HARDWARE ANALYSIS

Choosing the Best Device for your School District

Education Elements

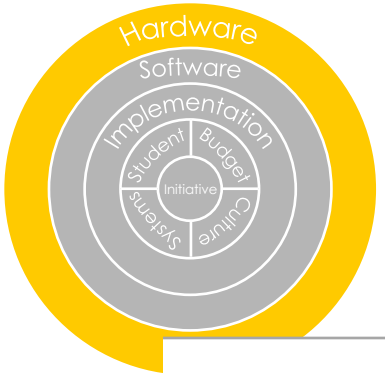
Unlock the potential to
PERSONALIZE LEARNING

Education Elements

As districts develop instructional models that personalize learning and prepare students for 21st century college and career readiness, they invariably begin to consider large hardware purchases. In an effort to provide a thoughtful framework for districts making device decisions we outline here the pros, cons, and things to consider.

Education Elements partners with school districts to design and implement personalized learning through our services and our software. We have worked with over 100 schools across over a dozen districts, supporting 2000 teachers and coaches and more than 50,000 students. Our focus is on the outcomes, not just the technology, and it shows. Our schools get results.

For more information about our Hardware Analysis or other inquiries, email info@edelements.com or visit www.edelements.com.



Starting your analysis

A comprehensive analysis of which device best suits your needs can be critical for the success of your blended learning program and save you a great deal of time and expense.

Do	Don't
• *Try before you buy. A common mistake is to buy 50 devices before trying one. It is well worth the investment to buy a few devices (or borrow if you have the opportunity) and run them through their paces first. Check that they are compatible with the programs you want to use in your environment and ensure that they provide a positive user experience.*	• *Leave the decision to your IT people only. Your IT person / department is unlikely to have as deep of an understanding of student needs or the objectives of your blended learning program as your teachers. By all means you should value their input, but do not just give the decision over to them.*
• *Consider the total cost of ownership. The purchase price of your device is not the only factor you need to consider. You should also take into account the cost of maintenance, installation, required security software, required network upgrades and replacement.*	• *Just buy the device that you the most familiar with. The demands of your students may differ substantially from your own. Try to look beyond the obvious choices and examine a variety of options.*
• *Plan for flexibility. Although you should always select your devices based on the content you are planning to use them with, your blended learning plan is probably going to change more than often than your hardware. It is best to select devices that not only support your current objectives but also give you options in case you want to go in a different direction in the future.*	• *Purchase the devices without considering your overall blended learning strategy. A lot of factors go in to choosing the right device. Cost, compatibility and reliability are fairly obvious but try to go beyond this. Think through how students will actually be using the device. Does it need to be portable? Is battery life a factor? Will they need to save work locally or use different programs?*

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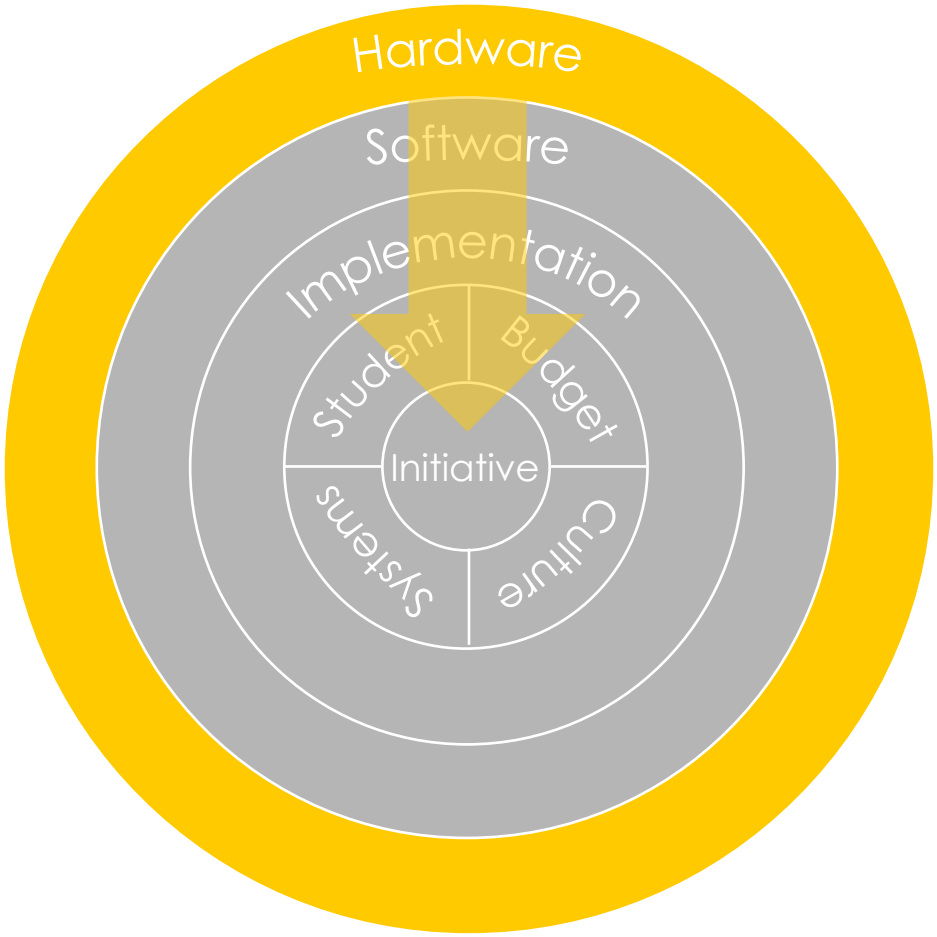
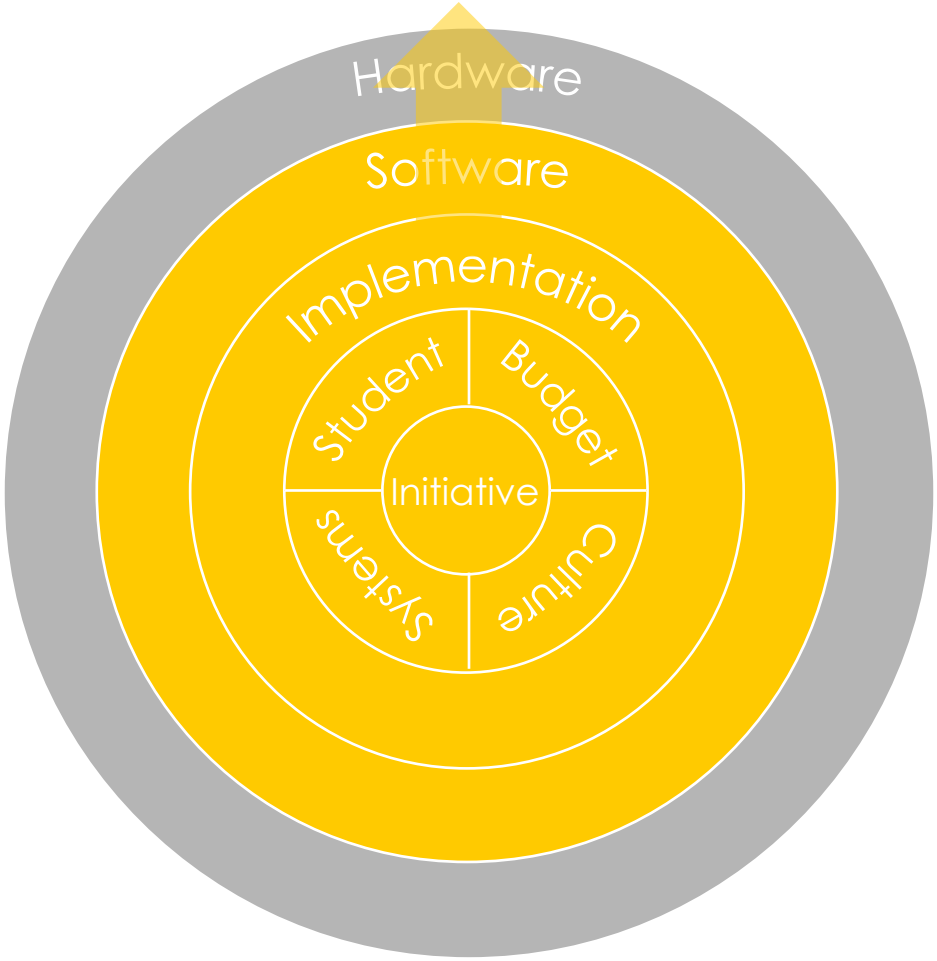
Selecting the right device for your initiative.

Many districts select hardware before considering key areas that may impact the device decision.

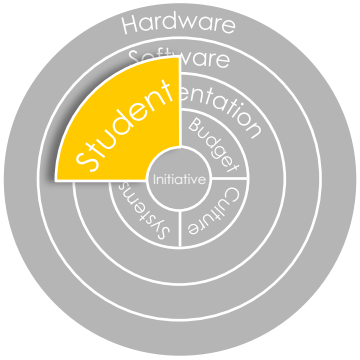


Hardware should be the last decision you make.

Districts need to take into account key areas such as student populations served, implementation challenges, and software availability before making the hardware decision.



Student population served impacts hardware decisions.



Most districts can only afford ONE device.
Which would you choose given the student population you serve?

Grade / Developmental Levels

K-8th

5-12th

Practice, content consumption, specific skill gaps.

Classroom Use Case

Research, content creation, complex workflows.

Few / no devices

Home Technology

Many devices; home Internet + WiFi

Other Considerations: What would be best for special education? What percentage of the district is ELL and do ELL students' needs impact the device decision?

**Creation of complex content*

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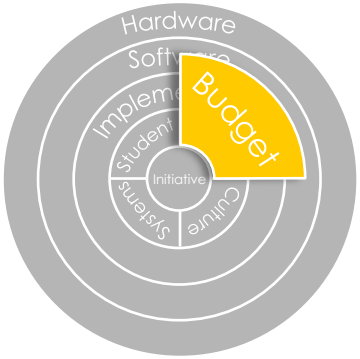
What device is the best value for your budget?



Accessories for each device need to be considered too.

High Versatility

Mac/Windows Laptop

Desktop

There are Windows PCs available at Chromebook prices.

Android Tablet

iPad

$ Chromebook $$$

Smartphone/
iPod Touch

eReader

Over 4.5 Million iPads have been sold to U.S. schools.

Low Versatility

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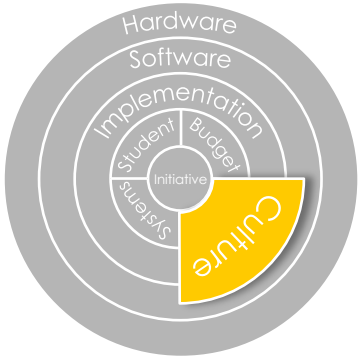
District culture drives device fit.



Examples of cultural considerations that may make one type of device better for your district over another.

Technology Culture
Level of comfort with tech

Use of Data
Data-driven decision-making

Pedagogical Philosophy
Collaborative work focused on higher levels of Bloom's

Openness to Change
Comfort with new device types and interaction modalities

Risk of Device Abuse or Theft
Site and neighborhood safety, school culture

*For example, districts committed to data driven instruction should consider **laptops or desktops** as the majority of standards aligned software is not available today on tablets.*

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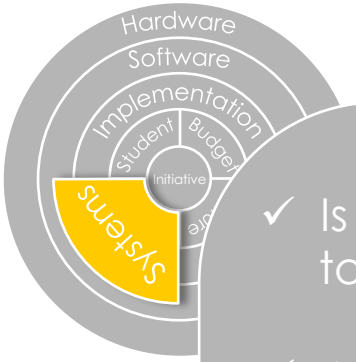
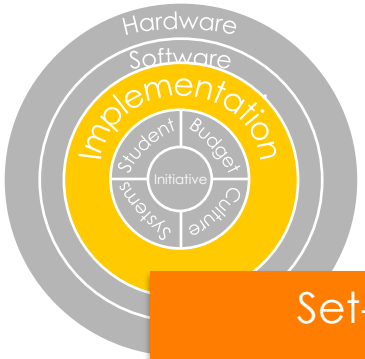
Structures and processes impact the decision.



Consider the following infrastructure questions.

- ✓ Is there an IT department? Does the department have the tools to scale computer deployment and maintenance?
- ✓ Are facilities built for technology? What upgrades are needed?
- ✓ Is there a system in place to support multiple users on one device?
- ✓ Is there capacity at the district to manage the security of devices?
- ✓ What is the software upgrade process for all devices?
- ✓ What is the process if devices fail? What if the network fails?
- ✓ What battery life do devices need, and how is charging handled?



Implementation and Maintenance.

Consider the following: planning, implementation, and maintenance of the device.

Set-up

Chromebooks are ready out of the box.

Configuration + Account Management

Ease of software deployment/ upgrades + central control of accounts is critical.
Management options vary by platform.

Security

Schools will need to decide the level of security and control required by FERPA and then by school culture.

iPads do NOT currently allow for multiple user accounts

Battery Life

Consider longest stretch of continuous student use, recharging logistics, etc.

Ergonomics

Touch, trackpad, and keyboard interfaces have advantages and disadvantages. Tablets and Chromebooks offer instant on.

Internet / WIFI

Consider which applications require always-on connectivity- these vary by device

Lifespan

Consider wear + tear over time.

Common Core

Devices should meet Smarter Balance and/or PARCC requirements.

Portability.

Low portability

- Low cost and easy to maintain
- Less likely to be accidentally dropped or damaged
- Greater processing power and memory

- Requires more floor space
- Students are unable to take home or between classes
- Classrooms are less flexible environments by design

VS

High portability

- Can be easily stored in carts and cupboards when not in use
- Allows students to take home and between classes
- Battery power means less outlets are required

- Less processing power and local storage
- Greater chance of accidental damage

The device you choose is limited by the software available.*

There are trade-offs with each device.

Cloud-based and offline digital content		Cloud-based content only		App Store Apps and limited cloud content.	
500+	Digital Content + Tools	400+	Cloud-based Content + Tools	100,000+	Education Apps**
80+%	Standards Aligned	80+%	Standards Aligned	**0.25%**	**Standards Aligned**
50+%	Comprehensive Solutions	50+%	Comprehensive Solutions	99+%	Point Solutions

Majority of tablet apps introduce new concepts or allow for simple practice of what has been learned.

Planning	**Introduce Concepts**	**Practice**	Creation	Assessment
Teachers apps for lesson planning	**(Interactive/Static)**	**(Guided/Independent)**	*Apps used to create content*	*Apps used to assess Student progress*

Tablet apps have a head start on programs that are aimed at a younger students.

**Or, if you choose the device first, the software you can use will be limited ** Definition of "Education Apps" is broad*

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Operating Systems

Fundamentally different approaches to computing.

PC / Mac

Powerful desktop software runs online and offline.

School implementation and maintenance requires third-party solutions (several available) and dedicated staff.

Multi-user support; **integrates well into complex IT ecosystems** (LDAP, ActiveDirectory, etc.)

Antivirus, firewall, remote monitoring, and other software required for stable, secure operation.

Chrome OS

Entire experience takes place within Chrome internet browser.

Cloud-oriented OS has a **limited app library and limited offline functionality**.

Cloud management solutions include native Google dashboard and school-specific Hapara.

Multi-user support through Google Apps.

No support for **Java** or **Silverlight**. Increases simplicity/security, but reduces content provider support.

Tablets

Mobile-first, touch-first operating system drastically different than traditional OS's.

Limited multitasking – complex, multi-app tasks such as research presentations are difficult to impossible.

Limited configuration and MDM options; **no multi-user support**.

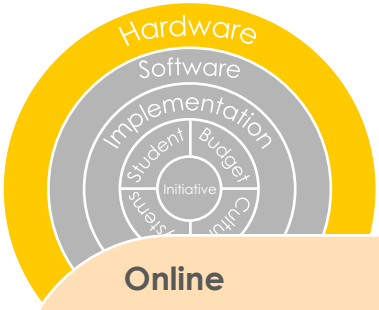
No support for **Adobe Flash**

Summary

When selecting the right device for your district, assess key areas such as student population served, implementation challenges, and software availability before making the hardware decision.

	Advantages	Implications
	• *Good devices for higher grades where creation of content is more complex.* • *Huge library of software available.* • *Most versatile and powerful device.*	• *Keyboard may be a challenge for lower grades or students with certain learning disabilities.* • *Cannot access Apps available on tablets.* • *Increased configuration and maintenance complexity. Higher IT costs.* • *Often slower than other options if not ordered with a solid state drive (SSD)*
	• *Low cost device offers many of the advantages of a laptop in a simpler, less expensive package.* • *Easy to set up and software is automatically updated.* • *Information and data backed up in the cloud automatically. Google Apps sync makes file sharing and management easy.*	• *Many apps require connectivity for optimal use. Requires solid network bandwidth.* • *Limited app catalog; especially limited for multimedia/multi-software workflows. May require additional investment in hardware/ software for multimedia tools.* • *No Java or Silverlight support.*
	• *User-friendly to students with disabilities.* • *Good devices for lower grades.* • *Engaging and fun to use. Touch interface + sensors allow new modalities of interaction.* • *Some very innovative apps.*	• *Lack of Adobe Flash limits content support.* • *Limited expansion options.* • *Better for consumption of content than creation. Limited support for multitasking and complex workflows.* • *Multiple users supported in Android and Windows, not iPads– hard to share classroom sets.*

Online vs. Offline



"A commitment to devices in the classroom is a commitment to provide sufficient Internet and wireless bandwidth. The value of any device, tablet, laptop or otherwise, is severely diminished without connectivity."
- Greg Klein, Rogers Foundation.

Online	PC / Mac	Chromebook	Tablet
Write a research paper that draws from multiple sources.	●	◕	◔
Access data-integrated digital cloud content.	●	◕	◑
Collaborate on a live Google Doc.	●	●	◑
Take an online assessment.	●	●	◑
Watch a streaming OER video or presentation.	●	●	◔
Email peers or faculty with questions on an assignment.	●	●	◑
Offline			
Read a PDF textbook.	◕	◑	◕
Edit a movie or photo slideshow	◕	◑	◕
Use locally installed educational apps.	◑	○	◕

* Support varies by provider

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Case Study | Oakland USD

Location: Oakland, California

# of Schools in Pilot: 6 Schools (5 District, 1 Charter) out of 84 Schools in entire district

# of Students: 2,850 out of 35,000 in all of OUSD

Grade Coverage: K-8

Initiative Goal: Building next generation skills through the use of technology in order to scale to entire district.

Device: Samsung Chromebooks Series 3

Cost per Device: $279

Ratio: ~1:1

At Home Access: No – at school only

Advantages	Considerations
• *Low cost.* • *Easy to deploy and replace.* • *Compatible with Google tools.* • *Compatible with Common Core Testing.*	• *Works best connected to internet.* • *Some digital content providers are not supported on Chromebook.* • *Schools have encountered varying hardware quality and some software incompatibility.*

Software in Use:

- Achieve3000
- MyAccess Writing
- Khan Academy
- Mangahigh
- iPass
- Tenmarks
- APEX
- ST Math

Case Study | Horry County Schools

Location: Horry County, South Carolina

# of Schools in Pilot: 11 Schools out of 51 Schools in entire district

# of Students: 9,314 out of 40,500 in all of HCS

Grade Coverage: 6-8

Initiative Goal: Horry County's Personalized Digital Learning initiative seeks to (1) Increase student engagement (2) Accelerate student learning (3) Personalize Learning

Device: iPad

Cost per Device: $650

Ratio: 1:1

At Home Access: No but in future plans

Software in Use:

- ALEKS
- Achieve3000
- i-Ready
- Compass Learning

Advantages	Considerations
• *Small and lightweight.* • *Supports 21st century learning.* • *Compatible with Common Core Testing.*	• *No keyboard which may limit creation of more complex content.* • *Works better connected to internet.* • *May not be optimal for home use.* • *Expensive to implement*

Case Study | Cornerstone Charter Schools

Location: MI

# of Schools in Pilot: 4 Schools out of 4 Schools in charter organization

# of Students: 589 out of 700

Grade Coverage: K-12

Initiative Goal: Have implemented data driven teaching and learning to prepare students to succeed in a global community and in life.

Device: Dell Optiplex 3011 Desktop

Cost per Device: $735

Ratio: 1:3 in MS, 1:1 in HS

At Home Access: No – at school only

Software in Use:

- Achieve3000
- Apex
- Compass Learning
- Powerspeak
- Rosetta Stone

Advantages	Considerations
• *Dell offers end-to-end solution for deployment and ongoing support and maintenance.* • *Desktop computers offer a higher level of control over equipment care.* • *Desktops work well in lab or classroom settings.*	• *Desktops limit the flexibility to change over time to a device take home strategy.* • *Desktops require sufficient power outlets.*

ADDITIONAL ANALYSIS

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Screen Resolution

Laptops and Chromebooks offer 25-50% more space on the screen than iPads for text, images, and complex workflows.

Many websites and apps are built for screens of at least 1280x768.

Alternative Options

Apple Macbook Air

Higher build quality, software usability, and simplicity than PCs….but more expensive.

Included productivity suite (iPhoto, iMovie, Garage Band, etc.) excellent for content creation.

Different selection of installable apps than Windows– more recently released, but less support for legacy applications.

Windows 8 Tablets

Offer the convenience of a tablet while also supporting PC functionality such as USB drives, mice and keyboards

Two main types, Windows RT and Windows 8. RT is slimmed down but Windows 8 can run any program that you can run on a PC.

Supports Adobe Flash (limited support on Windows RT)

Smaller App catalog than Android or iPads

Device Management and Security

	Laptop	Chromebook	Tablets
Physical	Lock slots	Lock slots	Locked cabinets
Software	Third-party management solutions (varied)	Hapara, Google cloud management console.	Built-in
Antivirus/Intrusion Prevention	Requires third-party software and careful management.	Built-in / not applicable.	Built-in / not applicable.
User account	LDAP / Active Directory	Via Google Apps	Supported on Windows 8 and Android 4.2 and higher. Not supported on iPads.
Backup/restore	Complicated – requires advanced configuration.	Simple – tied to Google Apps account.	Simple – tied to cloud or local machine
Secure assessment environment	Requires third-party download	Instantly configurable from cloud console.	Third-party app

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9th-12th Grade Multimedia Needs: Consider Labs

+

Inexpensive 1:1 devices

Low per-student cost for everyday needs.

Multimedia lab with iMacs or other powerful desktops

Savings can be invested in a smaller number of purpose-built machines for intensive creation tasks.

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of any teacher to
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