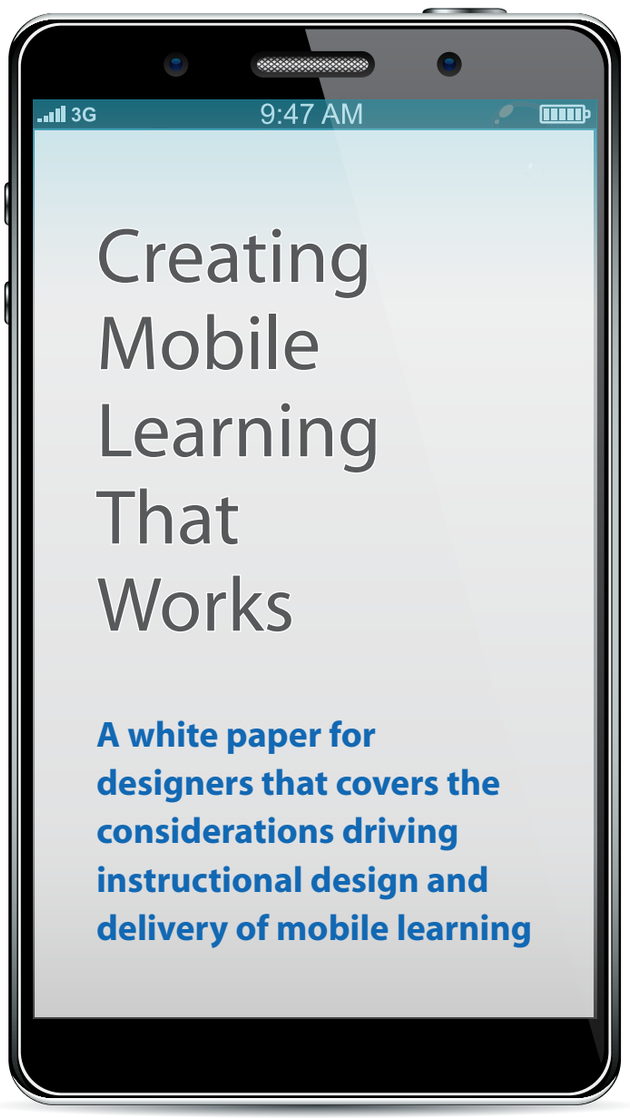

Creating Mobile Learning That Works

A white paper for designers that covers the considerations driving instructional design and delivery of mobile learning

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1. About This Paper

1.1. Overview

To quote Clark Quinn, "The reason mobile is so powerful is that it takes the perfect complement and makes it available anywhere and anytime. We can be more productive, more powerful, in more places, at more times." Given that mobile technology is currently one of the fastest growing ones, we can no longer afford to explore m-learning as an after-thought. However, the purview of design decisions has traditionally covered learning formats (web-based or instructor-led training, blended learning or standalone modules, synchronous or asynchronous training and so on); discussions then move on to the best approach for delivering the training (scenarios, stories, games, simulations, etc). Questions around the suitability of mobile devices to deliver learning have yet to become an integral part of the design discussion.

This paper focuses on the considerations driving the design and delivery of mobile learning. It covers the instructional design perspective, including the possibilities and challenges of designing for the medium. While it does not go into much detail on the visual and technical design aspects, it will cover basic elements of these two that an instructional designer must bear in mind.

1.2. Target Audience

Here, we focus on mobile learning for a corporate audience. While most concepts discussed in the paper will find application across schools and other educational institutions, given the unique learning requirements of these entities, they are currently beyond the scope of this paper.

1.3. Devices Covered

All recommendations are built around smartphones and tablets. Feature phones, while they do allow for basic m-learning functionality, will not be covered.

Please note that feature phones and smartphones are not mutually exclusive categories; an increasing number of feature phone manufacturers have actually been improving capabilities. For the purpose of this paper however, only smartphones will be considered given the fact that they are closer to full-fledged computers:

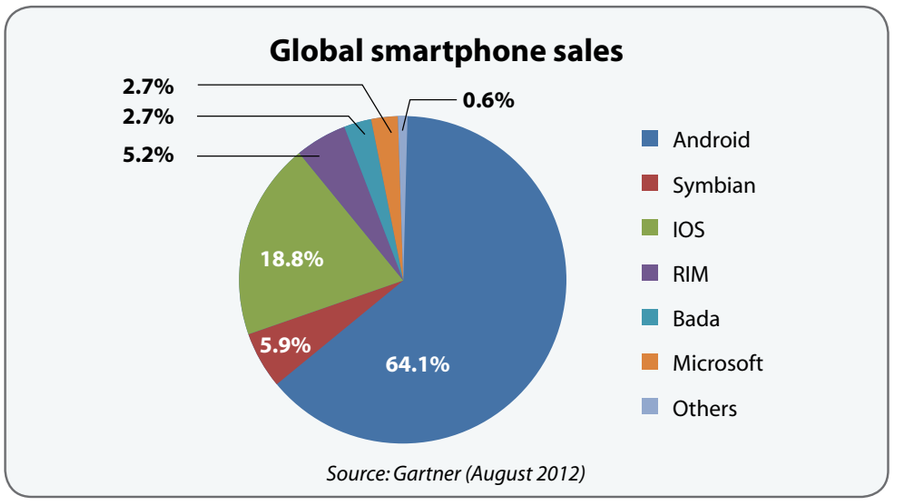
- **Features of smartphones:** They are characterized by more elaborate operating systems, QWERTY keyboards (virtual or physical), more user-friendly interfaces, enhanced multimedia features and a number of ways to connect to a network.
- **Usage of smartphones:** There has been a steadily increasing uptake of smartphones as compared to feature phones. As of March 2012, around 50.4% of U.S. mobile subscribers owned smartphones, a 3.5% increase from December 2011. By June 2012, this number had grown to 54.9% of mobile subscribers. Worldwide, IDC (International Data Corporation) predicts that smartphone sales will reach 686 million customers by the end of 2012 and 982 million by 2015.

2. Overview of Mobile Devices

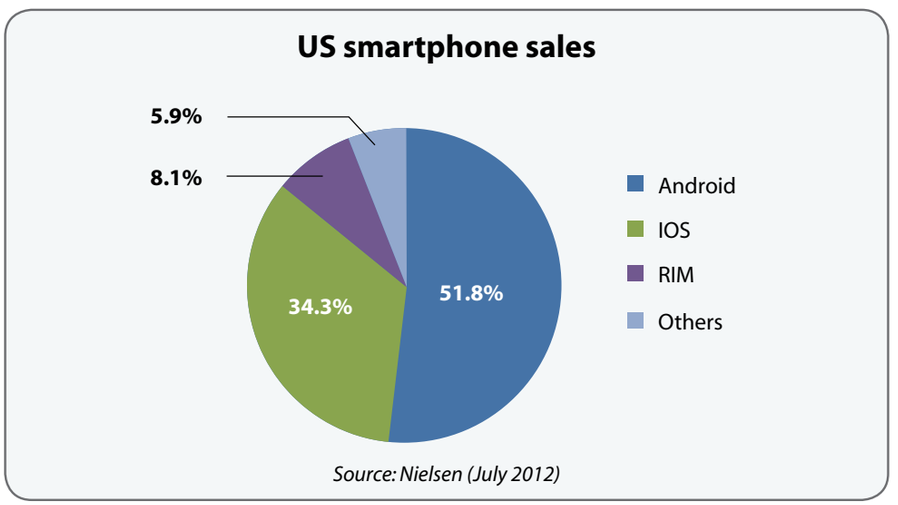
Before moving on, here's a quick snapshot of mobile devices, covering usage statistics and platforms, and their implications for m-learning. Apart from serving as a warm-up to the rest of the paper, this information is particularly useful when making a decision around the development of m-learning ("…is a native app the way to go or should the training be hosted online?" but more on that later).

2.1. Usage Based on Platforms

Smartphones can be considered in terms of the operating system on which they run. Both the US and global smartphone markets currently have a clear leader in the Android platform (for manufacturers like HTC, Samsung and so on); Apple's iOS emerges as a close second.

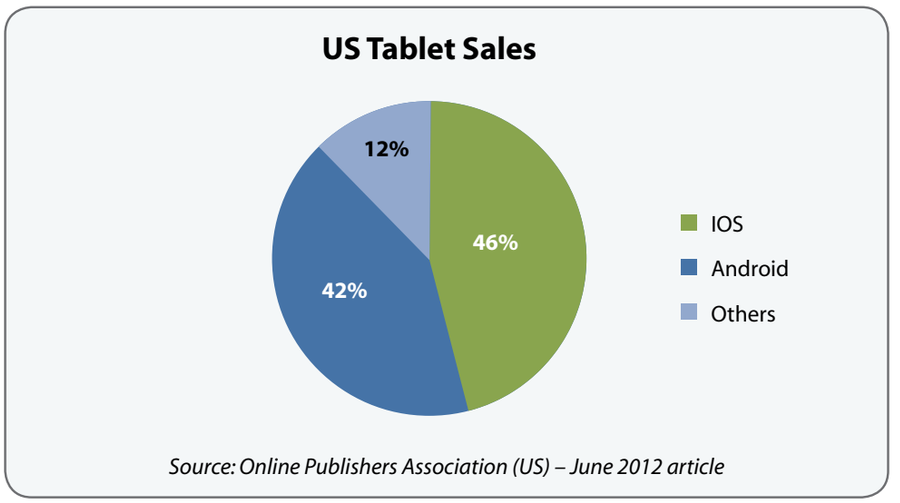


Source: Gartner (August 2012)



Source: Nielsen (July 2012)

The playing field is relatively narrow for tablets with an almost equal split between the two major contenders – Apple's iOS (iPad) and the Android platform.



Source: Online Publishers Association (US) – June 2012 article

2.2. Native, Web-based and Hybrid Apps

Most of what is currently technically possible on a mobile device will be governed by whether you choose to develop your m-learning as a native, web-based or hybrid app. Let's take a brief detour to understand what this means before we compare the possibilities and challenges of each type.

The term 'app' (short for 'application') describes applications that run on mobile devices such as smartphones and tablets. In the m-learning context, think of an app as your actual training module.

- **Native app:** This app needs to be downloaded from an 'app store' and is platform dependent. It will run only on the platform for which it is developed. So an app developed for an iOS-based device (iPhone/ iPad) will not run on an Android-based device (Samsung, HTC, etc.).

- **Web-based app:** This app is platform-independent. It is browser dependent, but will run off any platform. It does not need installation or configuration like native or hybrid apps, but needs the user to be connected to the Internet via a SIM card or Wi-Fi connection, to access the online app.

- **Hybrid app:** A hybrid app is platform dependent, but the content it displays is not. This app combines the interface and functionality of a native app but streams data through the Web. The native app will be platform specific while the content that it loads at runtime is platform agnostic. To use hybrid apps, the learner must be connected to the Internet.

	Native app	Web-based app	Hybrid app
Platform dependence	Platform dependent	Platform independent	The app is platform dependent, while content is platform independent
Browser dependence	Browser independent	Browser dependent	Browser independent
Compatibility with device hardware	It can access the device's hardware.	It can access the device's hardware.	It can access the device's hardware.
Compatibility with device UI	It can have native User Interface (UI) elements.	Native UI elements will need to be designed separately. One should avoid native UI elements if the app will be accessed using multiple devices across different platforms.	It can have native UI elements.
Ease of course administration and tracking	Tracking is difficult unless the Learning Management System (LMS) is customized to communicate with external apps.	Tracking is easy as online content is directly hosted on the LMS.	Tracking is difficult unless the LMS is customized to communicate with external apps.
Development effort/ cost	Comparatively high	Comparatively low	Comparatively low
Ease of modification and update	Updates to content involve making edits to content and re-delivering the app.	Updates to content can be done on the server. Users can then receive updated content.	Updates to content can be done on the server. Users can then receive updated content.

When making development decisions consider these factors:

- **Browser dependence:** determines immediacy of access in rolling out the training.

- **Compatibility with device hardware:** affects the ability of your training to incorporate all features offered by the device. For example, if the device has proximity sensors, an accelerometer, GPS etc., your training module will also be able to incorporate this feature.

- **Compatibility with device UI:** affects the ability of your training to incorporate all design elements offered by the device platform. For example, incorporating native UI elements like a spinner control (to select one of many available choices), look and feel of the buttons, tab bar, menu and so on, into the training would be easier if it were delivered as a native app rather than an online or hybrid app (using HTML5).
- **Ease of course administration and tracking:** affects how you will track performance (through assessments for example) and course completion, tracking this over an LMS or a backend server.

- **Development cost and effort:** plays an important role especially if the client has a bring-your-own-device (BYOD) policy and learners must access training on their own mobile devices. The mix of different devices for which content must be developed, might make a native app an expensive option. Developing online solutions in HTML5 does not involve testing across all such supported devices. Development and testing becomes a costly affair when the solution needs to be compatible with multiple platforms.

- **Ease of modification and update:** determines how often you will need to change the content delivered over the device, impacting the cost of developing and maintaining training.

Deciding which development approach to take depends on what you are trying to build, the devices the target audience owns and of course, what your client aims to deliver and achieve through the training. For example:

- A game typically requires a rich visual interface and the ability to use some of the device's hardware and/or employ multiple gestures. Typically, a game would also not require frequent updates. Is a native app the best way to go? Perhaps. But that would depend on whether your client is willing to spend on developing multiple versions of the game —one for each supported platform.

- If you are designing training where modules need to be rolled out over a period of time, you might want to forgo device-specific features and functionality for ease of accessing the course from the LMS; your choice would narrow down to a web-based or hybrid app.

2.3. Visual Display on a Mobile Device

Apart from the obvious differences in screen size between a Personal Computer (PC) and a smartphone, the visual richness of the display area, determined by the number of pixels (across and down) available in the screen, also plays an important role when designing for this medium. When it comes to visual display areas and richness of graphics, tablets come closest to PCs, so we won't be splitting hairs over that device for now.

In terms of the dimensions and display areas of smartphones, here's a snapshot of the current top four players:

Sr. #	Platforms	Operating system	Visual (resolution, interface)
1	Apple iPhone (3G and 3GS)	iOS	480*320 (3.5 inch display)
	Apple iPhone (4 and 4S)		960*640 (3.5 inch display) (Retina display)
	Apple iPhone 5		1136*640 (4 inch display) (Retina display)
2	Android	Android	Small (300-400), normal (500-600 pixels), large (800-900 pixels), extra-large (800+, 1000+)
3	Windows Phone 7.5	Windows Phone (Mango)	Similar to specifications listed above
4	BlackBerry	RIM (BlackBerry)	Least rich

Apple's iPhone 4 and 4S and Android's extra-large resolution devices come closest to the visual richness possible on a computer.

3. Mobile Devices and Learning

Before we move on to explore what is suitable for delivery over a mobile device, it is important to understand some current usage patterns for mobile devices; specifically, what the device is used for and when and how it is used. While usage patterns change as devices evolve, the reports below offers some indication of both patterns.

3.1. Smartphones

What they are typically used for:

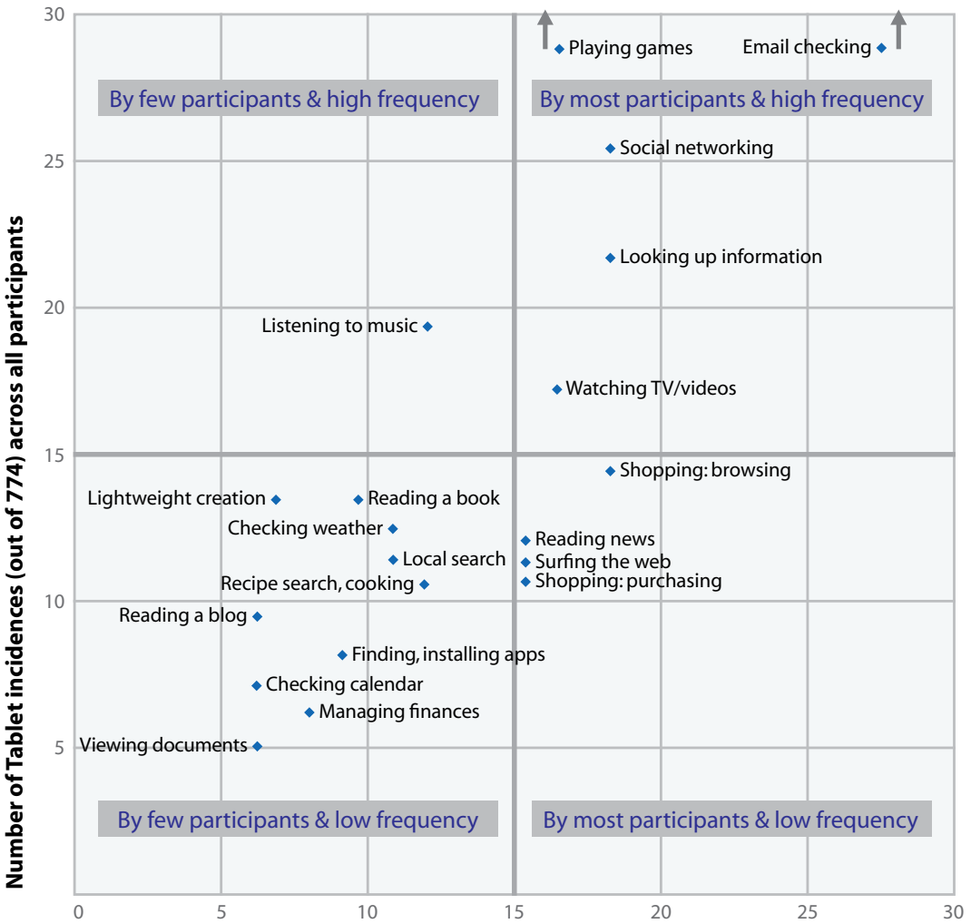
Activity	Mins/Day
Browsing the internet	24.81
Checking social networks	17.49
Playing games	14.44
Listening to music	15.64
Making calls	12.13
Checking/writing emails	11.01
Text messaging	10.02
Watching TV/films	9.39
Reading books	9.03
Taking photographs	3.42
Total	**128**

Source: Mobile Network, O2 (June 2012)

3.2. Tablets

What they are typically used for:

According to data shown below, the most popular activities on a tablet were playing games, checking email, visiting social networking sites, browsing for information, and watching television or videos.



Location	Incidences		Participants	
Couch	182	23.51%	23	69.70%
Bed	128	16.54%	22	66.70%
Home	97	12.53%	18	54.60%
Table	70	9.04%	13	39.40%
Kitchen	67	8.66%	15	45.50%
Office	46	5.94%	11	33.30%
Desk	28	3.62%	9	27.30%
Bedroom	26	3.36%	7	21.20%
Car	25	3.23%	6	18.20%
Restaurant/Café	21	2.71%	6	18.20%
Gym	12	1.55%	6	18.20%
Classroom	10	1.29%	4	12.10%
Commuting	10	1.29%	5	15.20%

Source: Google Research, via TechCrunch (September 2012)

The same study also found that respondents were more likely to access the tablet in their homes than in the office or another outdoor location.

The fact that your m-learning module will compete with so many tasks for attention, makes it even more important to ensure that your target audience is motivated enough to access it. Motivation to access training may be closely linked to how **relevant** and **timely** the training is to an individual.

So how do you decide whether m-learning will be a good addition to your training solution? The next section makes some recommendations on how to ensure this.

4. Learning Formats for Mobile Devices

If you are toying with the idea of including mobile learning as part of your solution, here are a few questions to help you along. Consider these factors:

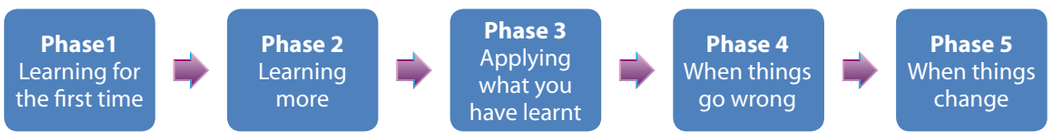
1. What is the nature of the learning problem being addressed?
2. What is the complexity of media elements required (video, audio, text on screen, visuals, etc.)
3. How will your solution benefit from being delivered over the medium?
4. Is the learning environment 'mobile ready'?

The next few sections tackle each of these question and offer recommendations for suitable candidates for m-learning. Please note, however, that these are merely recommendations; with technology rapidly changing, it is always good practice to evaluate assumptions and explore options before designing for the medium.

4.1. Nature of the learning problem

1. What is the nature of the learning problem being addressed?

To identify the nature of the problem, Mosher and Gottfredson have proposed a model that identifies the 5 phases during which most learners require support to perform successfully: [2]



Together, these phases are referred to as 'The 5 Moments of Learning'.

[2]The model described in this section has been adapted from Judy Brown's approach to m-Learning (mLearnCon 2012) and The Five Moments of Learning by Bob Mosher and Conrad Gottfredson.

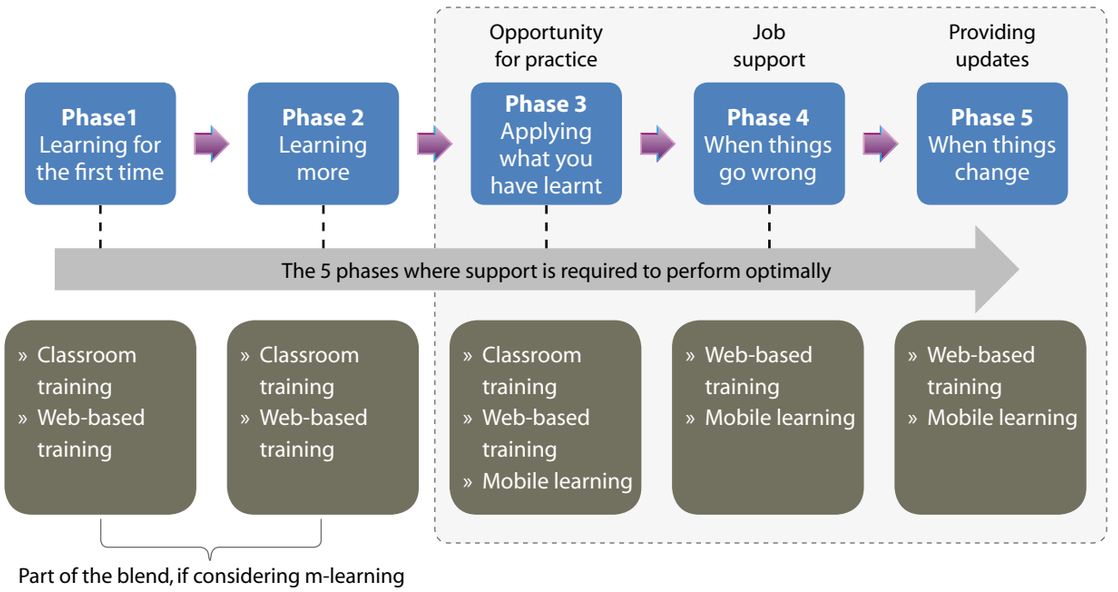
Phases 1 and 2:
Due to the nature and depth of content covered here, the first two phases call for a more structured approach to learning and a higher degree of 'teaching content'. This typically involves detailed information that requires a higher degree of onscreen real-estate and makes greater demands on the learner's attention-span.

If you are considering the inclusion of a mobile device such as a smartphone into the learning mix, it is recommended to include it as part of a blended solution, where primary teaching content is delivered through more traditional modes of instruction such as classroom training and/or web-based training, rather than a standalone module. For example, a smartphone could be used to announce a training program, provide takeaways from the training environment, or provide content through information nuggets, especially when dealing with content types like facts or procedures.

If you are considering training delivery over a tablet however, the restrictions diminish. You can tailor your approach to design and delivery in much the same manner as you would in the case of traditional web-based training. This also holds true for phases 3, 4 and 5, described below.

Phases 3, 4 and 5
The next three phases involve the reinforcement of basic knowledge and skills that the learner already possesses. These three phases focus on the opportunity to demonstrate knowledge of concepts or practice skills, access just-in-time information, and receive information updates. Subsequently demands on the duration of the learner's attention tend to be shorter than when teaching for the first time.

The shift in focus from teaching to reinforcement and practice makes phases 3, 4 and 5 ideal candidates for content delivery over a portable device.



4.2. Complexity of media elements

2. What is the complexity of learning formats required (video, audio, text on screen, visuals, etc.)

So it seems like m-learning that addresses the first two phases of the 5 Moments of Learning might not be the best candidate unless delivered as part of a blend. Phases 3, 4, 5 that rely on support and reinforcement might be better suited for blended or even standalone m-learning. But it's never that simple now, is it?

Along with the level of performance to be addressed, it is equally important to consider the level of media elements required to deliver an effective learning experience. For example:

Example 1

The previous section suggests that 'learning more' (phase 2) requires a more formal teaching structure that might not be entirely supported by a smartphone. However, what if it required only podcasts to be downloaded at regular intervals?

Example 2

Similarly, take a situation that requires a rich mix of media elements to test the learner's ability to 'apply what has been learnt' – while phase 3 (of the 5 Moments of Learning) is a good candidate to deliver m-learning, would current smartphones really be able to provide an effective environment for a learner to apply their skills in a complex setting (a representation of a ship's navigation system, for example)?

While it is possible to capture the same level of detail and richness of media elements on a mobile device like a tablet, using a smartphone for a learning experience that relies on richness of media elements might not be such a good idea.

4.3. Leveraging the features of the medium

3. How will your solution benefit from being delivered over the medium?

When considering the inclusion of a mobile device to deliver the solution, ask yourself, does the solution leverage the features and functionalities of the mobile medium? This section offers some suggestions for how some commonly available functionalities, known as 'accessories', can be made an integral part of delivering learning.

Functionality (accessories)

Search (database or Internet)

Description	The ability to search the Internet for information.
Application	This functionality, though simple, offers numerous opportunities for providing performance support. With simple input fields and fast connection speeds, users have easy access to information on the go.
Availability	Practically all mobile devices allow a user to connect to the Internet.
Considerations	• …needless to add, the user must be connected to the Internet. • Internet speed plays an important role, especially where it is necessary to download information.

Location-related alerts (GPS)

Description	The ability to track the user's current location and send alerts/information updates based on the current location of the user (also known as 'geotagging').
Application	This functionality offers developers the opportunity to include performance support and information updates, among other things. For example: • Providing the learner with location-specific information (sales people on the move, could access location-specific product information). • People working at an expansive shop floor or manufacturing unit could access a mobile device to check for the nearest available equipment, gear or workshop. • It also offers performance support while on-the-move (by detecting the source of information on a map).
Availability	Currently, almost all phone and tablet manufacturers offer GPS tracking services as a standard feature.
Considerations	The user must be connected to the Internet and keep the tracking functionality/service enabled. Connectivity plays an important role here. Another important factor is privacy as users might not be comfortable with having their location tracked by a piece of software.

Accelerometer

Description	An accelerometer detects acceleration. In the context of mobile devices, the accelerometer is responsible for motion input and sensing the orientation of the device. • Senses motion input: An accelerometer reacts to motion and changes in its physical, static state. • Senses device orientation: Aligning the screen in the direction in which the device is held. For example, changing from portrait to landscape view. It is important to design the layout for both orientations.
Application	Some examples of how an accelerometer may be used in delivering learning: • It can be used for walkthroughs, to create a more immersive environment for the learner. • It is especially useful for game-based learning that involves a physical form of navigation (tilt, move forward, etc.). • Accelerometer functions may be combined with multi-touch gestures to provide sophisticated interaction with an onscreen object.
Availability	Practically all modern smartphones and tablets are equipped with an accelerometer.
Considerations	Accelerometer functionality is easier if designing for native apps, challenging for apps designed in HTML5.

Gestures (pinch, swipe, tap, double tap, multi-touch)

Description	This refers to the ability to interact with a mobile device's functionality through various touch gestures applied to the device's interface. Some of the gestures currently possible include a pinch/spread, rotate, swipe/flick, long press, scroll, pan, tap, double tap and multi-touch (the ability of the device's surface to recognize two or more touch points).
Application	Functionalities such as these have changed the way people interact with information. Whereas traditional modes of online training are based on an audio-visual mode of delivery (text, video and graphics; voiceovers and sound effects) and interactions through clicks/double-clicks/drag-drops, users are now able to extend the learning experience to a number of touch-based gestures as well. Some of the ways in which these functionalities could impact training are: • More fluid navigation that could go beyond Next/Back buttons. • A redefinition of what is considered 'a page of learning'.
Availability	This functionality is specific to the device.
Considerations	The functionality is easier to implement in native apps. In HTML5, apart from basic gestures, most may be challenging to implement.

Augmented reality

Description	Augmented reality (AR) is when additional information specific to a context is made available via mobile-delivered annotation of the environment, whether visual or auditory.[3] AR offers a view of the physical world and allows the learner to superimpose on it digital input such as audio, video, visuals or location-related information (GPS enabled) via sensors in the user's device (like a camera).
Application	AR offers the opportunity to provide contextual learning in its truest form. Some examples of how augmented reality could be used include: • Using AR video clips to deliver skill-based training, where the learner could be shown clips of a process or equipment while being physically located in that area. • Superimposing product information that reveals itself when the device inputs a digital image of that product. • Designing for games that require a real-world context or interaction with real-world objects.
Availability	This functionality is specific to the device.
Considerations	It is possible to implement this functionality in only native apps.

Scanning ability/ camera

Description	The camera built into practically all mobile devices offers users the opportunity to scan and take pictures, and use the output to access just-in-time information.
Application	Some examples of how this functionality may be used in the training environment are listed below: • A number of apps are currently available that help you scan documents, codes, images, etc. and upload, share them in different file formats or access them at a later date. • Another example of scanning an object to access information is the Quick Response (QR) code. First designed for the automotive industry, it now has application across mobile devices as well. The code is detected as a 2-dimensional digital image by a semi-conductor image sensor. It is then analyzed by a processor. (Also see note above, on *Augmented Reality*)
Availability	All smartphones and tablets.
Considerations	Native apps only.

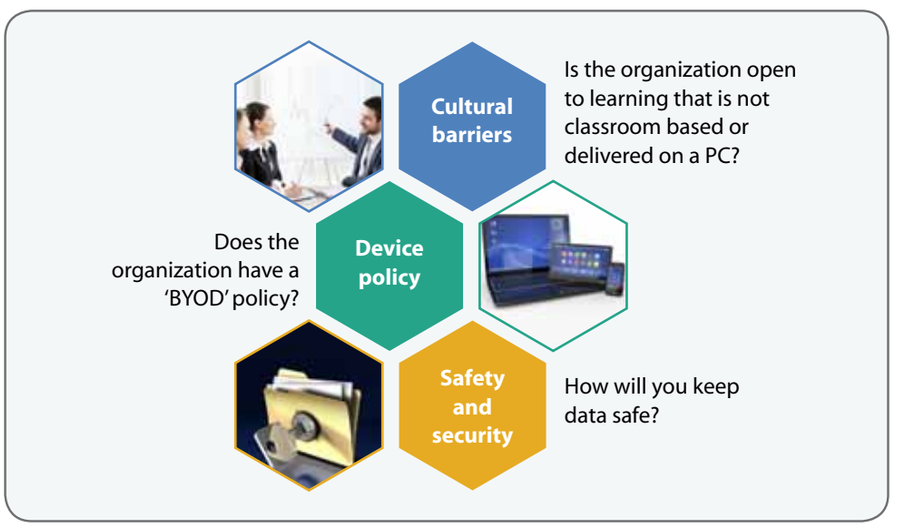
Voice recognition

Description	Several mobile devices incorporate speech-recognition software.
Application	Speech can be used as a method of input for voice typing and as a command to trigger an action like Search, for example.
Availability	Some of the more common apps that support speech recognition include Google Mobile Apps, Bing's mobile app, Vlingo (Android, BlackBerry, iOS, Nokia, Windows Phone), Siri (Apple iOS), DriveSafe.lyPro and so on.
Considerations	It is possible to include speech-recognition in platform-specific native apps only.

4.4. Reviewing the learning environment

4. Is the learning environment 'mobile ready'?

Last but not least, ask if the environment is 'mobile-ready'. Here are some questions that will help you decide:



Are there cultural barriers to accepting learning over a mobile device?
While this shouldn't be a show-stopper, it might make your job a bit challenging.

Identifying reasons for resistance and building a strong case for the value to be gained from 'learning-on-the-go' or highlighting the benefits of real-time performance support play an even more vital role while designing for mobile devices.

Does the project stakeholder have concerns around the safety and security of the learning delivered over a mobile device?

A number of organizations, most notably in the Banking, Financial and Insurance sector, may have concerns around the safety of the learning material as a result of data being shared or devices getting stolen, for example. While online and hybrid apps offer more scope for validation and authentication of users in order to safeguard sensitive data, on native apps too, periodic validation of the user's identity is possible.

What is the current availability of devices?

Does the organization have a bring-your-own-device (BYOD) policy? If it does, ask how open the target audience might be to accessing training on their personal devices. Also consider the variation in device platforms and how that will impact the design and delivery of mobile learning. It is typically less challenging to deliver mobile learning in an organization that provides a standard device to employees.

5. Design Considerations

If you've decided that your learning will benefit from being delivered over a mobile device, here are a few things to keep in mind when designing for the medium:

- **Consider the duration:** Mobile learning and performance support delivered over a smartphone, is best delivered in short nuggets of information. Given the physical dimensions and time at which the learning may be accessed (see *Mobile Devices and Learning*), limited attention spans must be accounted for.

- **Consider the location from where it will be accessed:** In addition to the duration for which a piece of information may be accessed, where it is accessed also plays an important role. Will connectivity to the Internet be a problem; does the learners' surrounding distract and detract from learning; if the information requires audio support, will the learner have access to headphones or earbud/earphones and will audio be audible… are all questions to be asked.

- **Keep it simple:** Consider the physical dimensions of the device when designing for it, especially in the case of smartphones (see *Physical Dimensions/ Visual Considerations*). Avoid complex navigation and scrolling to view information.

- **…yet engaging:** Consider the other types of content that learners have come to associate the device with – short clips of information; short animations and video clips; high-quality games; apps and so on – avoid deviating too much from this usage scenario if you want the learner to embrace your training. While the relevance and timeliness of content (see *Nature of the learning problem*) will always be a deciding factor in how useful the learner finds the training, a slick look-and-feel that is on par with what they currently enjoy on their mobile device, will also give your content a nudge in the right direction.

- **Leverage the functionality of the medium:** It's also time to go beyond creating 'mobile-friendly' versions of learning that is viewed over the PC/ laptop. To be truly mobile evaluate how the training or performance support that you are providing uses the functionality of the medium over which it is delivered (see *Leveraging the features of the medium*).

6. Accessibility and Mobile Devices

According to W3C, "Web accessibility" enables people with disabilities to perceive, understand, navigate, and interact with the Web, and contribute to it. Contrary to popular perception, Web accessibility encompasses not just visual impairment, but any disability that affects access to the Web. This includes visual, auditory, physical, speech, cognitive, and neurological disabilities. With the increasing number of requests for making courseware available over a mobile device, it is only a matter of time before requests for accessibility over such devices become commonplace.

In the case of mobile devices, accessibility can be implemented through either a web-based platform or a native/hybrid app. In the case of web accessibility, guidelines for development are similar to desktop accessibility. In the case of native apps however, accessibility guidelines differ. Here are W3C's guidelines for accessible courses:
http://www.w3.org/WAI/intro/accessibility.php

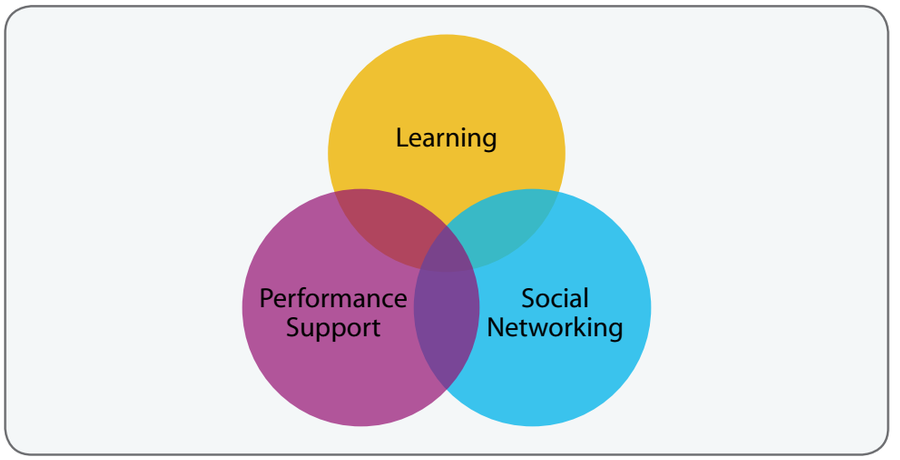
Also see:

Types of App	Link
Web	http://www.w3.org/TR/WCAG/ http://www.w3.org/TR/mobile-bp/ http://www.w3.org/TR/mwbp-wcag/
Native/ hybrid	http://code.google.com/a/apache-extras.org/p/rave-in-context/wiki/WidgetAccessibilityBestPractices http://code.google.com/a/apache-extras.org/p/rave-in-context/wiki/WidgetUsabilityBestPractices

Among the most commonly used accessibility features is the ability to adjust the color contrast and font size, and the availability of a screen reader. While most platforms allow you to change the color contrast and font size of the device, Apple's iOS currently boasts the best screen reader, making it arguably the better option for delivering an accessible course over a mobile device.

7. M-learning and Social Networking

Considering the basis of a number of popular networking apps such as Facebook and Twitter, social networking via a mobile device seems like a fertile ground for learning through sharing, or learning in a 'Community of Practice'.



A term coined by Etienne Wenger, 'communities of practice are formed by people who engage in a process of collective learning in a shared domain of human endeavor.'

Given the tacit knowledge that resides outside the formal learning structure in most organizations, mobile learning can be used to deliver learning through communities of practice, where adult learners are responsible for acquiring and managing information required for performing effectively.

A few examples of the application of mobile learning through collaboration include:

Troubleshooting	Can be used to share troubleshooting tips or to respond to queries posted by individuals facing a challenge on the job.
Knowledge sharing	Can be used to post best practices.
Storing reusable assets	Can also be used to store reusable assets. The Search functionality of most mobile devices makes retrieving information a fairly simple process.
Making announcements	A 'push' strategy can also be employed to roll out information to individuals.
Sending updates	Another push strategy to post updates to processes or systems.

Challenges

Encouraging a culture of social learning over a mobile device faces much of the same challenges that one can expect to encounter over traditional collaborative learning, including:

- **Overcoming cultural barriers:** Most individuals are still not predisposed to sharing information. Incorporating knowledge sharing into regular business practice may be one way of encouraging individuals to be more forthcoming with information.

- **Encouraging and sustaining participation:** Appoint a champion to take charge and drive interaction between participants. Find focus and select subjects that are likely to find both contributors and borrowers, to begin with.

- **Maintaining confidentiality:** In the case of tablets especially, given that they are typically a shared device, confidentiality assumes considerable importance. Clearly demarcate the kind of information that should be beyond the purview of social and collaborative learning.

- **Technical:** Technology considerations based on devices/platforms to be supported will play a crucial part. Devices used – touch over traditional – will determine how you design your social learning solution. Finally, what is the backend structure that will support collaboration – will it be public servers like Facebook and Twitter or custom solutions that impact the go-to-market strategy? These factors will impact the time, effort and cost to finally implement the solution.

8. Conclusion

Thanks to the growing segment of smartphone and tablet users, a large number of organizations are now making serious efforts to include m-learning as a platform for delivering training.

As a designer of m-learning, there are a number of paradigms to consider – shorter attention spans, a redefinition of 'chunks of information', alternate navigation strategies, ingenious apps, and superior quality graphics to name a few. For your target audience to transition seamlessly from the mobile world with which they are familiar to the one in which you are embedding your training, these paradigms must be accounted for.

In conclusion, while a number of m-learning solutions are merely extensions of more traditional e-learning courseware, there is vast scope to tailor that learning so it uses the features of the medium to provide a truly mobile experience. It's time to keep up with the way a rapidly-growing segment of 'mobile learners' access and receive information.

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