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# BLACK BOX WHITEPAPER: REDUCE TIME & COSTS IN DEVICE-BASED LEARNING

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LEAVE THE TECH TO US





## REDUCE TIME AND COSTS IN DEVICE-BASED LEARNING ENVIRONMENTS

Technology is now essential in education. In fact, public schools in the United States provide at least one computer for every five students. To promote digital learning, a massive project by the federal government is making affordable online teaching resources available to all schools, even the most rural schools. One statistic shows how much digital learning has become a key component in education today. In 2015-2016, for the first time, more state standardized tests for the elementary and middle grades were administered via technology than by paper and pencil.<sup>1</sup> To achieve this explosion in 1:1 learning, schools are purchasing laptops, tablets and Chromebooks in record numbers. For instance, in 2013 and 2014 alone, schools purchased more than 23 million mobile educational devices.<sup>2</sup> And the numbers keep rising.

Concurrent with this massive growth in 1:1 learning, is the growth in charging and storage solutions to keep the educational devices safe, secure and ready to use. Committing to the right cart or locker is an important decision. Depending on the size and scope of your 1:1 initiative—and your budget—your investment might be under a few thousand dollars or upwards of a half million dollars and involve hundreds of hours of deployment time. Whatever the size of your initiative, you want to make sure you get the best value you can in a charging and storage solution. In this paper, we'll discuss what to consider before you place your P.O., how you can reduce equipment and labor costs in your deployment and how you can improve device distribution and classroom management.





## BEFORE YOU WRITE THE P.O. LEAD TIMES AND INVENTORIES

When planning your deployment, some of the first things you should consider are lead times and inventories, especially in the busy spring and summer months.

Before deciding on a particular cart, find out where the cart is manufactured. If it is built overseas, lead times can become much more problematic. It's not unusual for some carts to have lead times of two to three months, which can derail the best laid plans for a summer deployment. Even if you find the cart you want to standardize on, if that manufacturer doesn't have the inventory, you're out of luck.

To solve this problem, look for US-built carts and manufacturers with high inventories to ensure your deployment schedule stays on track.

## STOCK OPTIONS VS. CUSTOMIZATION

Stock carts available with many options give you the ability to get exactly what you want—without paying for features you don't want. Stock carts are similar to cars that come in economy, sport and luxury models with different features for every budget level. A stock cart can be a better value than a less expensive, plain-jane cart. Once you start to add custom options to a bare-bones cart, such as cable management, charging system and believe it or not—handles, the cart becomes more costly than stock carts that come with those features. You also need to take into account longer lead times to build customized carts which can delay your deployment schedule.

## SAFETY FIRST

Safety should be among one of your top considerations. Under the theory of "premises liability", occupiers and owners of land (including schools) are legally required to keep premises safe for those who are legally allowed to be there. Because schools are utilized by young children, the law requires a greater amount of care to be taken in situations where students are present.<sup>3</sup> That means any equipment used in classrooms must be safe for children to be around. Cheap carts aren't necessarily a better value if they pose a safety hazard. Consider these safety factors when looking at carts.

### 1. CART CONSTRUCTION

Tablet and laptop carts should have rounded edges, no pinch points, no open screw ends that can scratch and no ledges to climb on. Open hinges, large stabilization feet and pullout drawers are all potential hazards as well.

### 2. MOBILITY

Depending on how you're going to use your cart, mobility becomes more of a consideration. In a survey of Black Box cart users, 39% of respondents said they rolled their carts between the classroom and the library. 36% of teachers push the cart and 39% said both teachers and students move the cart. Techs transport the cart in 24% of the schools. To safely move carts, five-inch casters are preferred for maximum maneuverability because they travel more easily over thresholds, uneven surfaces and sidewalks. And they lock when not in use.

WHO PUSHES THE CART	RESPONSE
TEACHERS PUSH THE CART	37%
TEACHER AND STUDENTS MOVE THE CART	39%
TECHS TRANSPORT THE CART	24%

### 3. CART STRENGTH

You want a cart that will stand up to years of daily use rugged, heavy-duty carts constructed of 100% steel with welded steel frames offer the most durability. Lightweight carts or carts without a welded frame may not be able to support a full load of devices. They can also easily warp, tip over when force is applied to an open door and can be difficult to push. Look for a cart that passes the UL 1678 tip-test safety standard for AV equipment.

### 4. ELECTRONICS

First, to ensure classroom safety make sure all PDUs and charging equipment are UL 60950 certified and capable of handling the power loads. Second, you want to make sure the power bricks are not on trays where there can be a dangerous buildup of heat.

## DELIVERY CHARGES

Some manufacturers include delivery in their pricing model and others don't. Find out up front if your cart includes delivery so there are no surprises after you sign the purchase order. Shipping can run as much as \$200 per cart and that's a budget buster.

## POST-PURCHASE SUPPORT

One can often tell the quality of a product by the warranty it has. Some manufacturers offer limited warranties, while others offer comprehensive warranties. Understand what your warranty covers before you purchase. And, keep in mind that limited liability workmanship warranties aren't the same as all-inclusive warranties. Check the warranty on the electronics too which can vary from three months to three years.



## KNOW BEFORE YOU DEPLOY

Deployment of carts can be a labor intensive commitment of time and effort often running into the hundreds of hours. There are two areas of concern: cart assembly and cart wiring.

You have two ways to tackle these tasks. You can use your in-house technicians, which doesn't incur extra out-of-pocket costs, but it does take time away from regular IT network maintenance and troubleshooting. Or, you can farm the job out to a third party which will increase your costs and deployment lead time and can be problematic if you're on a tight summer schedule.

### ASSEMBLY

Some carts require assembly (or minimal assembly) and some don't. To speed up deployment time and reduce expenses, choose assembled carts. If it takes one hour (minimum) to assemble a cart and labor is \$40/hour (minimum), costs can add up pretty quickly depending on the size of your initiative.

ASSEMBLE CARTS	LABOR	NO OF CARTS	TOTAL EXPENSE
1 HOUR/ CART (MIN)	\$40/HOUR	50	\$2,000
		500	\$20,000

### CART WIRING

When scheduling your deployment, factor in the time (and expense) of wiring the carts. It can take anywhere from 30 minutes (minimum) to 90 minutes or more to wire one cart depending on the device and the cart. Some manufacturers use clip systems, which can be difficult to wire and can make removing the devices cumbersome. Some clip systems are on the front and others are on the slots. Either way, they can easily break off and get lost. To minimize wiring time, look for a quick-wiring system, which can include sliding wire holders or a guillotine system. To eliminate wiring completely, some manufacturers offer packages that include carts and the mobile devices. The carts are pre-loaded and wired before shipping. This option can potentially save you a lot of time and money.

### SLIDING VS. GUILLOTINE WIRING SYSTEM



SLIDING WIRING SYSTEM



GUILLOTINE WIRING SYSTEM





## DAILY OPERATION AND USE

Before making your purchase, consider how the carts will be used. Will they be rolled from classroom to classroom? Will they be kept in just one classroom? Will the devices be used all day or only in certain classes? The answer to these questions may affect how you charge your devices and how the devices are distributed.

### CHARGING

Here are some considerations to keep in mind when it comes to powering and charging devices: having fully and evenly charged devices, ease-of-use, energy consumption, power draw and device protection. Below are some different power options.

#### 1. BASIC CHARGING

This involves a PDU on each shelf that you manually plug into a power outlet. There are a few drawbacks with this method. One is that most classrooms are not equipped with three or four electrical outlets in the same place but on different circuits. If all the devices were plugged into the same electrical circuit, particularly in older buildings, the devices will draw too much power, which can damage devices and/or trip a circuit. That can result in inconveniently uncharged devices in the morning. To avoid this, the teacher has to decide when to physically plug and unplug power cords for each group of devices, which can also lead to unevenly charged devices.

#### 2. TIMER CHARGING

A timer cycles power to each shelf in a round-robin fashion, typically for 15 minutes per group of devices. This prevents the device groups or zones from drawing too much power at once and causing an overload. This system takes longer to charge all devices. And not all the devices will have the same battery level until the cart is done charging.

#### 3. ADVANCED TIMER CHARGING

This is a timer system that enables you to configure how long, how frequently and in what order each zone will charge. Charging times range from 5 minutes to 60 minutes as opposed to 15 minutes.

#### 4. SMART CHARGING

Smart or intelligent charging cycles power through device groups like a timer. But these systems have sensors that detect and charge low-battery devices first before moving onto the next zone. They are capable of charging as many devices as possible while staying under a certain power draw. One advantage of a smart charging system is that it can actually reduce total energy consumption by discontinuing power when devices reach a full charge. This is beneficial for environments where devices are checked in and out for different time periods.

#### 5. WIRELESS CHARGING FOR TABLETS

A wireless system, such as GDS®, can make charging easy. Tablets are housed in protective IntelliSkin™ cases that snap into a port that is pre-wired into a PDU. This eliminates plugs and wires and makes charging extremely efficient.

### CLASSROOM MANAGEMENT

Teachers looking for better time management in the classroom will be interested in how devices are distributed. A Black Box survey indicated that 55% of students get their own devices from the cart. In 29% of classrooms, the teacher distributes devices. In the remaining classrooms, select students hand out devices.

HOW DEVICES ARE DISTRIBUTED	RESPONSE
STUDENTS GET THEIR OWN DEVICE	55%
TEACHER DISTRIBUTES DEVICE	29%
SELECT STUDENTS HAND OUT DEVICES	16%





Time to distribute devices varies from classroom to classroom. In 68% of the classrooms, it takes two to five minutes to distribute devices and two to five minutes to return them to the cart. That's 4 to 10 minutes per class which averages between 40 to 90 minutes long. That means 10% to 25% of teaching time in 40-minute classes and 4% to 11% of teaching time in 90-minute classes is spent on device distribution.

24% of survey respondents said it took 5 to 10 minutes to distribute devices. Double that when you consider returning devices to the cart. That's 10 to 20 minutes per class or almost half of a standard 40-minute class. Over the course of a year, that's a lot of time spent on technology that could be spent on teaching.

DEVICE DISTRIBUTION TIME	RESPONSE
1 MIN	8%
2-5 MIN	68%
5-10 MIN	24%

## HOW TO SPEED UP DEVICE DISTRIBUTION

### 1. BASKET SYSTEMS

Instead of storing laptops and tablets in storage slots on shelves, the devices are stored in "baskets" that sit on the shelves. A typical three-shelf cart can hold six baskets, each containing six to eight devices. This makes device distribution to groups of students incredibly fast.



### 2. WIRELESS CHARGING

With a wireless charging system, tablets are stored in protective cases that plug into a dock in the cart. The students only need to slide the tablets in and out instead of plugging and unplugging devices. It's also neater with no messy wires.



## IN SUMMARY

Here are the top seven ways you can reduce time and costs (both labor and equipment) in your 1:1 deployment.

- To reduce deployment time, look for a manufacturer with US-built carts and a high-inventory.
- Look carefully at all the features you want in a cart. A cart that has the exact features you want may be less expensive than a plain cart that you customize.
- Consider the time and costs associated with assembling and wiring carts. Quick-release systems can greatly reduce wiring time.
- Look at the safety of the cart to reduce any potential liability issues.
- Decide how the carts will be used and what charging options will work best for you.
- Based on your devices, decide what system will most reduce classroom distribution time.
- Last, but certainly not least, consider warranties and post-purchase support.

## ABOUT BLACK BOX

Black Box Charging Carts, Lockers and Cabinets can safely store, charge and transport all types of e-learning devices, such as Chromebook™ laptops, iPad® tablets and others. With an easy cable management system, exclusive quick-release wiring, safety-first design and future-proof shelves in a small footprint, they offer some of the best values you can get in charging and storage solutions. To see the entire line, visit [BlackBox.com/Carts](http://BlackBox.com/Carts). To talk to a carts consultant, call 877-877-2269.

1. *Technology in Education. Education Week, February 5, 2016.*
2. *1-to-1 Laptop Initiatives Boost Student Scores, Study Finds. Education Week, May 18, 2016*
3. *School Safety Legal Issues and Laws. FindLaw.com*