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Learning in an Always Connected World



White Paper

by

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Learning in an Always Connected World

People are more connected than ever, communicating and receiving information increasingly in nontraditional ways. The typical 21-year-old has sent or received 250,000 instant messages, spent an average of 3,500 hours on the Internet, and does not read a newspaper or wear a wristwatch.

In 2008, AOL Mail, in partnership with Beta Research, conducted an online survey of 4,000 email users ages 13 and older in the top-20 U.S. Markets to measure email usage. Among the findings were the following:

- 62% of people check work email on the weekends
- 19% choose vacation spots with access to email
- 59% check email from the bathroom (up from 53% the previous year)

Based on these statistics, there is no doubt that we are always connected to online media. Typically, the connection that occurs when we are not at our desks is through our mobile phones.

The challenge now is how do we get learning content to these mobile phones? Ambient Insight's U.S. Market for Mobile Learning Product and Services 2008-2013 Forecast and Analysis reported the demand for mobile learning services is growing at a five-year compound annual growth rate of 21.7%.

The challenge with trying to develop learning for mobile phones, however, is the diversity of hardware and software platforms compared to the personal computer (PC). In this study we will focus on the issues—and opportunities—inherent in:

- Screen Resolution
- Browsers
- Learning Management System (LMS)
- Bandwidth
- Instructional Design

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Screen Resolution Matters

Today most of the web-based training we build for a personal computer (PC) is designed to display in a screen resolution of 800 x 600 or 1024 x 768. Either of these designs is no problem for the vast majority of PC's. However, when dealing with a mobile phone, screen resolutions include 128 x 160, 320 x 480, 176 x 220 and 240 x 320. In addition, newer devices often support a landscape mode where the width and height are reversed as the phone is rotated.

So, in order to design a course for mobile learning, you are going to be faced with the problem of what screen resolution to design for. When designing training for a mobile device we can assume that the device will scroll up and down so screen length is not an issue, but we do need to consider screen width and the number of pixels or, more specifically, the pixels per inch.

The number of pixels per inch is important because it will affect the details in any picture or drawing that is displayed. So, you need to determine the range of pixel densities that you will support to ensure that critical details are not lost when displayed on the phone.

Once you have determined the screen resolution and the pixel density, you can set this as your reference and design all your learning modules based on the standard. However, in some cases you will have people in your organization that have mobile phones with different screen resolutions and pixel densities; therefore, you are going to have to investigate solutions to identify the mobile device when it accesses the course.

Microsoft's .NET Mobile framework has the ability to identify the mobile browser when a phone accesses a site and can also identify the screen resolution of the device. Another option is to use a database with the screen resolution information. This can be done through a user agent profile, the standard way defined by the Open Mobile Alliance (formerly the WAP Forum) for detecting user agent types and devices.

User agent profiles are stored in a server called the profile repository. Very often, a mobile device manufacturer maintains the profile repository. For example, the user agent profiles describing the capabilities of Nokia cell phones are stored in a profile repository maintained by Nokia.

More information on this method can be found at <http://www.developershome.com/wap/detection/detection.asp?page=uaprof>

Bandwidth Can Limit You

It is all about the speed. As a society, we have become less patient with waiting for web pages to download. A typical corporate Internet connection could be 20 million bits per second (Mbps). At that speed, it would take about two seconds to download a one-minute video.

Conversely, bandwidth on mobile phones varies from 56 thousand bits per second (kbps) on a General Packet Radio Services (GPRS) network to 1 million bits per second (1 Mbps) on a 3G network. At these speeds the same one-minute video would take anywhere from 10 seconds to download at 1 Mbps to two minutes at 56 kbps. So developers have to be aware of these download speeds and carefully choose the media elements that will be used in the course.

Mobile Browsers Work Differently

Applications like games, productivity tools and scheduling software are downloaded, stored and run off the mobile phone's hard disk, not through its browser. Mobile phone web courses are designed to run through the phones browser without downloading an application. It is important to note, browsers on mobile phones operate under much tighter constraints than those on a PC. Some constraints include smaller amounts of memory, slower processors and small hard drives. This means that less data can be cached. Therefore, web page load times will be longer unless the developer works hard to limit the file sizes.

Today, when developing web-based training courses for PCs, a lot of developers make extensive use of Adobe Flash or Microsoft Silverlight. Flash and Silverlight provide an easy way to put interactivity and animations into the course, and almost all PCs have the Flash plug-in and Silverlight can be easily downloaded if it isn't already installed. However, it is a completely different story for mobile phones.

Again, the typical mobile device will have a web browser but may not support Flash or Silverlight. Adobe Flash Lite is a version of Flash player for mobile phones. Today, over 400 different models of Flash Lite-enabled devices are available. For a complete list of mobile phones with Flash Lite, go to www.adobe.com/mobile/supported_devices/handsets.html. Silverlight will be available for newer versions of Windows Mobile and Symbian (Series 60) phones in 2010.

Learning Management Systems Need to Be Integrated

No matter what LMS you have, you are going to have to figure out how the mobile phone will communicate with it. This includes how the mobile phone receives content from the LMS and how the phone tells the LMS the course has been completed.

Your choices are to connect with the LMS through an application downloaded to the phone or through the mobile web browser. A native-run application is more efficient in terms of data usage, but it does require a custom application to be developed and downloaded to the mobile phone to ensure there is communication with the LMS.

However, you can use this application not only to connect with the LMS, but also to deliver the course. In this case, the course doesn't appear in the browser. It runs from the application. This allows for greater interactivity since you aren't dependent on the browser. But this approach is also more complex since you have to develop multiple versions of the application so that it can work on a variety of mobile operating systems.

The browser method uses more data but doesn't require working within the operating system constraints. This may be a significant challenge for large corporations that have strict security rules on accessing the company's intranet. You can see a browser accessing an LMS with MLE-Moodle at <http://moodle.elibera.com>. MLE-Moodle is a plug-in for Moodle, adding mLearning functionality to this open-source eLearning system. The mobile learning area can be accessed with the mobile phone browser or with a special application designed for mobile learning.



Instructional System Design Strategies Remain the Same

Instructional system design (ISD) fundamentals do not change when designing learning programs for mobile devices. That can present a challenge with a mobile device that, in most cases, will have no Flash or Silverlight capability, a small screen and limited bandwidth. Keep the following guidelines in mind:

- **Do not make this a page-turner like the early days of web-based training.** Build in interactivity and be sure your instructional designer is cognizant of each mobile device's navigation (for example, track ball, scroll wheel, and touch screen).
- **Chunk the mobile device learning into small nuggets of learning.** In a typical web-based training module designed to run on a PC, the ISD may be chunking the content up into 15-minute segments. But can you imagine staring at your mobile device screen for that long? On a mobile device, aim for about five minutes or less of content at a time.
- **Plan the media asset mix.** In a typical PC web-based training lesson, you will have a mix of 2D graphics, 3D graphics, animations and video. But on a mobile device, system limitations may prevent you using some or all of these media types.
- **Keep information architecture and navigation top of mind.** Your designer needs to consider the following:
 - How do users find/access courseware on the LMS?
 - If there is more than one course lesson, can users easily recognize the different lesson structures?
 - When a user is in one lesson, can he/she easily move to another lesson and return to the LMS course catalog to choose a different course?

At <http://www.damasistem.com/mdemo>, you'll find a good example of the kind of interactive courseware that is possible once the technology is available. You can play it on your computer to give it a test.

Success Awaits on This New Horizon in Learning

In a handful of years, we've seen mobile phones evolve from wireless telephones into sophisticated communications devices. Making phone calls is only the tip of the iceberg when it comes to what the vast majority of people can do—and want to do—when they're away from their wired worlds. Today's mobile phone technology presents unprecedented capability for organizations to take full advantage of every available opportunity for learning.

The key points to remember if you are going to investigate the feasibility of mobile learning in your organization are as follows:

- Mobile learning succeeds or fails based on the design. This is probably one of the greatest challenges we will face as we move in this direction. Mobile learning design is 100% different from online—and it's 100% more important. The challenge in the future will be how to create instructionally valuable courseware that works on both a PCs and mobile phones.
- The approach you use is key—is it application-based or web-based? These approaches are very different and require different strategies. If you choose the application approach, you will most likely need to build a “player” that is installed on employees' phones to deliver content and communicate to and from the LMS. Using a web-based approach, you must be able to deploy content so that it is rendered properly across a wide range of devices.
- It may be that the best use case for mobile learning is in a highly controlled (IT-wise) corporate environment where the push and pull of information is somewhat out of the users' control and/or visibility. Companies are able to develop and deploy a viable solution only when they have complete control of everything on employees' phones through their enterprise server.
- Mobile learning now means social learning can take place in new, low cost highly interactive ways. We can connect with people very quickly by using communities of practice or social networking sites that allow us to leverage the expertise of many people to solve our problems.

As we move into this new era of mobile learning, success is possible if you have a clear vision of how to use the medium to its best advantage. While some of that story is still being written, there's no reason not to start testing the waters now. The sooner you start using the mobile phone's unique capability to be everywhere at all times in the palm of your hand, the sooner you'll start realizing the true meaning of learning in an always connected world.

About the Author

Don Duquette is Executive Vice President of General Physics Corporation (GP) a training, consulting and engineering firm focused on performance improvement. Don is a noted learning and development expert whose thought leadership has earned him recognition by Training Industry, Inc. as one of The Most Influential Training Professionals in the nation.■



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