

The Total Economic Impact™ Of Apple Devices For K-12 Education

Cost Savings, Efficiency, And Learning Benefits
Enabled By Devices For Education

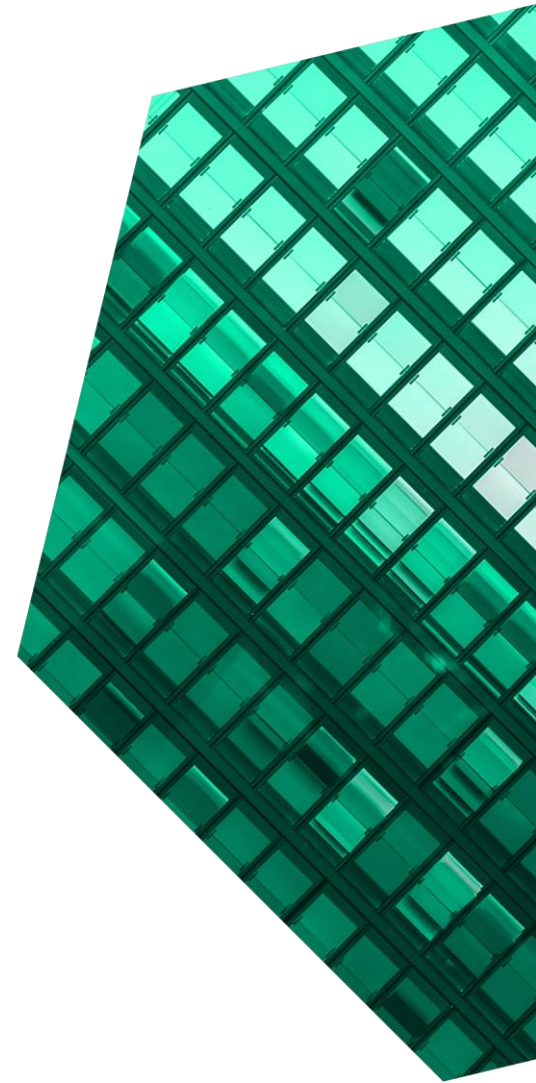
JANUARY 2023

Table Of Contents

Consulting Team:

Nicholas Ferrif
Luca Son

Executive Summary	3
The Apple Devices for Education Customer Journey	8
Use Cases	8
Key Challenges	8
Why Apple?	9
Typical Apple Devices Use Cases	9
Voice of the Customer: Customer Journey	10
Composite Organization	11
Analysis Of Educational Benefits	12
Evaluating The Impact Of Educational Benefits...	12
Analysis Of School District Benefits	14
Avoided Legacy Technology Costs	14
Device Residual Value Cost Savings	16
IT Operational Efficiency	17
Strategic Flexibility	18
Analysis Of Costs	20
Device And Training Costs	20
Analysis Of Additional Benefits	22
Teacher Productivity Improvement	22
Improved Teacher Retention	23
Improved Student Enrollment	24
Recaptured Student Academic Time	25
Financial Summary	26
Appendix A: Total Economic Impact	27
Appendix B: Interview And Survey Demographics	28
Appendix C: Additional Benefit Tables	30
Improved Teacher Retention	31
Improved Student Enrollment	32
Recaptured Student Academic Time	33
Appendix D: Endnotes	34



Executive Summary

Following rapid adoption at the beginning of the COVID-19 pandemic, device and technology use is the new normal for education. K-12 organizations must optimize their device and technology programs to strengthen student outcomes and engagement while keeping costs in check. Additionally, teachers need tools that offer flexibility, support, and innovative ways of teaching, and school districts can empower them by providing secure, reliable, and robust technology that can also be efficiently managed by IT staff.

The [Apple device ecosystem for K-12 education](#) includes Apple devices, software, and services that equip students with a secure, durable, and intuitive way to engage in learning. Apple devices help teachers streamline classroom learning and facilitate a diverse array of lesson plans and enable students to integrate and demonstrate their learning in more creative and engaging ways.

Apple commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) that K-12 educational organizations may realize by deploying Apple devices for their students and teachers.¹ The purpose of this study is to provide readers with a framework to evaluate the potential financial and educational impact of using Apple devices for education in their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed eight representatives who work in education and surveyed 234 educational employee respondents with experience deploying technology for students at their organizations. For the purposes of this study, Forrester aggregated the experiences of the interviewees and survey respondents and combined the results into a single [composite organization](#), a U.S.-based public school district serving 10,000 students across grades K-12.

Prior to using Apple devices for their students and teachers, interviewees discussed their organizations'

KEY STATISTICS



Return on investment (ROI):
48%



Device residual value after four-year lifecycle:
iPad: 20%
MacBook Air: 25%



Reduced device maintenance and management labor:
35%



Improved teacher productivity:
30 hours per year

experiences with non-Apple devices and a variety of deployment strategies. These included a non-Apple device 1:1 program, a mixed device 1:1 program, and no prior 1:1 program. Prior device strategies yielded mixed results, leaving organizations with limited instructional flexibility, fragile and unreliable devices, IT resource constraints, and security challenges.

Key results from the investment in a 1:1 Apple device program include improved collaboration for students and teachers, improved device reliability and resiliency, lengthened device lifecycle, greater IT operational efficiencies, and fewer security threats.

For the purposes of this study, the term “legacy devices” refers to interviewees’ organizations’ prior, non-Apple devices.

KEY QUANTIFIED FINDINGS

Quantified benefits. Four-year, risk-adjusted present value (PV) quantified benefits for the composite organization include:

- **Avoided legacy technology costs totaling \$3.67 million.** The composite organization avoids legacy device refresh costs, refreshes devices less frequently due to longer Apple device lifecycles, and avoids additional hardware and replacement costs by investing in a fully Apple 1:1 device program.
- **Device residual value cost savings of \$469,000 after one device lifecycle.** iPad and MacBook Air devices retain 20% and 25% of their original value, respectively, by the end of their four-year lifecycle. This allows the composite organization to resell used iPad models to third parties and reinvest those savings into its device program or other initiatives.
- **Improved IT operational efficiency, saving \$999,000.** The composite organization realizes 35% greater operational efficiency for IT teams managing Apple devices due to their nearly out-of-the-box deployment process, fewer help-desk requests, less time spent on repairs, and security posture improvement. As a result, the composite organization reallocates 2.8 FTEs worth of time to other value add tasks.

Costs. Four-year, risk-adjusted PV costs for the composite organization include:

- **The composite spends \$3.46 million to implement Apple devices.** The composite organization realizes the following costs in its investment in Apple devices: iPad and MacBook Air devices, peripherals, device management software, and IT administration training to deploy and manage Apple devices.

The financial analysis, which is based on the interviews and survey, found that a composite organization experiences benefits of \$5.14 million over three years versus costs of \$3.46 million, adding up to a net present value (NPV) of \$1.67 million and an ROI of 48%.

IT FTEs required for device management:

Before Apple
8 FTE

With Apple
5.2 FTE

KEY ADDITIONAL FINDINGS

Additional benefits. Four-year, risk-adjusted present value (PV) additional benefits that are not included in the ROI calculation but are important for school districts to consider:

- **Improved teacher productivity by 1.5 hours per week.** By leveraging iPad and MacBook Air models in the classroom, teachers in interviewees’ school districts improved lesson plan collaboration, communication with administrators, and student monitoring and assistance. With Apple’s consistent ecosystem across devices, teachers worked on their preferred device at their preferred time, which reduced the amount of time it took to perform day-to-day tasks like grading, planning, research, and checking-in on students.
- **Reduced teacher churn by 15%.** With Apple devices, survey respondents experienced less teacher churn compared to when they had non-Apple devices. A survey of educational organizations found that 41% of respondents who leverage Apple devices reported an improvement to teacher retention rates since deploying Apple. On average, respondents reported a 31% reduction in teacher churn.

- **Improved student enrollment by 2%.** One interviewee reported a 4% boost to enrollment and a 75% reduction in dropout rates, attributing the results to their district's Apple devices.
- **Recaptured 1.9 academic days per student per year.** Interviewees reported that there was less friction with Apple devices in their classrooms compared to legacy devices, and both students and teachers reported that Apple devices were more intuitive and easier to use for educational purposes. This led to greater efficiency and academic time back to the students.

Strategic Flexibility. There are multiple scenarios in which a customer might implement Apple devices for Education and later realize additional uses and opportunities to create value, including:

- Streamlined presentation, sharing, and collaboration with Apple TV.
- Apple support and training.

“There’s a smaller attack surface with Apple equipment and less concern about lateral movement if an iPad is compromised. ... Our risk mitigation has measurably improved.”

*Executive director of technology,
school district*

FINANCIAL METRICS GLOSSARY



Return on Investment (ROI)

A project's expected return (or profit) in percentage terms. Calculated by dividing net benefits (benefits minus costs) by costs. For example, an ROI of 48% indicates that for every \$1.00 invested in Apple devices, the composite organization receives \$1.48 back in value.



Present Value (PV)

The present value is value right now of some amount of money in the future. For costs or benefits that are expected to happen in the future, a discount rate (interest rate) is used to calculate the value of those future dollars in. For example, if an organization will earn \$1,000 next year, the present value is the current worth of that sum.²



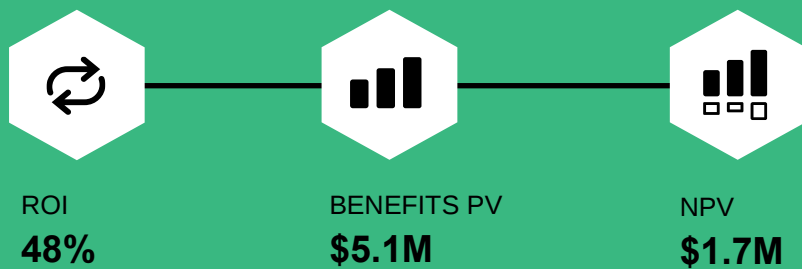
Net Present Value (NPV)

The present or current value of a given project or initiative calculated by converting all cashflows (costs and benefits) into present value and then subtracting PV costs from PV benefits. A positive project NPV typically indicates that an investment should be made.

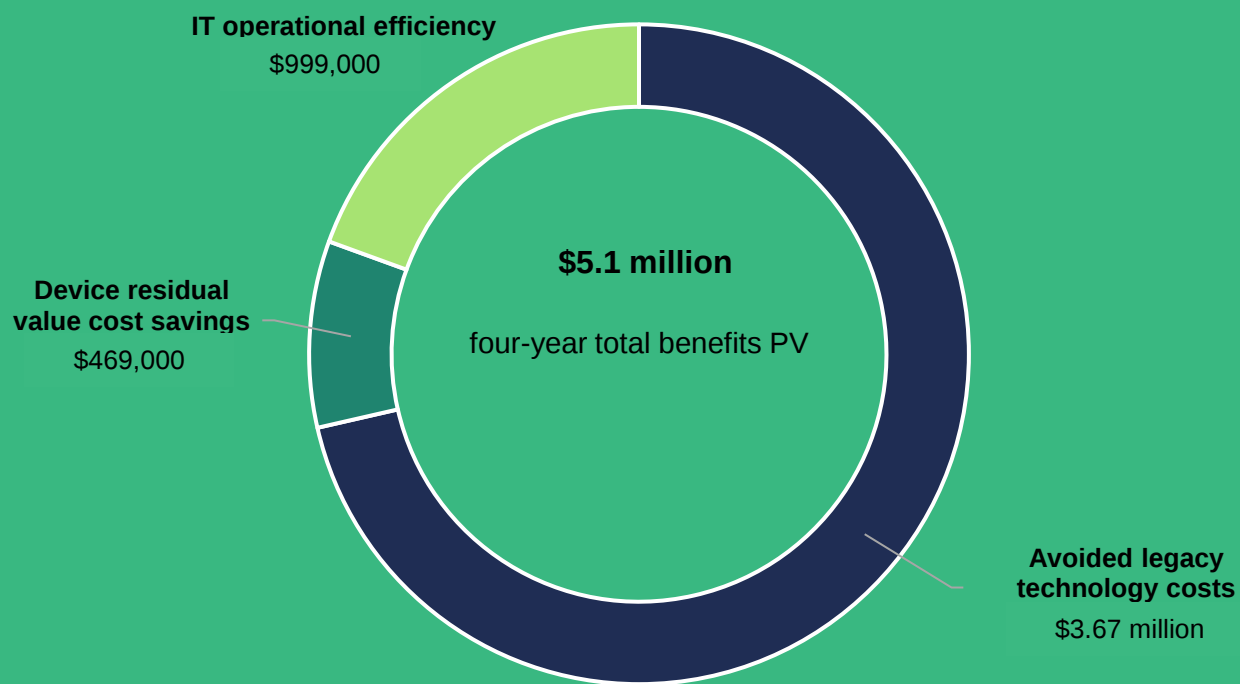


Discount Rate

The interest rate used to calculate the present value and the time value of money. For this model, the discount rate is 10%.



Benefits (Four-Year)



TEI FRAMEWORK AND METHODOLOGY

From the information provided in the interviews and survey, Forrester constructed a Total Economic Impact™ framework for those organizations considering an investment in Apple devices for Education.

The objective of the framework is to identify the benefits, costs, flexibility, and risk factors that affect the investment decision. Forrester took a multistep approach to evaluate the impact that Apple devices for Education can have on an organization.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Apple and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.

Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the study to determine the appropriateness of an investment in Devices for Education.

Apple reviewed and provided feedback to Forrester, but Forrester maintains editorial control over the study and its findings and does not accept changes to the study that contradict Forrester's findings or obscure the meaning of the study.

Apple provided the customer names for the interviews but did not participate in the interviews.

Forrester fielded the double-blind survey using a third-party survey partner.



DUE DILIGENCE

Interviewed Apple stakeholders and Forrester analysts to gather data relative to Apple devices for Education.



INTERVIEWS AND SURVEY

Interviewed eight representatives within six school districts and surveyed 234 respondents at organizations using Apple devices for education to obtain data with respect to costs, benefits, and risks.



COMPOSITE ORGANIZATION

Designed a composite organization based on characteristics of the interviewees and survey respondents.



FINANCIAL MODEL FRAMEWORK

Constructed a financial model representative of the interviews and survey using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the interviewees and survey respondents.



CASE STUDY

Employed four fundamental elements of TEI in modeling the investment impact: benefits, costs, flexibility, and risks. Given the increasing sophistication of ROI analyses related to IT investments, Forrester's TEI methodology provides a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

The Apple Devices for Education Customer Journey

■ Drivers leading to the Devices for Education investment

USE CASES

Forrester interviewed eight representatives from six school districts and surveyed 234 respondents with experience using Apple and non-Apple devices for education at their Pre-K-12 and K-12 organizations. For details on these individuals and the organizations they represent, see [Appendix B](#).

Before the investment in Apple devices, interviewees' organizations came from one of three prior environments:

- **Non-Apple device 1:1 program.** These organizations leveraged non-Apple devices for students and teachers.
- **Mixed devices 1:1 program.** One organization deployed iPad models for K-1, non-Apple devices for grades 2-12, and MacBook Air models for over 97% of teachers and admins.
- **No 1:1 device program.** These organizations relied on computer labs and carts.

KEY CHALLENGES

Both interviewees and survey respondents noted how their organizations struggled with common challenges, particularly with non-Apple device environments, including:

- **Student engagement and teaching outcomes suffered with legacy devices.** Interviewees had limited instructional and learning flexibility while using legacy devices. Teachers lacked tools for students to demonstrate learning in creative, engaging ways. Presenting, file sharing, monitoring, and instructing students were cumbersome for teachers due to disparate devices and ecosystems. For students, legacy devices were reportedly less engaging and less intuitive, especially for younger students. Student engagement and teaching outcomes suffered as a result.

“Teachers are more creative and productive with personalized learning capabilities. Our [prior devices] were more like encyclopedias. Teachers and students were just using it to get information, and nothing was very creative at all.”

Superintendent, school district

- **Fragile and unreliable devices.** Legacy devices frequently broke, which led to excess repair and replacement costs. Legacy devices had little to no resale value, with one customer reportedly spending money to recycle legacy devices. The director of technology stated: “We went to see other districts and heard their [non-Apple] devices were highly prone to breakages and that quality had not improved. We have not had the same experience with Apple in our district since we started.”
- **Excess security risk.** Interviewees and survey respondents experienced more security alerts and incidents with non-Apple devices. The superintendent of a school district told Forrester: “Our teachers had a hard time relying on the technology [in our legacy environment]. A lot of times devices didn’t work; there were viruses and those types of issues. Our staff and students can really rely on Apple devices.”
- **IT resource constraints.** Interviewees reported that IT administrators and technicians were inundated with tasks and often in break-fix mode, especially as it pertained to fixing legacy devices,

addressing security concerns, and responding to general tickets.

- **Limited access to technology.** School districts who did not have a prior 1:1 device program before Apple struggled to provide a technology-forward student experience. This limited student's access to technology, educational outcomes, and preparedness for post-education opportunities.

WHY APPLE?

The interviewees and survey respondents cited several reasons for choosing Apple, including:

- **Enhanced instruction and collaboration between teachers and students.** Interviewees' organizations invested in Apple to provide an improved teacher and student experience and drive top benefits for instructional flexibility, creative learning, student engagement, teacher career development, device resiliency, and user experience. Several interviewees cited their device program with Apple as an underlying driver for being chosen as a National Blue Ribbon School.
- **Better device reliability and durability.** Interviewees invested in Apple devices, in part, for their durability. Their organizations' iPad and MacBook Air models were less prone to breakages compared to legacy devices and retained more value for longer. This allowed school districts to resell devices, recoup costs, and reinvest in the district. After their investment, the executive director of technology stated, "We see fewer significant issues in the Apple environment than we saw with our non-Apple built hardware and operating system."
- **Greater cost efficiencies when considering a multiyear deployment.** Interviewees perceived Apple as less costly than legacy devices when factoring in the residual value of the devices, the avoided costs of repairs, and a greater device lifecycle.

- **Improved security posture.** The rising level of cybersecurity threats was a growing concern amongst school districts. Sixty percent of survey respondents using Apple devices cited that security was their most valuable feature. Interviewees saw Apple devices as less prone to attacks, benefiting organization risk profiles and offsetting IT administration time addressing vulnerabilities and incidents.
- **Greater IT operational efficiency to manage devices.** Interviewees viewed a 1:1 Apple device program as a way to streamline device management for IT admins and technicians.
- **Supportive Apple partnership and educational expertise.** Interviewees cited Apple's partnership and support as a differentiator when their organizations made device investment decisions. The director of technology told Forrester, "When you're talking to Apple Education, you're talking to teachers, former teachers, former administrators, who all know exactly what we need to be successful."

TYPICAL APPLE DEVICES USE CASES

Interviewed customers implemented 1:1 Apple device programs in several ways.

- Typically, districts deployed iPad models across either grades K-12 or K-8; with those choosing the latter option deploying MacBook Air models for grades 9-12.
- Teachers had a 1:1 MacBook Air deployment or 2:1 MacBook Air and iPad deployment.
- One interviewee used iPad and MacBook Air models for grades Pre-K-1, respectively, while grades 2-12 had non-Apple devices.
- Common peripherals and additional devices included iPad cases, keyboards, Apple Pencil, and Apple TV. Please see [Appendix B](#) for more information.

VOICE OF THE CUSTOMER: CUSTOMER JOURNEY

SECURITY AND RELIABILITY

"In my past [non-Apple] roles, **we were constantly sending masses of laptops to our technical people to deal with malware** and all kinds of different software programs to make sure that viruses would stay off those computers. It seemed like it was never ending issues that we had to deal with."

— Superintendent, school district

"The big drive toward the Apple environment was the stories we heard about **the stability of the platform, the strength for learning, the ability to manage it, and the sheer amount of uptime**; most of these things are what you want to see in an environment where devices need to work all the time."

— Executive director of technology, school district

"**We chose Apple due to the reliability** — all the different apps that you can use with the camera and with augmented reality, all the other different things we can use that iPad for. We can adapt our iPad usage across all the different apps that we have in our math, English, and social studies classrooms. Our teachers demanded that they wanted to change what instructional education looks like."

— Superintendent, school district

DURABILITY

"Our students break the [non-Apple devices] all the time and **the major differentiator [with Apple] is the [durability of the] screen.**"

— Chief technology officer, school district

"**Apple is better for instructional technology — and that's our business.** Apple is by far the market leader for best durability. I like that I can [still] pick up a MacBook [after] kids bounce them off sidewalks, leave them on top of their cars. They're just very durable."

— Superintendent, school district

INSTRUCTIONAL CAPABILITY

"**Investing in Apple devices boiled down to instructional capability**, that is, the ability for the device to meet our core instructional and learning goals. The Apple environment was a clear winner stacked up against other environments. Apple is ahead of the pack in terms of what we wanted to do."

— Executive director of technology, school district

STUDENT EXPERIENCES AND OUTCOMES

"Why do we like Apple over other options? It's because **our students and teachers have far more capabilities.** Our students can show us what they learned in far more varied ways."

— Director of technology, school district

"The goal of our iPad program is not to make the minimal state test requirements go higher, it is to **give the students different ways to show what they've learned, and to create, consume, and manage information.**"

— Director of technology, school district

"The most important thing for us is we want [Apple devices] to be a tool for creation. We're built on 'every person inspired to create.' We wanted kids to be able to show their learning in a variety of ways and not just have a device that replaces a paper and pencil. **We view the iPad as a creation tool and the things that our kids can do; they're absolutely amazing.**"

— High school principal, school district

"**We want digitally informed citizens. We want them to understand what it means to have a digital footprint.** We want them to be able to use this tool as a vehicle in whatever they pursue in the real world after high school; whether that's a technical school, a four-year university, or going straight to work."

— Superintendent, school district

COMPOSITE ORGANIZATION

Based on the interviews and survey, Forrester constructed a TEI framework, a composite organization, and an ROI analysis that illustrates the areas financially affected. The composite organization is a representative school district of the eight interviewees and the 234 survey respondents, and it is used to present the aggregate financial analysis in the next section. The composite organization has the following characteristics:

Description of composite. The composite organization is a U.S. based public school district serving 10,000 students across grades K-12. The composite organization employs 625 teachers and eight IT administrators.

Deployment characteristics. Prior to investing in Apple, the composite organization had a 1:1 device program with a mixture of non-Apple devices for students and teachers. After investing in 1:1 program with Apple devices, the composite organization replaces all legacy devices with iPad devices for students and MacBook Air devices for teachers. All devices are refreshed in Year 1 with costs spread over the device lifecycle of four years. Devices, peripherals, and management costs are financed over four years, which is also the recognized device lifecycle length for iPad and MacBook Air devices.

Key Assumptions

- **10,000 students**
- **625 teachers**
- **8 IT administrators**
- **1:1 iPad program for K-12 students**
- **MacBook Air for teachers**

Analysis Of Educational Benefits

■ Qualitative benefits that impact students, teachers, and schools

EVALUATING THE IMPACT OF EDUCATIONAL BENEFITS

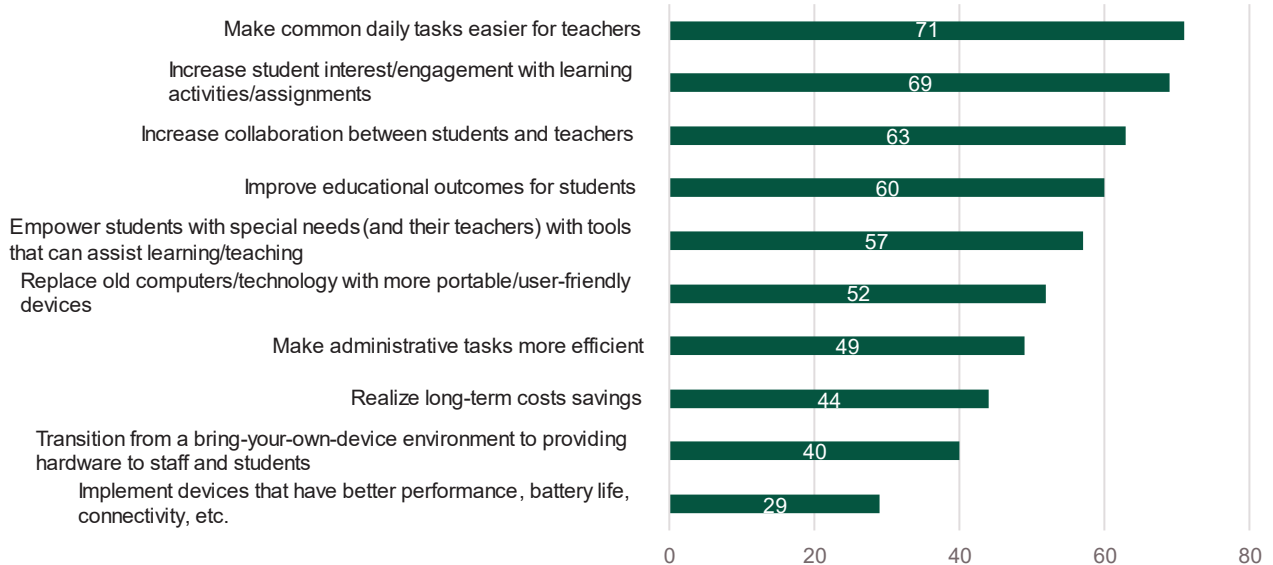
Customers cited nonfinancial benefits of leveraging Apple devices for their students, teachers, and administrators that had a significant impact on student and teacher experience. Increasing educational outcomes and engagement for students, increasing collaboration between students and teachers, and making common tasks easier for teachers were the top priorities of 234 survey respondents.

Apple devices improved student creativity, engagement, and learning outcomes. Apple devices helped students and teachers be more creative in the way they demonstrated and engaged with classroom technology and lessons, which improved student outcomes. In a survey of 125 education decision-makers who leveraged Apple devices at their organizations, respondents were asked what benefits they experienced from using Apple devices. The top responses were improved student engagement (64%), improved the class

teaching experience (63%), improved the ability to conduct hybrid learning (59%) and improved the quality of students' work (50%).

- A high school principal discussed what they heard from students: "When we ask kids why they are excited to be at school, it comes down to the ability to create and be creative. Creativity is everybody's foundation and if you have that head space to create, it's a pretty amazing feeling. We give our students the tools to do that."
- A principal explained how they think about student learning and engagement as it relates to their devices: "Being engaged in learning is the ability to have choice and the ability for students to show what they have learned and collaborate with others. One of the benefits we have seen with Apple is attracting students and student engagement. It gives kids' opportunities to show their learning in the way that they would like to show it."

"What were the top three drivers that led your organization to invest in Apple ?"



Base: 234 Education decision-makers

Source: A commissioned study conducted by Forrester on behalf of Apple January 2023



- The same principal also cited the iPad as a key component of their strategy, “The iPad has proven to be a device for creativity and sparking the imagination. Our kids seamlessly integrated it into what they do every day.”
- Apple devices provided and enabled additional accessibility features so students with special needs could adjust settings and improve their experience.

Apple devices enhanced teacher collaboration and instruction flexibility from a unified ecosystem.

Teachers streamlined their in-classroom mobility, presentations, file sharing, and student activity monitoring by operating under one ecosystem. Interviewees cited specific features such as Airdrop for easy file transfer assignment submissions; managed App stores to install Apple’s creativity suite (GarageBand, iMovie, Keynote, etc.); Apple TV for quick screen sharing; and other integrations between iPad, iPhone, and MacBook Air models.

- A high school principal shared: “We wouldn’t be where we are today without the use of the Apple ecosystem that we have, and we are a Gold Star School on the cusp of being a National Blue Ribbon School. We have kids creating and taking ownership in their learning and viewing themselves as leaders in our community and world. I don’t see how we would have made it this far without being part of the Apple ecosystem.”

VOICE OF THE CUSTOMER: EDUCATIONAL BENEFITS

- “Apple devices’ accessibility features level the playing field for all students by enabling students with differences to learn alongside their peers using the exact same device, without standing out or requiring different tools.”
— High school principal, school district
- “The [non-Apple] devices just don’t have the creativity tools for the kind of work that our students can do on the iPad. With those devices, students were mostly just consuming information off their screen rather than leveraging the devices for creativity.”
— Assistant superintendent, school district
- “Looking at what you can do with the Apple technology to help kids learn, I’d prefer us getting more Apple devices out there. That’s why you go Apple versus some other device.”
— Executive director of technology, school district
- “From [my experience] being in both worlds at one time or another, the Apple devices are more intuitive and are easier to use. I think more thought goes into the design and it works well for education. On top of the ease-of use, the management, the software that’s available, the devices provide a lot more functionality for us.”
— Director of technology, school district

Analysis Of School District Benefits

■ Quantified benefit data as applied to the composite organization

Total Benefits							
Ref.	Benefit	Year 1	Year 2	Year 3	Year 4	Total	Present Value
Atr	Avoided legacy technology costs	\$1,157,029	\$1,157,029	\$1,157,029	\$1,157,029	\$4,628,117	\$3,667,627
Btr	Device residual value cost savings	\$0	\$0	\$0	\$686,702	\$686,702	\$469,027
Ctr	IT operational efficiency	\$315,000	\$315,000	\$315,000	\$315,000	\$1,260,000	\$998,508
	Total benefits (risk-adjusted)	\$1,472,029	\$1,472,029	\$1,472,029	\$2,158,731	\$6,574,819	\$5,135,162

AVOIDED LEGACY TECHNOLOGY COSTS

Evidence and data. Interviewees' organizations avoided legacy device refresh costs by investing in a fully Apple 1:1 device program. Legacy devices often required additional costs that could be avoided in an Apple device program.

Interviewees reported that the maximum lifecycle for legacy devices were typically three years, while iPad lifecycles were anywhere between three and six years due to the hardware build quality and durability. Teacher usage for MacBook Air models ranged from four to six years. Interviewees' organizations avoided costs associated with more frequent device refreshes in their legacy environment. They also spent less on hardware repair and replacement costs.

- Fifty-six survey respondents reported extending device lifecycles by 18.5 months on average moving to Apple.

- The executive director of technology stated: "The big issue with [non-Apple devices] is that school districts plan to use them for three or four years, but they never last for three or four years. They usually last for two or three years."
- The superintendent of a school district told Forrester: "The Apple products are truly reliable. There might be a little bit more of a higher cost upfront compared to a [non-Apple] device, but you're going to get four years with an Apple product. You can get five years out of them without major issues. I just don't see that with other devices."

Modeling and assumptions. In modeling the composite organization, Forrester assumes:

- The composite organization utilized 10,000 legacy student devices and 625 legacy teacher devices in its prior environment.
- Legacy student and teacher devices had a three-year lifecycle and were financed over three years. The composite avoids a third of the total costs of legacy devices annually.
- The composite organization paid \$22 per legacy device for device management software for the entire device lifecycle, or \$7.33 annually.

Extended device lifecycle:

18.5 months



- The composite incurred an additional \$40 cost per device for breakage, hardware, and replacement expenses.

Risks. The expected financial impact is subject to risks and variation based on several factors, including:

- Number of devices in the prior environment.
- Legacy device, master data management (MDM), and repair costs.
- Lifecycle length of legacy devices.
- Device financing structure.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a four-year, risk-adjusted total PV (discounted at 10%) of \$3.67 million.

“Our device study found that Apple devices were by far the least expensive of all of the options that were out there because of residual value.”

Director of technology, school district

Avoided Legacy Technology Costs						
Ref.	Metric	Source	Year 1	Year 2	Year 3	Year 4
A1	Number of legacy, non-Apple student devices previously in use, 3-year device lifecycle	Composite	10,000	10,000	10,000	10,000
A2	Cost of each legacy, non-Apple student device	Interviews	\$279	\$279	\$279	\$279
A3	Device management and additional repair cost per device over full lifecycle	Composite	\$62	\$62	\$62	\$62
A4	Legacy, non-Apple student device cost incurred per year, 3-year financing	Composite	33.3%	33.3%	33.3%	33.3%
A5	Subtotal: Avoided cost of legacy non-apple student devices	$A1*(A2+A3)*A4$	\$1,135,530	\$1,135,530	\$1,135,530	\$1,135,530
A6	Number of legacy, non-Apple teacher devices previously in use, 3-year device lifecycle	Composite	625	625	625	625
A7	Cost of each legacy, non-Apple teacher device	Interviews	\$699	\$699	\$699	\$699
A8	Device management costs per device over full lifecycle	Interviews	\$22	\$22	\$22	\$22
A9	Legacy, non-Apple teacher device cost incurred per year, 3-year financing	Composite	33.3%	33.3%	33.3%	33.3%
A10	Subtotal: Avoided cost of legacy non-apple teacher devices	$A6*(A7+A8)*A9$	\$150,058	\$150,058	\$150,058	\$150,058
At	Avoided legacy technology costs	$A5+A10$	\$1,285,588	\$1,285,588	\$1,285,588	\$1,285,588
	Risk adjustment	↓10%				
Atr	Avoided legacy technology costs (risk-adjusted)		\$1,157,029	\$1,157,029	\$1,157,029	\$1,157,029
Four-year total: \$4,628,117			Four-year present value: \$3,667,627			

DEVICE RESIDUAL VALUE COST SAVINGS

Evidence and data. Apple devices retained 20% to 30% of their value by the end of the device lifecycle, depending on the lifecycle length. This allowed interviewees' organizations to resell used iPad models to third parties and reinvest those savings into their device programs or other initiatives.

- The superintendent told Forrester: "What distinguishes Apple from other hardware is the life of an iPad. I know I'm going to be able to sell these iPad [models] back at the end of next school year for maybe \$130, \$140, \$150. But if you have a [non-Apple device], they have four years in it, you can't even give them away. We use the money we get back for resell and roll that money into our new lease program."
- The chief technology officer stated: "We literally built [Apple devices residual value] into the revenue of the plan. We will recover a certain amount of money year over year from reselling our Apple products. If they were [non-Apple]

products, we'd be getting such a small fraction of that amount that we would not be able to do the same things that we're doing."

- The chief technology officer said: "Even after six years we still get a decent return on iPad [models]. The fact they hold their value allows us to use that as revenue to help to fund the [device] plan."

Modeling and assumptions. Forrester assumes the composite organization sells all of the 10,000 iPad models and 625 MacBook Air models purchased in Year 1 at the end of Year 4, recouping 20% and 25% of the initial device cost, respectively.

Risks. The expected financial impact is subject to risks and variation based on factors including realized Apple device lifecycle length and resale value.

Results. To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a four-year, risk-adjusted total PV of \$469,000.

Device Residual Value Cost Savings						
Ref.	Metric	Source	Year 1	Year 2	Year 3	Year 4
B1	Number of iPad devices refreshed at end of school year, 4-year device lifecycle	Composite				10,000
B2	Cost per iPad	Composite				\$299
B3	End of lifecycle resell value for iPad devices	Interviews				20%
B4	Subtotal: Cost savings for iPad	$B1 \times B2 \times B3$				\$598,000
B5	Number of MacBook Air devices refreshed at the end of the year, 4-year device lifecycle	Composite				625
B6	Cost per MacBook Air	\$799				\$799
B7	End of lifecycle resell value for MacBook Air devices	Interviews				25%
B8	Subtotal: Cost savings for MacBook Air	$B5 \times B6 \times B7$				\$124,844
Bt	Device residual value cost savings	$B4 + B8$	\$0	\$0	\$0	\$722,844
	Risk adjustment	↓5%				
Btr	Device residual value cost savings (risk-adjusted)		\$0	\$0	\$0	\$686,702
Four-year total: \$686,702			Four-year present value: \$469,027			

IT OPERATIONAL EFFICIENCY

Evidence and data. Interviewees reported greater operational efficiency for IT and technician teams managing Apple devices. With Apple, interviewees' and survey respondents' organizations experienced nearly out-of-the-box deployment, fewer help-desk requests, improved security posture, and less time spent on repairs. As a result, organizations could reallocate their IT employee's time to other value add tasks. Forrester found the following insights:

- The director of technology told Forrester that their IT staff typically spent 50% to 75% of their day fixing non-Apple devices.
- The superintendent of a school district report: "We would need easily double the amount of people if we were managing [non-Apple devices] instead of iPad [models]. ... I [would] probably need four or five people instead of two".

Interviewees shared additional IT benefits of managing Apple devices, including:

- **Ease of deployment.** The director of technology told Forrester: "We strive for an out-of-the-box experience. In the past, you had to unpackage every computer, image it, set it all up, [and] give it to a student. [Then] they had to do their setup. Now a student can pull an iPad out of a box for the first time and the iPad automatically joins our network, pulls down all our settings and self-service app, and knows who the student is. They log in with their network username and password. All of that just gets taken care of literally before the iPad even arrives here."
- **Greater IT productivity.** The director of technology explained: "The technician has more time to work with staff in a training capacity as well as being a support person instead of the break-fix person. It gives them more time to do other things."

The superintendent said: "From my experience in the [non-Apple] world, we don't see a lot of

IT Efficiency Survey Results

- Forty-three of 102 surveyed education decision makers who have security and compliance insights reduced the number of annual severe security incidents by 14%.
- Forty-three of 91 surveyed education decision makers who have IT insights reported reducing the number of monthly tickets by 14.6%.
- Forty-eight of 102 surveyed decision makers who have IT insights saved 2.2 hours a week on average managing and repairing devices.

support tickets in the Apple world. It's nothing like tearing a laptop apart and putting new hardware into that device."

The executive director of technology stated: "Once things are configured and up and running, there's not a lot to do other than do updates, keep an eye on things, run reports as needed, etc."

- **Improved security posture.** One school district organization eliminated 24 hours a month of IT staff time spent addressing security concerns due to the improved security posture Apple devices introduced. The executive director of technology explained: "There is additional time required to harden the [non-Apple] environment, which is more of a target for exploits. ... If we were deploying 11,000 [non-Apple] laptops versus 11,000 iPad [models], we'd be probably spending \$40,000 to \$50,000 more per year to do that."

Modeling and assumptions. In modeling the composite organization, Forrester assumes:

- The composite employs eight IT FTEs to manage legacy devices in the prior state.
- The composite repurposes 2.8 FTE worth of IT time to other value add tasks.
- The average IT administrator fully burdened rate is \$125,000.

Risks. The expected financial impact is subject to risks and variation based on factors including:

- Change management, learning a new ecosystem, and baseline skill sets.
- Size of IT teams and fully burdened rate.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a four-year, risk-adjusted total PV of \$999,000.

IT Operational Efficiency						
Ref.	Metric	Source	Year 1	Year 2	Year 3	Year 4
C1	Number of IT FTEs required to manage legacy devices	Composite	8	8	8	8
C2	Avoided device maintenance and management labor with Apple	Interviews	35%	35%	35%	35%
C3	Repurposed headcount due to increased IT operational efficiency	C1*C2	2.8	2.8	2.8	2.8
C4	Number of IT FTEs required to manage current environment	C1-C3	5.2	5.2	5.2	5.2
C5	IT administrator fully burdened rate	TEI standard	\$125,000	\$125,000	\$125,000	\$125,000
Ct	IT operational efficiency	C3*C5	\$350,000	\$350,000	\$350,000	\$350,000
	Risk adjustment	↓10%				
Ctr	IT operational efficiency (risk-adjusted)		\$315,000	\$315,000	\$315,000	\$315,000
Four-year total: \$1,260,000			Four-year present value: \$998,508			

STRATEGIC FLEXIBILITY

The value of flexibility is unique to each customer. There are multiple scenarios in which a customer might implement Apple devices for Education and later realize additional uses and business opportunities, including:

- **Streamlined presentation, sharing, and collaboration with Apple TV versus legacy interactive displays.** Customer organizations reaped additional benefits implementing Apple TV, which streamlined sharing and presentation capabilities, reduced non-learning time, and enabled cost savings by retiring and avoiding additional legacy presentation device costs. The

superintendent in a school district told Forrester: “We have Apple TV in every classroom. We really don’t use [our legacy interactive displays] anymore and haven’t purchased one for six or seven years. School districts spend hundreds and hundreds or thousands of dollars on [legacy presentation devices] but I can project a student’s iPad and a student can click on that Apple TV and project their iPad on there, and the teacher can project their own iPad and write on it using an Apple Pencil. It’s more advanced and saves a lot of money.”

- **Apple support and training.** Interviewees reported that Apple-provided training improved



teacher engagement, skillset, and device adoption success. The superintendent in a school district stated: “The training that Apple provides us is awesome. We have professional development throughout the year we call instructional fairs, and they are like mini conferences that you would go to where you get to pick sessions of your choice. Apple always brings trainers in for our sessions to provide ongoing professional learning for our staff and administrative team. I appreciate that partnership with Apple.”

- The executive director of technology told Forrester, “When we need engineers from Apple, which isn’t very often, we pretty much have them on the phone by the same day or next day for getting problem solved. You’re not going to find that with some of these other tools out there ... that’s a huge benefit on the IT side.”

Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in [Appendix A](#)).

Analysis Of Costs

■ Quantified cost data as applied to the composite

Total Costs								
Ref.	Cost	Initial	Year 1	Year 2	Year 3	Year 4	Total	Present Value
Dtr	Device and training Costs	\$0	\$1,100,470	\$1,088,719	\$1,088,719	\$1,088,719	\$4,366,627	\$3,461,775
	Total costs (risk-adjusted)	\$0	\$1,100,470	\$1,088,719	\$1,088,719	\$1,088,719	\$4,366,627	\$3,461,775

DEVICE AND TRAINING COSTS

Evidence and data. Interviewees considered the following costs when investing in Apple: iPad and MacBook Air devices, peripherals, device management software, and IT administration training to deploy and manage Apple devices. AppleCare or third-party insurance providers could cover additional device insurance costs. Interviewees noted the following considerations when investing in Apple devices:

- **Device financing and leasing options.** Interviewees' organizations had a variety of financing and leasing options to optimize technology budgets, as one superintendent explained: "We lease [our devices] so we don't have to upfront the cost with Apple right out of the gate. Let's say our iPad [models] cost a million dollars. We might be doing three or four payments of roughly \$300,000 annually over three years. That's helped a lot with our technology budget."
- **Peripheral costs.** The most common peripherals and complimentary technology interviewees purchased included iPad cases, keyboards, Apple Pencil, and Apple TV. Several interviewees testified that students often preferred digital keyboards over physical keyboards, especially for grades four and above. A high school principal told Forrester: "What we found is that the keyboard cases were just being used as

covers. Sometimes they break and the kids would just say, 'You know, I don't even want to replace it. I just want to have something to protect the screen when it's in my bag.'"

Modeling and assumptions. In modeling the composite organization, Forrester assumes:

- The composite purchases 10,000 iPad devices for students and 625 MacBook Air devices for teachers in Year 1 of their investment.
- The device lifecycle length is four years for both iPad and MacBook Air models.
- The composite pays \$7.25 annually, or \$29 over four years, per device for their MDM solution.
- The composite pays \$35 per iPad cover.
- The composite finances their device, peripheral, and MDM software over 4 years, paying 25% of the cost each year.
- The composite IT personnel spend a total of 16 hours each in a \$3,500 training course.

Risks. The expected financial impact is subject to risks and variation based on several factors, including:

- Cost of devices, peripherals, and device management software.
- Types and mix of devices and peripherals chosen.

- Level of IT experience and expertise.
- Additional deployment labor and employee training needed.
- Additional AppleCare costs.

Results. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a four-year, risk-adjusted total PV (discounted at 10%) of \$3.46 million.

Device And Training Costs							
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3	Year 4
D1	Number of iPad devices for students in use	Composite		10,000	10,000	10,000	10,000
D2	Cost per iPad*	Interviews		\$299	\$299	\$299	\$299
D3	Cost of device management software and peripherals per iPad for full lifecycle	Interviews		\$64	\$64	\$64	\$64
D4	Device cost incurred per year with 4-year financing (device lifecycle)	Composite		25%	25%	25%	25%
D5	Subtotal: iPad, management software, and peripheral costs	$D1 \times (D2 + D3) \times D4$		\$907,500	\$907,500	\$907,500	\$907,500
D6	Number of MacBook Air devices for teachers in use	Composite		625	625	625	625
D7	Cost per MacBook Air*	Interviews		\$799	\$799	\$799	\$799
D8	Cost of device management software per MacBook Air over lifecycle	Interviews		\$29	\$29	\$29	\$29
D9	Device cost incurred per year with 4-year financing (device lifecycle)	Composite		25%	25%	25%	25%
D10	Subtotal: MacBook Air and management software costs	$D6 \times (D7 + D8) \times D9$		\$129,375	\$129,375	\$129,375	\$129,375
D11	Training course cost for IT administrators	Interviews		\$3,500			
D12	FTEs in training course	Composite		8			
D13	Hours each FTE spends in training course	Composite		16			
D14	FTE fully burdened hourly rate	TEI standard		\$52			
D15	Attendee labor costs	$D12 \times D13 + D14$		\$7,692			
D16	Subtotal: Total training costs	$D11 + D15$		\$11,192			
Dt	Device And Training Costs	$D5 + D10 + D13$		\$1,048,067	\$1,036,875	\$1,036,875	\$1,036,875
	Risk adjustment	↑5%					
Dtr	Device And Training Costs (risk-adjusted)		\$0	\$1,100,470	\$1,088,719	\$1,088,719	\$1,088,719
Four-year total: \$4,366,627				Four-year present value: \$3,461,775			

*Pricing may vary. Contact an Apple representative for additional details.

Analysis Of Additional Benefits

Quantified benefits that are not included in the ROI calculation but are important for schools

Student and Teacher Benefits			
Ref.	Benefit	Impacted Groups	Relevant Metrics
Wtr	Teacher productivity improvement – reduced time spent on admin. work and increased amount of in-classroom teaching time	Students Teachers	Hours saved Dollars (salary) recaptured
Xtr	Improved teacher retention – teachers are less likely to move schools or leave teaching when given Apple devices	School District Teachers Students	Avoided headcount churn Dollars saved
Ytr	Improved student enrollment – schools with Apple devices attract more students from other schools or online alternatives	School District	Additional funding (dollars)
Ztr	Recaptured academic learning time for students – students spend less time on non-learning activities in-class with Apple devices	Teachers Students	Academic learning time

TEACHER PRODUCTIVITY IMPROVEMENT

Key Results. Teachers recapture 1.5 hours per week resulting in a total four-year present value of \$1.35 million worth of labor related to teaching and administrative tasks for the composite organization. This benefit is not quantified as part of the ROI analysis. However, Forrester has included a calculation table in [Appendix C](#) to help demonstrate the impact of these efficiency gains.

reduced the amount of time it took to perform day-to-day tasks like grading, planning, research, and checking-in on students.

The time savings reduced time spent on administrative tasks, communication, and planning. Ultimately, teachers spent more time dedicated to curriculum planning and engaging with students.

- A survey of educational organizations found that 65% of organizations that use Apple devices improved collaboration with teachers, aides, and administrators compared to when they used non-Apple devices. On average, respondents reported that teachers saved 1.9 hours per week.

Voice Of The Customer: Teacher Productivity Improvement

- “One of the huge benefits of Apple products is how easy it is to collaborate. I can take my iPad, my MacBook, or my iPhone, find a TV, immediately connect to AirPlay, and collaborate on the spot. This is true anywhere in our district and teachers frequently set up quick collaboration sessions with a few other teachers to share ideas and plan.” — Superintendent, school district

Weekly hours recaptured by teachers

1.5 hours



Evidence and data. By leveraging iPad and MacBook Air models in the classroom, teachers in the interviewees' school districts improved lesson plan collaboration, communication with administrators, and student monitoring and assistance. With Apple's consistent ecosystem across devices, teachers performed their work on their preferred device at their preferred time, which

- “Our substitute teachers have universally told us ‘Please don’t give us a non-Apple device to use. We are accustomed to using MacOS. We know that it’s plugged into the ecosystem, we expect to be able to use the screen mirroring and other features. We don’t feel like we can be as effective with other devices.’” — CTO, school district
- “One of the strongest benefits of Apple is that teachers are able to look on their device and see what the student right in front of them in the classroom is doing on their iPad. We view this as a way to help kids that might be stuck on something or to ask a student, ‘Can I show what you are doing up on the screen for the rest of the class?’ And they always say yes.” — Executive director of technology, school district

Reduced teacher churn by

15%



IMPROVED TEACHER RETENTION

Key Results. Reduce teacher churn by 15% resulting in \$761,000 of avoided replacement costs over four years for the composite organization. This benefit is not quantified as part of the ROI analysis. However, Forrester has included a calculation table in [Appendix C](#) to help demonstrate the impact of improved teacher retention.

Evidence and data. With Apple devices, survey respondents experienced less teacher churn compared to when they had non-Apple devices. A survey of educational organizations found that 41% of respondents who leverage Apple devices reported an improvement to teacher retention rates since deploying Apple. On average, respondents reported a 31% reduction in teacher churn. Interviewees reported improved teacher satisfaction with Apple devices — a key indicator of burnout and churn.³ A

consistent environment in every classroom and amongst students, teachers, and administrators made planning and executing lessons easier. Consistency year over year allowed teachers to confidently invest time and energy to learn and grow with the same ecosystem, Apple devices were viewed as premium devices and demonstrated that schools were willing to invest in teachers. Schools also reported that Apple provided teachers with accreditation, professional development resources, and free or subsidized classes.

Voice Of The Customer: Improved Teacher Retention

- “The Apple devices have definitely improved our teaching and learning, 100%. The professional development that Apple provides has allowed our teachers to truly embrace personalize learning and take advantage of the devices. Our teachers would never go back to that traditional type of learning without an iPad in their hands; they would revolt.” — Superintendent, school district
- “It gives teachers an excitement for learning when they can discover something new and can implement it in the classroom the same day. Or if a student comes to them, teachers can facilitate that just-in-time learning right in the moment with their Apple device.” — Director of technology, school district
- “The best tablet experience far and away is an iPad. When you make it possible for teachers to be busy about the classroom, create that proximity and presence to their kids, and still be very much engaged in whole group instruction, it’s a pretty compelling story.” — CTO, district
- “Every teacher at our school is an Apple teacher now. Apple has phenomenal professional learning that our teachers can access. There are tons of different and cool resources in there that teachers bring into the classroom and share with each other.” — Director of technology, school district

Improved student enrollment by

2%



IMPROVED STUDENT ENROLLMENT

Key Results. Improved student enrollment by 2% annually, resulting in \$1.52 million of additional student funding over four years for the composite organization. This benefit is not quantified as part of the ROI analysis. However, Forrester has included a calculation table in [Appendix C](#) to help demonstrate the impact of improved student enrollment.

Evidence and data. Forrester’s research proves that positive experiences, whether from customers or employees, will generate better outcomes and higher levels of engagement and retention. While education is different from traditional businesses in many ways, the same concepts can still be relevant to both spaces. Interviewees shared the following examples of how Apple devices provided positive experiences for students and teachers, and how the devices helped improve the overall performance and perception of their schools:

- One customer reported a 4% boost to enrollment and a 75% reduction in dropout rates, attributing the results to their Apple devices.
- With Apple devices, districts can bring in-person and remote learning closer together so students do not fall behind and have an easier time transitioning between in-person and remote classes. Districts can also give students experience using the same tools as real-world professionals and develop unique and immersive courses that use Apple technology to give students ownership over their learning. A few examples of unique classes that were developed using Apple devices include:

- A business incubator where students pitch ideas and then build out a business.
- A culinary arts course where students develop menus, budget for expenses, and learn how to manage a restaurant.
- Teachers using QR codes to instruct students at various levels simultaneously.

Voice Of The Customer: Improved Student Enrollment

- “Parents are moving to the district because of our technology and the advancements that we have made. [By] giving every student an iPad, we are seeing more excitement in learning. We’ve seen our dropout rate go from 20 kids per year to below five per year now. We have also had over 100 kids come back to our district from a cyber charter school, and that’s huge. While enrollment is still impacted by COVID-19, we have definitely seen a positive impact from the Apple devices, and we have saved hundreds of thousands of dollars as a result.” — Superintendent, school district
- “The teachers are all very happy, the students are happy with their iPad, we just don’t get a lot of complaints about our Apple devices. The biggest challenge was convincing parents who were skeptical. The most effective way to get parents to buy in is to show them how the iPad can be used in the classroom, the creative work that students submit, and the kinds of lessons that teachers can produce using the device. Once parents see that, they are sold.” — Assistant superintendent, school district
- “Our goal has always been to give an Apple device to every single kid and that’s the way we look at equity. We make sure that every kid in our school district is getting a great device with great software.” — Superintendent, school district

Recaptured student academic time, annually

1.9 days



RECAPTURED STUDENT ACADEMIC TIME

Key Results. Students recapture 30% more academic time, totaling 13 hours of recaptured academic time per year for the composite organization. This benefit is not quantified as part of the ROI analysis. However, Forrester has included a calculation table in [Appendix C](#) to help demonstrate the impact of recaptured student academic time.

Evidence and data. Interviewees reported that with Apple devices, there was less friction with technology in their classrooms compared to legacy devices. They also reported that both students and teachers said that Apple devices were more intuitive and easier to use for educational purposes.

- With non-Apple devices, teachers and students spent more time troubleshooting connectivity and login issues and getting students on the same page at the beginning of class or at the start of a new lesson.
- Apple devices quickly connected to other devices in the Apple ecosystem, making it easier to share screens, connect devices, and transfer files.
- The Apple iPad operating system, iOS, was intuitive for children and was a format that they were used to seeing and interacting.
- Interviewees mentioned that the camera on the iPad was easy to use and convenient to incorporate into lesson plans and the classroom environment.
- Pre-K to elementary school students and students with special needs could intuitively

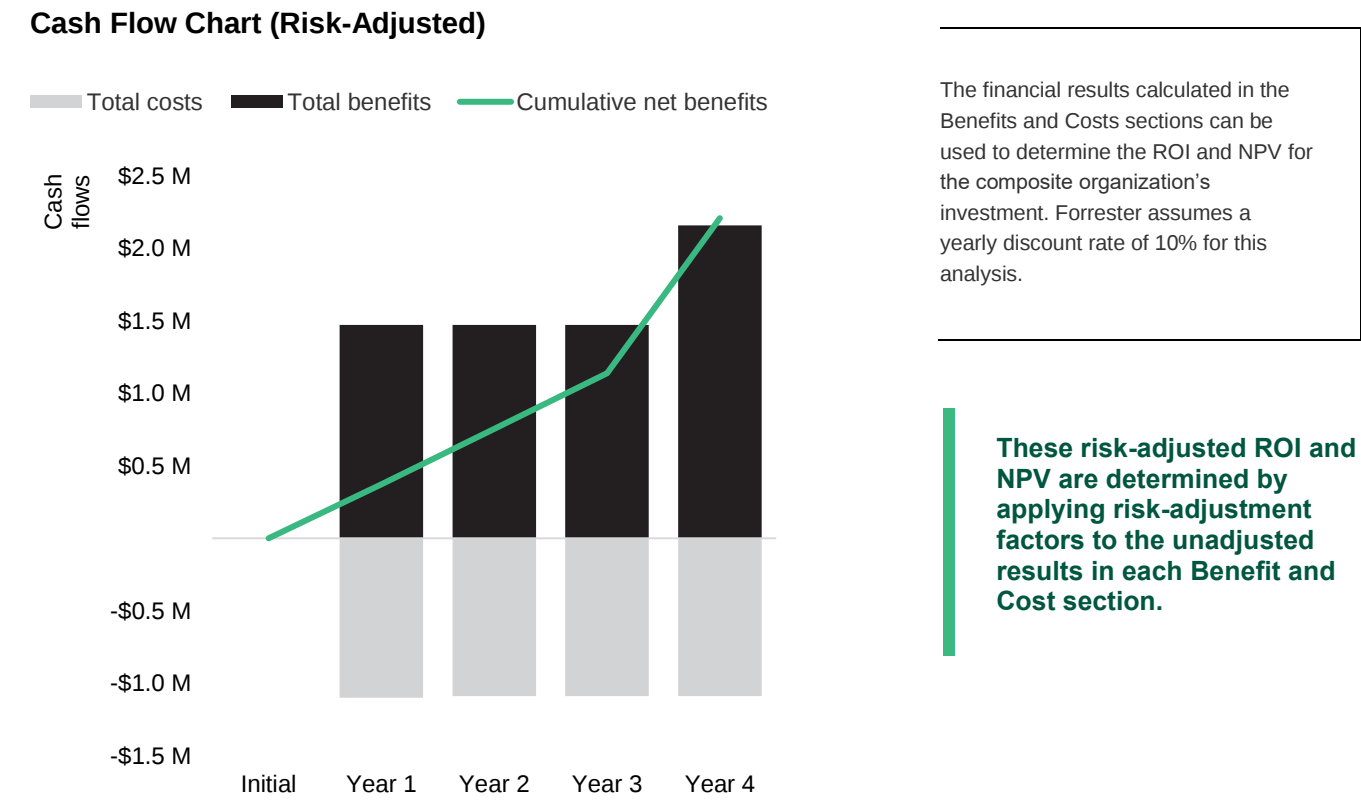
interact with the devices and use accessibility tools to aid in learning.

Voice of the Customer: Recaptured Student Academic Time

- “The kids would tell you that they would rather have an app that they can just click on instead of going to a website and having to log in. The kids just prefer to go right from the iPad [to] switch their calendar, put music on while they are working, airdrop an assignment to the teacher. That is the world they live in so it's natural for them.” — Superintendent, school district
- “[Apple] is so user-friendly which is really important. There is no other device where you can hand it to a group of kindergartners and say, ‘Hit the blue app,’ or, ‘Hit the app with a big A on it,’ and 25 kindergartners can follow along. We tried to use a non-Apple tablet device at one point, and it was just frustrating.” — Superintendent, school district
- “In our elementary school, each kid has about 40 minutes per day where they are working on something that is personalized to them using Apple products and the iPad. Kids can truly get the content that they need and work on their strengths and weaknesses — and that is built into every single day in the school. — Superintendent, school district
- “The great thing about Apple devices and creativity is when you go in a classroom, the Apple devices level the playing field for all kids. I can't speak to that enough. Kids come here with difficulties from their previous school, but, when they come to our school, they're able to show their learning in a variety of ways thanks to the Apple devices.” — High school principal, school district.

Financial Summary

CONSOLIDATED FOUR-YEAR RISK-ADJUSTED METRICS



Cash Flow Analysis (Risk-Adjusted Estimates)							
	Initial	Year 1	Year 2	Year 3	Year 4	Total	Present Value
Total costs	\$0	(\$1,100,470)	(\$1,088,719)	(\$1,088,719)	(\$1,088,719)	(\$4,366,627)	(\$3,461,775)
Total benefits	\$0	\$1,472,029	\$1,472,029	\$1,472,029	\$2,158,731	\$6,574,819	\$5,135,162
Net benefits	\$0	\$371,559	\$383,310	\$383,310	\$1,070,012	\$2,208,192	\$1,673,387
ROI							48%

Appendix A: Total Economic Impact

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

TOTAL ECONOMIC IMPACT APPROACH

Benefits represent the value delivered to the business by the product. The TEI methodology places equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization.

Costs consider all expenses necessary to deliver the proposed value, or benefits, of the product. The cost category within TEI captures incremental costs over the existing environment for ongoing costs associated with the solution.

Flexibility represents the strategic value that can be obtained for some future additional investment building on top of the initial investment already made. Having the ability to capture that benefit has a PV that can be estimated.

Risks measure the uncertainty of benefit and cost estimates given: 1) the likelihood that estimates will meet original projections and 2) the likelihood that estimates will be tracked over time. TEI risk factors are based on "triangular distribution."

The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1 that are not discounted. All other cash flows are discounted using the discount rate at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations in the summary tables are the sum of the initial investment and the discounted cash flows in each year. Sums and present value calculations of the Total Benefits, Total Costs, and Cash Flow tables may not exactly add up, as some rounding may occur.



PRESENT VALUE (PV)

The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total NPV of cash flows.



NET PRESENT VALUE (NPV)

The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.



RETURN ON INVESTMENT (ROI)

A project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits less costs) by costs.



DISCOUNT RATE

The interest rate used in cash flow analysis to take into account the time value of money. Organizations typically use discount rates between 8% and 16%.



PAYBACK PERIOD

The breakeven point for an investment. This is the point in time at which net benefits (benefits minus costs) equal initial investment or cost.

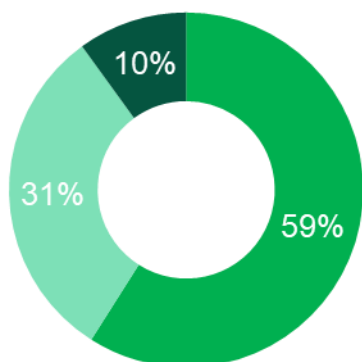
Appendix B: Interview And Survey Demographics

Interviews			
Role	Organization	District level devices	Students/ Faculty And Staff
Chief technology officer	Pre-K-12 school district	- Pre-K-1: 1:1 iPad ratio 2-12: Non-Apple devices - Teachers: 1:1 MacBook Air ratio	42,000 students 3,700 faculty and staff
Superintendent	Pre-K-12 school district	- K-6: 1:1 iPad ratio 7-12: MacBook Air - Teacher and staff: MacBook Air and iPad	27,000 students 4,000 faculty and staff
Director of technology	- K-12 school district - High School	- K-8: 1:1 iPad ratio 9-12: 1:1 MacBook Air ratio - Teachers: 2:1 MacBook Air and iPad ratio - Apple TV and Apple Pencil	12,500 students 2,000 faculty and staff
High school principal			
Executive director of technology	K-12 school district	- K-12: 1:1 iPad - Teachers: Predominantly MacBook Air - Apple Pencil	11,000 students 1,500 faculty and staff
Assistant superintendent for technology and innovation	- Pre-K-12 school district - High School	1:1 iPad ratio - Teachers: 2:1 MacBook and iPad ratio	8,500 students 950 faculty and staff
High school principal			
Superintendent	K-12 school district	1:1 iPad ratio - Teachers 2:1 MacBook and iPad ratio - Apple TV	2,400 students 320 faculty and staff

Survey Demographics

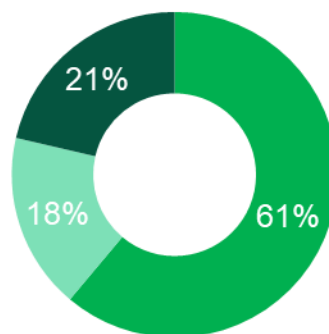
“Which of the following best describes your educational organization?”

■ Urban ■ Suburban ■ Rural



“Is your educational organization public or private?”

■ Public ■ Charter ■ Private

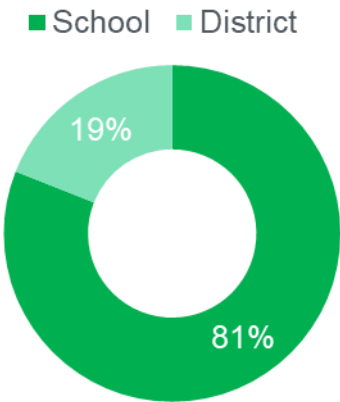


Base: 234 Education decision-makers

Source: A commissioned study conducted by Forrester on behalf of Apple, January 2023

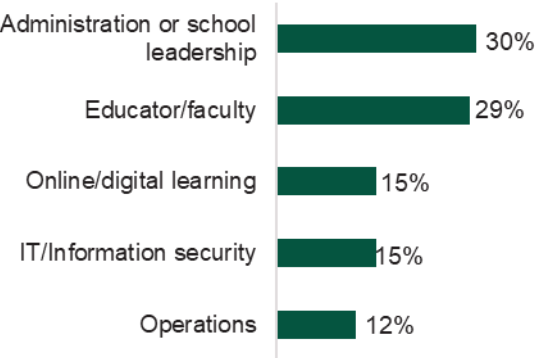
Appendix C: Qualitative Benefit Tables

“Are your duties primarily at a school or district level?”

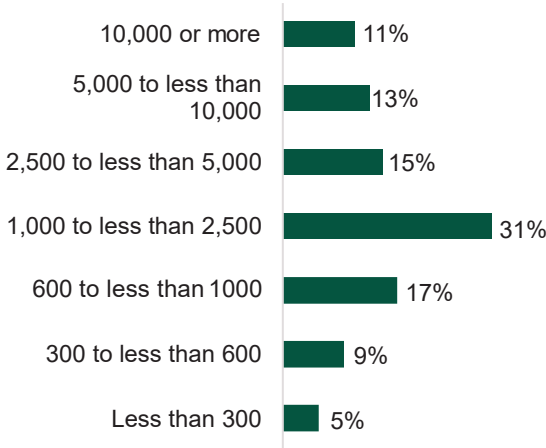


Base: 234 Education decision-makers
Source: A commissioned study conducted by Forrester on behalf of Apple, January 2023

“Which of the following best describes your current role?”



“Using your best estimate, please indicate the number of students who attend your educational organization.”



Base: 189 Education Decision Makers whose duties are primarily at the school level
Source: A commissioned study conducted by Forrester on behalf of Apple, January 2023

Appendix C: Additional Benefit Tables

TEACHER PRODUCTIVITY IMPROVEMENT

This benefit is not quantified as part of the ROI analysis. However, Forrester has included this calculation table to help demonstrate the impact of these efficiency gains for teachers for schools and districts.

Modeling and assumptions. Forrester models the composite organization as follows:

- The district has 625 full time teachers working 40 weeks per year in-school.
- Teachers save 1.5 hours per week with Apple devices compared to when they used non-Apple devices.
- Forrester applies a 50% productivity capture. This means that the model expects teachers to leverage 50% of the recaptured time for productive work. The other 50% of time is assumed to be spent on non-productive tasks.
- Teachers fully-burdened hourly salary is \$41 per hour.

Risks. The impact of this benefit may vary due to:

- The impact that Apple devices have on teacher and staff collaboration.
- The number of weeks per school year.
- The average hourly salary for teachers.

Results. To account for these risks, Forrester adjusted this benefit downward by 15%. Results are presented in:

- Number of hours saved per teacher.
- Total number of hours saved for the district.
- Quantified savings based on teacher salaries.

Salary savings are not intended to suggest that schools can reduce the overall number of teachers as a result of this investment.

Impact. While quantified teacher productivity gains do not impact a school district's bottom-line budget, efficiency gains for teachers do impact student and teacher outcomes.

Teacher Productivity Improvement

Ref.	Metric	Source	Year 1	Year 2	Year 3	Year 4
W1	Number of teachers	Composite (B3)	625	625	625	625
W2	Hours saved per week	Interviews and survey	1.5	1.5	1.5	1.5
W3	Number of weeks in school year	Composite	40	40	40	40
W4	Annual hours saved from using Apple devices per teacher	W2*W3	60	60	60	60
W5	Productivity recapture	Composite	50%	50%	50%	50%
W6	Subtotal: Hours recaptured annually per teacher	W4*W5	30	30	30	30
W7	Total hours recaptured annually - district	W1*W6	18,750	18,750	18,750	18,750
W8	Fully burdened hourly salary for teachers	\$70,000/2080 hours	\$34	\$34	\$34	34
Wt	Teacher productivity improvement	W1*W6*W8	\$637,500	\$637,500	\$637,500	\$637,500
	Risk adjustment	↓15%				
Wtr	Teacher productivity improvement (risk-adjusted)		\$541,875	\$541,875	\$541,875	\$541,875
Annual total: \$541,875			Four-year present value: \$1,717,671			
Annual teacher productivity improvement: 30 hours			Annual district-wide productivity improvement: 18,750 hours			

Appendix C: Additional Benefit Tables

IMPROVED TEACHER RETENTION

This benefit is not quantified as part of the ROI analysis. However, Forrester has included a calculation table to help demonstrate the impact of improved teacher retention.

Modeling and assumptions. Forrester models the composite organization as follows:

- The average teacher churn rate in the US is 16%.⁴
- With Apple, the teacher churn rate is reduced by 15%.
- Replacement cost for one teacher is \$20,000.⁵

Risks. The impact of this benefit may vary due to:

- Current teacher churn rates.
- Impact that Apple devices have on teachers.

Results. To account for these risks, Forrester adjusted this benefit downward by 20%. Results are presented in:

- The impact that Apple devices have on teacher retention.
- Replacement costs for teachers.

Impact. Improved teacher retention could be included in an ROI calculation because schools and districts save money by improving retention. This benefit represents real dollar savings for schools and districts.

Improved Teacher Retention						
Ref.	Metric	Source	Year 1	Year 2	Year 3	Year 4
X1	Number of teachers using Apple devices	Composite	625	625	625	625
X2	Average teacher churn rate (national average)	NCES	16%	16%	16%	16%
X3	Reduction in churn rate attributable to Apple	Survey	15%	15%	15%	15%
X4	Average teacher churn rate with Apple	$X2*(1-X3)$	13.60%	13.60%	13.60%	13.60%
X5	Avoided teacher churn with Apple	$X1*(X2-X3)$	15	15	15	15
X6	Replacement cost per teacher	NCES	\$20,000	\$20,000	\$20,000	\$20,000
Xt	Increased teacher retention with Apple	$X5*X6$	\$300,000	\$300,000	\$300,000	\$300,000
	Risk adjustment	↓20%				
Xtr	Increased teacher retention with Apple (risk-adjusted)		\$240,000	\$240,000	\$240,000	\$240,000
Annual total: \$240,000			Four-year present value: \$760,768			
Teacher retention improvement: 15%			Avoided teacher churn: 15 teachers per year			

Appendix C: Additional Benefit Tables

IMPROVED STUDENT ENROLLMENT

This benefit is not quantified as part of the ROI analysis. However, Forrester has included this calculation table to help demonstrate the impact of these efficiency gains for teachers for schools and districts

Modeling and assumptions. Forrester models the composite organization as follows:

- The district receives \$15,000 in annual funding per enrolled student.
- Districts that leverage Apple devices for students and teachers see a 2% improvement to enrollment compared to when the same school used non-Apple devices.
- 20% of the enrollment improvement is directly attributable to Apple devices.

Risks. The impact of this benefit may vary due to:

- Annual funding per enrolled student and how student-funding is handled in a school's state.
- The impact that Apple devices will have on student enrollment.

Results. To account for these risks, Forrester adjusted this benefit downward by 20%. Results are presented in:

- Percentage improvement in student enrollment
- Quantified value of student enrollment improvement.

Impact. Improved student enrollment could be included in an ROI calculation because schools receive funding based on enrollment. Having more students complete a year of school will translate directly into more funding dollars for that school.

Improved Student Enrollment						
Ref.	Metric	Source	Year 1	Year 2	Year 3	Year 4
Y1	Total number of students	Composite	10,000	10,000	10,000	10,000
Y2	Annual funding per student	Interviews	\$15,000	\$15,000	\$15,000	\$15,000
Y3	Improvement in student enrollment	Survey and Interviews	2%	2%	2%	2%
Y4	Subtotal: Enrollment improvement	Y1*Y2*Y3	\$3,000,000	\$3,000,000	\$3,000,000	\$3,000,000
Y5	Attribution to Apple devices	Composite	20%	20%	20%	20%
Yt	Improved student enrollment	Y4*Y5	\$600,000	\$600,000	\$600,000	\$600,000
	Risk adjustment	↓20%				
Ytr	Improved student enrollment (risk-adjusted)		\$480,000	\$480,000	\$480,000	\$480,000
Four-year total: \$1,920,000			Four-year present value: \$1,521,535			
Improved student enrollment: 2% annually			Annual value of improved student enrollment: \$600,000			

Appendix C: Additional Benefit Tables

RECAPTURED STUDENT ACADEMIC TIME

Modeling and assumptions. Forrester models the composite organization as follows:

- Survey data suggests that each student loses 45 hours of academic time per year due to major and minor interruptions and technology challenges.
- With Apple devices, students can reduce this lost academic time by 30%.
- One academic day equals 7 hours of in-school instruction time.

Risks. The impact of this benefit may vary due to:

- Average lost academic time per student with non-Apple devices.
- The degree to which the Apple device ecosystem can increase academic time.
- The number of academic hours per day.

Results. Forrester did not apply a risk adjustment to this benefit because the results are calculated in hours and are not demonstrating a financial impact. The results are presented in:

- Number of academic days saved per student per year.
- Number of academic hours recaptured per student.

Impact. This benefit should not be included in an ROI calculation because reducing the amount of nonlearning time for students does not carry a direct financial cost or benefit for schools. However, this benefit is important because it directly impacts students and teachers.

Recaptured Student Academic Days Per Student

Ref.	Metric	Source	Year 1	Year 2	Year 3	Year 4
Z1	Average lost academic time per student in legacy environment (hours)	Survey	45	45	45	45
Z2	Recaptured academic time with Apple	Survey	30%	30%	30%	30%
Z3	Subtotal: Academic time gained per student (hours)	Z1*Z2	13	13	13	13
Zt	Recaptured Student Academic Days Per Student	Z3 / 7 hours	1.9	1.9	1.9	1.9
	Risk adjustment	0%				
Ztr	Recaptured Student Academic Days Per Student (risk-adjusted)		1.9	1.9	1.9	1.9
Recaptured student academic time annually: 13 hours			Four-year total recaptured student academic time: 7.6 days			

Summary Table: Total Additional Benefits

Ref.	Benefit	Year 1	Year 2	Year 3	Year 4	Total	Present Value
Wtr	Teacher productivity improvement	30 hours per teacher \$541,875	30 hours per teacher \$541,875	30 hours per teacher \$541,875	30 hours per teacher \$541,875	120 hours per teacher \$2,167,500	N/A \$1,717,671
Xtr	Increased teacher retention with Apple	\$240,000	\$240,000	\$240,000	\$240,000	\$960,000	\$760,768
Ytr	Improved student enrollment	\$480,000	\$480,000	\$480,000	\$480,000	\$1,920,000	\$1,521,535
Ztr	Recaptured Student Academic Days Per Student	1.9 days	1.9 days	1.9 days	1.9 days	7.6 days	N/A

Appendix D: Endnotes

¹ Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

² Source: "[Introduction To Present Value](#)," Khan Academy.

³ Source: "Forrester's EX Index: A Deeper Look At The Data," Forrester Research, Inc., March 4, 2020.

⁴ Source: Desiree Carver-Thomas and Linda Darling-Hammond, "[The Trouble with Teacher Turnover: How Teacher Attrition Affects Students and Schools](#)," Education Policy Analysis Archives, April 8, 2019.

⁵ Source: Ibid.

FORRESTER®