

U.S. Army Training Support Center
TCM-TADLP-Courseware Standards and Certification Division

Mobile Best Practices

General Considerations

The decision to include mobile delivery for all or part of your content may happen as a result of media, or it may happen as a result of policy changes from the top directing some or all of your content be delivered in this way. In both cases, the designer must remember the end state, a well trained Soldier or Civilian. To achieve the desired end state proper instructional design principles should be followed.

Some examples of when mobile learning could be used include:

- 1) To deliver content (“Just-in-time” learning, micro learning, reach-back/review)
- 2) To deliver just-in-time performance support (Alert, reminders, procedures, job aid, forms and checklists, decision support)
- 3) To deliver reference materials (Field guide, presentations, podcasts, updates and alerts, audio recordings, video recordings)
- 4) To use as an e-Book (e.g., field manuals, training manuals)
- 5) To engage students in collaborative activities (Coaching, conferencing, feedback, mentoring, social networking)
- 6) To provide an assessment (Quiz, evaluation, test, survey or poll, reporting, certification)
- 7) To take advantage of some unique mobile capabilities such as GPS, games and applications
- 8) To allow for user-generated content (Note taking, transcription, translation)

Content Selection

Selection of the content for mobile delivery should be the result of learning objectives, media, target audience, and technical options and after careful consideration of the following issues:

- 1) Content, what is the best way to ensure learning objectives are met? This is best answered in the design of the learning content following traditional methods for selection of media.
- 2) Credit giving, does the learner need to be tracked and scores recorded?
- 3) Multimedia, how much and at what level of speed and fidelity? Many devices are available on the market with varying answers to this question. What is the data transmission speed, is it enough to ensure smooth resolution and required fidelity?
- 4) Interaction, how much and with whom? Does the learning objective require peer or instructor interaction?
- 5) User Degree of Interactivity, what is the user doing? How much speed, resolution, feedback is required?
- 6) Length of learning event, will there be enough battery length to support?

U.S. Army Training Support Center
TCM-TADLP-Courseware Standards and Certification Division

- 7) Delivery location, what is availability of 3G network? Wi-Fi?
- 8) Device, who owns it? The Army or the user? How are minutes accounted for? Who pays for over use? If the Army owns it, is it approved for the .mil, if yes, then there are three (possibly 4 choices), but if user owns the field is overwhelming.

Content Considerations

Principles to keep in mind when designing mobile learning solutions

Don't use a new technology to deliver old boring content - content should be designed specifically for the technology. This doesn't mean different versions of content, one for the computer and a different version for mobile delivery, but it does mean the user experience will be different and it must be presented in a way that makes the best use of the delivery method. One way to do this is the use of Cascading Style Sheets (CSS). This allows for scaling of the presentation based on the size of the visible landscape.

Small bursts of content – two to three minutes. Mobile means new considerations for the length of content presentations. Remember all those lost cell phone calls. Mobile transmits internet via the same cellular network as those phone calls. The technical packaging of the data is different but the transmission competes for the same digital space. Content presentation must be kept small, easy to view and understand within those small stable bursts. Content that is longer can be spread out over these smaller manageable chunks. This is an important consideration for mobile.

Avoid a lot of data entry – even with the larger tablets now on the market, the ability to quickly and efficiently enter data into the device is still an issue. Design your content so little use of the keyboard is required of your user.

Contextually relevant at the point of need – situated learning, scaffolding support. Mobile learning provides a unique opportunity to deliver support at the point of need. This offers support for situated learning (Lave & Wenger, 1990) or learning in the natural setting. Many job skills require quick reference to technical manuals, schematics, troubleshooting guides in the performance on the job. Mobile delivery offers a unique setting for this situation. Imagine a call back to the unit, a push of needed information to the device, and a step by step guide delivered just in time and at the point of need.

Performance support (reach back or sustainment) - much of our institutional, operational, and self-development training contains small elements that can be used to support the Soldier or Civilian in the performance of their day to day activities. These are best described as performance support or job aids.

Develop content that uses the capabilities of the device – today's mobile devices offer many capabilities for fast delivery of content in a format that supports point of need training. For example, short bursts of information that does not require media to convey meaning can be accomplished with the short messaging system (SMS) capability of the device.

U.S. Army Training Support Center
TCM-TADLP-Courseware Standards and Certification Division

Capabilities and Limitations

When planning on how to use mobile learning, awareness of some specific mobile capabilities and limitations is necessary.

Device and browser detection – content developed for mobile learning should be capable of providing device and browser detections services in order to insure a consistent look and feel for content across multiple mobile platforms. Device and browser detection in mobile phones allows for cross-platform delivery of content but not all devices have this capability or, if they do, some settings must be manually configured by the user.

File formats – mobile devices should support existing dL courseware content in its native file format (e.g., .pdf, .swf, .doc files). Since not all mobile devices and operating systems support each and every file format, mobile content should be designed for the lowest common device or operating system.

Screen size – from an instructional design perspective, some content may not appropriately “fit” mobile devices. The best use of screen size may be short lists, low resolution diagrams/schematics, or short video clips.

Technical Considerations

Delivery by mobile means working within the technical limitations of the platform. For all of us who struggle with delivery of web-based content and all the issues of bandwidth, fire-walls, plug-ins and players, just imagine what delivery via cellular networks and Wi-Fi will be for us.

Storage capacity – most mobile devices have limitations in internal storage. To supplement they offer additional storage capacity in the form of SD or micro SD cards, some netbooks offer USB connections for additional storage. But limitation in storage is and will be a design consideration that must be taken into account in the selection of content, instructional strategy, and delivery.

Bandwidth – Just as there are bandwidth considerations for desktop computers and web-based content, there are bandwidth considerations for mobile delivery. It is difficult for most to remember this is a signal being distributed via cellular network, in layman terms, radio tower to radio tower. Mobile networks can be slow compared to fixed data connections and they usually have a higher latency (W3C). Mobile is not a delivery solution for content that is displaying the same tendencies on a fixed network.

It has also been estimated that Smartphones such as the iPhone and Android consume five times the amount of bandwidth required by regular feature phones. This has implications for the delivery of multimedia content via mobile.

Processor speeds – processor speeds will continue to grow but they will probably not reach the capabilities of large systems such as desktops. These devices don’t currently require cooling systems but the faster the processor the more heat generated. This has to be cooled and the heat dissipated to keep the device functioning.

U.S. Army Training Support Center
TCM-TADLP-Courseware Standards and Certification Division

Power – a cell phone’s battery life is another important consideration when designing content for delivery via mobile. No one wants the battery to die just when the all important content is finally opened at the all important moment of need. This issue relates to the design of content in small bursts, processor speed, and bandwidth.

Page size- 20kb

Graphics – design for rendering capability of device, larger resolution wastes bandwidth.

Color – 256, more colors wastes bandwidth.

Background images – may result in content that is hard to view. There is limited contrast on mobile devices.

If your content is:	Standard	Length	File size	Device	Mobile Web	Mobile App
Credit giving – Completion of the content results in credit. Training and education is tracked by an LMS.	SCORM	NTE 40min		Net-book Laptop	Web	
Formalized, standardized lessons – Content is presented in a structured course format. Completion of the course may result in credit. Training and education may be tracked by an LMS.	SCORM	NTE 40min		Net-book Laptop	Web	
Collaborative learning – web-based collaboration using social media tools	SMS, MMS, MIM ¹ , voice or email all provide collaborative participation; however concurrent viewing is device specific.	160 character texts, video streaming limited to		Smartphone Tablet Net-book Laptop	Web	
Performance support – Learning material from a previously delivered course such as practice exercise, glossary, references, maps	XHTML 1.0 Transitional, UTF-8 character encoding, CSS 1.0, GIF, PNG, JPEG, PDF, TXT, DOC	Max total page weight 20kb				Apps

¹ Mobile Instant Messaging – two methods – 1) Embedded Clients - tailored IM client for every specific device. 2) Clientless Platform – a browser-based application that does not require downloading any software to the handset, and which enables all users and all devices from any network to connect to their Internet IM service

U.S. Army Training Support Center
TCM-TADLP-Courseware Standards and Certification Division

Knowledge checks, Quizzes, surveys – Present knowledge checks or quizzes for self assessment.	SMS ² or MMS ³ is used to deliver text or multimedia to the learner to choose an option then submit for assessment.	20kb					Apps
Audio learning – site specific inductions, i.e. listen to description of a new location such as a campus or other facility; key information about a location i.e. things to watch for.	MP3 AAC/MP4/MP4 AMR						Apps
Video learning – watch demonstrations of what “right looks like”, lectures, etc.	MPEG-4 AVI 3GP					Web	Apps
Gaming – Scenario to allow for skill practice delivered in small chunks	Unity, FLASH (not for iPhone, iPad, iTOUCH)						Apps
Simulations – Simulation of equipment or software delivered in small chunks i.e. net training.	FLASH (not for iPhone, iPad, iTOUCH)						Apps
Supplemental - Supportive material such as examples and case studies introduced for further reading and better understanding of the key subject.		20kb					Apps
Index - lists, indices and how-to guides; quick reference for learners to get immediate answers		20kb					Apps

² Short Message Service is also often referred to as texting, sending text messages or text messaging. The service allows for short text messages to be sent from one cell phone to another cell phone or from the Web to another cell phone. Including spaces, text messages traditionally can't exceed 160 characters.

³ Multimedia Message System, content is often received by another cell phone just like SMS, MMS is sometimes received by a cell phone and can then require the mobile Web to access it. MMS is considered a high-speed 3G service.