

BYOD Planning and Implementation Framework

The first step to planning a BYOD program is to engage the community in order to learn from their vision and achieve consensus.

Developing a successful BYOD program requires extensive planning, communication, and ongoing evaluation. Although each district is unique, with its own cultures and concerns, a well-defined framework will go a long way in helping a school initiate a BYOD program. The following is a framework that has been developed and implemented, with proven success, by Oak Hills Local School District in Cincinnati, Ohio. When Oak Hill High School decided to open their campus to student devices, they used a nine step program framework:

Step 1: Engage the Community

Step 2: Develop a Team

Step 3: Develop the Physical Infrastructure

Step 4: Develop the Software Infrastructure

Step 5: Develop a Portal

Step 6: Develop an Acceptable Use Policy

Step 7: Build a Curriculum

Step 8: Consider Devices

Step 9: Provide Ongoing Professional Development

Step 1: Engage the Community

The first step to planning a BYOD program is to engage the community in order to learn from their vision and achieve consensus. A BYOD program needs the support and buy-in of all parties involved, including parents, students, staff, and administrators. Before implementing BYOD, it is important to consider the school demographics to determine if it is a viable technology financing option. Parental support, average household income, and the percentage of students who already own a device all play a large role in the success of a BYOD program.

Community stakeholders that may be engaged in the planning process include:

- Parents
- Students
- Staff
- Business leaders
- Board members

Some program models use anonymous polling to garner viable information in determining whether BYOD is the best model for technology funding. Other methods of engaging the community and gathering information may include **electronic surveys** (click for an example), open house information nights, or meetings with all stakeholders equally represented.

When presenting to community members, offer them a vision of 21st century learning and explain how they can play an important role in achieving this vision through the BYOD program. Focus on 2-3 specific technology goals for the district, and outline the steps to get there. Many of the reasons that BYOD programs fail can be solved through open communication and engagement with community stakeholders before the program begins.

Implementation Example

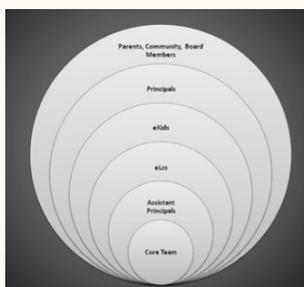
- In Oak Hills, many of the community engagements were centered on the creation of a three-year eTech Plan. The key points of the engagement were:
- Create and nurture a culture where technology-embedded instruction is an integral part of the everyday learning in all classrooms.
- Utilize a learning management system to provide one-stop, 24/7 access for students, teachers, parents, and community members.
- Explore the appropriate role and use of personal technology devices in and out of the school environment.

These specific technology goals, combined with community engagement, created a firm foundation for building a BYOD program.

Step 2: Develop a Team

Developing a team is critical to the success of BYOD in a school district. A well-defined team that meets regularly will move the objectives of a district forward.

A Sample BYOD Team



Roles

Core Team

The Core Team may include the Director of eLearning, the eLearning Coach and Course Developer, and other technology specialists who support the district in its technology initiatives. Additional responsibilities include detailed planning, exploring new technologies, planning professional development, and troubleshooting.

Assistant Principals

Assistant principals support technology planning, implementation, and professional development.

Teachers

Teachers support eLearning by testing new technologies, planning and running professional development, and advancing district technology goals.

When beginning a BYOD program, some districts elect teachers from every school building to fulfill a supplemental role as an eLearning Consultant. These teachers all have a full student course load, but sometimes may be offered a stipend for their additional planning and prep work. The number per level and per building is determined by the initiatives that year in eLearning & technology, and the population of each building.

Students

Schools may decide to create a smaller, focused group of students in the district who participate in an eLearning educational track. Their responsibilities include learning new technologies (often at a deep level), assisting staff with technology needs, and developing additional eLearning opportunities.

Students involved in the program may be offered additional school credit upon successful completion of the course. They are coached and supported by assigned eLearning Consultants (teachers).

Principals

Principals attend eLearning Team meetings and provide the perspective of a building administrator, broadening the scope of discussion and gaining additional insights.

Parents, Community Members, and Board Members

Parents can serve as valuable volunteers on project-specific teams. A BYOD technology initiative directly affects parents and, therefore, input from parents should weigh heavily on the program design. A BYOD team could involve input from local business owners as well, especially if the district is seeking community funding.

Additional Support

These support roles may attend eLearning team meetings or lend support on project-specific teams.

- Superintendent
- Project Manager of the Technology Team
- Multi-Media Designer
- District Directors

Step 3: Develop the Physical Infrastructure

Opening school doors to student and staff devices will create heavy demands on your network infrastructure.

- Will the network be able to handle large a number of devices simultaneously, for example, at the beginning of class periods when students log on to the network at the same time?
- Will students be able to rely on network access 24/7?
- How will you ensure enough bandwidth to handle multimedia applications?

Contact local vendors and network specialists to determine the best set-up for your district goals, existing infrastructure, and budget.

Also consider that BYOD brings with it a host of security concerns, including data protection and compliance with the Children's Internet Protection Act (CIPA).

- How will you protect student information and avoid data security conflicts?
- How will you protect your network from viruses and malware?
- Will students be protected from unsolicited email and inappropriate sites?
- How will you monitor Internet usage?

Protective wireless infrastructure for a BYOD program provides a segmented student network that is separate from the one used by teachers and administrators, thereby avoiding data security conflicts and protecting student information. Built-in authentication procedures enable monitoring of Internet usage while ensuring that only legitimate users are allowed to access the network.

In addition to extensive planning for network security, wireless infrastructure must also have the capacity for growth. An increase in the number of mobile devices presents a growing demand for bandwidth, requiring schools to devote a large amount of their BYOD budget to infrastructure investment.

Implementation Example

Oak Hills uses the following support hardware, finding this configuration capable of handling the demands of multiple student-owned mobile devices.

Wireless Infrastructure

- Cisco Dual-Radio wireless access points
- Strategically positioned to minimize RF interference between each other
- Provides approximately 95% building coverage for wireless G standard devices

Network

- Network configuration consists of multiple SSID's (networks)
- Security maintained with a separated network configuration that includes a staff network, student network, and guest network
- Staff and Student network is secured via WEP, and is available to any employee or student utilizing district-owned equipment
- Guest network is an open SSID, allowing any student- or staff-owned equipment to access the internet

VM Ware

- 8 Cisco UCS Blade servers arranged in two 4-blade chassis. Each Blade consists of:
 - (2) 6 core processors for a total of 12 cores per blade
 - 192GB of RAM
- This is a total cluster wide of 96 CPU cores, and 2.3 Terabytes of RAM
- Cisco UCS Fiber interconnect
- Netapp Fiber Channel SAN storage, with 7 TB of storage on SAS 15k RPM drives
- Running VMware ESX, and VMware View 5

Step 4: Develop the Software Infrastructure

In a BYOD program, students will bring a variety of devices. A significant challenge for any school district is to provide software tools that can be utilized by all students on any device. This requires considerable planning.

With a wide variety of personal mobile devices, successful BYOD implementation makes use of platform-independent tools. Web-based applications work on most platforms and can accommodate common software needs, including photo editing and multimedia presentations. To prevent file compatibility issues, BYOD programs are most effective when they use cloud-based online storage for sharing and collaboration that works on all devices.

Implementation Example

At Oak Hills, the challenge of accommodating a wide variety of devices is addressed through the use of a private and public cloud.

The private cloud sits on district-owned servers and essentially replicates a desktop experience for students. From home, students can download the VMware View Client and create a virtual desktop complete with district licensed software. The private cloud is generally used by students who have specific software needs and do not have access to that software on their own device.

The public cloud contains web-based applications that can be accessed through any Internet connection. The advantage of the public cloud is that it is built with HTML and other various web programming languages, and therefore it can be accessed from any web browser. Using web-based software allows a BYOD program to be device neutral.

Step 5: Develop a Portal

Once the software tools are determined (both in the public and private clouds), the next important step is to create a central location that collects those resources. An effective BYOD program has a “one stop shop” for students, staff, and parents to access web applications and district-licensed software.

An example of a BYOD district portal



Developing a Portal

A portal doesn't need to be complicated. Its main purpose is collect web-based software applications. Some things to keep in mind:

1. Display the most popular applications on the main page.
2. Don't overlook the importance of aesthetics. Aim to create a modern design with a clean, simple layout and navigation.
3. When designing a portal, keep in mind that the portal will be accessed from mobile devices. The design should be easy to view and navigate on a small screen. Another option is to develop different designs for different devices, based on user interaction and screen size.

1. Embed a microblog widget to communicate announcements on the main page of the portal. This allows the site moderator to post messages from any computer or smartphone without having to modify the website.

2. Advanced features may include fully customized portals based on the user. For example, a student would see applications based on their identification as a student.

Step 6: Develop an Acceptable Use Policy

Successful BYOD programs have strategies in place to help with classroom management of different devices and activities. They establish and communicate an acceptable use policy (AUP) that specifies where and when devices can be used, as well as policies for social networking and messaging. Previous versions of a district AUP must be updated to address policies regarding students and staff bringing in outside devices.

Before developing an AUP, first define the goals and intended results. For example:

1. Outlining appropriate behavior in positive terms
2. Specifically outlining inappropriate behaviors
3. Outlining the procedures involved with following or not following the AUP

Electronic Sign-Off

At the beginning of each new school year, require students and staff to read, agree, and electronically sign the AUP. Electronic sign-off allows a district to track acknowledgements easily as well as save paper.

Sample AUP Electronic Sign-Off

The screenshot shows a web browser window with the title "Oak Hills LSD Sign Offs". The page has a search bar and a navigation menu on the left. The main content area is titled "High School Sign Off" and includes a disclaimer: "As a student of the Oak Hills Local School district attending Oak Hills High School, you are responsible for reading and acknowledging that you have read the following items. Please click on each item, read it, and complete the form below." Below this, there are links for "Oak Hills High School Forms" and "Oak Hills High School Sign Off". The sign-off form includes a list of items to be acknowledged: "The Oak Hills High School Handbook", "The Oak Hills AUP", "The Code of Conduct", and "Recruitment in Schools". A note states: "Your username (vanderveen_z@ohlad.org) will be recorded when you submit this form. Not vanderveen_z? Sign out". There is a "Sign Off" button and a checkbox for "I have viewed and I am responsible for understanding".

The following is an example AUP that can be used as a starting point for development.

Oak Hills Acceptable Use Policy

We in the Oak Hills Local School District are pleased to be able to offer our students, staff and guests access to computer technology, including access to the Internet, certain online services, and the Oak Hills information technology network. We are dedicated to access and support of appropriate technology which unlocks our potential and connects us locally and globally. We envision a learning environment where technology is a part of us, not apart from us.

We believe that the tremendous value of technology and the information technology network as an educational resource far outweighs the potential risks. We will leverage existing and emerging technology as a means to learn and thrive in the 21st Century and prepare our students for success toward their goals in the competitive global, electronic age. We feel that access to the tools and resources of a world-wide network and understanding when and how these tools are appropriately and effectively used are imperative in each student's education. However, if parents feel they do not want their child to have Internet access, then they will be responsible for

informing their child's teachers, in writing, before the end of the second week of school.

The school's information technology resources, including email and Internet access, are provided for educational purposes. If you have any doubt about whether a contemplated activity is acceptable, consult with your immediate teacher, supervisor, or director to help decide if a use is appropriate. Adherence to the following policy is necessary for continued access to the school's technological resources:

Users must respect and protect the privacy of others by:

1. Using only assigned accounts.
2. Only viewing, using, or copying passwords, data, or networks to which they are authorized.
3. Refraining from distributing private information about others or themselves.

Users must respect and protect the integrity, availability, and security of all electronic resources by:

1. Observing all district Internet filters and posted network security practices.
2. Reporting security risks or violations to a teacher or network administrator.
3. Not destroying or damaging data, networks, or other resources that do not belong to them, without clear permission of the owner.
4. Conserving, protecting, and sharing these resources with other users.
5. Notifying a staff member or administrator of computer or network malfunctions through the creation of a service request.

Users must respect and protect the intellectual property of others by:

1. Following copyright laws (not making illegal copies of music, games, or movies).
2. Citing sources when using others' work (not plagiarizing).

Users must respect and practice the principles of community by:

1. Communicating only in ways that are kind and respectful.
2. Reporting threatening or discomforting materials to a teacher or administrator.
3. Not intentionally accessing, transmitting, copying, or creating material that violates the school's code of conduct (such as messages/content that are pornographic, threatening, rude, discriminatory, or meant to harass).
4. Not intentionally accessing, transmitting, copying, or creating material that is illegal (such as obscenity, stolen materials, or illegal copies of copyrighted works).
5. Not using the resources to further other acts that are criminal or violate the school's code of conduct.
6. Avoiding spam, chain letters, or other mass unsolicited mailings.
7. Refraining from buying, selling, advertising, or otherwise conducting business, unless approved as a school project.

Users may, if in accord with the policy above:

1. Design and post web pages and other material from school resources.
2. Communicate electronically via tools such as email, chat, text, or videoconferencing (students require a teacher's permission).

3. Install or download software, if also in conformity with laws and licenses (students must be under the supervision of a teacher).
4. Use the resources for any educational purpose.

Consequences for Violation

Violations of these rules may result in disciplinary action, including the loss of a user's privileges to use the school's information technology resources. Further discipline may be imposed in accordance with the Board's Code of Conduct up to and including suspension or expulsion depending on the degree and severity of the violation.

Supervision and Monitoring

The use of District owned information technology resources is not private. School and network administrators and their authorized employees monitor the use of information technology resources to help ensure that uses are secure and in conformity with this policy. Administrators reserve the right to examine, use, and disclose any data found on the school's information networks in order to further the health, safety, discipline, or security of any student or other person, or to protect property. They may also use this information in disciplinary actions, and will furnish evidence of crime to law enforcement.

The district reserves the right to determine which uses constitute acceptable use and to limit access to such uses. The district also reserves the right to limit the time of access and use.

Step 7: Build a Curriculum

How does technology support the curriculum?

This, of course, is the question at the heart of a BYOD program. A vision of 21st-century education is learning anywhere, anytime. Achieving this vision requires technology.

Students will bring their own devices if the curriculum (and staff) supports their use. A curriculum that encourages the use of technology may include the following components:

Personal Support

Each building establishes a number of technology coaches that actively support eLearning initiatives. The eLearning coaches work with teachers and administrators to support technology integration, BYOD management, and course development.

Course Companion Sites

Teachers develop online companion sites for their classes, which can be accessed through each student's mobile device. These companion sites feature:

- Daily objectives
- Discussion forums
- Electronic textbooks and articles
- Course resources (for example, notes, worksheets, presentations, audio, video)
- Class calendar
- Online assignments and assessments

Digital Citizenship

Direct instruction on Internet safety, search strategies, copyright, and netiquette can also be incorporated into a BYOD curriculum. Proper training will help ensure that all students are well-prepared to begin using technology every day in a safe, respectful, and responsible way. When combined with a well-defined AUP, a unit that specifically teaches digital citizenship may lead to fewer issues within a BYOD program.

Step 8: Consider Devices

Mobile Devices

Although mobile devices offer many advantages, such as anytime—anywhere learning, there are times when students will require a “real” computer. Many software programs require a computer with a file structure and mouse input, even if they offer a companion mobile app to supplement the software program. Not all software features and file types are supported on mobile devices.

- What will students use when they require a keyboard?
- How will students use software programs that require a “real” computer?
- What will students use when they need a larger screen?
- How will students access files that are not supported on their mobile device?

School-Owned Devices

Schools that implement BYOD programs must also provide mobile technology solutions for students who do not have their own device, and they must support the mix of the school's technology with the students' own devices. An effective program budget allows for purchasing or leasing school-owned devices, including costs for upgrading, repairing, or replacing the devices regularly. Some successful BYOD models report generous sharing of devices among students as well as donation programs for new and used equipment.

Device Recommendations and Purchasing Guidelines

When it comes to purchasing mobile devices, parents and students will benefit from a general

set of recommendations and considerations. An effective BYOD program will actively try to create an environment that will work with any device. However, it is still useful to post a Device Consideration Letter.

Sample Device Consideration Letter

Over the past year, students, parents, community members, teachers and administrators have been working together to examine how technology is deployed at Oak Hills High School and challenged us to increase access to eLearning opportunities for students—anywhere, anytime.

With this in mind, we are excited to announce that at the beginning of second quarter—November 1st—students may bring their own personal electronic devices - including laptops and handheld technology (smart phones, iPod Touches, etc.)—with them to Oak Hills High School. This will enable students to use a combination of district technology and their own to facilitate their learning. No longer will our high school students be limited by the availability of district technology or access to software and applications.

By connecting to www.ohlsd.org, students can access the web-based learning tools that are offered. Here, students will find instructions for our OHHS virtual desktop - where they can utilize classroom instructional software both on or off our campus - wherever they have Internet access.

While many of our students already own laptops and computing devices, some parents have contacted us to ask, "If I wanted to purchase a laptop or other device for my child, what would you recommend?" Because family and individual student needs differ, this can be a complex question to answer. However, there are some general specifications that can be considered by everyone, so we have created this document to give you some guidance.

The ideal computing device for school use:

- Is lightweight and sturdy;
- Is in a protective carrying case;
- Has several hours of battery power and easy options for recharging;
- Has wireless capabilities and appropriate software;
- Offers sufficient storage;
- Is flexible, with USB ports and other options for expansion.

Specifications for a Student Computer

If you are considering purchasing a new computer, it's important to keep in mind how the student is going to use the computer. For example, Juniors and Seniors who plan to pursue a college program may want to contact an advisor from that program to seek recommendations specific to that field. We recommend that you consider the following minimum specifications for any new purchases:

Smart phones, handheld devices and other devices using a mobile operating system

While there are times that a handheld device is the most appropriate tool for a specific purpose, there are limitations that should be considered as well. Limitations to these devices are specific to model. Please discuss the following with your vendor:

- Does it support Flash technology?
- Speed of the Internet browser
- Responsiveness, size and readability of the screen
- Availability of Apps
- Battery life
- USB ports

Step 9: Provide Ongoing Professional Development

Without proper planning, implementation, and professional development, BYOD may not live up to its expectations. Simply inviting students to bring their own devices into school does not raise achievement; rather, it's how teachers choose to implement the devices that can determine if a BYOD program succeeds or fails.

After implementing a BYOD program, establish a plan to provide ongoing professional development and extensive training for staff members who are responsible for implementing the program and procedures on a daily basis. Teachers may be more comfortable with a traditional technology model, which offers controlled, filtered and exclusive environments for mobile learning. BYOD is uncontrolled and offers less filtered environments, requiring effective classroom management strategies and a greater depth of knowledge about technology.