A Roadmap for District- and/or School-Wide Technology Implementation

This section of the Practice Guide provides best practice recommendations on the core components that district- and school-level leadership teams consider as they progress through the process of developing a comprehensive implementation plan. The recommendations are grounded in best practice research, and in the work of districts and schools that have successfully expanded technology in their building(s) and that now use these tools to enhance instruction in the classroom.

Assessing Readiness

The importance of developing a multiyear comprehensive plan for how the school will approach the process of implementing technology cannot be overstated. *A critical first step is assessing the readiness of your district and/or school for change.* The information that you learn during this initial step can guide you in your decisions throughout the planning phase and ensure that you are addressing the unique needs, and building on the unique strengths, within your context.

> View examples of school readiness tools and checklists to inform your planning in **Appendix A**

What are the options?

Part of assessing readiness is getting a sense of the current technology landscape in your school. What technology tools do you have in the school, and how are teachers using these tools? As with teaching, there is no one-size-fits-all approach to school-wide technology implementation. Schools have demonstrated success with a wide range of approaches to technology implementation, from one-to-one computing or Bring Your Own Device (BYOD) to interactive whiteboards and rolling laptop carts. Each model of technology usage has its own benefits and challenges. Read the descriptions below and think about which one best describes your school's current approach.

Identifying your approach allows you to gauge the amount of resources currently invested in classroom technologies and the prevalence of these technologies across the school, and it will provide a sense of what your staff thinks about the role of technology in instruction. From this foundation, you will create your plan for enhancing technology implementation in the building and technology integration in the classroom.

> For more information about various technology configurations for your school, please refer to **Appendix B.**

One-to-One (a computer for every student). One-to-one (1:1) computing models are exactly as they sound: one computer/laptop/tablet per student in each class.

Benefits	Things to Consider
▸ Increased student engagement and opportunities for personalization	▸ Initial start-up costs are a significant barrier
▸ Increased student attendance	▸ Student safety online
▸ Higher student achievement	▸ Potential viruses from downloads
▸ Fosters project-based learning, research, and collaboration	▸ Usage policies (Will students be able to bring devices home with them?) and repair policies; wireless technology infrastructure
▸ Extends learning beyond the walls of the classroom (anytime and anywhere)	▸ Classroom management strategies
	▸ Professional learning for teachers

Bring Your Own Device (BYOD). BYOD has recently emerged as one approach to getting technology into the hands of every student. It shares many of the same benefits as 1:1 computing models, with the additional benefit of being more cost-effective for schools than purchasing a device for every student.

Benefits	Things to Consider
▸ Students are ultimately responsible for their own technology	▸ Infrastructure/network to support multiple types of devices
▸ Reduced costs in upgrading, repairing, and maintaining school computer labs	▸ Usage policies and codes of conduct for usage in the classroom
▸ Increased student engagement and opportunities for personalization	▸ Plans for providing devices to students who do not have access to a mobile device
▸ Takes advantage of technology that is familiar and comfortable for the student, which can encourage them to be more active learners	▸ Professional learning for teachers to learn about the variety of devices and ways to support learning with each of the tools

Mixed Devices. While some schools implement the same device, platform, and operating system in every classroom or computer lab, many schools today are opting for mixed device models. In these models, the district may support BYOD policies for middle and high school students but not in elementary schools, or a school may determine that each classroom will have three tablets, four classroom computers, and two e-readers (Kindle or similar).

Benefits	Things to Consider
▸ Cost-effective	▸ Technology support, maintenance, and installation of multiple programs, operating systems, and platforms
▸ Access to a variety of technology tools suited to meet different needs and activities	
▸ Increased student personalization of learning and differentiation of instruction	▸ Professional learning for teachers on the variety of devices in the classroom
▸ Teachers can take advantage of the comparative strengths of each type of device	▸ Classroom management strategies so that students know the routines around using each piece of technology in the classroom

Mobile Laptop Carts or Computer Work Stations. Mobile laptop carts and computer work stations (i.e., four or five computers in the back of the classroom or in the hallway just outside the classroom) provide students with increased access to computers (in comparison with spending time in a computer lab once or twice per week) and introduce technology into the classroom and day-to-day instruction. Some schools provide one laptop cart for every classroom on a 2:1 model (two students sharing a single laptop) while others share one laptop cart across multiple classrooms.

Benefits	Things to Consider
▸ Cost-effective	▸ System for teachers to "sign up" for the cart
▸ Increased student access to technology tools in the classroom	▸ Classroom management strategies for students to access the technology
▸ Lessens scheduling conflicts in the computer lab	▸ Determine how many carts will be provided
	▸ Technical support (e.g., keeping the batteries charged)

Building Your Implementation Plan

Regardless of the technology option your school is using or wants to achieve, effective implementation requires developing a step-by-step plan to support the initiative.

Unpacking the "black box" of implementation

As with any new program or policy, increasing the use of technology in your district/school will require an implementation plan that clearly articulates your vision, sets short- and long-term goals, and identifies specific action steps that will facilitate the realization of your goals. Paying attention to the *implementation process*—i.e., how you will initiate, integrate, and maintain technology use in your school setting—is as critical as selecting the devices that students will use and the instructional strategies that teachers will practice. In the implementation plan, you will devise your strategy, evaluate your progress, and make any necessary changes to ensure that you successfully achieve the desired outcomes of instructing with technology—an increase in student achievement, higher levels of student engagement, and personalization of student learning.

Read what other schools and districts have done by viewing their implementation plans in Appendix C.

Effective Innovations + Effective Implementation = Positive Outcomes

In essence, the implementation process involves coordinated change at the system, organization, program, and practice levels. It is a multiyear process, guided by a shared vision, and it is most successful when the leadership team has thoughtfully built an infrastructure of support for the initiative and has developed professional learning opportunities to build collective capacity. Although recommendations vary in terms of the number of "stages" or "phases" to consider and the terminology used to represent each stage, they possess a number of common core elements. Key elements represented in most implementation and school change frameworks highlight the importance of:

1. A planning phase, an implementing phase, and a scaling-up or sustaining phase

2. Using data to identify needs, set goals, assess progress, and generally inform the process of implementation

3. Creating relationships, collaborating with stakeholders, and building "buy-in"

4. Building collective capacity

Research in implementation science suggests that quality evidence-based programs or practices that are *not* implemented effectively are likely to *fail* and not achieve the desired outcomes.

In a nutshell, implementation is...a plan to foster change.

An implementation plan is typically a multiyear process that includes planning, implementing, monitoring and evaluating progress, rethinking, more planning, adapting, and meeting the needs of the stakeholders in your context. Implementation activities are purposeful, and they are defined though a series of concrete, detailed action steps. Specifically, we define technology implementation as the set of activities designed by the leadership team to facilitate the use of technology throughout classroom instruction.

Implementation is NOT . . . a specific event. It does not happen all at once, and it does not always proceed smoothly. Implementation is NOT the validation of evidence-based programs.

Appendix A: School Readiness Tools and Checklists to Inform Your Planning

EdTech Locator. This tool provides free access to an online self-assessment of readiness for technology implementation school-wide (consisting of five questions), as well as a planning worksheet to advance the process. There are separate sections for teachers, administrators, tech coordinators, and PD coordinators, which also include descriptors/markers of individual stages (early, development, and target) of task completion.

http://www.edtechlocator.org/#assess

Digital Learning Day: Self-Assessment, Project 24. This online survey allows for self-assessment of readiness to implement digital learning (in Project 24's seven areas: Professional Learning, Budget and Resources, Curriculum and Instruction, Academic Supports, Use of Time, Data and Assessment, Technology and Infrastructure). The end product is a PDF report that includes analysis and recommendations for each of the mentioned areas and links to additional resources. The survey takes less than two hours to complete.

http://digitallearningday.org/news-and-events/project-24/self-assessment/

Massachusetts School Technology and Readiness Chart (STaR Chart). This document is a rubric-like chart that allows for self-assessment on readiness progress toward the implementation of best practices on the technology continuum. It includes four areas for assessment (Teaching and Learning, Educator Preparation and Development, Administration and Support Services, and Infrastructure for Technology), with descriptors for individual levels of progress (early, developing, proficient, and advanced).

http://www.doe.mass.edu/boe/sac/edtech/STaR.pdf

Texas STaR Chart. This document is a rubric-like chart that allows for self-assessment on readiness progress toward the implementation of best practices on the technology continuum. It includes five areas for assessment (Teaching and Learning, Educator Preparation and Development, Leadership, Administration and Support Services, and Infrastructure for Technology), with personalized descriptors for individual levels of progress (early, developing, proficient, and advanced).

http://starchart.epsilen.com/docs/TxTSC.pdf

Appendix B: Information and Resources About Various Technology Configurations for Your School

One-to-One: A computer for every student

Sunnyside Unified School District (SUSD). SUSD shares information about the vision and goals behind the One-to-One program, which aims to prepare students for 21st century learning by assigning a laptop to each student for continuous use for school work and homework. A PowerPoint presentation of the program is available, as well as FAQs and additional resources (some links do not appear consistently functional).

http://www.susd12.org/one-one-computing

Walled Lake Consolidated School District (WLCSD). WLCSD shares information on their Anytime Anywhere Learning (AAL) Laptop Program. A video (3:45 minutes in duration) is available, as is additional information regarding technology support and requirements for the program, and curriculum, program enrollment, and research studies completed for AAL.

http://www.wlcsd.org/programs.cfm?subpage=359522

Henrico Country Public Schools (HCPS). HCPS provides information regarding their Teaching and Learning initiative, including the vision, technology requirements, and other tips for providing students with access to computers and the Internet and helping teachers to use eLearning methods and materials.

http://www.henrico.k12.va.us/Technology/InstructionalTechnology.html

The Challenges of 1:1 in the Classroom. Daniel Donahoo—a contributor to the New Media Consortium (NMC) and a researcher and author of childhood learning and development, technologies, and emerging literacies— blogs on the challenges associated with, and tips for successfully implementing, 1:1 technology devices (tablets, iPads, and so on).

http://www.nmc.org/news/challenges-11-classroom

1:1 Model Research—National and State Perspectives. This report by Dr. Corn (affiliated with the William and Ida Friday Institute for Educational Innovation) provides a summary of findings from a national and state perspective on 1:1 computing programs. The results address student learning outcomes, teaching approaches, and the critical components of such programs.

http://s3.amazonaws.com/mooc-ed.org/course_readings/DLT+1-1+Research+Summary.pdf

Tablets

Using Your Tablet in the Classroom: An App Summary. The McGraw Center for Teaching and Learning at Princeton University provides a list of tested apps which were found to be useful for teachers and which can be used on tablet devices.

http://blogs.princeton.edu/etc/2012/12/06/using-your-tablet-in-the-classroom-an-app-summary/

One Tablet Per Child? This article by Susan McLester, a contributor to *District Administration*, discusses the benefits of using tablets. The article includes a downloadable chart on "What to look for in a tablet" (including type of tablets [13], pricing, operating system, features, resolution/display, weight, storage, dimensions, connectivity, and battery life) for those school districts interested in investing in such a project.

http://www.districtadministration.com/article/one-tablet-child-0

Bring Your Own Device (BYOD)

Bring Your Own Technology/Device. This website provides a toolkit that includes perspectives and recommendations for educators and school and district leaders who are implementing BYOD programs (links to research and reports about policies and practice are available as well). The tool includes BYOD for teachers, the potential and the challenges of BYOD, policies for BYOD use, mobile learning, and models of BYOD.

http://www.digitallearningday.org/learn-and-explore/digital-learning-tools/bring-your-own/

Chromebooks and BYOD Success in Education: Access to Windows Applications and Virtual Desktops—From Any Device. This is a white paper by Ericom on using Chromebooks and BYOD. It provides information on the challenges of using IT in education (such as application management, cyber security, and hardware distribution), Chromebooks as solutions (such as hosting, longevity of devices, and administration), Chromebook access to Windows applications and desktops (BYOD, individual case study), and device replacement, protection, and availability (such as virus and malware protection, and classroom use).

http://www.ericom.com/specs/WP-Chromebook-and-BYOD-Success-Education.pdf

Hanover Public School District (HPSD) Implements a BYOD Model—Learn More. HPS is showcasing their actual BYOD model, which includes information regarding policies, how to connect, tech support, nine themes/expectations of digital citizenship, NETS standards, acceptable devices and required software/recommended browser, professional development links and resources for HPS employees, and BYOD FAQs for students, parents, and teachers.

http://byod.hanoverpublic.org/

Mixed Devices

From Distraction to Engagement: Wireless Devices in the Classroom. This article addresses the issue of student distractibility when surrounded by and working with wireless devices. It includes information regarding applications such as the Respondus LockDown Browser (which prevents students from straying from the URL they are supposed to be working on), a link to ConnectEd podcasts on mobile learning, and ideas about using the classroom's wireless community to benefit the learning environment.

http://www.educause.edu/ero/article/distraction-engagement-wireless-devices-classroom

Challenging the Model of 1:1 with BYOD. Edutopia, a George Lucas Educational Foundation project, presents a blog on a specific hybrid model of the 1:1 computing program and BYOD (implemented by a school district in Vermont) and addresses issues such as how to mix the devices in use, how to allow for ongoing experimentation and professional development, and how to provide a structure of support through coteaching and planning. The readers' comments on the blog also provide links to additional resources on BYOD-like initiatives or components.

http://www.edutopia.org/blog/challenging-one-to-one-model-amanda-paquette

Mobile Laptop Carts

Wireless in the Classroom. This article by Rhett McDaniel, an educational technologist with the Vanderbilt Center for Teaching, reflects on the use of wireless devices in college classrooms. The article is divided into sections that address the need for classroom policies (with statement models by various professors and their syllabi), instructional strategies, links to best practices for laptops in the classroom, and instructor and student

feedback on their prior and current experiences using wireless classrooms. (Two videos created by students also are available, each of which lasts between 5 and 10 minutes.)

http://cft.vanderbilt.edu/teaching-guides/technology/wireless/

Use of Laptops in the Classroom: Research and Best Practices. This paper, authored by professionals affiliated with the University of Michigan, explores the use of laptops and other mobile devices (iPads, smartphones, tablets). The results of the survey they conducted among college students (undergraduate and graduate) on the use of wireless technology in the classroom are included.

http://www.crlt.umich.edu/sites/default/files/resource_files/CRLT_no30.pdf

The Unwired Classroom: Wireless Computers Come of Age. This article for *From Now On: The Educational Technology Journal* summarizes the author's findings regarding the use of wireless computers in schools, following classroom observations in several U.S. states. Information on the benefits of using wireless laptops for classroom learning is included, as well as additional resources relating to this topic.

http://www.fno.org/jan01/wireless.html

Mobile Learning

Mobile Learning Anytime Everywhere. This mLearn book gathers 56 papers on mobile learning presented during the third annual mLearn conference in 2004. Topics include (but are not limited to) using learning theories to design instruction for mobile learning devices, JAVA environment for learning design, collaborative learning on mobile phones, engaging and supporting mobile learners, wireless learning communities, mobile awareness, tablet technology for higher education, virtual cooperation, distance learning, mobile learning games, adaptive mobile learning devices, e-learning applications, assessment in a mobile environment, mobile workplace learning (case study), mobile lessons, blended learning, and the ethical and legal challenges of mobile learning.

http://www.voced.edu.au/content/ngv36586

A Beginner's Guide to Mobile Learning. This article outlines some basic rules for mobile learning and includes links to five educational resources: EcoBug (a science game), Evernote (a note-taking and organization app), LetterSchool (which focuses on handwriting), MIT App Inventor (which allows you to create your own app), and PSAT Ace (a PSAT practice exam).

http://www.teachthought.com/trends/mobile-learning-trends/a-beginners-guide-to-mobile-learning/

Anytime Anywhere Learning: Mobile Education and the Wireless Industry. This brochure, produced by CTIA - The Wireless Association, addresses the benefits of mobile learning. It includes information about digital books, mobile devices, and mobile applications, as well as a list of the most popular iOS, Windows, Android, and Blackberry applications for education.

http://files.ctia.org/pdf/filings/CTIA_Mobile_Education_and_Wireless_Industry.pdf

Interactive Whiteboard Use

The Art and Science of Teaching/Teaching with Interactive Whiteboards. This article by Robert Marzano summarizes the findings of a study on teaching with interactive whiteboards. It includes recommendations for teachers and discloses some of the pitfalls of using such technology.

http://www.ascd.org/publications/educational-leadership/nov09/vol67/num03/Teaching-with-Interactive-Whiteboards.aspx

Using Electronic Whiteboards in Your Classroom: Benefits. A list of key findings from various reports on the use of electronic/SMART whiteboards in the classroom. Links to the full reports are provided (though not all the links are functional).

http://www.waukeshaschools.com/WIT/smartBoard/benefits.htm

Ten Ways to Get Smart With SMARTboard. A list of examples of specific classroom activities that can be completed with the SMARTboard (including board games, graphic organizers, PowerPoint presentations, click-and-drag activities, united streaming, interactive flannel board, notetaking and brainstorming, and interactive websites).

http://www.techlearning.com/from-the-classroom/0015/ten-ways-to-get-smart-with-smartboard/43707

SMART Exchange. This website provides practical classroom activities organized by subject (Art and Design, ELA, Information and Communications Technology, Music, Social Studies, Science, Citizenship, Geography, Library and Informational Sciences, Special Education, Cross-curricular, Health and PE, Mathematics, Religion, English as a Second Language, History, Modern Foreign Languages), grade level (prekindergarten through postsecondary), and file type (lessons, question sets, collaborations, widgets, ideas, activity packs, applications, videos, images, PDFs, add-ons).

http://exchange.smarttech.com/#tab=0

Appendix C: Implementation Science Frameworks

Implementation Science: What Do We Know and Where Do We Go from Here? This is a PowerPoint presentation on the stages of implementation frameworks. It includes steps toward success, challenges, ideas for further research, readiness assessment, and examples.

http://www.researchconnections.org/files/childcare/pdf/FranksPresentation.pdf

National Implementation Research Network. This is the landing page for the National Implementation Research Network.

http://nirn.fpg.unc.edu/

▶ **Learn Implementation.** This provides information on defining implementation, forming implementation teams, stages and cycles of implementation, and measurement.

   http://nirn.fpg.unc.edu/learn-implementation

▶ **ImpleMap: Exploring the Implementation Landscape.** This document outlines the key planning elements needed for successful implementation.

   http://implementation.fpg.unc.edu/resources/implemap

▶ **Stages of Implementation Analysis: Where Are We?** This planning tool can be used to assess, plan, and track the implementation of evidence-based programs and evidence-informed innovations.

   http://implementation.fpg.unc.edu/sites/implementation.fpg.unc.edu/files/resources/NIRN-Education-StagesOfImplementationAnalysisWhereAreWe.pdf

▶ **Establishing a Framework for the Implementation of Evidence-Based Programs.** This poster summarizes the steps (methods and recommendations) required to establish a framework for the implementation of evidence-based programs.

   http://nirn.fpg.unc.edu/sites/nirn.fpg.unc.edu/files/resources/NIRN-APHA-PosterSession-12-2004.pdf

Stratosphere - Fullan. This video (15 minutes in duration), presented by the author of the book *Stratosphere*, addresses the relationship between technology and pedagogy. Michael Fullan speaks of effective technology integration and the new role of teachers in the 21st century.

http://thedigitalfrontline.com/2012/06/25/stratosphere-michael-fullan/

Kotter's 8-step Change Model. This article describes the change model authored by John Kotter, a professor at Harvard Business School, and published in his 1995 book, *Leading Change* (see below for a link to a graphic of the model).

http://www.mindtools.com/pages/article/newPPM_82.htm

▶ **Kotter's 8-Step Change Model Diagram.** This links to a graphic of John Kotter's change model.

   http://3.bp.blogspot.com/-dPdlugG7Tnc/Tb92avD3NsI/AAAAAAAAAFg/MlVXyC9np2E/s1600/kotter4.gif

State- and District-Level Planning for Progess. This website describes the Project 24 framework, which predicts seven key areas for the successful use of technology and digital learning (academic supports, budget and resources, curriculum and instruction, data and assessments, professional learning, technology and infrastructure, and use of time).

http://www.all4ed.org/project24

Missouri Department of Education Six-Step Process in Creating a Technology Plan. This is a model of a technology plan provided by the Missouri Department of Education. It includes the six steps required to create a technology plan (getting started; technology mission statement; current technology raw data and analysis; goals and objectives; development and implementation of the plan with action plans and timelines; and dissemination, monitoring, and evaluation of the plan), as well as additional resources with a downloadable Tech Plan Scoring Guide and other templates.

http://dese.mo.gov/divimprove/instrtech/techplan/gettingstarted.htm