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Mobile Learning

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LEARNING TECHNOLOGIES

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LEARNING TECHNOLOGIES

MOBILE LEARNING

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Mobile learning, also known as m-learning, is becoming an increasingly popular way to convey information and enhance the learning process in numerous fields. Rather than being restricted to a specific location at a desktop computer or fixed module, the learner is able to access information from an array of mobile devices, including laptops, tablets, smartphones, and phones. By 2016, there will be more than 2.1 billion mobile devices—up from 109 million in 2010—that use HTML5 web browsers (*ABI Research*, July 2011).

Mobile learning can be utilized in several ways to deliver informal and formal learning, social tools, and performance support. One of the biggest hurdles we face is that the audience for mobile devices does not want to be penalized for viewing or accessing information; they want to be able to learn from any device at anytime, anywhere. This creates a challenge, as we have to plan, develop, and deliver tools and content that can be used in all facets of learning, as well as work on the range of devices we use now and will use in the future. This may require us to rethink how we create content, package that content, and deliver it. In this *Infoline*, you will learn several ways to achieve this goal.

The launch in 2007 of the original iPhone was followed by Android devices, and now the iPad has caused an explosion in new devices hitting the market, forcing changes and innovation in the latest generation of apps, HTML5-based browsers, and how we expect to interact with information. The adoption of these devices has also made it easier for training developers to deliver their content without building special versions; they can use browser-based delivery rather than create a unique application for each platform. This *Infoline* will explain the tools, the technology, and what may work best for your organization today.

The technology innovation in mobile phones, smartphones, and tablets has advanced significantly over the past five years, and has provided new hardware that offers larger resolutions, faster bandwidth, processing power that is on par with its desktop counterparts, 2D/3D graphics, and increased storage, plus new features in location (GPS) and accelerometers for motion/spacial input. If you attempted mobile learning six to 10 years ago, it was like working in the dark ages, with text only or low-quality graphics; or if you used PDAs such as Palm, or a Windows-based platform, you built a particular solution for a particular series of devices, and then you had to start over or continue in that platform. Today we have two primary platforms (iOS and Android) in the forefront and several others competing for space (Blackberry, Microsoft, and HP).

This *Infoline* is written for a variety of experience levels, ranging from beginners who are just discovering mobile learning, to experts who may already have a mobile learning platform in place. You will learn the reasons why mobile learning has seen such recent growth and what areas are best suited for this type of learning. In addition, the following report will define and explain the key elements to a successful mobile learning plan so that you can decide if it is right for your company.

WHAT IS MOBILE LEARNING?

Mobile learning can be defined as any type of learning that occurs when the learner is not fixed in a specific location. The learner may use an array of mobile devices to access mobile technologies. Whether the learner is on a train, plane, or by the pool, the mobile device can provide an easy way to answer a question, demonstrate a function, or collaborate with peers on an idea or concept. Mobile learning also provides a new way for knowledge to be created by experts or peers in the field who can do the following:

- capture a video, edit, and upload it with a couple of touches
- take a photo, annotate, and share
- record an audio thought, notes, or knowledge and post or share with a group
- write a document that can share any type of media, including audio, video, graphics, and text
- participate in social networks, whether in the public or secure environments
- receive and send email
- access HTML5-based browsers
- utilize GPS and location information
- download apps for just about everything you can imagine, from education to entertainment
- facilitate voice, video, and screen sharing (app may be required).

The key ingredient for mobile learning is a mobile device (smartphone, tablet, laptop, or web-enabled phone) whereby the learner can share, participate, or learn. Content can be delivered via the browser or an application for the device. The power in the processor, storage, and graphics has been scaled to desktop-type performance (see the sidebar, *Devices and Capabilities,* for a comparison of the various options).

You also have to make an important decision. One challenge, based on your organization or audience, is whether you develop a custom application or you develop your content for browser-based delivery. Based on the features, platforms, timeframe, and budget, the primary way to deliver learning will be via the browser, which will enable you to support everything from mobile devices to desktops.

HOW MOBILE LEARNING DIFFERS FROM E-LEARNING

Mobile learning is different from e-learning in that mobile learning is less restrictive because it is more portable. E-learning has limited mobility (access is via a desktop computer), whereas small mobile devices allow mobile learning to be done almost anywhere. You can choose to develop unique content specifically geared toward access via a mobile device within your course; or you may choose to make the device transparent. Thus, it would not matter how the learners access the information, as the content is suited for all methods. Certain mobile devices may allow you to access additional tools or content, while desktop devices may allow you to perform different types of actions.

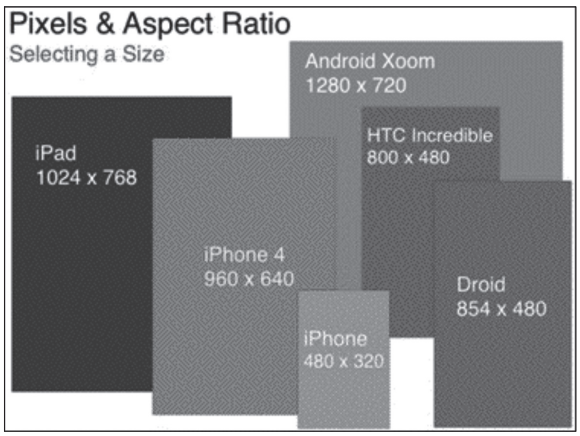
One of the original concerns in mobile delivery was screen size and resolution. First generation iPhones consisted of 480 x 320 pixels and a 3.5 inch screen. Previous generations of devices from Palm, Handspring, Compaq, and Dell handhelds had smaller resolutions and fell short in processing compared to recent developments.

DEVICES AND CAPABILITIES

Below is a chart describing the range of mobile devices and their capabilities.

		
SMARTPHONE	**TABLET**	**LAPTOP**
Capabilities: third party apps, mobile web browser, wireless Internet	**Capabilities:** third party apps, mobile web browser, wireless Internet	**Capabilities:** power and functionality of a desktop computer, mobile
Pros: mobile, convenient, access to hundreds of tools through apps and web	**Pros:** large screen, light, access to same things as smartphone	**Pros:** powerful, fits in a backpack, runs all normal computer programs, acts as main “hub” for all of your other devices
Cons: small screen, requires home computer to manage content	**Cons:** not as mobile as a smartphone, but still requires home computer to manage content, not stand-alone computers yet	**Cons:** price, not as convenient as smartphones or tablets

These earlier devices also lacked full support for browsers and Adobe Flash, which is supported on Android, HP, and Blackberry devices. Apple does not allow support for Flash, which has helped push HTML5 to the forefront and caused Adobe to rapidly improve the performance of Flash for mobile devices. Today's devices have doubled in resolution, and devices range up to 13 inches in screen size and fit into the mobile category (see image below).



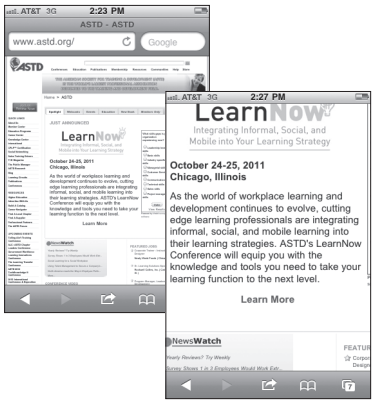
Another aspect unique to mobile learning is that many of these devices are touch-based. The personal interaction with touching the data creates a new, unique interaction that can be described as "magical," to quote Apple. If you have not had the opportunity to work or interact with a touch-based device, this is a must-do and you need to go to a local store to try one out for several minutes. When the user is interested, or needs to understand or learn from the content you generated, it creates a more personal learning environment and new ways of interacting with the information.

THE BENEFITS OF MOBILE LEARNING

What are the benefits of mobile learning for the learner, the instructor, the organization, and the extended enterprise?

Best practices in mobile learning recommend conveying smaller bits of information than a typical e-learning module, without sacrificing additional content. Just-in-time learning will allow the user to pull out a mobile device to search for a quick answer to a question that recently arose. This process is evolving quickly. Because tablets and other devices are replacing desktops as a primary or a secondary device, users expect to be able to perform the same functions without any penalties or restrictions, and in some cases, they want more, whether that means interaction or content and activities.

One of the unique features of the current generation of devices is that by double-tapping a paragraph or content on the screen, that item will become full screen, allowing you to focus your attention on the content at that time. (See the images below—the top image is the regular view, and the lower image is zoomed in.) Most users today do not want a special limited version of the content; studies are showing that users expect the same if not better content. You will need to keep this in mind as you evaluate what is best for your organization in developing a plan for m-learning.



Example:

A technician is in the field and needs to confirm which component to replace within a device and how to do it. Using his or her mobile device, the technician can enter a search or select a component visually on screen and view a procedure, a "how-to" animation, or a video that illustrates how to perform the action.

TECHNOLOGY TO WATCH: AUGMENTED REALITIES

If you have not had the opportunity to try Google Goggles or LeafSnap, these are two applications that allow you to use the camera built into your mobile device and identify more information on the subject matter. Imagine the above scenario and allowing the technician to utilize the built-in camera to instantly access the information that is needed.

WHY YOU SHOULD CONSIDER MOBILE LEARNING

The best argument in favor of mobile learning is that learners are able to gain knowledge immediately and on the go, rather than having to sit down in a fixed location. Whether they are traveling, in the field, or on location for a job, they can access the information they need when they need it.

The instructor is able to introduce a new range of teaching techniques through mobile devices to enhance the experience. This can include movies, sounds, touchable content, and even game-like interactions. The ability to offer this kind of variety appeals to a wider range of learning styles.

An instructor can also use mobile learning within a classroom to gather feedback via a poll, or by having learners create content using the built-in camera, microphone, or document creation tools. You can use a web tool such as Poll Everywhere, which allows you to create a text message or web-based audience feedback tool for your learners and gather real-time feedback or answers during the session.

The organization can greatly benefit from providing mobile devices, whether a smartphone, tablet, or other device, in the following ways:

- Mobile devices are always with your team and are always on, so employees have instant access to email, information, and learning content.
- Knowledge requirements continue to grow, and we always need to know more; mobile devices provide an easy way to access the information.
- Mobile devices provide a simple way for users to add to the organization's knowledge base, whether via a blog, wiki, or social network.
- Smartphones can be used to deliver text messages about new content or reminders about activities or tasks to be completed.

ADDITIONAL READING

"10 Reasons Executives Should Care About Mobile Learning," by Float Mobile Learning: http://floatlearning.com/2011/04/10-reasons-executives-should-care-about-mobile-learning/

Another benefit is that mobile content and course information are available 24 hours, promoting learning outside of the classroom.

WHEN IS MOBILE LEARNING APPROPRIATE?

Mobile learning supports and enhances the learning process rather than being integral to it. Mobile learning is best used for access to information on the go. This information is not necessarily long learning modules, but instead consists of compact, relevant pieces of information that the learner could obtain quickly from a mobile device.

This may change as mobile devices take over as the primary way learners interact with content and applications, as well as how they function in the workplace.

SUPPORTED MEDIA

Text: The current smartphones, tablets, and laptops do an amazing job of rendering text. As mentioned earlier, on today's smartphones and tablets, a double touch to a text paragraph will zoom that content to the full screen, and turning the device from portrait to landscape also reorients the content.

Video: This can also be used in the delivery of m-learning content. There are two primary challenges: platform and broadband.

1. Platform: The video codec and technology you choose may need to be updated to support current smartphones. Several mobile OS's support the Flash plug-in technology partially or fully; Apple's iOS does not support it and may never do so. A primary solution most developers are taking advantage of today is the H264 codec that can be used to deliver to HTML5 as well as Flash-based support. This allows you to create one file that can be used on all current platforms, from mobile to desktop. It requires only Flash Player 9 or an HTML5-based browser, which all the current platforms have supported for the past 18 months. Learn more at: longtailvideo.com.

2. Broadband: This may be a challenge or cost factor if your learners are primarily in the field and do not have access to Wi-Fi. If this is the case, then you need to consider the impact of the data plan and whether 3G or 4G are supported. This not only will be a cost factor but also will determine how fast your learners will have access to the content. If your learners are primarily on a 3G network and not normally within a Wi-Fi network, whether at home or at the office, then you may want to optimize all of your content for the smallest possible delivery to allow for quick usage.

Audio: This can also be easily utilized with mobile devices, and it can even be more optimal because users may have a headset or easy access for listening to a podcast or audio of an expert. The MP3 codec has been the primary delivery method for audio-based content, and all mobile platforms will support playback without additional software.

CONSIDER YOUR CONTENT

The following section discusses the types of content that you may choose to deliver. In each case, think about your audience, their needs, and how they will access the content.

Lessons: If you are delivering animation, video, text, graphics, or a combination, then delivery on mobile devices will work well for most content. Based on the size of the device you are using, you will want to make sure that the content is not too small for delivery on the device, whether you are using text or doing screen recordings. Test prior to recommending use, or plan an alternative if the content is appropriate for a smaller size; for example, smartphones.

Activities: Today, most of us develop activities as Flash-based objects. Over the past 12 months, as we have developed new content, we have considered if it's possible to build in JavaScript and HTML5. Based on our target audience and their devices, if we feel there is a large percentage of users who may access the content currently or will in the next 12–18 months, we take a stronger look at alternative ways to build the objects. If you are primarily targeting Android-based devices, then you need to look at the target size and whether the device has the processing power to handle the playback.

Games: Most games have been built in Flash as well, so you need to consider again your target audience, the size of the devices, and what makes the most sense for delivery.

Simulations: Most simulations have been built in Flash or a tool that will export to Flash format as well. If you are building a branching-based tool with graphics and simple interactions, you could consider building in HTML and playback of video, audio, or graphics, which will enable you to deliver content to the majority of devices available today.

Screencasts: As mentioned earlier, screencasts have a large downside on smaller smartphones. Because of the smaller sizes, it would be hard to expect the learner to comprehend the content. Using a tablet or laptop would not pose a problem and may be preferred if you want to focus the user on the content.

App / Tool: If you are considering launching a new web tool or application, look at developing custom CSS (Cascading Style Sheets) to auto format and size the content to the particular device. CSS3 and HTML5 offer the ability to recognize a device's size and select the proper format for display.

Just-in-time learning: For mobile and especially smartphone devices, just-in-time learning provides a simple way to offer tools via the web or an app to provide learning content quickly and efficiently, based on a specific need at the time. You can provide a simple search field to locate content or a simple interface to navigate through content and locate case studies, additional information, or materials that would assist the learner.

TECHNOLOGY AND YOUR AUDIENCE

Your learner or organization may provide a laptop and a smartphone or mobile phone. Moving forward, we may use one device primarily based on our job and needs; so we want to consider our audience and what technology they have while in the office, on location, traveling, and at home. Most users have multiple devices between work and home and may choose to use a personal device to access work networks and learning content. Try to keep in mind which device a user may prefer, depending on their location or their needs. For example, what device do users prefer to use when in a classroom? When their learning is primarily online? Do they have a primary and secondary device? Which do they use for informal learning or social media purposes?

The next section will discuss starting a mobile learning program; but before you read on, review the sidebar *Myths and Misconceptions*.

TECHNOLOGY TO WATCH: MOTION-BASED INTERACTIONS

Motion-based interactions would allow you to use your mobile device (mainly a smartphone) for a presentation or some type of interactivity. We are also seeing how, in tablets that are currently in prototype, the built-in camera can recognize gestures and movements and use the data to control interactions on screen, similar to the Xbox Kinect technology.

DESIGNING SUCCESSFUL MOBILE LEARNING PROGRAMS

Before you can begin designing successful mobile learning programs, you need to decide if you are developing content or applications exclusively for a mobile platform, a specific set of users, or a wide range of devices. As you continue to develop content for the desktop, you should consider thinking about what would happen if this content were to be accessed from a mobile device. Would it work? If your answer is no, then you need to rethink your program and consider the impact of adding mobile support as well as the primary desktop support.

1. Will it function as the ideal delivery method?
2. Will it fail and not work at all, partially work, or be fully supported? For example, if your content is primarily Flash-based, iOS will not play the content at all.
3. Can you design the content to support and take advantage of each platform? This is getting easier if you are using HTML-based frameworks for your content, because they will work via any browser. If you are concerned about the size of the browser window or the physical size of the device, consider using CSS3, cascading style sheets, and JavaScript to recognize the device your learner is using and automatically adjust the UI (user interface) to optimize for that device. If your organization does not currently support this concept, you will want to look at what would be involved, and plan to update your LMS, CMS, or platform so that you can support most platforms and devices.

MYTHS AND MISCONCEPTIONS

The following are some common misconceptions that members of an organization may have regarding mobile learning and the ways in which it can be applied, along with an explanation of why each statement is inaccurate.

WE CAN JUST USE OUR EXISTING CONTENT AND DELIVER IT TO MOBILE DEVICES.

For existing content you will need to look at your target audience, determine what technology they have, and test within those devices to see how the current content is delivered. You will need to decide if you want to support these devices, if you recommend they view the content on a desktop, or which devices you are supporting.

With the latest generation of m-learning devices, most content will appear and be able to be viewed, but it may not be designed or optimized for the touch interfaces. If you are looking at the Apple's iOS platform, the browser does not support Adobe's Flash format.

You will also need to recommend target sizes and resolutions, so that a learner will know if they should view the content on their device.

As you develop new content, you want to consider the development strategy, determine how you want to support it, decide which devices you want to use, and provide tools and information to your learners so they can take advantage of the content.

WE CAN DEVELOP ONCE AND IT WILL WORK EVERYWHERE.

It is possible today, using HTML and CSS, to develop learning tools and sites that will take advantage of multiple types of devices as well as each environment. This will take additional planning, development resources, and time to develop properly.

You will need to determine what makes sense for your learning content, how your audience will use the information, and when and where they will interact.

MOBILE DEVICES ARE NOT SECURE.

We face two challenges in deploying mobile devices: the risk that the physical device could be lost or stolen, and the software security for the device.

1. **Physical device:** A mobile device (smartphone, tablet, or laptop) may be lost or stolen, and there are a couple of steps that you can consider for increasing security. You can implement a security password on each device that would be required prior to accessing the device. Most of the operating systems now offer a "find your phone" feature, which will allow you to remotely locate via GPS where the phone is and even erase the contents if you feel it will not be located.
2. **Software security:** If you are deploying an application, based on if you are using the store or enterprise installation, you can either lock down or allow the learner to install the app on their phone. Each app can be tested, and if you are locking the device down, this may limit how the device can be used. Most mobile devices offer more security within the operating system than their desktop counterparts.

DEVELOPING FOR MOBILE IS TOO EXPENSIVE.

Developing for mobile, just like developing for any platform, can be expensive if not properly planned and if you have not defined a set of requirements prior to starting.

As we discussed earlier, there are two strategies for developing for mobile:

1. **Web App / Site:** Because the data will be accessed via a mobile device, this strategy is easier to update, typically requires less time, and is operable on a lower budget (compared to building a custom application, as described in option two). You will need to have a team that is knowledgeable in newer HTML, CSS, and JavaScript tools, which will provide a faster delivery than a dedicated application. Based on the scope of a project, a typical development timeframe is two or more weeks for an entry app or product.
2. **Application:** Developing a custom application will require additional planning and expense; however, it would allow you to take full advantage of the features within the hardware and increase the user experience—whether accessing the GPS, motion feedback, camera, or other tools that may be on the device. Based on the scope of the application, it would require an average of eight or more weeks in development.

Additional Reading:

A list of common mobile learning myths along with a more realistic appraisal (2010 CEDMA) can be found at: http://www.cedmaeurope.org/newsletter%20articles/eLearning%20Guild/Top%20Myths%20and%20Misconceptions%20of%20Mobile%20Learning%20(Jun%2010).pdf

OnPoint Digital: M-Learning: Common Myths & Misconceptions Presentation, can be found at: http://www.wiziq.com/

INGREDIENTS FOR A SUCCESSFUL MOBILE LEARNING STRATEGY

First you need to define the scope of your strategy:

- Who is your audience and how will they use the solution?
- What hardware/software technology do they have, or what will they need?
- What is the timetable?
- Does the content exist, or are you starting from scratch?
- What is the budget?

Second, based on the information above, you need to determine the following:

- Are you developing a native app or web app? A web app is accessible from any device, on any operating system, be it a desktop or smartphone, created with HTML5. See the sidebar, *Web App or Native App?,* for more on the two kinds of apps.
- Are you choosing a single OS or attempting to support as many as possible? Based on your organization and audience for learning, you need to determine if you will support one or multiple platforms. If you are working with learners who can choose their OS or use home devices, then you will need to take a more general approach to be able to deliver to as many platforms as possible. If you choose an OS, you need to consider how often the company updates the OS, how often the hardware changes, and how they may affect your web or app tool.
- Have you developed specific content for your mobile learning, or will all new content be supported in desktop and mobile learning efforts? In the past, most m-learning has been short and simple because the learner will most likely have numerous distractions and probably will pay attention to the device for only a short period of time. This concept is also true on the desktop today—with multiple windows, chats, browsers, emails, and applications. We could argue that mobile platforms let you focus on one task at a time, at least until you start to get notifications of text messages, tweets, and calls.

You should also consider who your audience is, how they will access the content, when they will access the content, and how much time they will spend with it during each session. Usability should always be a priority in development, but it is extremely important when it comes to mobile devices. They come in all shapes and sizes, so an aesthetically pleasing yet simple display is essential. Along with simplicity comes ease of use. The screen is most likely going to be smaller than that of a computer, so try to keep a clean design that does not require much explanation on how to use it. The user should be able to figure out what to do just by looking at the screen.

The interface should have an appropriate display layout, simple menus and buttons, and varied media support. Another important thing to consider is help links and files. If a user is having trouble understanding how to properly use the interface on their device, there needs to be a quick and easy way to find the solution. Along with a "help" button, a search option is an additional way for users to find what they are looking for. (See the sidebar, *Create a Mobile Learning Program*, for an overview of the steps you should take when building your program.)

ADDITIONAL READING

"Five Mobile Learning Implementation Tips," by Upside Learning, 2010: http://www.upsidelearning.com/blog/index.php/2010/03/01/five-mobile-learning-implementation-tips/

WEB APP OR NATIVE APP?

The following table outlines the differences between web apps and native apps, including the benefits and shortcomings of each. It is important to keep this information in mind as you decide which kind of app you want to develop.

	WEB APP	NATIVE APP
Definition	A web app is an application or site that is delivered via the web browser. Using JavaScript and the growing tools within HTML5, it is now possible to create sites that can behave as an application.	A native application is a bundled program that you have your users install or you pre-install on their mobile devices.
Pros	• Is easy to update. • Can be deployed to desktops, mobile devices, and product with a browser. • HTML5 continues to grow in adoption and features to allow for more powerful features.	• Allows for unique experience. • May provide for improved hardware/software integration on tools. • Promotes improved utilization of mobile hardware.
Cons	• Testing may be required in multiple browsers and platforms to support feature set. • May not take advantage of all hardware features.	• Is harder to update. • May require delivery via store or enterprise solution. • Requires longer development times. • Requires custom packaging or programming per platform. • Is costly to support, update.
Development Process and Results	• Average development time is one to two weeks. • Average development expense is $10,000. • Developer expertise required is one to two years. • Content experience is fair. • System security is basic. • Access to core functions is nominal. • Overall experience is serviceable.	• Average development time is 12 to 16 weeks or more. • Average development expense is $75,000 or more. • Developer expertise required is three or more years. • Content experience is polished. • System security is high (“mil spec”). • Access to core functions is fully integrated. • Overall experience is exceptional.

CREATE A MOBILE LEARNING PROGRAM

What problems can arise in the planning, development, implementation, and maintenance of a mobile learning program? Here's a quick overview of the steps you need to take to build and maintain your own mobile learning program.

PLANNING

During the planning phase, be sure to define the hardware and software specifications and think about a 1 to 3-year plan and how the hardware and software changes may affect your developments. Make sure you, as well as the project lead, fully understand the goals, priorities, and deliverables and what may affect those goals.

DEFINITION

During the definition phase, use the following documents to prevent potential problems and issues:

- Flowcharts to display functionality and user screens.
- Wireframes to test functionality, usability, and design. Start with paper, PowerPoint, Keynote or an application such as Balsamic Mockups for quick visualization of your content, product, and mobile learning.
- Definition documents to define visual, hardware, and software specifications.

DEVELOPMENT

During the development phase, weekly or bi-monthly reviews should be scheduled to review progress, give updates, and offer the opportunity to provide feedback during the development process. Testing on the mobile platform is recommended during weekly reviews to ensure performance and functionality requirements are met.

IMPLEMENTATION

Based on the web or app model, implementation should be planned prior to determining how you will reach your learners or what may be required for installation. If your mobile devices are controlled within IT, you will want to coordinate plans and a strategy for implementation as early as possible.

If you are delivering via the web (or the learners have the ability to install via the platform app store), then you may be able to provide a direct link that will lead to installation on the mobile platform. If using a website, app, or tool, you will want to build up to launch to let learners know what is coming and build interest and excitement in the new tools. You may want to include a group of peers who represent your audience to test, gather feedback, and help evangelize the new learning tools.

MAINTENANCE

Maintenance should also be discussed prior to launch based on an app- or web-based delivery. If it's an app and you deliver via a store, it may take two to six weeks to get new versions approved and available for downloads. If you are using an Enterprise-based installation, then you will be able to push updates directly based on how your organization is set up. Web-based delivery provides a simpler path in that you only need to update the web server, and users logging in will gain access to the latest learning content and product builds.

SUPPORT

A support strategy also needs to be planned prior to launch. Will learners require help with installation or hardware support when interacting with your tool? Will internal support suffice? Will you need to partner with a third party, or will you rely on the learners to figure it out?

TOOLS FOR MOBILE DEVELOPMENT

The following tools can be used for mobile development, and choosing a particular tool should be based on the level of experience you have as a developer and what you want to offer with your mobile program.

Native Programming Language: Each platform (Apple, Google, HP, Microsoft) offers a suite of applications that are designed for programmers to build and customize tools.

Web HTML: One recommendation would be to learn the syntax and then use an authoring tool to build custom HTML and CSS to provide the best and cleanest code. If you are new or starting out, you may want to look at a tool like Adobe Dreamweaver, which provides a drag-and-drop visual interface and allows you to view the code as you design/develop or flip back and forth between modes.

Flash: Using Adobe's Flash Professional CS 5.5 now allows you to create applications from your Flash content and bundle them into an application for delivery on Apple's iOS and Android platforms. For experienced teams or programmers, this may be a great way to speed up delivery and offer the ability to customize for each platform quickly.

Two amazing tools to consider for game development are:

GameSalad Creator: Currently only available on the Mac OS platform, this drag-and-drop interface provides an amazing interface to quickly develop games and interactions with content. You can currently export to HMTL5 and iOS platforms as well as to Mac/Windows browsers, which use a free plug-in to playback (http://gamesalad.com/).

ANSCA Corona: Provides a Mac and Windows development environment for coding games using a powerful suite of APIs. The gaming engine is fast, and delivery is available for iOS and Android markets (http://www.anscamobile.com/corona/).

OPEN VS. CLOSED

Open Source versus Closed Source is a compatibility decision that must be made when creating your mobile learning system. Rather than running programs through a specific operating system or plug-in (Closed Source), the gradual shift to HTML5 will allow programs to function through a web browser (Open Source). That means that all learners will be able to access the same content from any device (desktop computer, laptop, tablet, smartphone, and so forth) because a browser is a platform common to all devices.

HTML5 has become a buzzword, but the base components have been supported for the past 18 months. You can choose to use parts such as JavaScript and CSS3, and gradually grow support as the standard evolves. Even if you choose HTML4 support, you are heading in the right direction of open standards and can continue to add functionality as you grow support for the technology. See the sidebar, *Tools for Mobile Development*, for tips and information on the various tools available for developing a mobile learning program.

THE FUTURE OF MOBILE LEARNING

What are the latest developments and trends in mobile learning? How might the course of mobile learning continue to evolve?

The popularization of tablets has created a whole new trend in mobile learning. Tablets are more transportable than a laptop, but have a larger screen than a normal mobile phone. This opens up an entirely new realm of opportunities for mobile learning applications.

As the use of these devices continues to grow, we will continue to see the power and features widely adopted. You need to jump on the bandwagon and start planning and developing your mobile learning or get left behind.

Currently, Apple's iPad has had the largest market share, but we now have several choices in the Android market, HP OS, and the upcoming Windows-based tablets.

Microsoft and Apple, with their latest desktop operating systems, have begun to combine features that have become popular in the mobile markets, and analysts believe that we will see the technologies continue to converge both in features and hardware. This may create even more powerful devices and possibly users will continue to replace their desktops with mobile devices.

WRAPPING IT UP

You should be considering mobile learning for your workforce because it is a critical factor in delivering the best in learning experiences. You can start small, adding components and continuing to evolve as your organization adopts mobile devices. With an enormous growth in mobile devices across the board, reluctance to adapt to the evolution of technology could leave your company behind and scrambling to catch up. As the newer generations grow up using these devices in all aspects of their lives, why should learning be left out? Access to mobile devices will change the future of learning.

REFERENCES & RESOURCES

APP DEVELOPMENTS

iMockUps: http://itunes.apple.com/us/app/imockups-for-ipad/id364885913?mt=8

Sketchy: http://sketchyapp.com/

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Quinn, Clark. *Designing mLearning*. San Francisco, CA: Pfeiffer, 2011.

DEVELOPMENTAL APPLICATIONS

Flash: For experienced teams or programmers, this may be a great way to speed up delivery and offer the ability to customize for each platform quickly. http://www.adobe.com/products/flash.html

Native Programming Language: Each platform (Apple, Google, HP, Microsoft) offers a suite of applications that are designed for programmers to build and customize tools. For Apple iOS: http://developer.apple.com. For Google Android: http://developer.android.com/sdk/index.html

Web HTML: You may want to look at a tool like Adobe Dreamweaver, which provides a drag-and-drop visual interface, and you can view the code as you design/develop or flip back and forth between modes. http://www.adobe.com/products/dreamweaver.html

GAME DEVELOPMENT TOOLS

GameSalad Creator: Currently only available on the Mac OS platform, this drag-and-drop interface provides an amazing interface to quickly develop games and interactions with content. You can currently export to HTML5 and iOS platforms as well as to Mac/Windows browsers that use a free plug-in to playback. http://gamesalad.com

ANSCA Corona: Provides a Mac and Windows development environment for coding games using a powerful suite of APIs. The gaming engine is fast, and delivery is available for iOS and Android markets. http://www.anscamobile.com/corona

HTML5 RESOURCES

http://www.caniuse.com: Allows you to quickly compare features in HTML across browsers to confirm compatibility.

http://html5doctor.com: Provides tips and techniques for implementing HTML5 today.

http://html5demos.com: A site of examples and reference materials to see how you can use HTML5.

http://www.css3.info: A great site for learning about CSS3 and latest techniques.

PRESENTATIONS

Gadd, Robert. "mLearning: Common Myths & Misconceptions" Presentation through OnPoint Digital. February 5, 2010. Retrieved from http://www.wiziq.com/tutorial/122862-quot-mLearning-Commons-Myths-amp-Misconceptions-quot

PROTOTYPING TOOLS

Balsamiq Mockups: A Mac/Windows application for prototyping apps and websites quickly. http://balsamiq.com/

Free Photoshop templates for iPad and iPhone interfaces. http://www.teehanlax.com/blog/2010/06/14/iphone-gui-psd-v4

Free set of templates for PowerPoint. http://www.raizlabs.com/blog/294/wireframing-in-powerpoint or http://www.michaelgaigg.com/blog/2009/01/23/powerpoint-wireframe-stencils-as-free-download.

Keynotopia: A series of Keynote and PowerPoint templates for prototyping for web and apps you may be developing. http://KeyNoteKungFu.com

JOB AID

MOBILE LEARNING ASSESSMENTS

The following checklists and questions will help you determine if delivery via a mobile device is the best fit for your project and your trainer's learning needs. Or, if you've already decided on mobile learning, the checklists and questions will help ensure your program is on track.

ASSESSMENT 1: WHEN TO USE MOBILE LEARNING

Ask the following questions at the start of a project to confirm that delivery via a mobile device is the right fit.

1. Are you developing a web-based app or content, or an application for installation on the mobile device?
2. Will there be interactive objects within your content? If yes, will you use Flash, JavaScript, or HTML5?
3. What are the size requirements for viewing the content? The actual resolution? Will it work on a smartphone, tablet, or desktop?
4. What is the timeframe for development?
5. Will you have audio or video on a page? If yes, you need to determine how to best deliver that: Flash, HTML5, or other format.
6. If you are using rapid authoring tools, what formats do they support for export?
7. Will your learners have access to a Wi-Fi network or only a 3G or 4G network?
8. How long have your learners had the device, and will they need to have additional training to take advantage of or access your new web content or app?
9. Will IT and support assist with implementation and answer questions that may arise from using the devices and content?

ASSESSMENT 2: AUDIENCE CHECKLIST

If you've determined the program you are designing is an appropriate fit for using a mobile learning program, you also must consider the trainer's learning needs and the capabilities of the audience to work in such a program. Review the following checklist to make sure your trainer and audience are prepared for a mobile learning program.

After you decide how you are going to deliver content to your mobile devices, use the following table to help navigate your development.

How will your audience access the new content?

- App to install, or "native app" (see questions in right column)
- Website or web app (see questions in left column)

WEB APP	NATIVE APP
Does your audience have mobile devices? If so, which ones? • Mobile Phones • Smartphones • Tablets • Netbooks • Laptops • Other	Does your audience have mobile devices? If so, which ones? Based on these answers, you may need to develop one app or look for a development tool that will allow you to deploy to multiple platforms. • Mobile Phones • Smartphones • Tablets • Netbooks • Laptops • Other

(continued on next page)

JOB AID

MOBILE LEARNING ASSESSMENTS (CONTINUED)

WEB APP	NATIVE APP
Does your audience have primarily one type of device? This is important for testing and developing a solution that will allow you to reach all learners. For a web app, you should use a language such as HTML5 that is adaptable across all devices. • iOS • Android • Blackberry • WebOS (HP) • Windows Phone 7 • Other	Does your audience have primarily one type of device? This is important for testing and developing a solution that will allow you to reach all learners. • iOS • Android • Blackberry • WebOS (HP) • Windows Phone 7 • Other
What type of bandwidth will your learners need for access to the content? Will learners be able to access the content? • High Bandwidth: We have lots of interactive objects with graphics, audio, and video. • Low Bandwidth: This project will consist of mostly text and minimal graphics.	Does your organization provide support for mobile devices? • Yes • No
Does your learning system support mobile devices? If you want to deliver content via your learning system, you will need to test the interface. • Yes • No • Based on content within the system	
Desktops: Which browsers do you support? If you will be developing web-based tools, content, and apps, you will want to make sure your organization supports modern browsers to help deliver one version of your content or tool. • Internet Explorer 6 • Internet Explorer 7 • Internet Explorer 8 • Internet Explorer 9 or higher • FireFox 3.5 • FireFox 3.6 • FireFox 4.0 • FireFox 5.0 or higher • Chrome 9.x • Chrome 10.x • Chrome 11.x or higher	

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