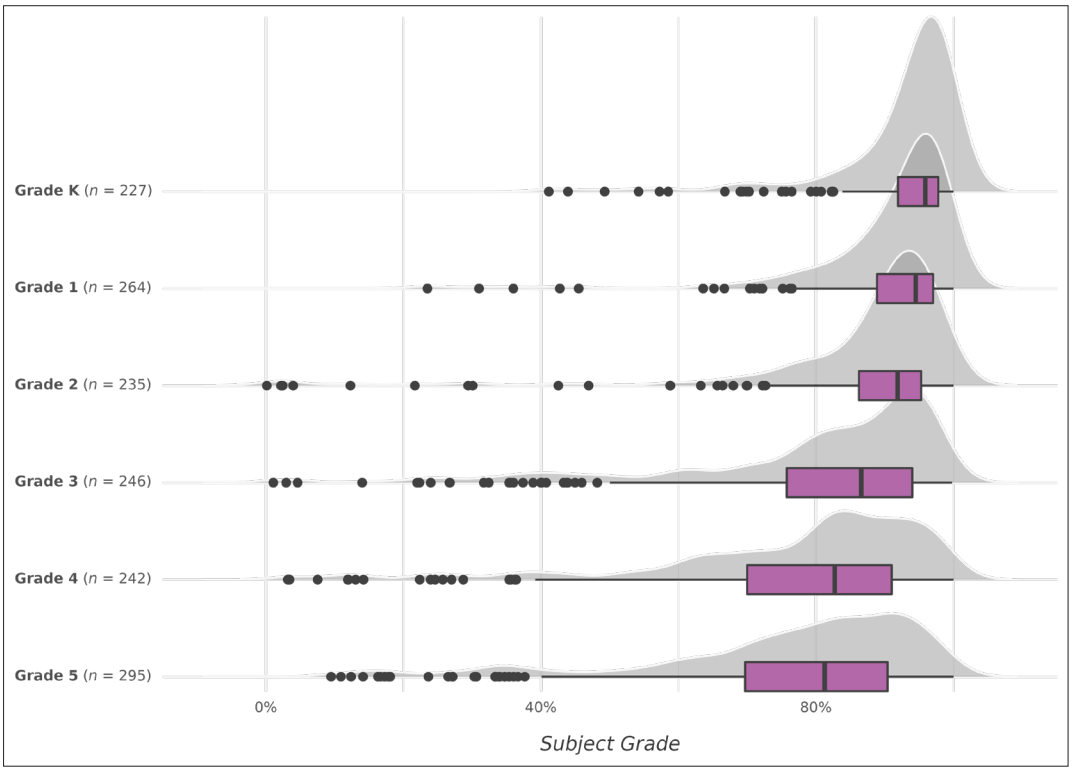
MEDIAN STUDENT OUTCOMES BY SUBJECT AND GRADE — ENGLISH LANGUAGE ARTS

Median English language arts outcomes by grade shown in Table A3 and Figure A3 show that students completed significant proportions of the curriculum and achieved at high levels, with median grades ranging from 81.2 in 5th grade to 95.9 for kindergarten.

Table A3: English language arts (median values)

Grade level	Course grade	Percent completed	Mastery grade	Quiz grade	Project grade	N
Grade K	95.9	98.9	100	100	100	227
Grade 1	94.5	96.2	100	93.8	100	264
Grade 2	91.9	100	100	87.5	100	235
Grade 3	86.6	98.8	100	83.3	100	246
Grade 4	82.7	98.2	95	68.2	100	242
Grade 5	81.2	97	100	80.0	100	295

Figure A3: English language arts (median values)



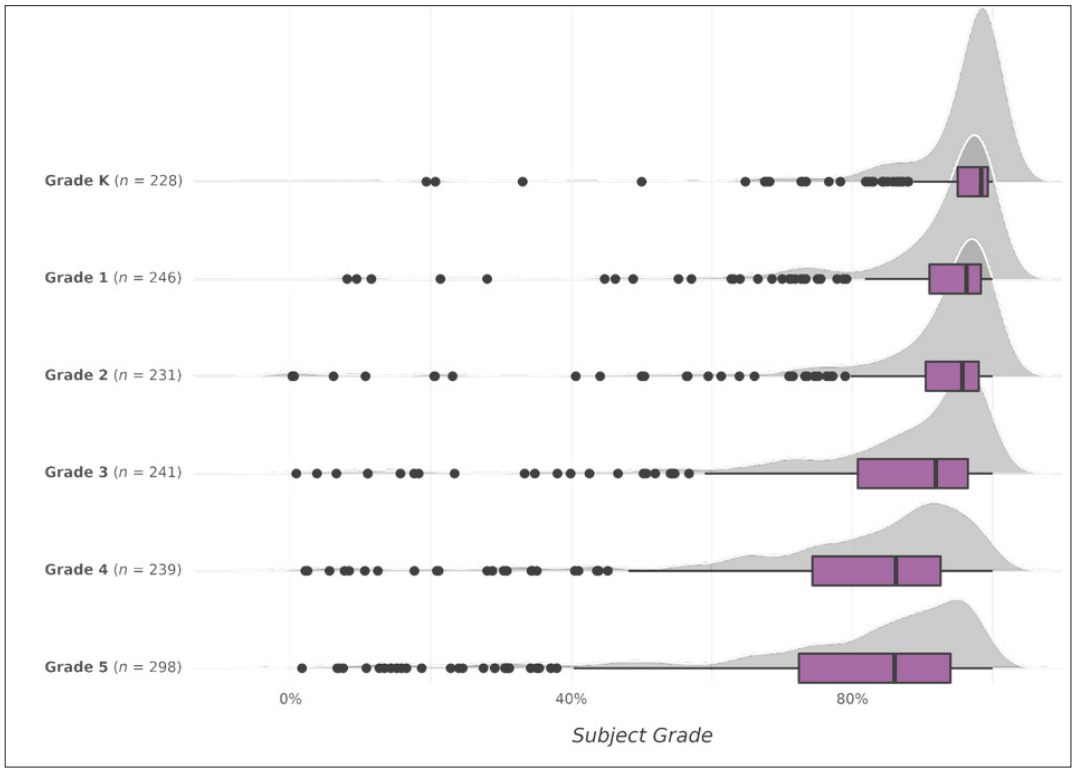
MEDIAN STUDENT OUTCOMES BY SUBJECT AND GRADE — SCIENCE

Median science outcomes by grade shown in Table A4 and Figure A4 show that students completed significant proportions of the curriculum and achieved at high levels, with median grades ranging from 86.0 in 5th grade to 98.4 for kindergarten.

Table A4: Science (median values)

Grade level	Course grade	Percent completed	Mastery grade	Quiz grade	Project grade	N
Grade K	98.4	98.9	100	100	100	228
Grade 1	96.3	100	100	98.2	100	246
Grade 2	95.7	99.4	100	94.4	100	231
Grade 3	91.9	97.6	100	96.2	100	241
Grade 4	86.2	100	100	88.9	100	239
Grade 5	86.0	100	100	88.9	100	298

Table A4: Science (median values)



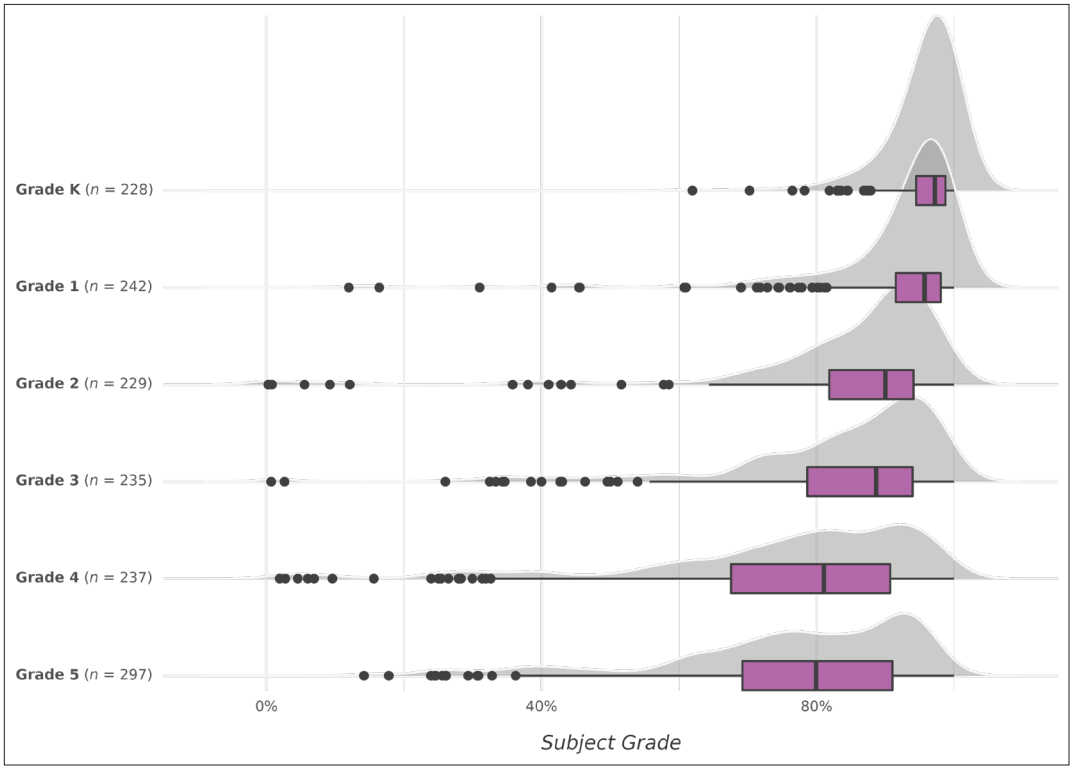
MEDIAN STUDENT OUTCOMES BY SUBJECT AND GRADE — SOCIAL STUDIES

Median social studies outcomes by grade shown in Table A5 and Figure A5 show that students completed significant proportions of the curriculum and achieved at high levels, with median grades ranging from 79.9 in 5th grade to 97.2 for kindergarten.

Table A5: Social Studies (median values)

Grade level	Course grade	Percent completed	Mastery grade	Quiz grade	Project grade	N
Grade K	97.2	98.8	100	100	100	228
Grade 1	95.7	98.8	100	97.2	100	242
Grade 2	90	100	100	93.3	100	229
Grade 3	88.7	98.7	100	88.6	100	235
Grade 4	81.1	93.9	90	84.6	100	237
Grade 5	79.9	97.5	90	85.3	100	297

Figure A5: Social Studies (median values)



Appendix B

5 Key Components of a Sustainable Virtual Program

Part of Edmentum's ongoing work is to define what high-quality sustainable virtual instruction looks like. After decades of work as an innovator in online teaching and learning, Edmentum has identified several key components for building a sustainable, high-quality virtual program.

High-Quality Instructional Practice	• Effective instructional practices, tailored for an online environment • Experienced virtual instructors, highly-qualified and state certified • Active learning strategies
Online Curriculum and Assessment	• Instructional materials that meet students where they are • Aligned with state's college and career ready standards • Multimodal and student-centered
Virtual Platform	• Organized from a student's point of view • Simple, efficient, and ubiquitous • Data-driven intervention
Whole-Learner Services	• Multi-role support teams: coaches, advisors, counselors, and mentors • Specialized services for students with disabilities, ELLs
Continuous Improvement	• A deliberate focus on learning growth and continuity • An emphasis on growth-oriented goals and accountability metrics • Promoting students' beliefs that they have the ability to meet goals by changing how they approach new learning experiences.

Appendix C

The Science Behind Virtual Teaching Effectiveness

Edmentum's virtual instructional training and development for teachers is built on a foundation of research-based pedagogical principles.

ESTABLISHING STUDENT-TEACHER RELATIONSHIPS

When students feel welcomed and comfortable, they develop a sense of community, and they are more receptive to learning (Brown, 2010). When students join an Edmentum online learning community, they immediately receive tailored video introductions from their teacher or coaches. They'll also use the time to get acquainted with school norms and culture. Research has shown that, in a virtual learning setting, instructors can enhance collaboration and establish a community of inquiry through the instructional methods that are used (Mandernach, 2009). Research demonstrates that students who received personalized feedback from their instructors felt more satisfied in the learning experience and achieved larger academic gains than students who did not (Gallien & Oomen-Early, 2008)

VIRTUAL INSTRUCTIONAL TOOLS AND TECHNIQUES

Edmentum instructors are trained to effectively leverage and utilize a variety of virtual instructional tools and techniques, including Edmentum's course learning platform, online video technology to record instructional sessions or micro-lectures. Instructor-created video content, for example, is a simple strategy for increasing students' sense of connection with their teachers. The utilization of personalized video content has been shown to increase the level of engagement and satisfaction experienced by students (Underdown & Martin, 2016).

TEACHER QUALIFICATION, EXPERIENCE, TRAINING, AND LEARNING OPPORTUNITIES

EdOptions Academy employs highly qualified, state-certified teachers who are experienced in teaching online courses in a virtual environment. All EdOptions Academy teachers have a bachelor's degree from an accredited institution, a valid state teaching certificate for the states and subjects they teach, and experience teaching in both traditional and virtual classroom settings. Many teachers hold multiple certifications, advanced degrees, and endorsements. Specifically, EdOptions Academy teachers have an average of 14.8 years of teaching experience; 73.6% of teachers have a master's degree or higher, and 93% have certifications in multiple states. In addition, all newly hired teachers receive rigorous onboarding trainings and access to continuous learning opportunities.

TEACHER EFFICACY AND CONTINUOUS IMPROVEMENT

EdOptions Academy's academic department chairs ensure that all EdOptions Academy teachers are equipped with sufficient information and resources needed for instruction. The department head reviews teacher performance three times per year (during the academic year of August through June) to ensure that instruction consistently meets high standards. Reviews consist of one or more walkthroughs, feedback, evaluation checklists, and a final summative evaluation. Walkthroughs consist of checks on the teachers' certification for good standing and the use of technology for synchronous and asynchronous communication purposes (Zoom classrooms, email, IM, Web conferences, live sessions, threaded discussions, and file-sharing activities). Instructional reviews examine teachers' use of innovative strategies, the quality of their feedback and monitoring of students, and the degree of their responsiveness to students with special needs.

References

Archer, A. L., & Hughes, C. A. (2011). Explicit instruction: effective and efficient teaching. Guilford Press.

Blagg, K. & Gross, B. (2021). *Surging enrollment in virtual schools during the pandemic spurs new questions for policymakers*. Center for Reinventing Public Education. https://crpe.org/surging-enrollment-in-virtual-schools-during-the-pandemic-spurs-new-questions-for-policymakers/

Bonwell, C. C., & Eison, J. A. (1991). Active learning: Creating excitement in the classroom (ASHE-ERIC Higher Education Report No. 1). The George Washington University. https://files.eric.ed.gov/fulltext/ED336049.pdf

Campitelli, G., & Gobet, F. (2011). Deliberate practice: Necessary but not sufficient. Current Directions in Psychological Science, 20(5), 280–285. https://doi.org/10.1177/0963721411421922

Center for Reinventing Public Education. (Oct., 2021). *2020–21: The State of School Reopening. The Evidence Project, Get Smart, Fast Series*. https://docs.google.com/presentation/d/1v7CQ06DwTRNcrr-_Yk7xFJktsQx3hAgNbQwK_M5qjQQ/edit?usp=sharing

Chu, L. (May, 2021). *Many kindergartners aren't showing up as schools reopen in person. How some large urban districts are trying to re-engage families*. Center for Reinventing Public Education. https://crpe.org/many-kindergartners-arent-showing-up-as-schools-reopen-in-person-how-some-large-urban-districts-are-trying-to-re-engage-families/

Dickson, S. V., Chard, D. J., & Simmons, D. C. (1993). An integrated reading/writing curriculum: A focus on scaffolding. LD Forum, 18(4), 12–16.

Dorn, E., Hancock, B, Sarakatsannis, J. & Viruleg, E. (July, 2021). *COVID-19 and education: The lingering effects of unfinished learning*. McKinsey & Company. https://crpe.org/surging-enrollment-in-virtual-schools-during-the-pandemic-spurs-new-questions-for-policymakers/

Dusseault, B. & McCann, S. (August, 2020). *We reviewed 86 districts' reopening plans for the 2020–21 school year. Here's some of what we found*. Center for Reinventing Public Education. https://crpe.org/we-reviewed-86-districts-reopening-plans-for-the-2020–21-school-year-heres-some-of-what-we-found/

Edmentum. (2022). *Equity In Virtual Learning: Improving Outcomes for Diverse Populations*.

Edmentum. (2022). *Virtual Learning and Rural Schools: Improving Access and Opportunity for Learners in Rural Communities*

Geiser, S. & Santelices, M. V. (2007). Validity of high-school grades in predicting student success beyond the freshman year: High-school record vs. standardized tests as indicators of four-year college outcomes (CSHE Research and Occasional Paper Series). UC Berkeley. https://cshe.berkeley.edu/sites/default/files/publica- tions/rops.geiser._sat_6.13.07.pdf

Goldring, R., and Taie, S. (2018). Principal Attrition and Mobility: Results From the 2016–17 Principal Followup Survey First Look (NCES 2018-066). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved [date] from https://nces.ed.gov/pubsearch.

Haynes, E., Zeiser, K., Surr, W., Hauser, A., Clymer, L., Walston, J., Bitter, C., & Yang, R. (2016). Looking under the hood of competency-based education: The relationship between competency-based education practices and students' learning skills, behaviors, and dispositions. American Institutes for Research. https://www.air.org/ resource/looking-under-hood-competency-based-education-relationship-betweencompetency-based

Hattie, J. (2009). Visible learning: A synthesis of over 800 meta-analyses relating to achievement. Routledge. Hattie, J. (2012). Visible learning for teachers: Maximizing impact on learning. Routledge.

Hattie, J., & Yates, G. (2013, August 6). Understanding learning: Lessons for learning, teaching and research [Paper presentation]. How the brain learns: What lessons are there for teaching? Melbourne, Australia. https://research.acer.edu.au/research_conference/RC2013/6august/10/

Lasky, Krista., Roche, Amy. & Weber, Kate. (2020, May 17). *Virtual Learning in Grades K–5: Best Practices from Calvert Learning to Support Elementary Students* [Webinar]. Edmentum. https://youtu.be/kCos3CY4iBA

Learning Policy Institute analysis of National Center for Education Statistics Schools and Staffing Survey 2011–12, and Teacher Follow-Up Survey 2012–13.

Le, C., Wolfe, R. E., & Steinberg, A. (2014, September). The past and the promise: Today's competency education movement. Jobs for the Future. https://jfforg-prodnew.s3.amazonaws.com/media/documents/The-Past-The-Promise-091514.pdf

National Research Council. (2005). How students learn: History, mathematics, and science in the classroom. The National Academies Press. https://doi.org/10.17226/10126

National Research Council. (2013). Education for life and work: Developing transferable knowledge and skills in the 21st century. The National Academies Press. https://doi.org/10.17226/13398

Prince, M. (2004). Does active learning work? A review of the research. Journal of Engineering Education https://www.engr.ncsu.edu/wp-content/uploads/drive/1smSpn4AiHSh8z7a0MHDBwhb_JhcoLQmI/2004-Prince_AL.pdf

Rosenshine, B. and Meister, C. (1992) The use of scaffolds for teaching higher-level cognitive strategies. Educational Leadership, 49(7), 26–33. https://www.ascd.org/ASCD/pdf/journals/ed_lead/el_199204_rosenshine.pdf

Schwartz, Heather L., Melissa Kay Diliberti, Lisa Berdie, David Grant, Gerald P. Hunter, and Claude Messan Setodji, Urban and Rural Districts Showed a Strong Divide During the COVID-19 Pandemic: Results from the Second American School District Panel Survey. Santa Monica, CA: RAND Corporation, 2021. https://www.rand.org/pubs/research_reports/RRA956-2.html.

U.S. Department of Education, National Center for Education Statistics, National Teacher and Principal Survey (NTPS), "Public School Teacher and Private School Teacher Data Files," 2017–18

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Harvard University Press. https://doi.org/10.2307/j.ctvjf9vz4