iOS @ IUSD:
A Primer on Your iOS Project

Introduction

Introducing a disruptive device such as a mobile computing platform into a classroom requires deliberate planning and analysis, iPads, iPods, and iPhones require special care because of the rigidity of the ecosystem they are embedded in. The same framework that enables developers and teachers so much freedom to innovate with the devices also restricts the ability of a centralized department to support them.

In order to best explain the options and constraints of an iOS deployment, this document will detail each phase of a typical project, paying particular emphasis to the decisions that need to be made at each phase and the reasons for them. The first step is to establish an initial, conceptual vision for the project. After that comes the detailed plan to implement the vision, addressing educational, logistic, and budgetary concerns. The third phase is the initial setup and of hardware and software as well as the training of interested parties. The final phase is maintenance and evaluation phase, when the project has been deployed and results are measured and compared with expectations.

Platform Limitations

Before beginning an iOS project, it is important to understand the limitations of the platform, particularly with regard to educational uses. The district also has a limitation on how it can purchase applications on the devices.

The biggest limitation in our environment revolves around a school's existing wireless device infrastructure. Many of our schools are not configured for wireless density, and can only support a small number of devices per access point, and they may not have coverage in every classroom. In order to remedy this, a school contemplating an iOS project should survey the rooms involved to make sure that there is sufficient wireless bandwidth for the application and number of devices being used.

A second major limitation is that iOS does not allow access to the district's existing file storage infrastructure, and there is no readily available and easily configurable way to change this. This means that students are unable to simply "save" their work the way they are able to on a desktop computer. While there are methods to transfer a document from an iOS device to another device, these methods are either cumbersome, such as email, or something that is impractical to use in our institutional environment, such as iCloud.

Another major limitation is the lifespan of the device. Apple has stated that it's iOS devices have a twenty-two month expected life. After twenty-two months, it is not guaranteed that the devices will support the latest features, applications, and operating systems. After this window, it is possible that the operating system and software may not be able to update. Schools should budget for replacement of their iOS devices every two

years. This replacement cycle is faster than a laptop (IUSD recommends replacement every three years) and much faster than a desktop computer (IUSD recommends replacement every five years).

Another limitation is related to the devices web browser. iOS uses a mobile version of the Safari web browser by default. This web browser may render pages differently than Internet Explorer or Firefox available on the desktop. While many alternative browsers are available, none render in exactly the same way that desktop browsers do for everything. Any web application should be checked on an iOS device before a program to use them on devices is initiated.

There is also an additional limitation related to use of the Internet. iOS devices do not support Adobe Flash. While the number of websites that require Flash is falling, it is still very common, and any website that requires it will not work properly on an iOS device.

The last critical limitation is that district owned applications must be purchased through Apple's Volume Purchase Program. This is due to legal restrictions on the use of public funds as well as the way apps are licensed. The Volume Purchase Program is explained in detail in the last section of this document.

Phase 1 – Vision

In this phase, the overarching vision for the project needs to be established. It is essential to build a vision that answers the following questions: what do I want the project to achieve, who will be using the devices, and how often will they be using the devices. The first question is the most important, as it provides a direction to use to answer the other essential questions. After that, the most important question to answer is who is going to be using devices. The third question to ask is how often the users will be using the devices. These questions provide a definition to the project and allow for detailed planning in later phases.

When deciding what the project should achieve, leaders should identify specific instructional programs that they wish to enhance with the deployment of iOS devices. It is far more important to answer the question "What do I want to use these devices to do?" than "What device should I use?" at this stage.

After identifying what they want to achieve, leaders should work to identify who they envision using any devices as part of the program. This is critically important because the approach taken for different stakeholders can be drastically different. A project oriented towards staff devices will have different constraints than one oriented towards devices in students hands.

The third essential question for the project vision is "How often do I see each stakeholder using the devices?" This question informs everything from which device to use to how many devices are needed for the project. A device with more limited battery life may be acceptable if it only needs to be used for an hour or two per day, while a device that is

expected to last all day and be passed from class to class will require a much larger battery and more powerful chargers. This also informs how many devices are needed, as if it determines how widely devices can be shared.

Phase 2 – Detailed Planning

In this phase, a detailed plan for the project needs to be worked out. This is the phase where you translate your broad vision into specific concrete plans for the acquisition, setup, and roll out, and support of the devices. This is also where plans on training and professional development should be finalized. The plan needs to take into account specific constraints relating to iOS devices being used in large numbers, as well as more general concepts such as staff time, locations, and logistics.

Device Allocation Model

The first step in translating your vision into a project plan is to determine exactly how the devices will be allocated. There are several different models that may make sense for your project, and the models come both in teacher/staff-centric and student-centric flavors.

The first model is that of "one device per staff member." In this model, one device is assigned to a staff member, and they use that device as an instructional and communications tool. In many ways, this is the simplest model available, as it requires very little in the way of additional management beyond having a staff member have an AppleID and using the Volume Purchase Program to manage purchased apps. Some examples of this model would be:

- A teacher who uses their iPad, along with mirroring software or an AppleTV, as a document camera and display device for instruction.
- An administrator who uses their iPad to take notes in meetings and access the student information system to have student data readily available at all times.
- A member of campus security who uses an iPod to access information about students as they are encountered on staff and to be able to send and receive emails while mobile on the campus.

The second staff-centric model is similar to the one above, but allows for the provision of fewer devices than there are staff members. This case involves slightly more management of the devices, as instead of being configured individually, then need to be configured for shared use. This means that many of the built in productivity tools will be made significantly less useful, or even made so that they cannot be used effectively. Examples of models like this would be:

- A department or grade-level that shares one or two iPads, using them primarily to mirror specific lessons and applications.
- An iPad used by a group of high school PE teachers to record attendance, the teachers share the device before release the students from their attendance formation.

The first of the student-centric models is probably the simplest conceptually, that of a "cart deployment." In this model, an entire class set of devices is grouped together. These devices are intended to allow all of the students in a class to simultaneously participate in a single lesson. Several classes would most likely share the cart in order to get the most use possible out of the devices. This model requires careful, thoughtful management and planning to make it work. This model is the most sensitive to changes on the devices, as the devices need to behave exactly as expected in every class, and all applications must be present. For this reason, devices used as part of this model should be synced far more often than devices used in other models, and the devices should be locked into a particular configuration. Examples of this model are:

- A shared cart used for assessment and testing, teachers schedule the use of the cart for particular times of day, and the cart is moved between classes several times a day.
- A shared collection of iPads is used to deliver instruction from a specific app for one hour a day for every student in a grade level. Each class is given a specific hour to use the devices every day.

The second, most flexible, student-centric model is centered on the concept of small group instruction. In this model, small groups of students use the devices, either collaboratively or individually at a station. In some ways, this model can be thought of as a "mini-cart," but it deserves consideration separately due to the additional possibilities the smaller number of devices opens up for management. With this model, managing free apps with a shared group AppleID becomes much more manageable and approachable, allowing the devices to be used much more independently of a sync station than a cart-based model. Examples of devices being used in this model are:

- Several iPads are assigned to a specific department or grade level. Teachers schedule time to use the devices as their instructional program requires.
- Each classroom is assigned enough iPads for one quarter of the students to each have one. The students rotate through four stations, one of which uses an iPad app for instruction.
- A classroom has enough iPads for each group of two to have one. The students work collaboratively on projects on the iPads.

A third student-centric model is for each classroom to have a small group of iPads. This model is slightly less flexible than the "mini-cart" model because it does not allow for a teacher to group large numbers of students for prepared lessons, but it does allow the devices to be used for semi-independent work. In many ways, this is the easiest model to manage in a classroom, as the small numbers of devices are very easy for a teacher to manage without using a full sync station. This model is slightly less flexible than the "mini-cart" model because it does not allow for a teacher to group large numbers of students for prepared lessons. An example of this model being used is:

- Students are given silent reading time. When the student finishes their book, they pick up an iPad and complete a quiz for a reading incentive program.

None of these models are rigidly defined, and they are not the only ways to use iOS devices in the classroom, but defining exactly how you expect the devices to be used allows for detailed planning regarding logistics, management and budgeting to take place.

The model you choose influences several things relating to how you deploy your devices, but perhaps the most important thing that they influence is the design of your synchronization and management system. For most models, it will be convenient and even desirable to only have a single sync station per school, but the numbers of sync stations goes up depending on exactly how the devices are planned to be used, reaching a maximum of one sync station per cart being desirable for cart-type deployments.

Printing

Many uses of iOS devices require or are greatly enhanced by the ability to print. There are three different ways to provide printing from an iOS device in our district. The first is to use Apple's AirPrint service. The second is to leverage the district's PaperCut printing management software to allow managed printing through the district's printing infrastructure. The third option is the use of specially written apps available from many sources to enable the printing of certain file types. Each of these methods has tradeoffs, and should be taken into account when planning your iOS project.

Printing via AirPrint is the simplest method to configure, as it requires no configuration on the device, and only minimal configuration on the printer. The downsides are that this is a proprietary protocol and is only supported by some manufacturers on some of their printers. At the moment, most of the printers supported are personal printers of some variety, and many are inkjets.

AirPrint via Papercut is more complicated and requires a desktop Mac of some kind to act as the print server, but it enables the use of logged and managed printing via the district's existing print architecture, and allows the use of all varieties of printers.

Printing via App is perhaps the least flexible or desirable option, as it is limited in both what printers are supported and what types of files can be printed. Many manufacturers have released proprietary apps that work with their printers, but those apps are unable to provide print services to other apps on the device, and can only print the files in the photo stream, or occasionally in other locations. They are also limited to printing the file formats that the application is written to support.

Management

Once you have decided on a usage model, then you can explore the exact details of how to manage your devices. The district's standard is to use Apple's free Configurator application installed on either a Mac Mini or MacBook Air, depending on the exact details of your situation. This architecture requires the physical tethering of the devices for synchronization and management.

The primary reason why Configurator is an ideal solution is it's unique ability to allow the reuse of Volume Purchase Program licenses. This allows the district to safely keep its software investment without having to expend large amounts of effort in the management of hundreds or thousands of unique AppleIDs. Configurator is also a required part of almost all MDM management systems, at least at the initial configuration. Since the true MDMs do not bring anything critical to the table, it was decided that they were not worth the expense.

If your project will include more than 20 iPads, it is strongly recommended that you have at least one on site Configurator (or sync) station. This station should be used only for this Application, and not as a general use computer because of the amount of time involved in rebuilding the configurator database. If this database is lost, all devices supervised by that Configurator station need to be wiped and rebuilt, along with all of the policies, groups, and app associations on the device. For maximum flexibility and security, it is recommended that a Mac Mini be used as the sync station. This Mac Mini can also be used as the PaperCut relay if printing is desired.

In some cases, it may be desirable to have more than one sync station. This will usually be used in the case of "cart-type" deployments, where one sync station per cart is desirable.

Carts and Syncing

One of the most important peripheral decisions is how to sync and charge the devices, and there are several options depending on the usage model you have chosen. For individually assigned devices, this is not as much of a concern as it is for devices that are used in groups. When fewer than ten devices are assigned to a group, charging is usually best done with the included power adapters on the devices. When more than ten are assigned, then desktop charging/sync devices and even carts become attractive.

If it is decided not to use a cart or a charging device, then the easiest way to sync the devices is with a large (10+ port) USB hub attached to the sync station. The devices are brought to the hub, plugged in, and then synced. Once they are synced (a process that usually only takes a few minutes, but can take an hour or more when an operating system update is applied or a large app needs to be installed) they can be disconnected. Because of the length of time involved in some of the updates, more ports being available on the sync station is highly desirable. In some cases, it may be cost effective to purchase a desktop power/sync device for the sync station.

If a desktop power/sync device is chosen for each group of devices, then the easiest way to manage the devices is to bring the sync station to them (if you chose to use a laptop device) or to bring the devices and the power/sync device to the sync station. If you are using a cart-based model, the devices should sync whenever the sync station on the cart is logged in with configurator open. Ideally, this will be almost all the time, so the devices sync and charge whenever they are plugged in in the cart.

Device and Peripheral Selection

When choosing devices and peripherals, it is important to take into the intended use of the device. The planned use of the device influences the device choice in several ways, the most important being those related to the Smarter Balanced assessment. The SBAC requires that devices that are used to take the test have at least a 9.5" screen and have an attached keyboard. If you are planning to use the iOS devices from this project with SBAC, then you must use a full size iPad with a keyboard of some sort.

If SBAC is not a concern, then it is possible to consider any of the different iOS devices and select them based on other criteria. An iPod Touch is the least expensive option, and may be a viable solution if the vision of the program is of a highly mobile environment. The 7" form of the iPad Mini allows it to be used in many cases where the full-size iPad would be too large, but the need for screen area or software prevents the use of the iPod Touch. The full-size iPad is the most comfortable to use with either a soft keyboard or attached keyboard for longer periods of time and is more conducive to group work, as the larger screen allows more students to view the screen comfortably.

Once the device type has been selected, it is possible to consider storage capacity. Although the minimum storage capacity will be perfectly adequate for most tasks, if the vision of the project is to use large amounts of videos, many large applications, or to provide an extremely wide range of applications available on the device simultaneously, then it may be desirable to choose a larger capacity device. If you are interested in this option, please contact the Information Technology department for help choosing an appropriate capacity device.

AppleIDs

One final aspect of planning for the deployment of your devices is to decide how you will use AppleIDs. The district supports a three tiered approach, but two of the tiers are optional and may or may not be needed for your project. The tiers are grouped by how many devices an AppleID is associated with. The highest tier is associated with all of the devices in the district, the middle tier is associated with a specific group of devices, and the lowest tier is associated with only the devices assigned to a particular person.

At the highest level, the district maintains a single master AppleID (iusd-apps@iusd.org) that will be used primarily for the redemption of VPP codes and mass installation of apps onto managed devices. This master AppleID is used only from Configurator stations, and does not need to be configured on the devices, as any apps that are associated with it will be installed by Configurator, which bypasses many of the AppleID related steps that take place when an app is downloaded directly from the Apple App Store.

At the middle level, sites that wish to do so can create "group" AppleIDs to associate common devices together for easily managing free apps without needing to return the device to the Configurator station.

At the lowest level, staff members can use individual Apple IDs to give themselves as much freedom as possible on devices that are assigned to them. Staff members are encouraged to create "credit card-less" AppleIDs for professional use and keep them separate from any Apple ID that they have of home use. It is most likely that staff members will want to use this option on devices that they will be the primary user of, and that they do not anticipate providing for student use.

Because an unlimited number of AppleIDs are supported on each device, sites can decide what combination of AppleIDs from the bottom two tiers works best for them. Some devices may have several "group" AppleIDs associated, and others might not have any.

Final Planning and Budgeting

Once you have decided what devices you need, the only step left is to develop a plan for the replacement of those devices. IUSD recommends that iOS devices be replaced every two years for best results. Longer replacement cycles may be used, but it must be assumed that device capabilities are unchanged throughout the lifespan of the device.

Before ordering devices, make sure that you enter the required personalization information on the PO. District policy requires that all iOS devices be personalized with a message stating that the device is district owned. If you are using a quote developed by the IT department, this personalization should already be present on the quote. The order must be entered exactly as stated on the quote.

Phase 3 – Device Setup, Configuration, and Training

Once all of the devices (iOS devices, peripherals, and the sync station(s)) have been delivered, please contact the Information Technology department. The initial setup of all of the devices is relatively straightforward, but it is a time consuming process, and it is very unforgiving of mistakes. The IT department will schedule a time (usually about 2 hours plus 1 hour for every ten devices) to come out and do the initial setup for your devices. At that time, you can also schedule a time for a Professional Development session on the devices for your staff.

When the IT department sets up your devices, they will also train the personnel you designate on administering the devices.

It is recommended that all staff that will be using the devices attend a PD session on responsible use and classroom techniques provided by the IT department. If your devices are staff assigned, this training session is also a very good time to distribute the devices. If your devices are assigned to students or groups of students, then it is recommended that the devices only be made available after the initial training session. This is also a good time to give program specific training, such as how to sign up to use the devices or where the devices will be. The training will also cover app purchasing and best practices with regards to free and paid apps.

Phase IV – Maintenance

Once you have distributed the devices, you enter into the final phase of the project, maintenance. This phase is characterized by several tasks that are performed on an as-needed basis. This is only an overview of these tasks, and detailed training will be provided when you do an actual iOS deployment. Detailed how-to documents are also available on the IT intranet page.

Adding New Devices

If you decide to add new devices to your iOS deployment, you will need to activate them and configure them for use as part of your environment. In order to do this, you will use the application "Configurator" on your sync station. Configurator will prepare your devices according to the settings you have stored and add them to its database. This will add these devices to the list of available devices in the "Supervise" tab in Configurator.

Backing Up the Configurator Database

The will be an application in the application folder of your sync station that backs up your configurator database to a district server. This application is scheduled to run every day on configurator stations that are desktop computers, but must be run manually on MacBook configurator stations. It is critical that this information is backed up regularly, because without this information, any paid apps that you have purchased will be lost.

Creating a Device Group

To create a device group, open Configurator and select the "Supervise" screen. From here, press the "+" button in the bottom left of the left most section of the window. Enter a name for the group.

Adding a Device to a Group

In order to add a device to a group, open Configurator and select the "Supervise" screen. Select the devices you wish to add to the group from the "All Devices" list and drag them into the desired group.

Adding an App to the Configurator Database

In order to add an app to the configurator database, you must first use iTunes to download it on the Sync station. Always use the IUSD-Apps AppleID to do this, so that there are no problems when syncing apps. After downloading the app, open Configurator and select the "Apps" tab on either the "Prepare" or "Supervise" screens. If you click the "+" button at the bottom of this window, a dialog box will appear for you to select the app to add. You will then be asked to enter the AppleID used with that app, enter the AppleID and password for "IUSD-Apps@iusd.org." If the app is a paid app, you will also

be asked to provide the "redemption spreadsheet" for the app, which will be provided from IT when you make a VPP purchase.

Buying a Paid App

In order to buy a paid app, you must use Apple's Volume Purchase Program. The district does not support any other methods of acquiring paid apps.

In order to use the VPP, you must first identify which apps you wish to purchase, and how many licenses of each you want. You must purchase one license for each device you wish to install the app on. After confirming availability of funds, enter the exact name of the app you wish to purchase, the quantity, the expected cost (do include volume discounts), the educational justification, and the budget code to withdraw funds from into the IUSD VPP website. Once the purchase has been made, you will be sent the "redemption spreadsheet." The person responsible for running configurator at your site will import this spreadsheet into Configurator and make the app available for assignment to devices. Once the apps are associated to the devices through configurator, the app will be installed next time the device is synced.

One of the biggest advantages of using configurator is that you can reassign redemption codes between devices. Redemption codes are tied to a particular sync station, though.

Please allow extra time if you are requesting more than $250 worth of apps.

Decommission an iOS Device

In order to remove an iOS device from the list of managed devices, right click on the device and choose "Unsupervise." Any other method of removing devices will result in the loss of any paid app licenses assigned to the device.

Conclusion

We hope this primer has answered any questions you might have regarding planning for an iOS device deployment. If you have any further questions, please contact the Information Technology department by emailing helpdesk@iusd.org.