Australian Flexible Learning Framework

supporting e-learning opportunities

Mobile Touch:

A Guide to Implementing Mobile E-learning in Your Organisation

Flexiblelearning.net.au



Department of Education, Employment and Workplace Relations

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Introduction

Mobile Learning, or "m-learning", is the practice of learning, not just through the mobile devices but also through the flexible delivery and creation of content, when and where the learner wants to access their learning. One definition states that m-learning is;

"Any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies." (MOBIlearn. October 2003. pp. 6.)

According to the Australian Mobile Phone Lifestyle Index Survey conducted by the Australian Interactive Media Industry Association (Mobile Industry Group: 5th Edition – Special Topic: Mobile Commerce September 2009) 21% of respondents said they visit websites on their mobile phone at least once a day, while 25% of respondents said they carry out mobile searches at least once a week. The majority of content created for e-learning is in an online format, so access to the web via mobile devices has direct implications for m-learning. The types of content being accessed by mobile phones vary.

Of those respondents that used at least one information service (48%, n=1,766):

- 82% accessed weather (up from 50% in Survey 4)
- 80% accessed news (up from 53% in Survey 4)
- 62% accessed location/traffic information (not collected in Survey 4)
- 52% accessed sports information (up from 34% in Survey 4)
- 51% accessed movie information (up from 24% in Survey 4)
- 50% accessed entertainment news (not collected in Survey 4)
- 44% accessed restaurant/café information (up from 15% in Survey 4)
- 39% accessed event listings (up from 9% in Survey 4)
- 37% accessed financial information (up from 11% in Survey 4)
- 37% accessed TV guides (up from 14% in Survey 4)

The future of web content, and therefore e-learning content, will be increasingly mobile. A report compiled by Morgan Stanley (Figure 1) confirms the popular prediction that mobile web will overtake desktop web by 2015. E-learning design, therefore, cannot be done without considering m-learning design.

This document outlines the methods and technical considerations for implementing a mobile elearning (or m-learning) strategy including a case study from YMIS - a Brisbane based RTO.

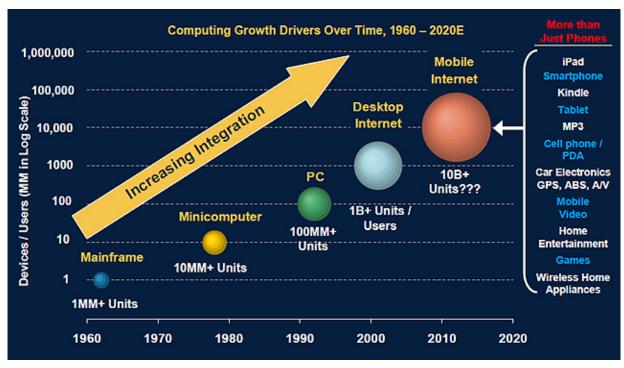


Figure 1- Morgan Stanley 2010.

Mobile Web includes; Audio Files, News Content, RSS Feeds, SMS to Web, Video Files, Streamed Media, GPS and Geo Location Technology, Social Media and Email.



M-Learning in Practice

The basis for M-Learning is being able to engage in elearning anytime/anywhere. A Mobile Phone is a unique device for learning as it allows elearning to remain in the context and location of the student. The mobile devices we see today are unique in many ways to any previous technology.

Any Where Any Time Device	Learners can access content and contribute to content on location, and this opens up a new dimension in training possibilities. No longer will location be a barrier to teaching and learning.
A Peer Sharing Device	The size and flat movable screen of a phone allows content to be shared between peers in any location, much more easily than a desktop computer.
A Community Device	Mobile devices connect people together and create a space for learning. A learning community is strengthened through ongoing connections between participants through mobile devices.
A Comfortable Device	People are already familiar and comfortable with a phone, and carry out many daily routines and tasks naturally on their phones. Transitioning learners to mlearning is not as hard as it may seem.
A Coveted Device	Mobiles device are now an essential tool, a fashion item, and a must have for most young people. The future growth of the mobile market will only pave the way for mlearning to be utilised.
A Peer Learning Device	Students can quickly update online status, post to forums and contribute to wiki's all form a mobile device, adding to the rich knowledge the students have brought with them into a course.
A Flexible Learning Device	With mobile content comes flexible learning, and the challenge for course developers is to access learners in this emerging space.
A 'Common' Device	Many more people in the world have mobile phones than they do computers and this is a growing trend.
A Work Place Device	Mobiles are already a productivity tool for the workplace, with many learners using mobile devices for daily work tasks. It makes sense that this same productivity tool could also be a learning tool for the workplace.

Methods for Implementing M-Learning







Currently, there are three ways to implement a Mobile E-learning solution:

- 1. **Optimised Website**, whereby your current website is tweaked to better support mobile devices.
- 2. **Dedicated Website**, that is purpose built to support mobile devices.
- 3. **Dedicated App's**, for each mobile device you want to support.



Dedicated Mobile Apps

Dedicated Apps can be useful for specific functions and allow for direct compatibility with a limited group of devices. The iPhone and Android platform Apps for example are offering over 100,000 apps for download which are custom made for specific mobile OS's. Mobile Apps can be good for marketing/branding, simplifying content or for a specific function (eg.

Loan Calculator), but the limitations of OS compatibility make Apps an unworkable solution to a community of learners with a variety of mobile phone models. For example, the Australian made Teacher management App *Educate 2.1* by ikonstrukt, is currently only available for the iPhone. (http://www.ikonstrukt.com/educate.php)

Dedicated Mobile Website



Building a dedicated mobile website means that you can deliver just the content that mobile users require. This makes their experience fast and easy. But, it may mean that you are duplicating content for your regular website and for your mobile website, depending on how it is implemented.

Optimised Website



Optimising your current website for mobile devices is likely to be an easier solution and means that all online constituents, whether they are using a mobile device or a personal computer, have access to the same content. However, some content is not compatible with mobile web browsers and you may need to change the way you deliver content like video and Adobe Flash.

The Case for the Mobile Web

As mobile pixel density, screen size and mobile browsers have improved, the decision needs to be made about whether you really need an App for your course work, if that course work is already fully functional in a mobile browser.

Choosing to implement a learning solution optimised for mobile browsers means that you have an easier path to delivering content to more devices (and thus people).

Mobile Browser Compatibility

While delivering content to mobile browsers is the easiest to deliver and update, they do have limitations and it is important to be aware of these limitations when developing your solution.

Limitations

- **Small screen size** This makes it difficult or impossible to see text and graphics dependent on the standard size of a desktop computer screen.
- Lack of windows On a desktop computer, the ability to open more than one window at a time allows for multi-tasking and for easy revert to a previous page. Historically on mobile web, only one page can be displayed at a time, and pages can only be viewed in the sequence they were originally accessed. However, there are apps for the iPhone (e.g. Oceanus), as well as browsers such as Opera Mini, allowing multiple windows, but sometimes a limited number, and not multiple windows in the same screen.
- **Navigation** Most mobile devices do not use a mouse-like pointer, but rather simply an up and down function for scrolling, thereby limiting the flexibility in navigation.
- Lack of Javascript and cookies Most devices do not support client-side scripting and storage
 of cookies (smartphones excluded), which are now widely used in most Web sites for enhancing user experience, facilitating the validation of data entered by the page visitor, etc. This also
 results in web analytics tools not being suitable for uniquely identifying visitors using mobile
 devices.
- Types of pages accessible Many sites that can be accessed on a desktop cannot on a mobile device. Many devices cannot access pages with a secured connection, Flash or other similar software, PDFs, or video sites, although recently this has been changing, especially with the advent of smartphones.
- **Speed** On most mobile devices, the speed of service is very slow, often slower than dial-up Internet access.

- Broken pages On many devices, a single page as viewed on a desktop is broken into segments, which are each treated as a separate page. Paired with the slow speed, navigation between these pages is slow.
- **Compressed pages** Many pages, in their conversion to mobile format, are squeezed into an order different from how they would customarily be viewed on a desktop computer.

Best Practices

In order to reach a wide array of devices and deliver a workable solution for learners, there are a few practices that should be observed:

- **Focus on key tasks only** make sure you have clearly defined goals about what you want to deliver to learners and what you need them to do in response. Adding too many features can make your application crowded, complicated and ultimately too hard for people to use.
- Use a bottom-up approach Design your application for the simplest of mobile web enabled devices and use progressive enhancement to enrich the experience for more powerful devices (such as smartphones).
- **Design for usability** The web is a great place to project your brand and make your website visually appealing. However, visual flare usually comes at the cost of load-times and space on the screen neither of which are in abundance on a mobile device. What is more important to your brand (and to the people using your website) is that they can get things done quickly.
- Make it easy to get home Because of the small screen size, it is not good practice to have
 your full navigation on every page (as you would in a website targeted at PC's). However, it is
 important that people can get back to the full navigation from any page. The best strategy is to
 ensure that there is an obvious way to get "HOME" no matter where you are within the website.
- Limit the use of interactive elements and video Be mindful that not all devices can display video and even fewer can display interactive elements like Adobe Flash. You may find that many of your students do have compatible devices and that it is appropriate to use video and Flash in your mobile learning website, but perhaps consider an alternative source for that content (such as on your regular website as well).

Technical considerations for M-Learning

Dedicated Apps

The biggest consideration for Dedicated App Development is that each platform (iOS, Android, Blackberry, Symbian, etc) has their own Software Development Kit (using different programming languages) and their own set of User Interface Guidelines.

Usually, this means that the user-interface needs to be tweaked for each platform and the underlying software needs to be built (from scratch) for each different platform you want to make an app available for.

For learning institutes this is not feasible and as such, this document has not focused on Dedicated App development, but rather Mobile Websites.

Mobile Websites

There are three main technologies that are used together to build a website:

- 1. **HTML** (HyperText Markup Language) which is the data (content).
- 2. **CSS** (Cascading StyleSheets) which is used to style the data for consumption in a more visually appealing way.
- 3. **JavaScript** which adds behaviour and interactive elements (such as drop down menu's and the like).

Making an effort to keep your styling and behaviours out of the HTML will make it easier to build a mobile optimised version of your website.

Mobile Browser Stylesheets

Through simply linking to a mobile friendly stylesheet using the media="handheld" attribute in the <ti>tle> tag, a site can auto detect it is being viewed by mobile browser and restyle accordingly.

```
<link rel="stylesheet" href="http://domain.tld/mobile.css" type="text/css"
media="handheld" />
```

However, the best method for optimising a website for mobile is to clear your styling and start with your mobile styling first. You can then add additional stylesheets for larger screens. For instance, the following stylesheet will only get included if the minimum device width is 1025 pixels wide.

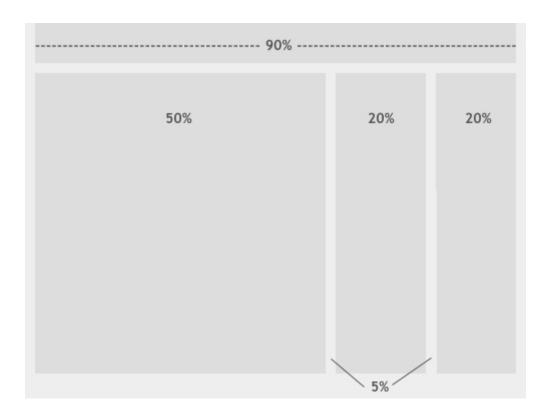
```
<link media="(min-device-width: 1025px)" href="/styles/largescreen.css"
type="text/css" rel="stylesheet" />
```

Tablet devices tend to have a maximum screen width of around 1024 pixels, whereas most desktop computers these days have a screen width of 1280 pixels or more. So, this is a great way to include a more elaborate design for desktop computers.

Elastic Layouts

In addition to building specific stylesheets for each type of device, you can also do this in a single stylesheet. For instance, you might just make a stylesheet called layout.css that includes different layout specifications for each different type of device:

Using this technique not only allows you to specify things like margins and font-sizes, but also the layout of columns in your page.



For instance, consider a website with the following layout, viewed on a desktop:

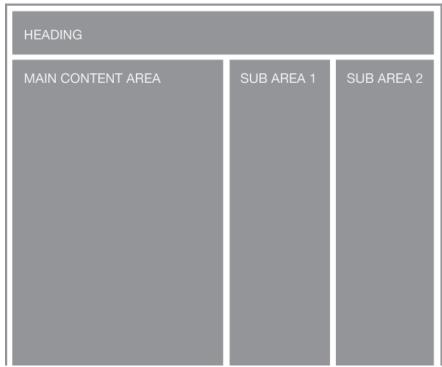


Figure 2 - Desktop Layout

This layout has a heading, the main content area and two sub-content areas side-by-side. However, this layout becomes too crowded for Netbooks, Tablets and Mobile phones. By specify some layout changes in the stylesheet you can make a better browsing experience for these smaller devices. For instance...

The Netbook layout might cascade one column under the other:

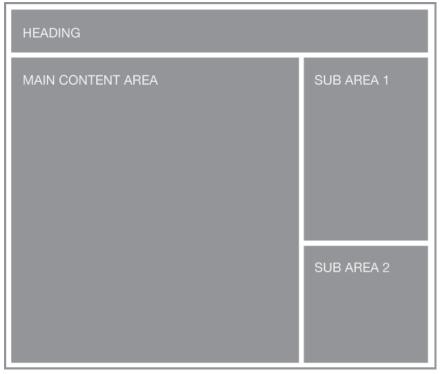


Figure 3 - Netbook Layout

The Tablet version may push both sub-areas under the main content area, but still keep them in a two column (side-by-side) layout:



Figure 4 - Tablet Layout

And, finally, the Mobile Phone version could stack all the elements vertically, with one element under the other:

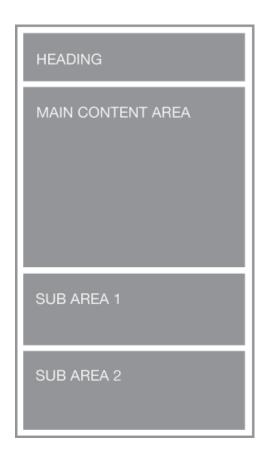


Figure 5 - Mobile Layout

To see an elastic layout in action, visit http://hicksdesign.co.uk/ and resize your browser width to see the layout reconfigure itself for each device width defined in the stylesheet of the website.

HTML 5

HTML 5 is an emerging standard that has already made its way into Smartphone web-browsers and many websites. It is particularly relevant to Mobile Devices in that it aims to provide a standard for inbrowser document editing, geolocation, 2D & 3D animations, embedded audio and embedded video (all of which are currently issues for the Mobile Web).

Although the standard is still being developed, many smartphone manufacturers have chosen to support key parts of the standard to solve some of the cross-platform issues on mobile devices (such as lack of Adobe Flash support for video).

The following table shows current compatibility ratings for different mobile devices with the HTML 5 standard:

THE RESULTS FOR PHONES		
os	Version	Score
Opera Mini	10	33
iPhone OS	2.0	37
Android	1.6	39
iPhone OS	2.1 - 2.2	45
Maemo microB	5 PR-1.1.1	55
Firefox Mobile	1.0	101
Palm WebOS	1.4	107
iPhone OS	3.0	110
iPhone OS	3.1	113
iPhone OS (iPad)	3.2	115
Android	2.0 - 2.1	118
iPhone OS	4.0	134 Calling AllGeeks.org

Figure 6 - Compatibility results from html5test.com

HTML 5 Components can be tested at (http://html5test.com/) by accessing this site through your mobile browser, it will give you feedback about which components are HTML5 compatible.

Mobile Video Formats

One of the key advantages to HTML 5 is the standardised support for native video control (with the new <video> tag) directly in the browser, with no need for a flash player plugin. Obviously this has advantages for mobile video content as most mobiles don't have a workable flash solution.

Kultura has a video player system that can work on most platforms that support some level of video. Take a look at http://www.html5video.org/kaltura-html5/ for more information.

E-Standards for Training - Mobile Technology

The mobile technology standards established for the E-Standards for Training are currently under a mid-year review by a panel of volunteers. We have offered to have input from our own research in the E-standards project for mobile technologies.

http://e-standards.flexiblelearning.net.au/topics/mlearn.htm

Testing

There are 30+ mobile browsers that learners could possibly be using to access learning content (and the number is growing). To test what your LMS or Learning Content might look and behave like on every mobile device would be impossible. There are a few strategies we have found to test for mobile compatibility in your desktop browser.

Testing Methods	Strengths	Limitations
Testing on real devices	Test full navigation, audio, button control and navigation experience.	Difficulty acquiring access to 100's of devices available and cost of mobile browsing.
Mobile Browser Emulators TestiPhone.com opera.com/mobile/demo/	Free to use and can be tested through web browsers. There are also Mobile Device and OS Emulators.	Usually require the developer kit and some knowledge of development to use the emulators properly.
Optimising Web Browsers	Firefox plugin "Web developer" Optimised to small screen. 320x240	Artificially displays screen size without browser styles.



Case Study: YMIS

Introduction to YMIS

YMIS Online hosts over 200 students and its online content services many more youth workers in the field who require ongoing support and training with limited time frames available to access online content.

Our 2010 Innovations project will be to first test the accessibility and functionality of our LMS on different mobile platforms, then to alter the state of our web based content for optimum performance in m-learning activities.

This will involve trialing and documenting the use of QR codes, SMS and CSS for mobiles and smart phones with a pilot group of students and trainers in 2010.

Over the last three intakes of students in our youth work program, we have noticed an increase in student accessing our web content on their smart phones while in class. At first we thought this was a distraction but soon realised it was, if anything, enhancing their learning experience. Students have also started to expect that their online material will be available to access from mobile devices.



Our Approach

Most of our RTO staff now use smart phones, and find them a good tool for self directed learning, through blogs, podcasts and video media. Our first step in moving to m-learning will be to make our current material available on mobile devices in a user friendly format. **Primarily we have focused on optimising our current web resources for mobile devices**, though we have also explored dedicated app's to assess their advantages and viability as a learning platform.

We hope to move towards experimenting with other m-learning technologies within our web platform with a pilot group of 15 students. The results could be an exciting new way to engage learners at YMIS.

Our Learning Management System (LMS)

We currently use Moodle as an LMS wrapped inside Joomla as a CMS. Joomla has some Mobile Browser StyleSheets we are going to trial, but the current version of Moodle 1.9, has no Mobile friendly Style Sheets available at present. Moodle 2.0 which will be launched late 2010, is said to have Mobile Style Sheets included. We've also found no mobile device, including the iPad, displays the Moodle HTML editor, making it impossible to edit code in Moodle blocks and elements form a mobile device.

Our Students and their E-learning Habits

In May 2010 we ran a student survey (61 responses from 200 sample) to look at the e-learning habits of our students and particularly to probe their use of mobile devices. The survey found that around 25% of students found

readings, resources, videos and discussion forums to be particularly helpful, while around 75% of students found our online tasks to be most useful.

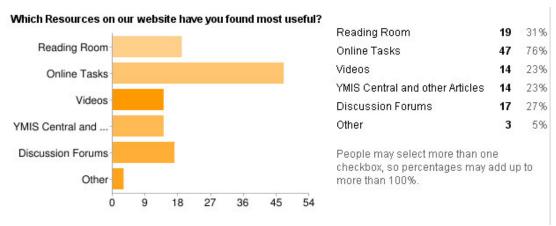


Figure 7 - Resources our students found most helpful - from a survey conducted in May 2010 amongst YMIS learners.

What's interesting about this result is that our online tasks are where the most peer-learning takes place. With that in mind, we also looked at the students experience of interacting with others through Moodle (online tasks).

Devices used for viewing the YMIS website

As part of the survey, students were asked which devices they generally use to view the YMIS website. The results suggest that most people – currently - use a computer for browsing the internet.

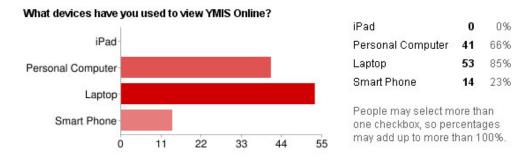


Figure 8 - User satisfaction of interacting with other students though our LMS - from a survey conducted in May 2010 amongst YMIS learners.

Our Students and their Mobile Phones

Our student survey shows that less than half of our students have a phone capable of mobile browsing, but the intentions of our learners to upgrade their phones in the next 12 months where strong. Some students are already accessing course content from iPhones.

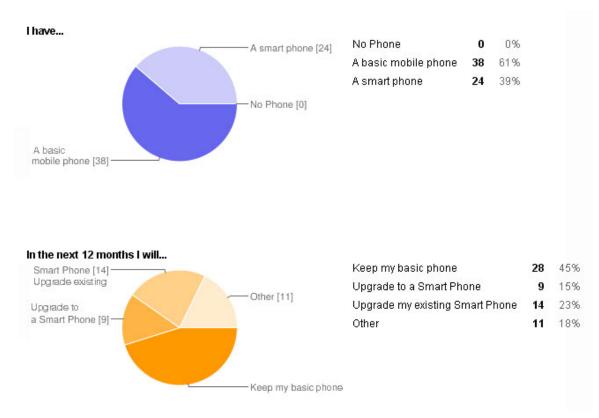


Figure 10 - Mobile phone ownership results from a survey conducted in May 2010 amongst YMIS learners.

Figure 14: Survey 5 - Ownership of mobile phone by brand

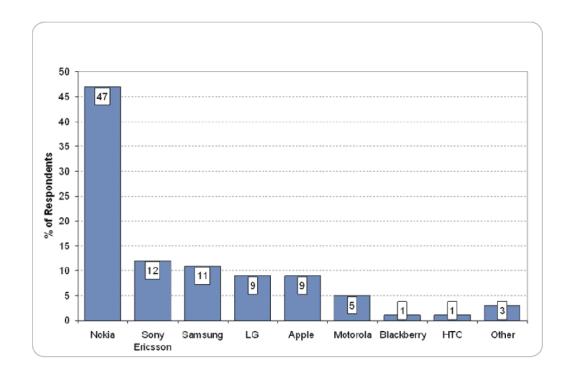


Figure 9-Mobile phone brand ownership results from a survey conducted in May 2010 amongst YMIS learners.

Mobile Phone Activities

In addition to looking at the types of devices that learners were using, we also asked respondents to indicate the types of activities they use their phones for. SMS Texting came out on top as the most used function of their phones. However, Browsing the web, Social Media, Email and Maps were used by around 30% of people we surveyed.

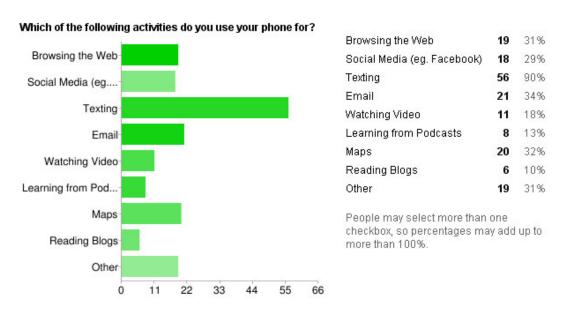


Figure 11 - Mobile phone activity results from a survey conducted in May 2010 amongst YMIS learners.

Multi Platform Community of Users

There is not a standard mobile browser or OS, and it looks like there never will be, but the Android OS is fast closing the gap on iOS as the most common platform available. Amongst our own students, iPhone (with the iOS3) and Nokia are currently the most common phones.

Issues we encountered

The teaching strategies and learning design techniques of m-learning find themselves in the context of a rapidly changing mobile technology environment.

For basic content viewing (text, images) and engagement with discussion forums, the YMIS ONLINE LMS works well on any mobile device we've trialled. However, we discovered that the following course components could be improved;

- Downloading Video Content
- Social Media Plugins (eg. The Facebook Like Button)
- HTML Editing in the LMS in non functional on mobile devices
- · Page Clutter, students may just need main page view

Other Possibilities

During our time investigating Mobile E-learning strategies, we also discovered a number of other possibilities which could add great value to our organisation.

Moodle Mobile

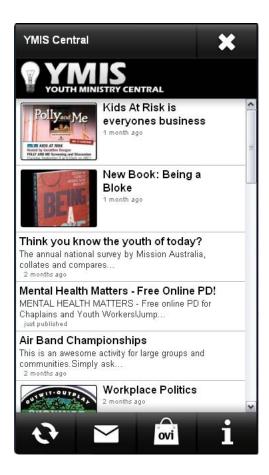
The we are aware of the following projects/plugins for mobile moodle solutions;

Moodle4iPhone Project	Still in development of a working App, also building for Android.
МОМО	Formerly known as the MLE mobile learning engine, ceased develop-
	ment
Moodle Mobile	An iPhone App with customised Moodle Forums, Podcasts, and Pro-
	files. Designed by Romain Mallard , Digital SK, Brazil
Moodle 2.0	Moodle 2.0 will have mobile stylesheets included.

App Development

We have had a brief look at the Nokia, Android and iPhone software developer kits. We deviced to build an RSS Feed Reader for our YMIS Central website as a test of the App Development platforms.

For Nokia phones we used the Ovi App Wizard (http://appwizard.ovi.com/) to build a simple app for pulling content from our website into an easily digestible format. This proved to be a quick and effective way of making content available on Nokia handsets.



We also developed an iPhone App to compare the processes. The iPhone Software Development Kit did not provide any kind of wizard as with the Nokia platform. This made our particular example App a little harder and slower to develop. It was also only available for Mac. This wasn't a problem for our developer, who uses a Mac, but it is something that should be considered when planning to develop for this platform. We found this SDK to be well put together and well documented.

YMIS CENTRAL

Kids At Risk is everyones busin...

It's Child Protection Week, and you may hav...

New Book: Being a Bloke

Red Hill Publishing is pleased to announce th...

Think you know the youth of tod...

The annual national survey by Mission Austr...

Mental Health Matters - Free Onl...

MENTAL HEALTH MATTERS - Free online...

Air Band Championships

This is an awesome activity for large groups...

Workplace Politics

Have you ever turned up to work and felt like...

Rob Bell on Boundaries in Minis...

Here's a great little video extract from an inte...

Including Families with Teens in...

Across our country, there is the perception th...

Staying Spiritually Fresh

One of the hardest parts of youth ministry is...

Too Much Information!

Though we did not develop an Android app, we did take a look at the SDK to compare it with the Nokia and iPhone platforms. It was quickly apparent that this SDK required more technical proficiency and was somewhat buggy.

The Ovi App Wizard was the easiest to use and deploy apps with, but it should be noted that this is a Wizard and as such only provides limited types of functionality. To develop an App with new functions and concepts you would need to use a different SDK for the Nokia platform.

The biggest technical difficulties with App Development appear to be that each SDK is very different and requires a lot of research and technical expertise in order to be able to use them. If the functionality of our example App had been more substantial, it may have been better to sub-contract professional developers for each platform to undertake the build.

iTunes U

We have been in conversation with a Mac Education representative in Brisbane and hope to gain an iTunes U account for both our audio and video content very soon.

E-book

We are currently investigating the possibility of putting together an E-book of our course work. We hope to make this available for students in a number of different formats and platforms.

Mobile Podcasting

We were impressed with the use of AudioBoo, by a delegate at the Moodle Moot Conference in Melbourne, through the use of an iPhone.

Promotion and Partnerships

We have been contacted by the *Vocational Education and Training Disability Support Service* (VDSS) for Queensland, by the officer for VET Disability Support Service Queensland VET Development Centre about sharing our project findings.

We are also considering showcasing our casestudy as a paper at the third International m-libraries conference: *Mobile technologies: information on the move* to be held in Brisbane, Australia, 11 - 13 May 2011. Abstracts are due in November this year.

Useful Links

- Android Developer Website: http://developer.android.com
- Apple Developer Website: http://developer.apple.com/
- Audioboo: http://audioboo.fm/
- Dive into HTML5: http://diveintohtml5.org/
- Educate App by iKonstrukt: http://www.ikonstrukt.com/educate.php
- Hicks Design (example of Elastic Layouts): http://hicksdesign.co.uk/
- HTML 5: http://en.wikipedia.org/wiki/HTML5
- Kultura Video Player: http://www.html5video.org/kaltura-html5/
- Mashable 5 Things to Consider When Designing Your Mobile App: http://mashable.com/2010/07/07/designing-mobile-apps/
- Mobile Application Development:
 http://en.wikipedia.org/wiki/Mobile_application_development
- Mobile Technology Recommended Standards: http://e-standards.flexiblelearning.net.au/topics/mlearn.htm
- Mobile Web: http://en.wikipedia.org/wiki/Mobile_Web
- MOBIlearn Project: http://www.mobilearn.org/
- Moodle for Mobiles: http://docs.moodle.org/en/Moodle_for_Mobiles
- Moodle: http://moodle.org/
- Ovi App Wizard: http://appwizard.ovi.com/
- Progressive Enhancement: http://en.wikipedia.org/wiki/Progressive enhancement
- SMS Poll: http://www.smspoll.net/
- The HTML5 Test: http://html5test.com/
- Visible Tweets: http://visibletweets.com/