



Leabharlann UCD
UCD Library



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Strategic mobile library development: the place of library apps and the options for creating them

Project Report

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Executive Summary

The purpose of the research

In this report we report on research undertaken to flesh out our understanding of the options available for developing library platforms for mobile users. We undertook a range of activities to provide a non-technical overview and understanding: this will undoubtedly appear somewhat simplistic to those with a technical knowledge in this area but the intended audience is IT-literate library and information unit staff.

Options for library development for mobile users are diverse

From an initial starting point of considering mobile websites versus apps, as reflected in the early survey of the Irish situation, it quickly became apparent to us that the situation is more complex with at least 4 not 2 main options: Responsive Web Design (RWD) which has developed a great deal over the 2 years since we commenced investigations; mobile websites; native apps; or in-browser apps (webapps), another area that has taken centre stage over the research period.

As of writing (July 2014) it could not be said that any one approach is dominant, making it a tricky area for libraries to address in a strategic longer-term manner.

A responsive website should replace separate desktop and mobile websites

It is probably fair to say that the concept of a desktop website and totally separate and somewhat attenuated mobile website as we have in our own library currently is “old hat” and a totally responsively designed website is certainly the strategic approach to follow there as and when finance and technical resources allow, the entire website displaying useably on any sized mobile device as well as desktops and laptops.

With 2013 being badged by some as the year of Responsive Web Design we may in our investigations have been overtaken by technical developments, and sites such as IT Tallaght and the School of Medicine at UCD are Irish examples already live with this approach. The key perspective of this approach would perhaps be that indicated in a website item on Nielsen’s Usability website – that the idea of having cut down content via mobile websites or apps is outdated and what users should be offered is a consistent cross-channel experience, with the same options offered in all channels:

“Users engage with companies and organizations across many channels, including the web, email, mobile devices, kiosks, online chat, and by visiting physical locations (such as storefronts or service centers). Users expect companies to provide a usable experience across all channels. Although you may think of various channels within your organization or company as separate or siloed, your users do not. They consider any interaction with you, regardless of channel, as part of the overall user experience. And they have high

expectations. We are no longer just designing for the web. We are designing for the holistic cross-channel experience.”¹

Is there a role for apps discrete from the website?

The nature and place of any library app development within that overall desirably responsive website picture is very much up in the air, both in terms of the technical solution followed and what types of library content exactly may be worth developing in an app.

The examples given in the report of library app content will show a mix from what can be called general apps with many functions through to highly focused niche apps such as library floorplans, tours, exhibitions.

What muddies the waters for libraries is the fact that a number of library system vendors have some sort of app available or in development and a number of third party library suppliers also offer a ready-to-use app. In other words, it may not be a question of a library deciding from scratch their ideal app content, but rather seeing how they can best leverage these “ready-to-use” solutions which do not require technical skills to develop, and which by and large are heavily catalogue search focused, and quite hard-coded in terms of what other content can be included.

Which is the best approach to app development?

Assuming some local app development is being pursued by an information unit, there is intense argument on the native app v. the web app approach. Webapp development - essentially a particular form of touch enabled mobile website but with heavy use of JavaScript to access and make use of local mobile device features – is seen as the only supportable, platform-independent route to take to app development by many.

Others focus on the fact that at present you cannot get quite the same level of access to local device features with a web app, and to give just one notable library example, Innovative Interfaces app development plans are currently entirely focused on native app development for iOS and Android.²

The hybrid approach to any app development deemed worthwhile is probably the best strategic solution at the present time: with this solution a platform-independent web app is created that can be used on any mobile device, and this is then enveloped in proprietary iOS and Android code so that it can be lodged in the stores where users expect to find apps and downloaded and used in the normal app manner, as opposed to popping the webapp onto your launch page, which is a different process. A number of high level development languages are available which enable this hybrid approach to be taken.

¹ Janelle Estes, “Cross-Channel Usability: Creating a Consistent User Experience”, available at http://www.nngroup.com/articles/cross-channel-consistency/?utm_source=Alertbox&utm_campaign=d51a38b655-Alertbox_email_10_28_2013&utm_medium=email&utm_term=0_7f29a2b335-d51a38b655-24386101, accessed October 29th 2013.

² Presentation given by Analisa Ornelas, Product Manager Patron Services, at the Innovate Users Group 22nd Annual Conference, May 6-9 2014

How far have libraries got with mobile and app development?

During the period of this piece of work there have been developments: our initial survey results, for example, we have had to annotate as there have been significant developments since various Irish libraries filled out our 2012 survey. And there are of course many examples of library apps to call upon.

Still, overall it would be fair to say that whilst an understanding of the crucial importance of offering resources and services of libraries to mobile devices is well understood, in practical terms libraries are still very focused on the desktop/laptop delivery of the online library: mobile catalogues in some form are very common, otherwise developments are somewhat piecemeal.

Challenges impeding development

Some simple lack of being on the ball may be involved; other key factors would seem to be the lack of technical expertise and specialist staff; a lack of finance to employ outside development agencies to build apps of any kind - certainly in the Irish context, the period when higher-risk specialist development of mobile apps would ideally have been tried out with resource expenditure to achieve that has coincided with the economic recession and cutbacks to university and library staffing and budgets; and as of 2014, this is a very confused area, with no single clear and obvious strategic development path to pursue, and no great clamour of user demands for development of specifically library interfaces for the smartphone and tablet.

What next?

With mobile usage of university networks and online library resources and services steadily increasing, this is certainly not an area that can be ignored in library strategy-formulation and there are choices to be made and risks to be taken, in an area that we have found to be constantly developing, making some of the findings of the earlier stage of our research process already somewhat out of date.

How the research has impacted UCD Library plans

To end on a specific note, our own situation can be summarised currently thus:

- The UCD Digital Library is being re-coded as a fully Responsive Website based on bootstrap
- We are convinced of the strategic need to re-form our main website as a responsive web design and scrap our separate mobile website: finance is the key inhibitor there
- As a demonstrator we developed a webapp for this project which could hypothetically complement the mobile website and act as its launch page: but we feel that the responsive website route is a better way to go and will show colleagues but may not take that further
- We have had for some time mobile interfaces to our catalogue. These are not apps but are included within the University level app. We are keeping a watching eye on the development of native apps in terms of functions, platforms available and costs and that could be a specialised app that we take forward in the future

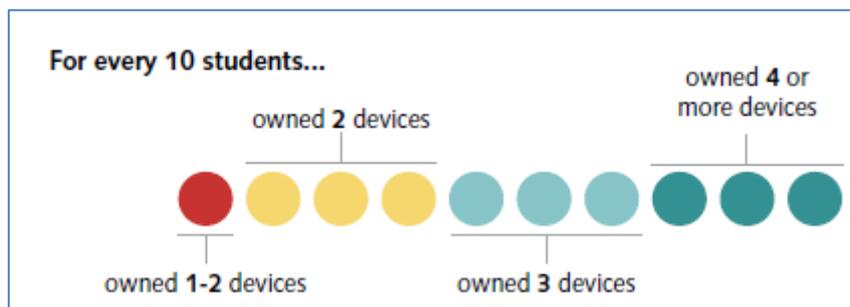
- We are experimenting in September 14 with a niche app for new students to complement the new student platform in Libguides and that is another that may become a regular feature depending on usage in the pilot
- A paper on this project was given at the 2014 mLibraries conference in Hong Kong

Introduction

Nutshell statement – Context statement

Some research estimates that as of 2013, more than 70 percent of all hours spent on computing devices (PCs, smartphones, and tablets) are still on a PC. More pertinent to this report, more than 80 percent of Internet traffic comes from PCs. For 74 percent of people, the PC is the device used most frequently to access the Internet.³

These however are overall population figures: the student population would seem to be on a different plane with regard to both mobile device ownership and the proportion of their usage of the internet with such devices. A standard-entry student entering the third level education system now has never known a world without internet. The ECAR survey 2013 shows that students in general own multiple devices, including mobile ones, all of which can access the internet⁴



Internet-Capable Device Ownership ECAR Survey 2013

To take a local example, at University College Dublin by the end of 2013 25,000 different Apple devices and 14,000 Android devices were accessing the UCD network every month from a UCD population of around 30,000 in total.

The usage of mobile devices in third level to access specifically library services is our narrower and key interest. Surveys suggest that though mobile usage of library and academic services via mobile is increasing, this is not dramatic, and there is a disconnect between what mobile devices students do have and their desire to use them in their academic studies or library resource or service use.⁵

And indeed what statistics we have found locally, which are described in this report, show that access to library websites and catalogues made up in 2013 only a modest amount of usage: to give another local example, at UCD Library web page views from all types of tablet and smartphone devices peaked in December 2013 at 20% of the total.

Nevertheless, as we advance into the “Age of Mobilism”, libraries can scarcely turn a blind eye to this: they cannot remain focused entirely on the desktop-based internet age and ignore the mobile-based “Connected Age” that is evolving, or treat it as some sort of second-ranking added-extra.

³ “Put Away The Eulogy, The PC Is Alive And Well” blog entry by Chester Ng at <http://techcrunch.com/2013/04/20/could-the-pc-actually-be-alive/>? Accessed April 21st 2013.

⁴ ECAR Study of Undergraduate Students and Information Technology 2013, p. 24

⁵ For example the ECAR Study of Undergraduate Students and Information Technology 2013, p 3-4

We report on some practitioner based research looking at delivering content and services optimised for the mobile context and in particular the place of apps in that process. There is a brief overview of the aspects of library provision that may be priorities for targeting at the mobile user, we summarise progress to date with Irish Libraries on an Island of Ireland basis as we have been able to establish it during the research, and then focus on the place of apps, options for creating apps and discussion of a couple of demonstrators using different approaches that we developed as part of this research.

Please see Appendix 1 for our Project Outline and Work Packages as envisaged at the start of the project.

What aspects of the mobile library we cover in the report

It is difficult to know what to include in the terms “the mobile context”, “the mobile library” or “mobile library application”. This can be very wide ranging including the resources, the services, the information all available to be used easily on mobile devices. That then raises the equally tricky question of what devices to include in the scope, which could be limited to the small screen hand held device with a full web browser, or include also the tablet device within it.

For the purposes of this report we are including the full range of: mobile website, responsive website, web apps, native apps. Mobile and responsive websites will feature mainly as alternative approaches to apps which became clear as we undertook our project.

We are including the full range of resources, services and information about library service. Whilst we touch on eLearning in relation to library information skills materials, we have not had the capacity to look at the wider issue of academic learning as a whole via mobile delivery.

We are not including lower end feature phones in our considerations (about 12% of UCD undergraduates may still have these, as of our survey in 2013) - our baseline is the Smartphone with a full web browser.

We are only really focused upon iOS and Android models here. We are aware of the other platforms but sample statistics indicate that they have a minute percentage of the library mobile usage in our own and other third level institutions, just as in 2013/14 iOS and Android dominate the overall smartphone landscape beyond the library.

We are including tablets such as the iPad and cheaper models. These do complicate the whole issue, given their much larger form factor and ability to render many desktop websites in a perfectly satisfactory manner – but screen size is only one aspect of things and what users of the tablet would expect in common with smaller screens is a tactile, touch-driven user experience. During the period of this work, the situation has been further complicated by the serious emergence of the mini tablet, with a 7” or similar screen size. Those opting for responsive design are now having to design and arrange elements for a minimum of 4 breakpoints in screen size and a simplistic comparison of smartphones and laptops does not cover the mobile field adequately anymore.

Tablets and larger sized smartphone screens also upset the widespread notion that mobile devices are for quick access to key information only, rather than sustained access via a desktop machine: that concept, often used to justify having a very cut down mobile website, is breaking down: tablets, unlike smartphones, are an ideal size for viewing eBooks and articles, watching library video and accessing digitized images.

We are not including laptops or netbooks however. An Educause briefing paper on mobile learning summed up the boundary we have practically employed, though with the arrival of Windows 8 and touchscreen for desktop and laptop and of hybrid netbook/tablet devices this will not be tenable as a distinction for long:

“Laptops and netbooks are technically not included – they’re not handheld and they belong to the set of devices that employ the desktop WIMP (window, icon, menu, pointing device) computing metaphor, rather than the handheld NUI (natural user interface) metaphor.”⁶

We are not including aspects of the mobile library beyond the library resources and services on the user screen - things such as lending out tablets or kindles, or using mobile kit to support library staff in their roving work are excluded, important though this may be.

We are only including other mobile possibilities such as SMS texting/reference and QR codes in so far as they could form part of an app, but not in themselves. SMS texting in particular is a key possibility for mobile use by libraries but we only touch on that here.

Although one of the key issues, we are not focusing in any depth on the vexed issue of gaining mobile and in particular app-based access to vendor databases and full text and the rather convoluted and various vendor-implemented processes required to identify yourself on the mobile device as a member of an institution and gain full access, particularly to full text.

As these exclusions clearly indicate, the options for mobile apps and mobile websites is only one aspect of a much broader mobile Library service picture.

Cisco (2012). Gen Y: New Dawn for work, play, identity. CISCO Connected: World Technology Report.. Available at <http://www.cisco.com/en/US/solutions/ns341/ns525/ns537/ns705/ns1120/2012-CCWTR-Chapter1-Global-Results.pdf> Accessed Jan 4 2013

Part One

Gathering Background Information

In this section we provide some general contextual information, the results of a small survey of Irish libraries that was undertaken, and a range of case studies based on visits made.

Mobile devices - Timeline and Trends

To provide context, a simple timeline is here presented with a few key dates. This makes no pretence of being comprehensive.

1970s	Early efforts at portable phones started around the same time as efforts on portable computers, in the late 1970s
1990s	The World Wide Web introduced in early 90s
	In the mid-1990s truly useful devices emerged, with the pocket able PDA such as Palm coming to market
	Smartphones emerged in the late 1990s
2000	The first camera phone
2001-2002	Palm software was included in mobile phones, Microsoft launched its Windows mobile software and the Blackberry from RIM emerged – features phones are cutting edge devices. Reading email and taking low resolution photos possible, browsing the web more an idea than a reality
	Apple's iPod was released in early versions ⁷
2007 June 19	Apple release iPhone/iPod and the App store, a step leap in the multifunctional mobile device, the first touchscreen smartphone. Not just texting and phone calls – here you had full web viewing, fully rendered web pages to move around in plus listening to media, creating photo and video all on the mobile device not the desktop – this was the game change when it came to viewing the web on mobile, a totally different experience to the early WAP access, which was mainly text based with limited colours and used over slow connections.
2009	the first Android device is made available
2010	Apple release the iPad The app store and other stores really take off
2011	Pivotal year for the mobile device The ComScore report “2012 Mobile Future in Focus” summarised this succinctly: “2011 was a pivotal year for the mobile industry, marked by the dramatic rise of smartphones in the mainstream, the burgeoning of tablets and other web-enabled connected devices, and a cultural shift toward cross-platform digital media consumption.” ⁸ They go on to note that smartphones approached parity with feature phones in ownership in that same year and surpassed feature phones in terms of new purchases, reaching 60% of new mobile phone purchases by year end due to the rollout of cheaper smartphone options, particularly Android devices. ⁹
	App user reaches parity in US and EU with use of the mobile browser
2012	Smartphone ownership reaches tipping point
	Exponential tablet adoption from 2011 and the emergence of the smaller mini-tablet through 2012 presents quite a challenge in terms of library strategy, as libraries juggle with the desktop, the laptop and netbook, the tablet and the small screen smartphone user.
	The multi-device user, making use of devices simultaneously

2. Quinn, C. N. (2011). *The Mobile Academy*, John Wiley & Sons. P. 7

3. Comscore (2012). 2012 Mobile Future in Focus: Key Insights from 2011 and What They Mean for the Coming Year. p.2

4. Ibid. p.7

	<p>As ComScore noted in their report:</p> <p>“..It is important to note that as tablets gain popularity among users, they are not replacing mobile phones or computer. Rather, it would seem that tablets are supplementing a multi-device diet that is increasingly becoming the norm among consumers...the rise of the “digital omnivore” – consumers who now go about their days engaging seamlessly through multiple online touch points.”</p> <p>The 2013 ECAR survey of undergraduates in USA and Canada found that 58% of respondents owned 3 or more internet capable devices.¹⁰</p>
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It is also worth noting the surrounding factors to this entire mobile device explosion and take up: costs coming down; improved 3G and 4G networks offering up to 1GB per second transfer speed; Wi-Fi becoming widespread and often free in locations, allowing a shift from phone calls only to widespread use of mobile media as well without incurring large costs; CPUs in mobile devices offering 1GHz and more comparable to netbooks; inclusion of facilities to target the mobile user on the move – gyroscopes, compasses, GPS capabilities¹¹ and the explosion of mobile apps/websites which make the investment an attractive proposition.

Library timeline

We have gleaned less information regarding the mLibrary timeline but development has been going on for around a decade. Here are just a few sample dates followed by some discussion of the relatively low and slow rate of development in this area.

2004	Individual libraries such as Ball State University and North Carolina State University created mobile library websites for ease of use on feature phones, pioneers in this area
2009	District of Columbia Public Library. Built app to browse and search library materials, translating catalogue search to mobile setting
2010	Libraries start to use location sensitive features. In early 2010 North Carolina State University released Wolfwalk, a historical walking tour with archival photos used
	Webapps at NCSU and Penn appear that use not listing styles but icon layouts, as found on native apps and libraries begin more widely to develop mobile optimised websites
2013	A sizeable number of libraries still have no mobile-friendly catalogue or other presence – at the same time significant numbers of native and web apps have been developed by libraries

¹⁰ <http://net.educause.edu/ir/library/pdf/ERS1302/Eig1302.pdf>

5. Oller, R. (2012). *The Future of Mobile Learning*, ECAR. May 1 2012, p. 3



Examples of libraries who were early developers in this area and their webapp launch screens

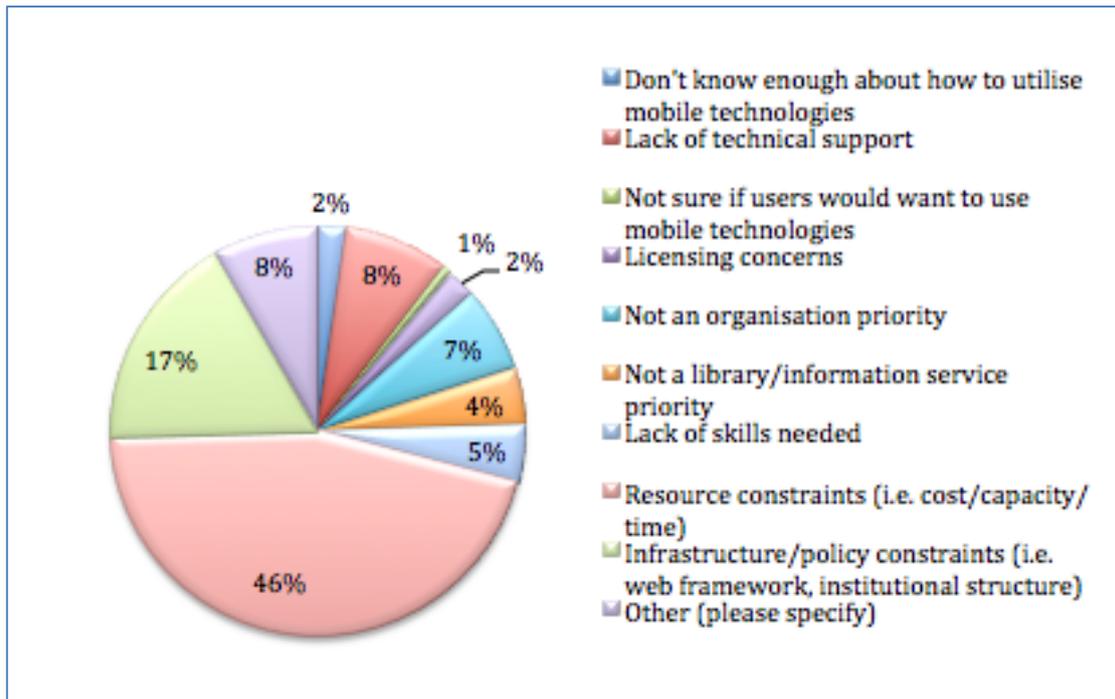
It could certainly be argued that overall libraries have clung to the desktop-based internet age but have not fully grasped the mobile-based connected age in their strategy or service and resource offerings. Reasons may be many: lack of strategic vision; lack of skill sets; lack of resources; lack of user-led demand.

In the introduction to his book *“Using Mobile Technology to Deliver Library Services: A Handbook”*, Andrew Walsh notes that although libraries were early and enthusiastic explorers of the web, they have been by comparison fairly slow to wake up to the need to consider how libraries target the various mobile devices that are joining the desktop web as standard internet devices to access mobile media, and form up library strategies:

“Libraries seem to have engaged enthusiastically with the early web, with many of us having web pages by 1995...However, most of us seem only recently to have started to think about engaging with mobile phones or mobile computing..”¹²

Our survey to establish the situation in Ireland, covered later in this report, would certainly back that statement up. One problem is resources including finance and skill sets. The JISC m-Libraries end of project works included a survey question on this issue and the results as summarised in the following diagram reflect this problem:

6 Walsh, A. (2012). *Using Mobile Technology to Deliver Library Services: A Handbook*. London, Facet Publishing. Introduction p xiii



Primary barrier to utilising mobile technologies¹³

Still, things are not standing still, and by 2013 a query on the web apps search engine uQuery (www.uquery.com) for “university library apps” provides a good number of sample app results however by 2013 to show that significant numbers of libraries beyond Ireland are trying this out and the sorts of thing going on.

Case Study One provides further information around the mLibraries Support Project, which attempted to provide a base of support for mobile library development in the UK, with mixed results in their own view.

¹³ Mobile Technologies in Libraries End of project survey: barriers/challenges to implementation. Available online at <http://mlibraries.jiscinvolve.org/wp/2012/12/05/end-of-project-survey-barrierschallenges-to-implementation/> Accessed Dec 19th 2012

Case Study One – The mLibraries Project in the UK

Birmingham City University



On Tuesday, May 14 2013, Jo Alcock and Anthony Humphries of Birmingham City University were interviewed in Birmingham city centre. Anthony works as a Library Assistant and Learning Resources Co-ordinator within the BCU Library. Jo is a researcher with BCU's Evidence Base (www.ebase.bcu.ac.uk), a team of researchers and librarians who support the information community and conduct research projects to improve services in libraries throughout the UK. The meeting was arranged to find out more about Jo's work on a mobile libraries project, and also to find out from Anthony about his work with augmented reality software.

M-Libraries Support Project

Jo has been instrumental in the JISC-funded M-Libraries Support Project, which began in November 2011 and ran until September 2012. Part of the meeting was arranged to find out more about this mobile library community support project, the purpose of which was to conduct research, gather information and highlight mobile technologies and services being offered by libraries to their users. Case studies from UK libraries were a big part of the project and were to cover three main areas:

- Existing library services which have been enhanced by mobile technology, e.g., roving programmes which now utilise iPads or other mobile devices.
- Library content – the provision of eBooks, journals and other content optimised for mobile usage.
- Mobile technologies and programmes that enhance library functionality – the use of QR codes, augmented reality, mobile websites, apps that include mobile versions of library catalogues, location services, etc.

A blog titled Mobile Technologies in Libraries (<http://mlibraries.jiscinvolve.org/wp/>) was set up as a support platform and to share information about the project as well as to showcase some of the library case studies. An initial survey was distributed in November 2011 to find out what libraries were doing with mobile technologies and the extent of knowledge in the area. The survey found that many libraries were enthusiastic about adopting mobile technologies but also highlighted resource, infrastructure and skills barriers that prevented some libraries from implementing any type of mobile technology to enhance their services to users.

A second survey was run at the end of the project to see how activity had changed since the start. Most libraries were planning on working with mobile technologies if they hadn't already done so and confidence levels in implementing and using these technologies were high, but the some of the same barriers were noted, namely resource and infrastructure constraints.

Jo explained that though a lot of good feedback and usage scenarios for different technologies came out of the project, overall it wasn't as successful as the project group had hoped. As a support mechanism, the m-libraries blog will continue, though the project is over and no longer being funded. [as of June 2014 this blog has not been updated since December 2013]

Desirability of an overall Library mobile strategy

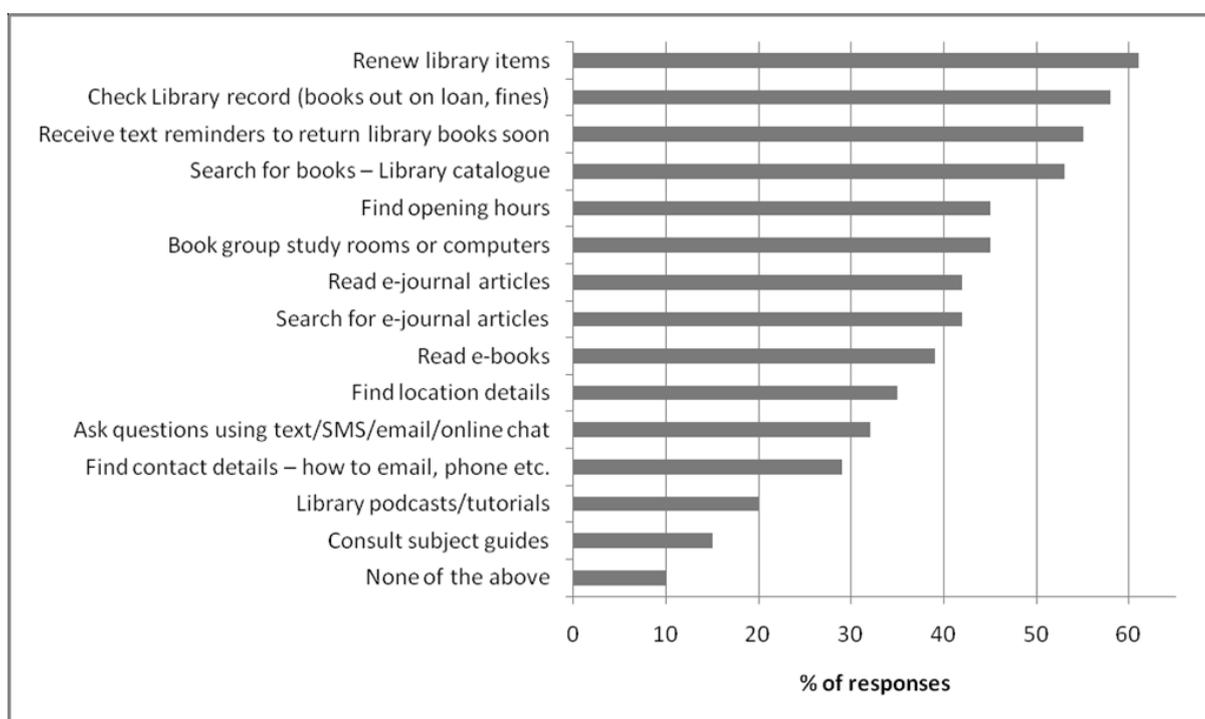
It would seem that the time is certainly now for libraries to develop a comprehensive mobile strategy, and any app development would form just one part of the strategy. University of Glasgow provides just one example of a Library that has been working on this area since 2010 in a systematic manner. Here are their 10 priority areas for overall mobile strategy as of 2012 and one of the things this shows quite clearly is that a comprehensive library mobile strategy would need to involve staff from all teams, among them IT, collections, user services, user education, website managers. Another is that an mLibrary strategy may well cut across the usual divisions under which strategy is formulated in a library:

1. Creation of a mobile Library website
2. Adoption of QR codes
3. Investigation of instant messaging enquiry service
4. Mobile e-book strategy
5. Investigation of SMS/Text messaging Library notices and enquiry Service
6. Bluetooth
7. Development of a mobile user education strategy
8. Mobile infrastructure
9. Development of a mobile promotion and evaluation strategy

10. Development of ‘Live Lab’ concept for device and service testing ¹⁴

Libraries will need to make a decision as to whether they develop mainly what users express a wish for, or take the lead in developing a wider range of mobile-optimised services on the grounds that users cannot express a desire for things they have no idea are possible on mobile.

Birmingham City University found in a survey undertaken in 2012 that though mobile device ownership was high, users were entirely pragmatic in their priorities for mobile development. They want a fairly small number of practical solutions to practical issues: in this particular study the top 3 priorities for mobile options from the library were renewing books, checking user record and SMS reminders: librarians can get carried away with all sorts of developments such as complex virtual tours, photo slideshows or Augmented Reality apps that are possibly not likely to be used.



*The dangers of librarian-centred mobile development:
what students really want on mobile¹⁵*

Evidential basis at University College Dublin to date

At UCD Library we can take 3 examples and provide snapshots of where things are locally:

1) YouTube channel. We have much expanded our range of video.

In 2012 8% of the views of our library video channel content were initiated from mobile devices. In 2013 this figure was 10%, of which 60% was from mobile phones. In the first half of 2014 this figure is 11%, evenly divided between mobile phone and tablet devices to access the video collection.

¹⁴ Library, U. o. G. (2012). University of Glasgow Library Mobile Strategy. Available online at http://www.gla.ac.uk/media/media_203782_en.pdf. Accessed Dec 18th 2012

¹⁵ Birmingham City University case study available online at <http://mlibraries.jiscinvolve.org/wp/2012/03/27/using-sms-to-reach-students-at-birmingham-city-university-library/> Accessed Dec 19th 2012, p. 7.

According to the YouTube website, as of 2012 more than 20% of global YouTube views come from mobile devices so clearly our mobile use is well below the average at this point in time, just very steadily increasing.

2) Use of our desktop and mobile websites from mobile devices (including tablet)

Use of our Library websites from mobile devices (smartphone and tablet) is edging upwards at the same gentle pace, as shown in the table below.

A number of individual pages such as opening hours account for approaching a third of all use from a mobile device now.

UCD Library website pages – access from any style of page from a mobile device 2013/2014													
	<i>Apr 2013</i>	<i>May</i>	<i>June</i>	<i>Jul</i>	<i>Aug</i>	<i>Sep</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>	<i>Jan 2014</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>
Visits from mobile devices to any page	7027	6799	2688	1982	2320	7038	8903	8842	6631	5587	7357	9252	11304
Visits % of total from mobiles	10%	12%	9%	7%	8%	12%	10%	11%	14%	13%	12%	14%	16%
Page views from mobiles	19708	23597	8011	5603	6572	21342	24234	23385	18286	14773	17134	22837	31349
Page view % of total from mobiles	13%	19%	13%	10%	11%	13%	13%	14%	20%	15%	13%	17%	21%

3) Use of our catalogue

In January 2013 7% of visits to our catalogue came from mobile devices. For the first 6 months of 2013 between our two mobile catalogue options Encore mobile and AirPAC there were a total of 15,247 sessions initiated from mobile devices.

Overall in the first half of 2013 around 6% of catalogue search sessions came from a mobile device, a modest figure.

Use of website from mobile devices

For the calendar year 2012 4.6% of visits to the website came from mobile devices at ITT, with complete dominance of Apple devices. This included 5,495 visits out of a total of 121,877

Concluding thoughts

These figures are just snapshots. A few additional statistics provided by those responding to our survey of Irish libraries were very similar to our own figures at that time (2012). This is all broadly in line with global and wider analysis of mobile sourced web traffic. Mark Power, in a JISC briefing paper, provides various other statistics of use of the web via mobile and makes the key point that there are two aspects to this: actual % of use of web via mobile devices at the present time which are clearly modest, but the perhaps more important steady upward trend in that figure which can be observed taking place.¹⁶

¹⁶ Power, M. (2012). Delivering Web to Mobile. TechWatch Report, JISC Observatory CETIS UKOLN. May 2012. Available online at <http://observatory.jisc.ac.uk/docs/delivering-web-to-mobile.pdf> Accessed Dec 20 2012.

Irish developments and plans

Looking at Ireland overall, it was estimated by a number of market research agencies (Amarach, Red C) that by early 2013 70% of the Irish population would operate with smartphones, and tablet ownership increase from 10 to 40%. ComReg had more conservative estimates of 50% mobile phones in Ireland being Smartphones at start of 2013.¹⁷

Certainly our local UCD feedback with students in 2013 does relate to this (see below) : they had invested heavily in Smartphones but as yet tablets are not commonly owned: the cheaper models coming on stream may present a different picture now, 12 months on.

To establish an overview of university and library mobile website and app development in Ireland, we put together an informal survey in Survey Monkey

We initially requested that this be filled in using the lir-I Irish mailing list with a reminder sent about a week later.

Results suggested that there was some ambiguity and lack of understanding of a few questions and from a few respondents but this was not a problem overall.

Libraries represented in responses

30 replies were received in late December 2012, but after removal of entries with zero useful content and merging of duplicates from the same institution a final listing of 23 institutions remained as shown in the table below, a disappointing aspect of our research. Nevertheless some useful leads were established and the project timeline did not allow for further follow up activities on the survey, the results are thus viewed as a snapshot rather than a comprehensive view of progress in Ireland as had been hoped for and we will provide only a little detail of it.

One has to be aware of the rapid pace of development: at DCU, for example, a pilot using the Layar application has now been undertaken, but that was not in process at the time of the survey¹⁸. And Maynooth have now had their library app re-developed for start of semester 2013 so any information about that in the survey is now outdated. A number of other such notes are added in the sections below.

Children's University Hospital Temple Street
Daughters of Charity
DCU Library
DIT Library
Dublin Business School
Dublin City Public Libraries
Dublin Dental University Hospital Library
Failte Ireland
GMIT Library
Health Service Executive, Regional Library & Information Service Dr. Steevens Hospital
IADT, Dun Laoghaire - The LILRC

¹⁷ In ComputerScope January 2013, p 20. referenced by Martin Cullen of Microsoft Ireland, Alan Brown of O2

¹⁸ Presentation at LIR Annual Meeting, March 22nd, Dublin Ireland about use of the Layar app to provide added information on information posters around the Library.

Institute of Technology Carlow
Institute of Technology Sligo Library
Institute of Technology Tallaght
Irish College of General Practitioners Library and Information Centre
NUI Galway, James Hardiman Library
NUI Maynooth
Royal College of Surgeons in Ireland
School of Celtic Studies, DIAS
Sligo Libraries (Sligo County Council)
St. Angela's College, McKeown Library -
Trinity College Library Dublin
University College Dublin Library
University of Limerick Glucksman Library

Valid survey responses received

Some key survey findings with supplemental information on post-survey developments

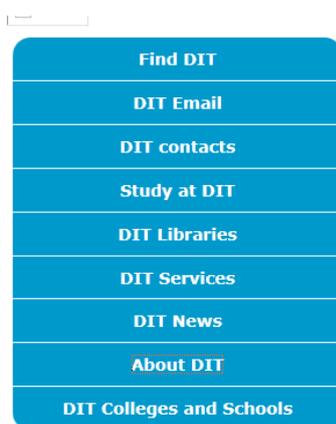
AT THE INSTITUTION LEVEL

1. Institution-wide mobile websites and web apps

A key finding is that few third level institutions in Ireland have developed a mobile website, designed specifically for small screen devices, perhaps a surprising thing. UCD intended for Sept 2013 to develop their web pages for new students with a mobile version for the first time.

DIT

DIT indicated that they had an institution-wide mobile website at <http://dit.ie/mobile/>



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However, this appears at time of writing (Oct 2013) to consist of a home page only – all links take users to the standard desktop layout website pages for the details as far as could be checked.

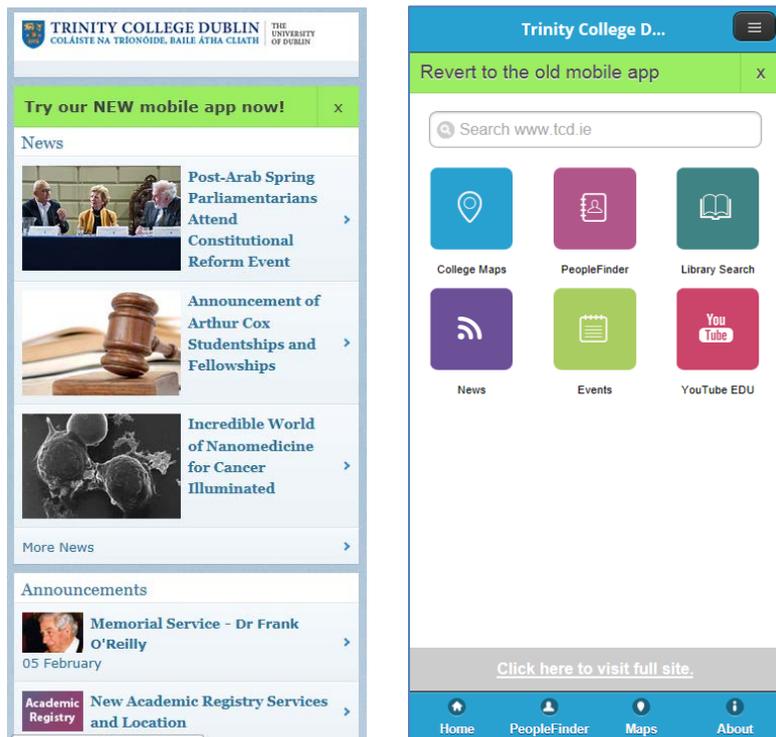
St Angela's College

St Angela's College indicated that they had made use of the service <http://mobile.dudamobile.com> to build a mobile website, but as of June 2014 this is not working.

This provides a fairly full mobile website for the college, though some sections such as prospectus just revert to the standard desktop display and some areas have a few performance issues.

TCD

Though not reported in the survey, TCD do have a university mobile website available, alongside their native apps. The earlier version has however now been replaced with a web app approach and the old and current screens are shown below for information:



Old mobile website

New site – a web app approach

See Case Study Three below for further details and screenshots of this.

NUI Galway

NUI Galway are opting strategically for mobile services offered via the web rather than any development of native apps –

“Our big plan on the mobile landscape is to develop a mobile-specific suite of services delivered through the web. It will be quite pragmatic - the core services one would expect, with very few frills, but a huge emphasis on speed, functionality and reliability.”

2. Responsive Web Design at Irish institutions

Interesting feedback emerged from the survey of Irish libraries about the alternative approach offered by advanced responsive web design, which we did not ask explicitly about in the survey, having focused on mobile websites and app options. It seems from conferences and presentations that there is a strong view held by some that both the app and mobile website routes are not the

way to go and that truly responsive website design is a much better route to pursue: the ability to make such a move depending on how the institution manages the websites and either technical and design expertise or finance to pay an outside development agency.

IT Tallaght

IT Tallaght noted that they are not creating a separate mobile site or apps, but have developed a fully responsive website that scales to smaller screens and are following that strategy at <http://www.it-tallaght.ie/> As of January 2013 this development was highlighted on their home page and in November 2012 detailed information was made available about this initiative, developed in partnership with Granite Digital/Digital Crew (www.digitalcrew.ie), a web design company based in Cork, on their website:

“This enhancement to the website recognises the huge shift in website access platforms from traditional PCs & laptops to tablets, smartphones and other mobile devices, ensuring the website meets the needs of today's users. Our website is now fully responsive which is a first for any Higher Education Institution in Ireland”

Both images and layout adapt to the form factor of the accessing device, with more or less non-essential content displaying to suit the device screen, as these screenshots show: the Library is not part of this new design at present and has implemented its own solution based on Library Anywhere – but that was due to change in later 2013 – please see case study below.



Case Study Seven below provides further information on the ITT Library strategy as regards the responsive web design route or more dedicated library apps.

Responsive Web Design takes hold post-survey

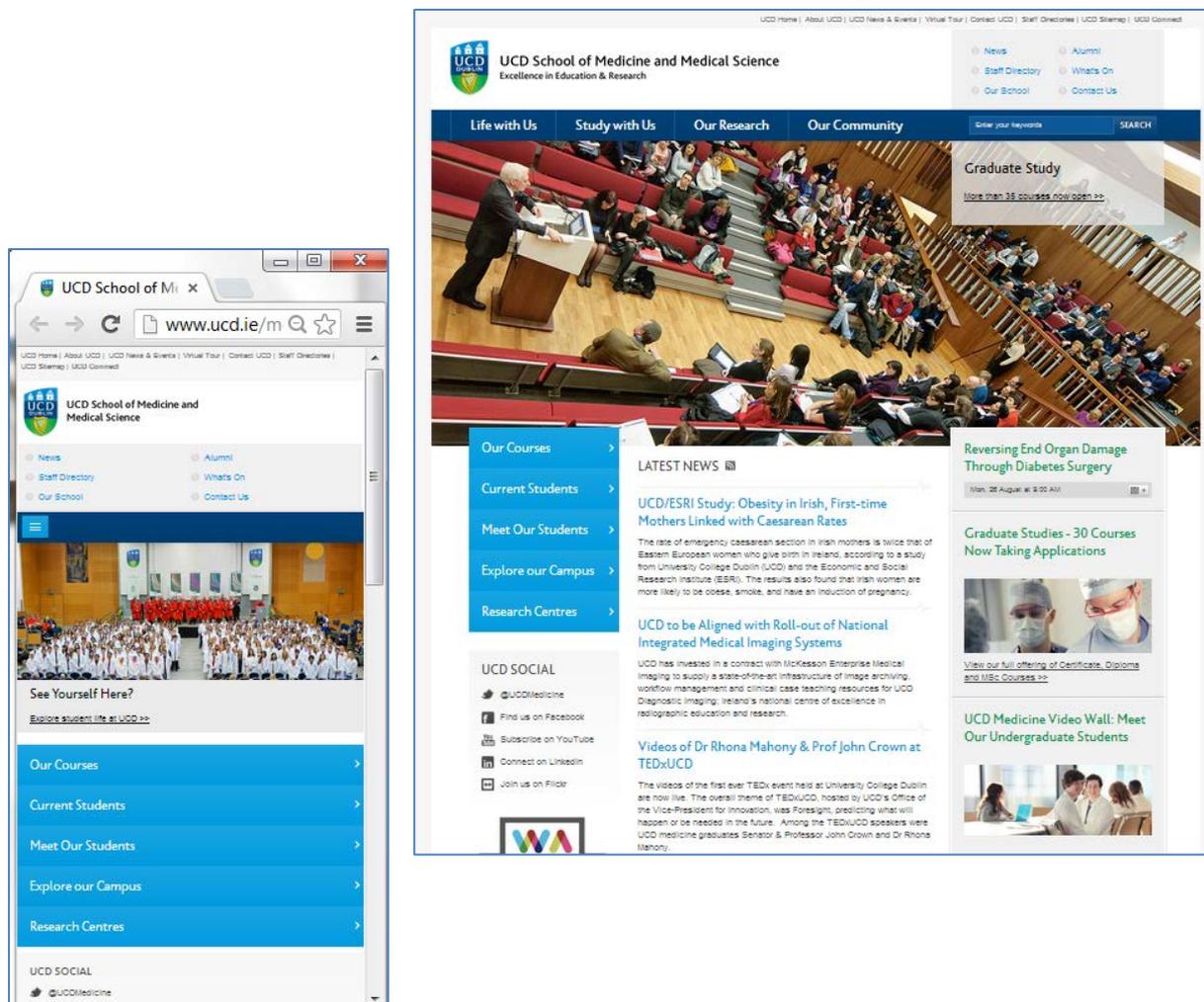
There has been some development in the area of responsive web design in Irish institutions since this survey was conducted.

In addition to IT Tallaght, other universities seem to have updated their websites to some form of responsive design among them Galway Institute of Technology and DCU.

UCD

The School of Medicine at UCD, who had a new website in 2012, have had a fully responsive one designed for them, using the T4 CMS which can support such developments with no difficulty, if funding or staff expertise is available for that development (<http://www.ucd.ie/medicine/>)

It should be noted however that something is lost in not developing a more focused set of content as a mobile website or app and an alternative view is that there is a place for a select or single-theme app alongside a fully RWD web presence.



RWD screenshots from the UCD School of Medicine website

3. Institution-wide native apps

Few respondents indicated that their institution as a whole had an app for the whole enterprise, of those that do have, all have developed them in different ways.

DCU

DCU have an app, currently it is available for

iPhone(<https://itunes.apple.com/ie/app/dcu/id463730378?mt=8>) and Android.



This app is not current, with no updates since 2011 and it may be that this approach is being replaced, though it is still available (June 2014) in the app store.

NUI Maynooth

They have an app "The Maynooth app" for iPad, iPhone and Android. This was updated in September 2013.

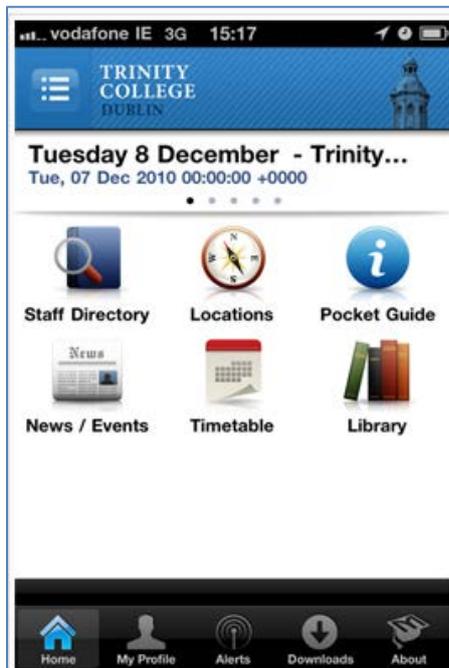
It includes a little Library content including summary of opening hours and a link to the separate Library app "NUIM Library" (see below under library-specific survey results).



Screenshots from the NUIM app

Trinity College Dublin

TCD have a general app, last updated June 2013 (as of June 2014) which is for current students (<http://isservices.tcd.ie/internet/tcdstudents-app.php#features>) and is available for iOS - all platforms - and Android. This was built using CampusM, a third party solution also widely used in the UK by around 25% of universities there: sample sites include Lancaster, Edinburgh and Imperial. (<http://www.ombiel.com/>)



Regarding library content, there is a link to the library mobile catalogue in it, included from the springboard page, as shown above.

UCD has built an app using Blackboard Mobile

UCD used a different third party app development solution from Blackboard.

See Case Study Two below.

Case Study Two – Building a university app using a third party solution: Blackboard Mobile at UCD

Choosing a realistic development path at UCD for apps

Sheffield Hallam was the first university in the UK to go live with the Blackboard mobile app solution in February 2011, and Liverpool is another example of a UK customer.

University College Dublin has followed this route also with in excess of 24,000 downloads to date (May 2013).

They already had the Blackboard VLE which is included within the app making a very good fit with a key online environment that our students want on mobile, and were looking for a third party solution so that coding was not required locally due to serious staff resource constraints. They also wanted a solution which pulled in other ready to go interfaces such as YouTube and Flickr so content could be quickly made available.

Currently it is available for iPhone (<https://itunes.apple.com/ie/app/university-college-dublin/id459396981?mt=8>) and Android.

The app is in constant development and improvements in the short term will include addition of grading information for students and programme information.

In a discussion in May 2013, IT Services staff confirmed their intention to remain with this solution which is a realistic solution for UCD providing acceptable results within their staff resources: any solution required extensive local coding cannot be supported at this time in the University.

The future

The CMS in use at UCD, Site Manager from T4, is quite capable of supporting fully responsive web design and the School of Medicine is a recent example of such a local implementation (<http://www.ucd.ie/medicine/>) .

IT Services however feel that at this stage there remains a strong case for the app, partly to provide a concentrated focus on key functionality required on the go. They are also not convinced that the local features of the mobile device such as geolocation systems and camera can be fully made use of via the web app route. At this point in time they are fully committed to further app development.

The place for extended Library content in the UCD Blackboard app

Discussion in May 2013 focused particularly on the potential to extend Library content in this third party solution app, and to what extent that was possibly should agreement be reached about that.

At May 2013 the university app contains a Library link on the opening springboard page, which links to the library mobile catalogue. That in turn provides a link to opening hours. There is some information about library locations and opening hours within the app which is navigated to from the Directory and the map, a little hidden away. There is a difficulty with the opening hours information currently as it occurs in places where it cannot be pulled in dynamically and the Library has to inform IT Services every time opening hours change and this has to be updated manually with a 24 hour turnaround time.

The Library YouTube channel is also included in the video section.



The opening springboard page of the UCD Mobile app, and the library catalogue screen once the Library option is picked

Library location, Library opening hours info and Library search/reserve/renew functions i.e. catalogue range of functions, which could be regarded as the core user requirements are thus included.

Getting beyond that core range was what we wanted to discuss in the case study, and the extent to which this would or would not be possible due to the technical limitations of the package or University policy.

A greater immediate library impact via its own landing page

There is some “tension” in the views of Library and University in regarding to presentation. IT Services were keen on integration of Library content into broad areas such as video and news. The Library was keen on the contrary to have all of its content gathered together more visibly from a sub-landing page.

The key point from the discussion in this regard was that given that this is a University wide app, the Library is unlikely to get more than one icon onto the main springboard. However, there would be nothing to stop that icon taking users to a Library springboard of its own, rather than direct to the mobile catalogue. On that landing page could be laid out all the key library offerings; catalogue, news, events, images, courses, mobile databases, opening hours, comments and feedback, contact information and any other innovations such as built in scanners.

Such an additional library launch page could not be held within the app – being a third party solution, such development was not possible other than by Blackboard themselves – but would have to be a web app development of the Library which could then be linked to. The development work would have to be undertaken by the Library. Essentially then the Library would need to develop its own web app which could be integrated into the University app was the message.

We could also offer our web app independently and envelope this in proprietary code and offer it in the iOS and Google Play stores as native apps from one piece of development work, if well chosen as to how that was done.

The University also could develop other new inclusions, such as barcode/QR code scanner for the app – that would have to be put forward to Blackboard as a development request or suggestion.

Whilst getting a single expanded library presence in the app would have to be a local library web app development, a number of opportunities for a greater library presence dispersed across the app did emerge. These included: a Library news feed in the list of news feeds; a number of library tours included in the maps tours such as general library tour, cultural heritage units tour; possibly library images within the images section, though our use of Picasa could be a problem; consideration of improving the information in the app that you get when viewing the places link. The importance of good rapport and formal channels of communication between mobile library champions and university app developers was highlighted here, to ensure libraries get as much exposure as possible in the overall app and be aware of all possibilities.

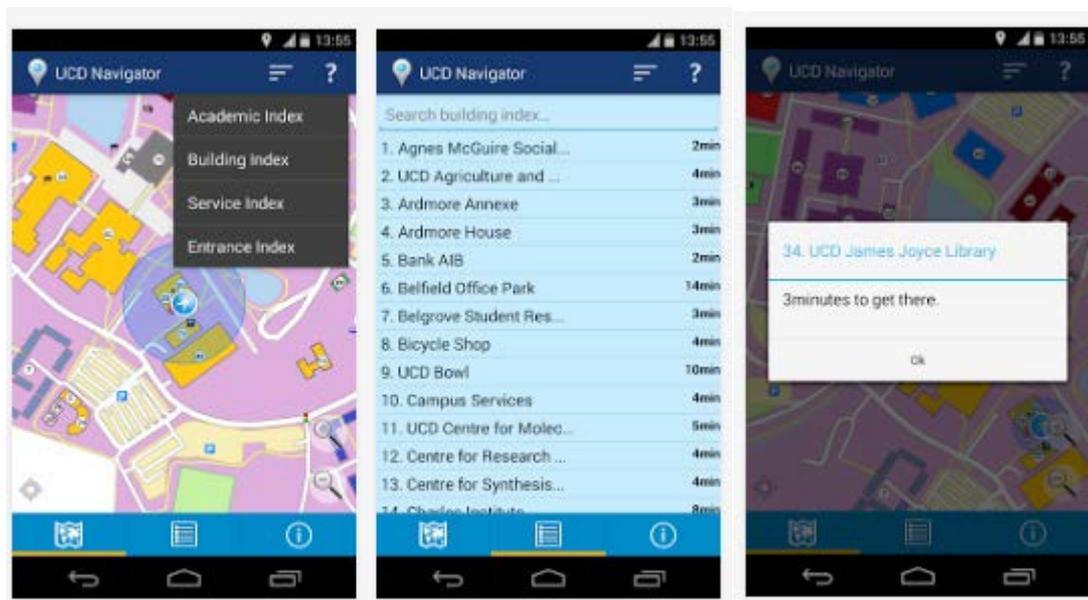
As of June 2014 a new administrative system with more local control but more local staffing requirements had implemented it should be noted. Some statements above about requiring Blackboard personnel to initiate changes and developments are likely now out of date but there has been no further progress regarding expansion of library content in the University app to date.

Here is just one point of view regarding use of these third party solutions, such as CampusM and Blackboard Mobile to achieve an institutional level app:

“Clearly the likes of CampusM and Blackboard Mobile could offer a convenient outsourced solution, but they do so at a financial cost, without providing as much functionality as some of the in-house examples. “¹⁹

Further UCD University level developments

In January 2014 as a personal project UCD student Damilare D. Fagbemi designed and published an effective single function, free Android app ‘UCD Navigator’ for finding your way around UCD, based around a GPS enabled clickable map with various indexes of buildings, services and entrances also available. <https://play.google.com/store/apps/details?id=com.ucdnavigator>



FOCUSING IN ON DEVELOPMENTS AT THE LIBRARY LEVEL

As can be seen in the small number of examples above, where the university has some development focused on mobile users, libraries vary as to how much information and/or resource discovery tools are included within the overall institutional mobile site or app.

The clear next question is whether there is a case for any separate, albeit complementary, library app or library mobile website development and what has been achieved here. These were the next survey questions.

1. Libraries with their own mobile or responsive websites

Development as part of University work

St Angela’s College have a full library website within the overall University mobile website built using dudamobile, already mentioned above.

¹⁹ University, U. o. t. H. a. I. E. N. (2011). The M-Library Project: UK academic libraries going mobile, University of the Highlands and Islands Edinburgh Napier University. p. 11

IT Tallaght have a responsive website which was extended to their library service in late 2013, using a variant design from the University-level website (<http://library.ittdublin.ie/>) See Case Study Seven below.

Health Service Executive, Regional Library & Information Service Dr. Steevens Hospital noted that they do not have a mobile website but their desktop site displays well on mobile devices (<http://www.hselibrary.ie/east/>) and NUI Galway library also noted that their desktop site worked fine on mobile devices.

Sligo County Library noted that they had a blog site www.sligolibraries.blogspot.com that converts for mobile usage, but not a mobile website.

Other than these responses, Libraries have made various efforts to develop their own mobile web presence independent of any university-wide initiative.

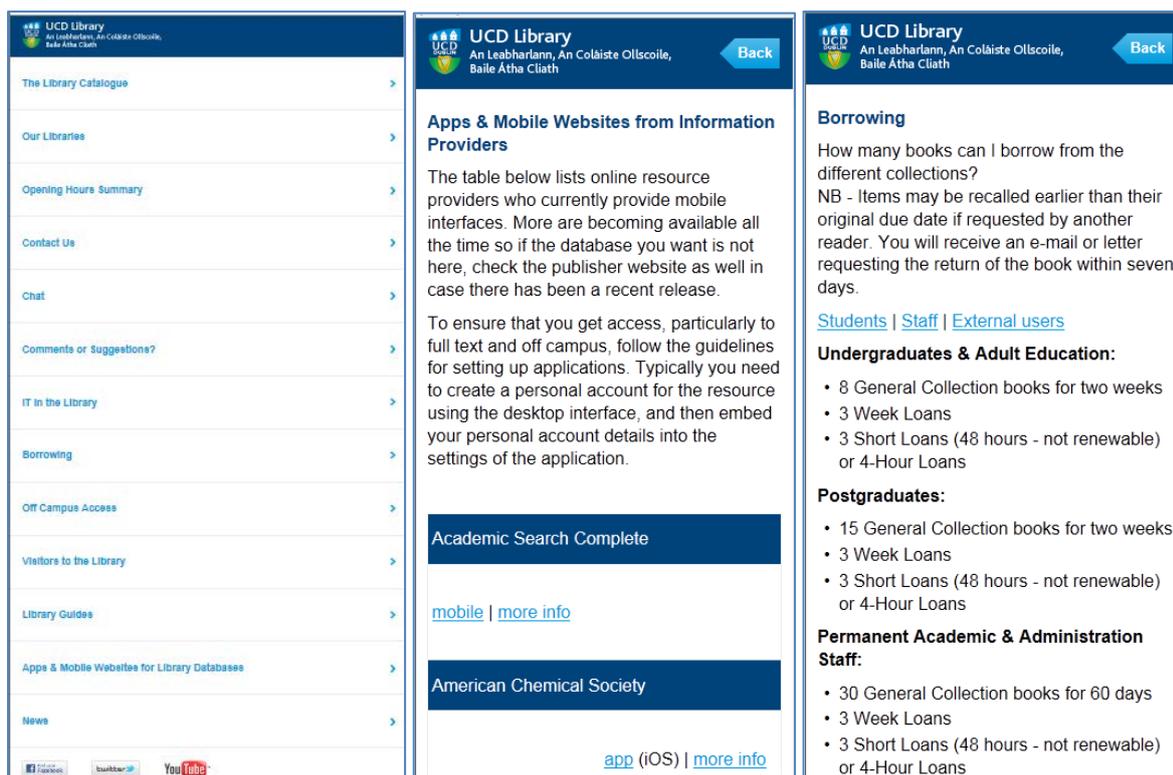
Libraries developing a mobile presence on their own initiative

These vary widely: some of the responses indicate that the Library has a mobile catalogue search presence (sometimes via the LMS provider); there are other individual mobile interfaces as well that can be “cobbled together” into a library mobile website which is more or less just a front door to these third party mobile offerings. Examples would include the mobile websites that various database vendors offer, and the mobile versions that you get automatically with LibGuides and LibCal products from Springshare, and chat providers’ mobile-optimized widgets, which often feature in the mobile websites and apps of libraries that use it. Catalogues for mobile are sometimes enhanced beyond search results with some other functionality and information (such as libraries using the Library Anywhere or Boopsie solutions); finally, some libraries do have more comprehensive mobile websites with a set of pages including a mix of information, resource discovery interfaces and service options such as contacting the Library. These types of development in Ireland are briefly listed below.

UCD

The only respondent who indicated that the Library had its own full mobile website was UCD <http://www.ucd.ie/library/m/>. This was developed as part of the University T4 CMS using mobile specific style sheets and templates. It was decided that there was too much content on many pages to include on a mobile device and too many pages to just use CSS to render the entire site suitably for mobile browsers. Therefore the pages are select and not only that but the selected page content is also much shorter - they are also keyed independently of the main desktop site content - a much briefer set of information is provided - which has its downside in terms of multiple pages to keep up to date. An alternative would be to have a mobile CSS that provided a mobile display of every page and every element of information on the desktop site in mobile suited format – the full library website.

Content is being added to all the time: recent additions include Chat widget and comment and suggestions form, the mobile version of the Springshare online booking and library training calendar. At the time of creation there was consideration of the relative merits of this as against an app.



Screen shots from UCD Library separate mobile website

Though not found in the survey, there would be various fairly simple options for creating a separate mobile website including using a catalogue with extra info approach such as Boopsie (see below) or a cloud based tool such as Springshare (<http://www.springshare.com/mobile/> €299 per year), Google Mobile Site Builder or many other options.²⁰ We do not cover these any further in the report as we view this type of discrete mobile library website as an outdated approach to take.

2. Libraries with a mobile catalogue and/or resource discovery web interface

a. 3rd party solution - Library Anywhere at Institute of Technology Carlow, DIT, IT Tallaght, and GMIT

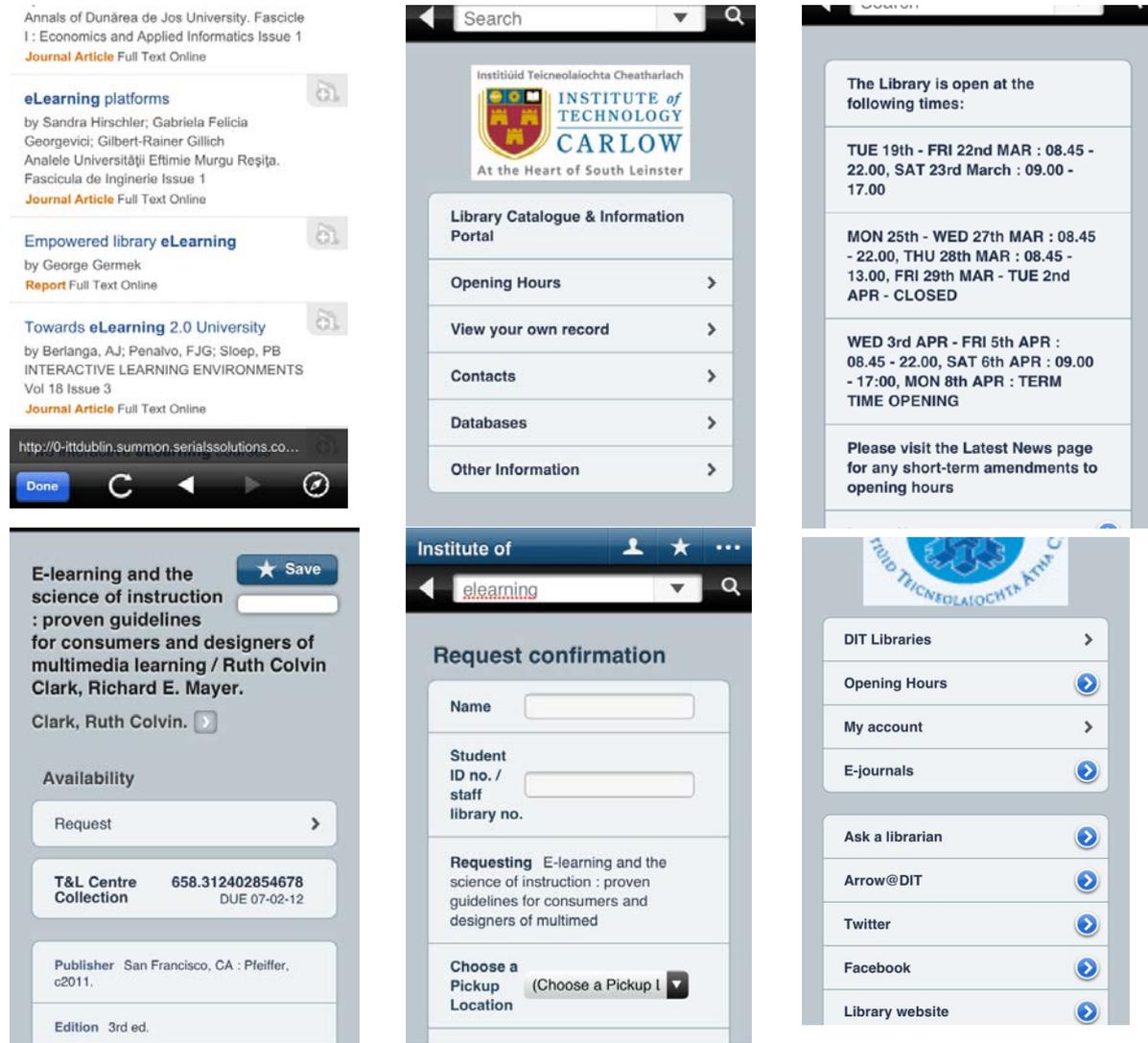
These have all developed their mobile website using Library Anywhere. (www.libanywhere.com)

A considerable number of Irish libraries are using this solution, which is primarily a catalogue interface from this third party (rather than LMS suppliers) with some news, event and contact forms, opening hours and branch information and links to parts of the desktop website or other web interfaces for mobile provided by: resource discovery tools; database vendors; LibGuides and so forth. The solution appears to be fairly hard coded as to functions and appearance from the examples viewed. These screen examples are from IT Carlow.

Library Anywhere also provides an app for their customers who therefore end up with both mobile website and app in fact – the following shots are from the app version. With a few minor extras in

²⁰ A 2014 review of a dozen of these cloud-based and reasonably priced mobile website building options is available at <http://mobile-website-builder-review.toptenreviews.com/index.html>. Accessed Jan 24th 2014

the app such as barcode scanning to move directly to book records, the functionality is identical and the look similar.



Various Library Anywhere screen shots from Irish customer libraries

These are listed Irish users of Library Anywhere (January 2013), please see Case Study Seven for some additional information about its use at IT Tallaght.

University College Cork Library	http://www.libanywhere.com/la/index.php?dofollow=50f55228dfccb6.51568672-467418194
Carlow County Libraries	http://www.libanywhere.com/la/index.php?dofollow=50f552f4814c73.54624397-99278146
Clare County Library	http://www.libanywhere.com/la/index.php?dofollow=50f55454585285.85167237-1596556947
Kildare County Libraries	http://www.libanywhere.com/la/index.php?dofollow=50f554d6714382.21271635-1748066442
GMIT	http://www.libanywhere.com/la/index.php?dofollow=50f55aab25d5f5.02723872-661412790
DIT	http://www.libanywhere.com/la/index.php?dofollow=50f55aeb3f543.22239528-1236926749
IT Tallaght	http://www.libanywhere.com/la/index.php?dofollow=50f55b0c5da462.46992044-909056204
Limerick IT	http://www.libanywhere.com/la/index.php?dofollow=50f55ca02678f1.49369650-522721341

b. Mobile catalogue solution from LMS –

i) Innovative Interfaces at TCD and UCD

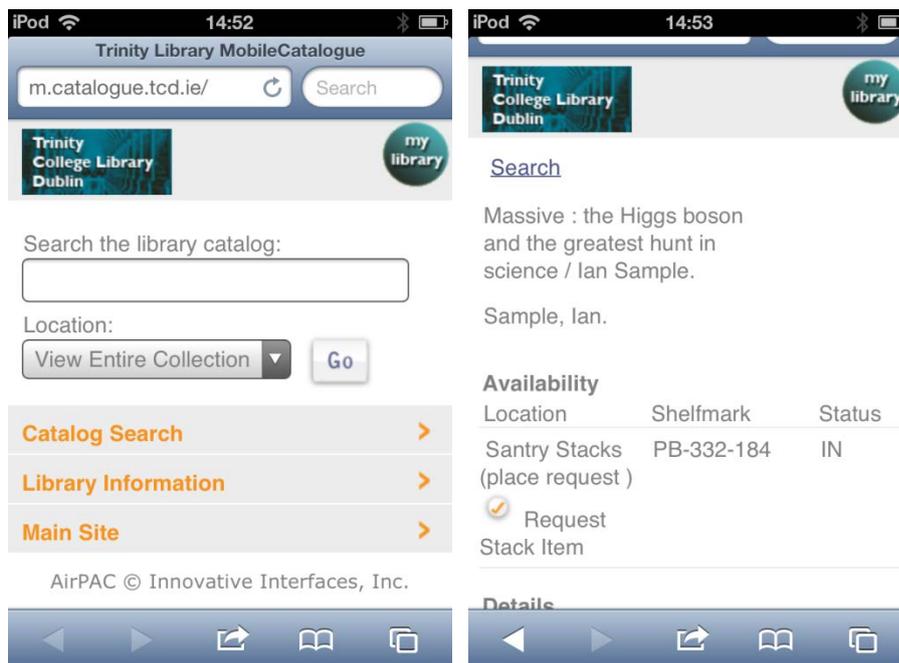
Library Anywhere provides a value-added mobile catalogue for users whose LMS supplier offers nothing or just an alternative and cheaper option for those who do not want to purchase the LMS supplier mobile catalogue add-on module, possibly at high cost: Boopsie was not found in use in Ireland but would be another similar product to Library Anywhere.

However, if the LMS vendor has a mobile catalogue offering then, finances allowing, the Library is perhaps more likely to offer this on its own or to build it into both institution level sites or their own library mobile sites and apps if they have them, often as the top priority service offered.

Both TCD and UCD Libraries make available the mobile catalogue provided by Innovative Interfaces, their LMS supplier. DIT reported that they were looking into both of these options at time of survey in 2012.

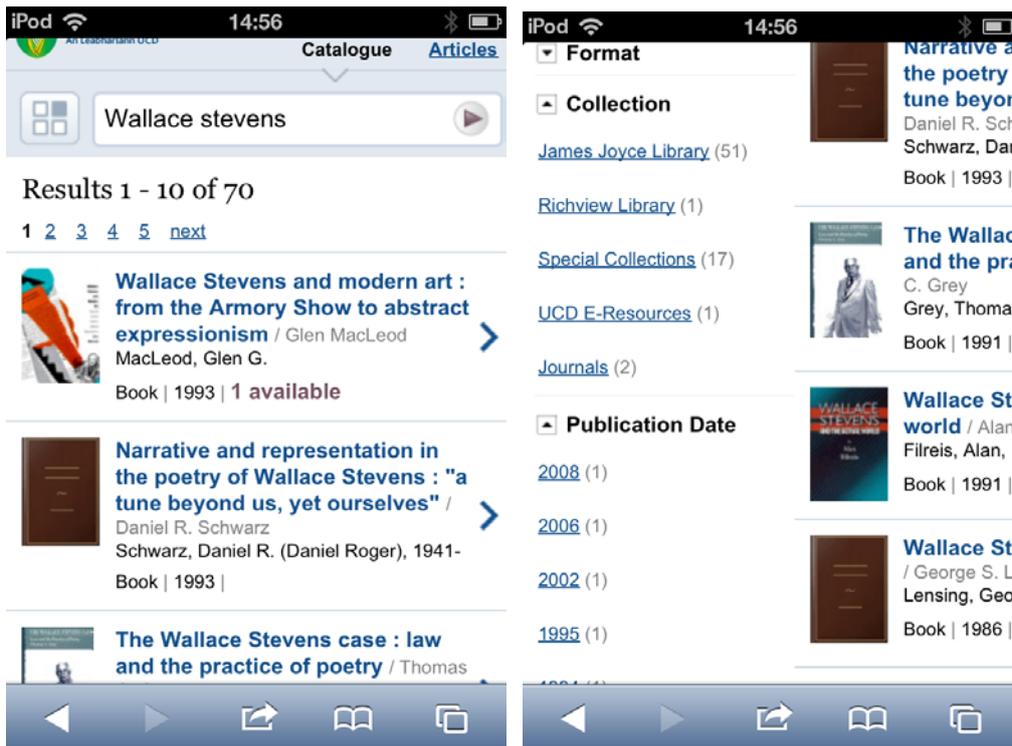
The classic catalogue mobile interface is called AIRPAC and the Encore faceted multi-resource mobile interface is also available, Encore mobile

TCD Library does not have any other mobile library website and offers the catalogue on its own, and it is also part of the University app. This is the AirPAC mobile catalogue <http://m.catalogue.tcd.ie/>



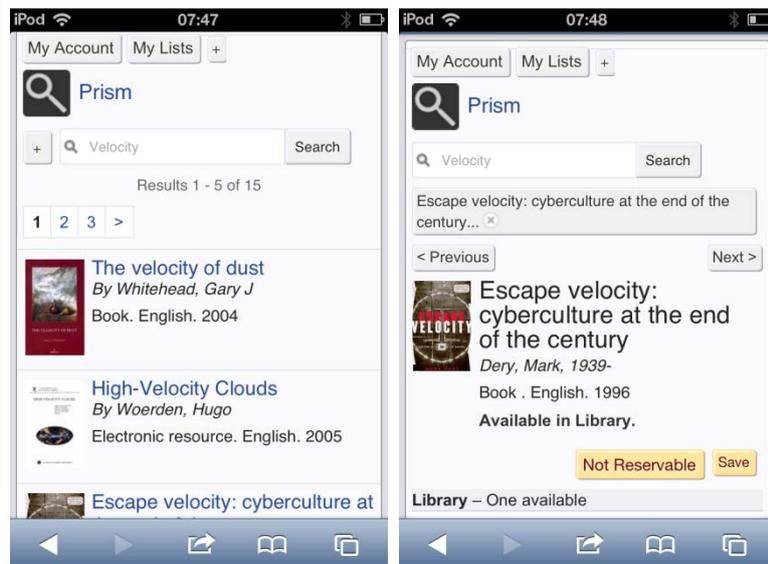
UCD are now offering the Encore mobile interface as their standard mobile catalogue search. <http://library.ucd.ie/iii/mobile>

This is also available via a fuller library mobile website. Within the University mobile app the older AirPAC interface is currently offered but this will shift to Encore mobile 2013/2014



ii) A mobile catalogue from TALIS – DCU and Limerick

DCU have a mobile catalogue at <http://prism.talis.com/dcu/> - when accessing on a small factor device the mobile version is offered to you. In March 2013, University of Limerick also went live with the same mobile catalogue offering from their LMS supplier.



Libraries with their own library app

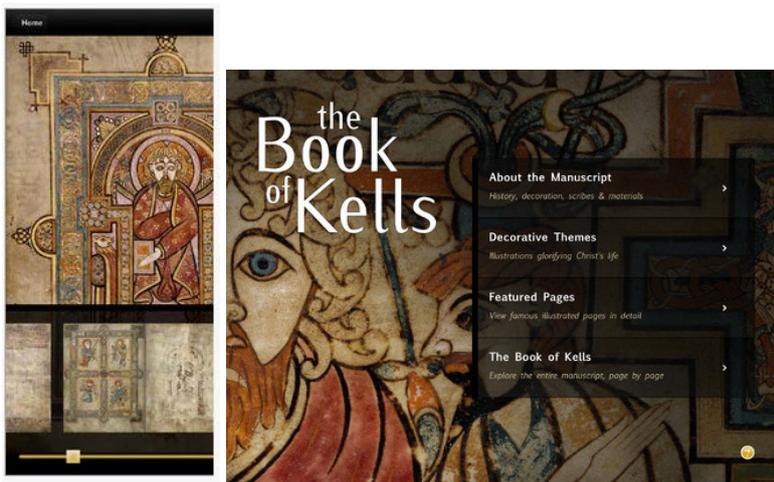
Moving on to look at native apps themselves, as of 2014 Irish libraries are rarely involving themselves in apps at this point.

Summary of findings

- TCD launched the Book of Kells app for iPad in late 2012, a high profile costly app developed by an external agency, X Communications for them, something of a special case.
- Maynooth also have a library app including catalogue search: and Maynooth now also have the FindIt@NUIMLibrary locator app, which is described in Case Study 3
- Library Anywhere customers also have an app version available to users by default
- Since the survey, DCU have been experimenting, not with their own app, but with using the app “Layar” to provide some limited augmented reality functionality in the form of posters around the library with icons that take users through to additional information: it is a system to enhance print.²¹
- In late April 2013 St Angela’s College Sligo went live with their own library android app. See Case Study Three below for more information about this.
- Finally, with regard to library suppliers Innovative Interfaces are now in the process of developing a native app and please see Case Study Four below, covering the Sirsi/Dynix catalogue app which is already live, also of related interest though not found in Ireland.

a) Book of Kells iPad from TCD Library

The costly Book of Kells app for the iPad was developed for them by X Communications. The images used for this highly specialised iPad app were digitised by The Digital Resources & Imaging Services in Trinity College Library from transparencies provided by Faksimile-Verlag Luzern. The app was designed and developed by X Communications. All of the program logic is written in Object C, Apple's own version of the C programming language. Content is defined using XML, HTML and CSS. The total file size for the app is around 670MB, the vast majority of space is used for the images of the 680 pages.



b) Maynooth Library app

Maynooth have an app, NUIM Library, for the iOS platform and a newer book locator app. See Case study 3 below.

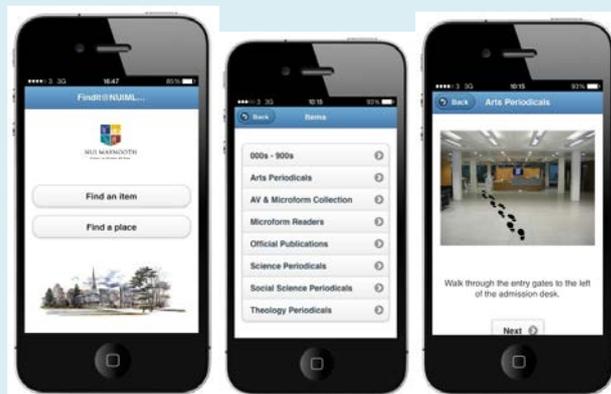
²¹ <http://www.layar.com/> provides further details on this app and system. DCU reported on use of this at LIR Annual meeting Mar 22nd, 2013 Dublin.

Case Study Three – NUI Maynooth Library develop the FindIt@NUIMLibrary app with help from the Computer Science Department

Tuesday, November 5th 2013 interview with library staff members Mary Antonesa, Hugh Murphy and Elaine Bean, and with Dr. Aidan Mooney of the NUI Maynooth Computer Science department.



With the imminent opening of the new NUI Maynooth Library in late 2012, Mary Antonesa, Senior Librarian for Learning and Research Information Services, was looking for a way to assist users with finding collections and other resources and services in the new building. After the release of the original NUIM Library app, spearheaded by Librarian Cathal McCauley and built by Eclipse, an NUI Maynooth company, the library was looking to further develop the mobile environment. As a result, Mary and colleagues Elaine Bean (Senior Library Assistant for Learning, Teaching and Research) and Hugh Murphy (Senior Librarian, Collection Management Services) teamed up with NUI Maynooth's Computer Science department to create the FindIt@NUIMLibrary app.



After initial discussions between Mary, Elaine and Drs. Susan Bergin and Aidan Mooney, lecturers in the Computer Science Department, the task of creating a native application fell to third year computer science student Tommy Kavanagh, working for the Library as part of the department's required 6-month student work placement programme. Tommy was supervised by Dr. Bergin and Dr. Mooney and met with Library staff (mostly Elaine) and the lecturers regularly to go over progress. The NUIM Library app was just one of four apps completed for campus services by Computer Science students during this period.

FindIt@NUIMLibrary

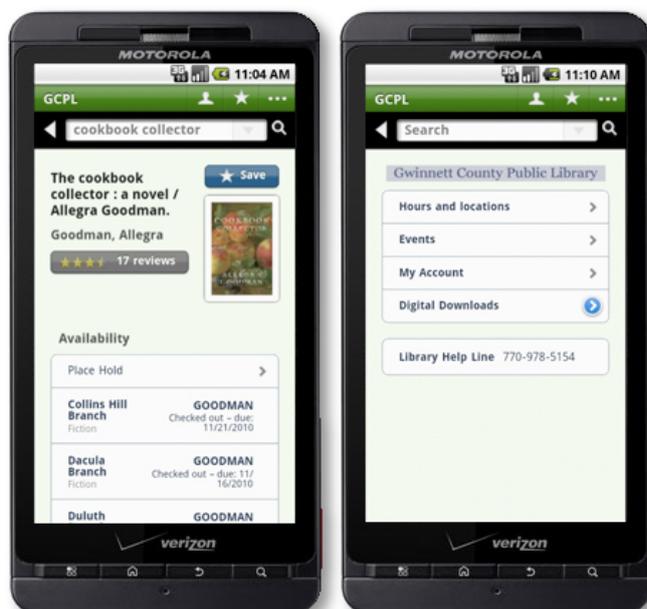
The idea behind the app is simple: to allow a library user to find items (collections) and places in the newly opened library. Starting from the admission desk in the main lobby on the ground floor, the app guides the user step by step via text directions and photos - complete with automated footsteps - to a desired destination. Since the Library's website uses Drupal as its CMS, it seemed logical and more efficient to build the app using DrupalGap, a Drupal mobile SDK plug-in, and PhoneGap, an open source framework that allows a developer to build cross-platform apps using HTML5, CSS and JavaScript. This means the app works in both iOS and Android operating systems. The app does not employ geolocation technology, however, and the user is required to begin his search from the admission desk. Further development of the app could see this enhancement introduced, but not in this version.

Maintenance and Promotion

Prior to the launch on 23rd September 2013, promotion of FindIt@NUIMLibrary consisted of three posts on Facebook, twitter and plasma screens aimed mostly at First Year students. The Library created a poster to go along with this campaign. The Computer Science Department was responsible for packaging the app and placing it in the App Store (iTunes) and Google Play, etc. This service is part of an annual maintenance fee of 100-200 euro NUIM Library pays to the department for upkeep. Elaine Bean is in charge of making edits to the app, which are relatively simple, but adding routes, for example, cannot be done by Library staff.

Lessons Learned

In retrospect, Elaine Bean said it would have been a good idea to be a bit more involved in the step-by-step development of the app, so as to ensure the original vision and purpose of the app was kept intact. According to Elaine, anyone thinking of creating an app for their organization should also begin planning well in advance of development, thinking about the app's raison d'être and what you ultimately want it to do.

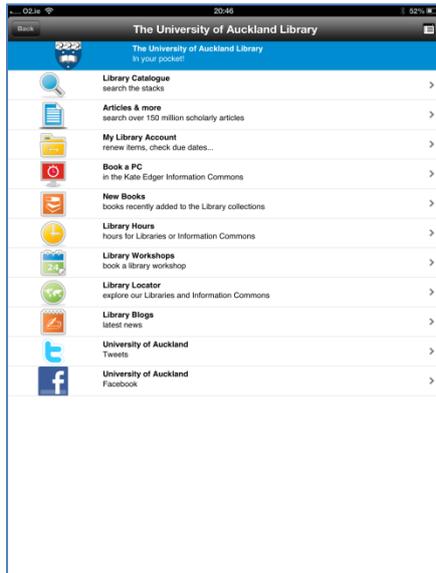


c) The Library Anywhere app

All the libraries that use Library Anywhere for mobile website do in fact also have available an app for iOS and Android for some years – but this is something that library staff may not be fully aware of and did not report back on in the survey when reporting on use of that mobile website solution. This could reflect confusion about the difference between these things. The app is titled LibAnywhere and as with the mobile website, the menu at top right allows you to browse all libraries using the product.

(<http://www.librarything.com/blogs/thingology/2010/11/library-anywhere-android-app-now-available/>) It is a little bit surprising that this app is not given more promotion in the libraries that use Library Anywhere.

There is some extra functionality in the app compared to the mobile website version, notably the ability to use the mobile device camera to scan the book barcode e.g. in another library or bookshop and get the catalogue record up directly showing holdings and availability. Also the ability to check item availability in other libraries nearby, using the locational sensors in the mobile device to pick the nearest alternative libraries to check.

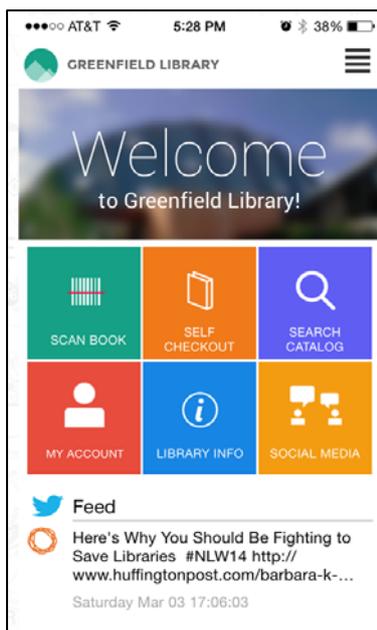


If one wished to pursue a third party solution such as this for mobile catalogue/app with a catalogue search built in, then the alternative produce that is widely used, but not in Ireland, is Boopsie. This perhaps offers more scope for additional content and linkages and there are many examples of apps built using it that can be viewed – to left is a screenshot of the opening screen at University of Auckland.

d) Android app at St Angela’s College, Sligo
See Case Study Four below.

e) Library vendor plans for native apps
Innovative Interfaces are now in process of developing a native app for iOS, with Android to follow, as part of their Sierra platform. This can be seen as “catalogue plus” in its

development containing as it does catalogue search, book scanning with mobile camera, self-issue functions but also including links to the library website, possibly chat and all library social media channels, with twitter in particular highlighted. A very early development sample screen set, shown at the May 2014 user group is given below.



An early sample screen from the ILL native app under development

Please see Case Study Five below for a description of the Sirsi/Dynix catalogue app, live for some years.

General comments from the Irish librarian survey

Some feeling that we are not keeping up in the area of mobile services plus concerns about resources were the two main themes in general comments.

I think mobile technology is the now. We are quite behind on this technology and the biggest barrier is cost and ICT infrastructure.
challenges are: - persuading The Powers That Be to free up resources - trying to figure out where the landscape will be in 3 - 5 years to help us strategise something relevant for the medium term - getting colleagues on board with the final product to help get the word out - this can be particularly challenging sometimes - resource providers are very much in a state of flux in terms of mobile provision and this necessarily has an effect on us
Nothing else for the moment and I'm not sure if that will change in the future. Our biggest concern would be the resource spend on it, and the time needed to keep another branch of library services running at an acceptable level. It's better to have nothing than a service that has stalled.
Due to increasing staff shortages and increasing usage, we have not been able to advance our services as much as we'd like. We are currently moving to a new LMS. Hopefully after this has been implemented, will we be able to look into this area.
The key challenge to development is that there are too few on the ground who are expert but who are single-handedly trying deliver ALL services.

Case Study Four - St Angela's College, Sligo : a small institution develops a mobile website and apps using dudamobile, Andromo and theappbuilder



Andrea Mullen who joined the McKeown Library in 1994, and Damien Kearns ICT and AV Technical Officer, who joined the IT staff around 2000, were interviewed on their campus on May 17th 2013.

St Angela's College, Sligo is a small teacher training college, focused upon Teacher Education - domestic science training with various elective options - and Nurse Education, general and intellectual disability nursing. The college has an idyllic location a few kilometres outside Sligo town on the shores of Lough Gill. There is a student body of around 860, achieving high Leaving Cert points scores, of which some 440 are full time undergraduates, and it is notable that 98% of students are female. There are 110 staff equally split between support and academic staff.

The college is affiliated to NUIG and degrees are awarded by them. There is an expectation that in the current rethinking of educational institutions the college is likely to merge with NUIG and what this will mean for the college and location is the cause of concern. Students are members of NUIG and therefore can make use of the James Hardiman Library at Galway and borrow materials, which few do due to distance, but the big advantage this gives is that members of the College also have full access to the range of online resources available to NUIG members. There is good cooperation with all local libraries including the hospital library and the Institute of Technology Sligo. All cooperation focuses on sharing physical space and resources: there is no sharing of IT systems or of Library staffing: in these regards the college and library is on its own.

The small Library occupies the top floor of a new building and a notable fact is that the library staff at full strength is only 3 people. They put in many extra hours, and due to the small size everybody does everything and they manage to have the library open 9-9 4 days a week. There are 4 IT Support staff at the college who assist the Library with technical support as required and deal with the network, PCs, e-mail, software and operating system areas.

The Library Management System is Heritage which is hosted on the college server and IT staff look after the technical side of things and Library staff deal with parameters and day to day operational work. The institutional website is third party hosted (Letshost.ie) which has worked well for the college, and built using open source database tools and is database driven using MySQL and PHP to populate about 12 template page layouts with content. Most website editing is done by the IT support staff but a few other staff edit the content in specific areas such as the courses information section. Moodle is used as the college VLE, and SharePoint is also available to manage documents across the College, with variable levels of take-up.

The college is very small, disciplines taught do not have a major need for high end applications or data processing, there is quite a traditional attitude. There is no top level focus or strategy for eLearning or mobile learning. These are not priorities and no IT staff are dedicated to this area. Initiatives have come very much from the Library itself with IT support assistance and the cooperation between Andrea Mullen and Damien Kearns has been the basis of development. The advantage of both the lack of overall strategy or bureaucracy and the small scale of the operation is that staff have been free to develop and go live with both mobile website and apps directly, building up from their personal interest and sense of a need that could be met with these tools.

Considering the small scale of the college and staff, they have been notably forward thinking and successful in developing both a mobile website, an Android app and a web app for all platforms to offer something app-like for iOS users as well. All of these mLibrary developments have made use of third party tools to achieve a result which, certainly in the case of the apps, is fairly basic but none the less functions well within its limits and has been achievable with such a small staff.

Library and IT colleagues feel that mobile devices are the way forward. They think that their students as well as their staff are quite conservative in their use of Smartphones: a lot now have them but use them in quite basic ways for phoning, texting, and Facebook. They feel that to a considerable extent they are pushing the students to look at the fuller potential of mobile devices in areas such as apps and QR codes which they are also experimenting with, and that they are key drivers at the institution for this.

It was noted that the Sligo area is an example of an area where once you leave towns broadband coverage is very poor, and they do have that in their minds as a limiting factor and design their website with modest use of images and such features for that reason.

Mobile website

Dudamobile was chosen to create a mobile friendly version of the website. This costs 70 euro per annum, and takes the entire website and creates a mobile version: it is not therefore taking the approach of being more selective with the mobile version. Auto sensing is in place on the college home page so that users directly pick up the mobile version when accessing from Smartphones – this needs to be enabled on the Library home page as well.

There are a lot of these types of tool. This one had good reviews and provides a good range of add-on features. Each page, for example, has an option at base of page to call the college and you can add in links social media accounts easily too.

You have no control over how it redeploys and displays the different elements of your desktop site and not all parts work well but overall it has come out well for them.

There is very little effort involved in achieving a mobile website following this route, though there is also very little flexibility in how it operates and success will depend on the design of your desktop site.

Usage is running at around 10,000 visits per academic year, a fairly small percentage of overall website usage. All usage is from Ireland – there are no international visitors as there are for the desktop site. Statistics and other functions are controlled from a straightforward web-based administrative interface.

The mobile website takes users to the mobile version of the Heritage library catalogue. This is not great however and it is believed most students have bookmarked the desktop version on their mobile devices and are happy to make it larger and scroll about the screen: they do like to use the catalogue on their Smartphones so that they can go to the shelves with the record displayed on the screen. Heritage have as a priority an app version of their catalogue to focus on user account information and search, but there is no concrete development in place at this time.

Sample screenshots from the mobile website built with dudamobile





Developing apps

Both Andrea and Damien feel that the advantage of the app should be cutting through all the choices and navigation and providing the key functions to users very quickly and see particular value if the main website and the catalogue are fairly complex.

Their apps are quite basic and provide links to other web pages in the main and mostly standard desktop designed web pages as well which is not ideal: they do not pull in information dynamically from other databases, for example. But they do have some features enabled and embedded nicely, notably communication option for phone and email and opening hours are given directly in the app.

An Android app

The app details in Google Play store

To develop an Android app Andrea Mullen initially tried Google App Inventor, an open source solution originally developed at MIT. But this proved to be not so simple under the bonnet and was abandoned. Deciding to pick this up again in 2013 a tool called Andromo was selected. This is one of many web-based solutions available.

Development is easy, based around a range of available templates, image work is the main time-consuming element but the basic app took only about 4 hours to develop: in the main it points out to other web pages.

You can develop your app without payment but you need to pay \$25 a month or \$99 a year to save and download the app. At this point you own it. Any updates required, if you have included in the app itself opening hours for example and they alter, requires that you have a current account to make edits and download the final app again. You can build as many apps as you wish with one account.

Having got your app downloaded you can provide a link to this without getting it into the Google Play Store but it was decided that was the natural place for Android users to expect to find it so registration as an app developer is required at a cost of \$25. 2 screenshots from the app are also required to be uploaded and that required downloading Android SDK to a PC, the only slight complexity in the registration process. There is no quality check in Google/Android open source environment and the app appeared live in a couple of hours.

In the first week there were 13 downloads, and renewing books email requests was the most popular function.

Functionality included in the app presently includes: a link to the library mobile website; Catalogue search; sending an email requesting renewal of loan, which enables users to choose a mail method and inputs most details for them; news which takes users to the library WordPress news blog, and FAQ which opens a simple pdf file with the most common queries; contact me with built in contact options; and opening hours which are included in the app itself.

A web app

To cover iPhone and other platform users another solution was used, which is free, TheAppBuilder (<http://www.theappbuilder.com/>) This was only recently developed at the time of interview.

This is not creating a native app but a web app that works on any platform.

It is far less flexible than the Andromo product overall – for example you cannot alter the default wording that comes with the feedback form to local needs - but there are two advantages to it: you can easily update content as it is basically an app mimicking web page hosted on the company server; you can also create subsections within a page for a more complex information architecture.

Not being downloaded from a store, users need to have it explained how best to use it which is to get the link and bookmark it and then to pin this to their homepage so that it has an icon just as real native apps have them. It is simple enough but there is a worry that this is going to be a barrier to use.

Case Study Five - Leeds Met Library Offers A Mix Of Mobile Website With WordPress And Native Catalogue App From Sirsi/Dynix

Leeds Metropolitan University –Library responds to survey demands with a mobile website & native catalogue app

Debbie Morris (Library Systems Team Manager), Adam Watson (Portal Content Manager) and James Fisher (Information Services Librarian) were all interviewed on May 15th at Leeds Metropolitan University in Leeds.

Leeds Metropolitan University is spread over two campuses and has a library at each. The library is physically open 24 hours a day, 365 days per year. The library website is called Library Online and electronic resources are accessed via the Ebscohost Discovery Service. The university website is running the RedDot content management system, while the Library uses a custom-built PHP-based in- house CMS. Meanwhile, after conducting surveys the Library developed a mobile version of the desktop site using WPtouch Pro – a WordPress product.

The mobile site menu offers access to mobile-optimised pages for services such as printing, copying and borrowing information, as well as a listing of mobile-friendly databases and access to these sites. Dynamic services such as PC availability and off-campus access to folders and files are also offered. Access to a mobile version of the Sirsi/Dynix catalogue includes the option to download the associated BookMyne native app for iOS and Android. This app offers a more complete visual search experience, complete with book covers and barcode scanning using the phone's camera.



University of Reading is another example site using this vendor-provided app. Overall the development of the mobile environment for students and staff has been a low priority for the University. This conflicts with the Leeds Met Library's own initiative, but is not surprising as this scenario has been experienced by other academic libraries.



As previously mentioned, the Library conducted a short student survey on mobile access in early 2012. Over 500 users completed the survey and results showed that there was definite need for a mobile option. Users wanted to see access to the library catalogue and their accounts, timetables, email, and X-Stream, the university's portal and VLE platform. The library seems to have delivered through their mobile website.¹

In a guest blog¹ forming part of the m-Libraries project, Debbie Morris discussed this user research that they had done at Leeds Metropolitan University Library into what users wanted for mobile and how they had built their mobile strategy from this market research.

Quoting directly from her report of the 2012 survey, it shows a common finding, that in their overall university experience, for users the library function that makes it into the top priority list for mobile use is the library catalogue and account functions:

“Early in 2012 we conducted a short online survey about mobile access. Over 500 of our users responded. They told us that the top 5 services they would like to access via a mobile device were:

- Timetables
- Emails
- Virtual Learning Environment
- University Portal
- Library Catalogue / Account

She noted that the app was felt to be something that the university should have in survey returns, there was ignorance about what was already available for mobile such as mail and timetables and more promotion was required.

The university uses the Blackboard VLE, and there is an option to download the Blackboard Mobile Learn app, available for iOS, Android, Blackberry and WebOS (Palm) to view and interact with university modules. A review of the mobile VLE is coming, however, and CampusM is cited as a competitor to Blackboard's solution.

Watson states that the ultimate solution for the Library would be the development of a responsive website, but there are currently no plans to do this.

Part Two

What to Develop and How to Do It

In this part of the report we present a couple of case studies illustrating different ways in which the development of Responsive Website Design is asserting itself as a key strategic option, as compared with any mobile website or app development.

Following that we make an assumption that nevertheless some app development has been decided upon and present findings from an informal survey of UCD students that was undertaken to inform thinking in this area in early 2013, followed by a brief review of some typical library apps and content.

RWD (Responsive Web Design) – In a non-technical nutshell

Many websites have gone some way towards being responsive – they use grid layouts and relative sizes for fonts and images, for example, but RWD takes this considerably further beyond just re-sizing, selecting and re-arranging elements and having alternative ways of presenting some content for different form factors, such as lower resolution images.

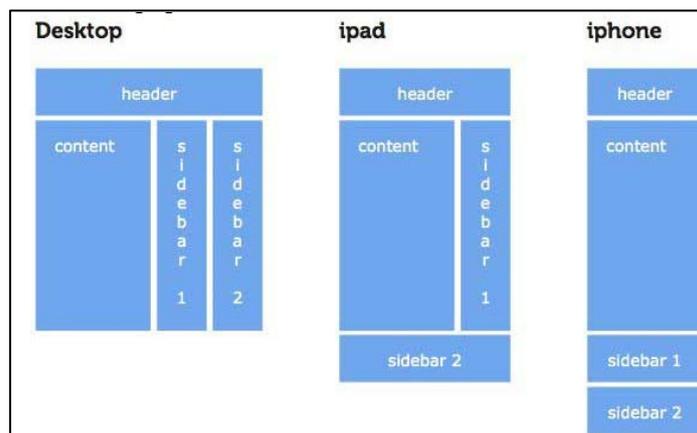
Responsive web design is not about building “mobile websites”. Marcotte outlined a set of design principles that allow a website to be flexible enough to work well at varying resolutions, that will fluidly scale and fit to suit the screen it is being viewed on; from phone, to tablet, to desktop and further.

Responsive web design uses three primary techniques:

- CSS3 media queries
Allows for delivery of tailored styles to suit the browser environment
- Fluid-grid layouts
Enables the underlying page grid to scale nicely, using relative proportions rather than fixed pixel dimensions
- Fluid images and other media
Enables images (and video) to scale effectively within the grid²²

The following diagram summarises what you typically see in terms of overall layout with different form factors with a truly responsive web design in use.

Not all favour this approach. The point has been made that it can be disconcerting for users to find that a familiar library web page layout, for example, is entirely differently presented on their tablet or smartphone: some may prefer to pinch and expand and zoom around a familiar layout. Another possible downside is slowness because with RWD the same code is used and downloaded for all devices from desktop to smartphone.



²² Power, M. (2012). Delivering Web to Mobile. TwechWatch Report, JISC Observatory CETIS UKOLN. May 2012. p 7. Available online at <http://observatory.jisc.ac.uk/docs/delivering-web-to-mobile.pdf> Accessed Dec 20 2012.

Case Study Six – UCD Digital Library: plans shift from a mobile website to a responsive website

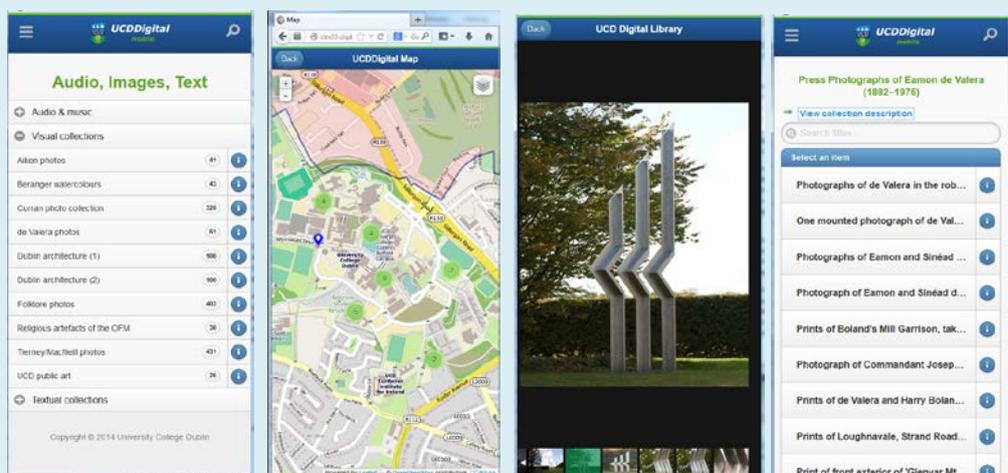
UCD Library wanted a mobile offering to view the UCD Digital Library. Initial work in 2013 was based on the concept of a separate mobile website, but after review it was decided to shift to developing a single responsive website for all screen sizes.

John B. Howard, University Librarian discussed in January 2014 the development of a mobile website for the UCD Digital Library, a key open access repository for Irish cultural heritage materials (digital.ucd.ie). This is an interesting case study in that initial plans to develop a separate mobile website were put aside after review, and a responsive website for all devices including desktop is now being developed and is viewed as the best way forward with regard to access for mobile users.

A solution for users of hand held devices was clearly required. A native app approach was not considered viable. The skill set is formidable, there is no web applications developer with the specialised skill set, and no finance to get this developed by a third party agency. The need to update with new revisions of operating systems would be costly, and there were doubts about what impact such an app would have even if it was viable: a common pattern of high downloads initially that rapidly tail off was noted.

In 2013 a mobile website was developed using jQuery Mobile, enabling a quasi-app experience via HTML/JavaScript. Dr Howard already knew the language and knew that JavaScript was highly developed and could provide a high end solution with many elegant tools available. Around 80 hours of development time were required to get the site to a fairly advanced stage.

The downsides in his view of this solution were: a totally separate mobile website was going to be hard to maintain; full coding skills and fluency with JavaScript and css were essential; JavaScript is not ideal for dynamic sites pulling a lot of data out of a database, which he elected to implement on the local device mainly using JavaScript - but this introduced issues for users with lower end smartphones and devices where this solution resulted in a degraded performance. Development work was therefore halted in July 2013.



A new approach is now under way, developing a Responsive Website using Bootstrap, the platform developed by Google to support twitter, which is now open source, one of many such frameworks available (<http://getbootstrap.com/>)

This is a responsive site, based on Bootstrap 3.x (BS3). Unlike JQuery mobile, Bootstrap is not a framework but is rather more a library for support of responsive web design; it does not attempt to emulate the app experience or provide substantial support for the HCI (Human Computer Interaction) idioms of touch devices.

It does, however, enable one site to serve multiple purposes and development is not as strenuous as with JQuery mobile. This site will in due course replace the desktop site and offer views suited to smartphone and tablet screens. Another advantage of the Bootstrap solution is that it will be fairly easy to have a number of instances of the website, with varying text e.g. UCD Digital Library site, UCD DataHub site, and pulling out filtered contents from the underlying Fedora database. The current development was spurred by a sense that we will want to provide a data-oriented site to support the growing interest in research data and the OA requirements but a more general UCD Digital Library interface and some quite specific filtered and styled views are also on the cards as the type of material in the digital library expands.

A distinctive feature of BS3 is its mobile-first approach - you design primarily for mobile screen sizes and then adapt for the desktop: indicative of the exponential growth in mobile device usage but quite a radical move, putting the mobile device centre stage.

Bootstrap is very flexible, with design based on a recursive 12 column grid system, and great flexibility in how many screen size breakpoints you can specify and design all of your layouts for.

It has been challenging to consider both the desktop and mobile experience in designing the site. One challenge is simply that there is a lot of descriptive information for some individual objects and the question is whether to retain all of this, offer an optional pop up display for it, or elect to leave some detail out on the assumption that smartphone users are going to be more focused on a browse of the images more than on the detailed text: in the small screen displays the content has been organised with around this assumption with the contents and images at the top and any detail below that.

It is much easier to develop in than JQuery mobile but nevertheless some local programming has been required, such as how images are handled which the out of the box platform deals with in a way not suited to our content. Additional JavaScript widgets have been applied, notably the Seadragon image displayer that uses touch screen swiping to progress the display, which is not supported by Bootstrap. Additional coding and extras will also need to be applied to provide a secure login system for the content that is not for general viewing, which is again not supported in the framework itself.

The lack of a web application developer has again been an issue, with Dr Howard working on development and a newly appointed digital programmer rapidly gaining skills and working with him and it is felt that once developed, ongoing maintenance of the site will be much easier with this solution. The absence of any web applications development expertise in the University as a whole to call upon was also noted.

UCD DataHub

UCD DataHub

Search for data



Lead in in caption. Additional text plus link

Find Data

Search to discover many kinds of data deposited by UCD researchers as well as reference data from other sources that are made available by UCD Library ...

Read more »

Use Data

We provide several APIs that allow data to be integrated into your research activities or web publications, including images, geospatial data, and Linked Data ...

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UCD DataHub

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Publish Data

blah blah blah

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UCD DataHub

maps

← Previous | 1 - 11 of 11 | Next →

1. Reconstructing Irish Science: The Library of the Royal College of Science for Ireland (1867-1926)

Date: 1867 - 1926
 Type/Formats: text — collection
 Publisher: Irish Virtual Research Library and Archive (IVRLA)
 Description: A representative selection of printed books and maps associated with the scientific subjects taught at the Royal College of Science for Ireland (RCSI) held in UCD Special. ... Scope and Content This collection consists of a representative selection of images associated with the scientific subjects taught at the Royal College of Science for Ireland. ... Scope and Content This collection consists of a representative selection of images associated with the scientific subjects taught at the Royal College of Science for Ireland. ...]
 Subjects:

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maps

You searched for: maps > still image

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1. Reconstructing Irish Science: The Library of the Royal College of Science for Ireland (1867-1926)

Date: 1867 - 1926
 Type/Formats: text — collection
 Publisher: Irish Virtual Research Library and Archive (IVRLA)
 Description: A representative selection of printed books and maps associated with the scientific subjects taught at the Royal College of Science for Ireland (RCSI) held in UCD Special. ... Scope and Content This collection consists of a representative selection of images associated with the scientific subjects taught at the Royal College of Science for Ireland. ... Scope and Content This collection consists of a representative selection of images associated with the scientific subjects taught at the Royal College of Science for Ireland. ...]
 Subjects: Databases Abstracting and indexing services — University College, Dublin — Royal College of Science, Ireland

2. Desmond FitzGerald Photographs

Creator: Alta Holland
 Dates: 1916-1932 — 1916
 Type/Formats: Collection — Stillimage — Photographs
 Contributors: University College, Dublin. Archives Department — FitzGerald, Desmond, 1888-1947
 Description: This collection of photographic prints forms part of the papers of Desmond FitzGerald (P60). The majority of these photographs arise out of the Civil War but other smaller series. ... This collection of photographic prints forms part of the papers of Desmond FitzGerald (P60). The majority of these photographs arise out of the Civil War but other smaller series. ...]
 Subjects: Ireland History Easter Rising, 1916 — General Post Office (Dublin, Ireland) — Rebellions Ireland Dublin — Ruins Ireland Dublin — War damage Ireland Dublin [...]

It is hoped to go live with the new response UCD Digital Library website in 2014

Case Study Seven - IT Tallaght, Native App or Responsive Website?



Niamh Walker-Headon was interviewed on Monday, June 10th 2013 at IT Tallaght Library, Dublin. IT Tallaght is a relatively small institution, serving approximately 4600 students (FTEs). The Library has a staff of 9 (down from 14 over the past couple of years), and Niamh is both Systems Librarian and Subject Librarian for the humanities.

Library Anywhere app

ITT Library has had the Library Anywhere app, built by Library Thing, since August 2010. This includes a native app, for both iOS and Android, and a web app, which consists of the library catalogue and a menu of other options for the user. There is a link to the app from the Library's desktop homepage, and when on a smartphone, the user is prompted to open the mobile version of the website (which is the web app). From the mobile version a pop-up prompts the user to download the native app. It is worth noting that the native app and mobile web views look exactly the same. Niamh states a big reason for going with this mobile solution is that it was simple to implement and integrated with the library's existing catalogue well – a big plus for a relatively small library with a small staff. Also, unlike a ILL mobile catalogue solution, this option better suited the library's budgetary constraints.

ITT Library's configuration of the Library Anywhere app package consists of a search box for their Innovative Interfaces Millennium catalogue and links to essential information such as opening hours, account logins (for accessing electronic resources and personal accounts), contact info, and links to social media. Like the Library's website, the Library Anywhere app is edited using Dreamweaver. Niamh says that the app package is relatively simple to set up, and the only real skill needed is a little knowledge of XML. A small Web team of 3 easily handle any updates.



Google Analytics shows that about 3.55% of their website traffic comes in from mobile devices, with Apple products topping the list of devices, followed by Android devices. App usage statistics reached a peak in March 2011, with around 1200 hits, but have been on the decline ever since. Niamh feels this may be due to more students having devices with larger screens (such as Samsung Galaxy smartphones, etc.) and therefore not bothering to use the mobile version, and possibly the natural decline after the initial buzz of promotion.

Designing a responsive website

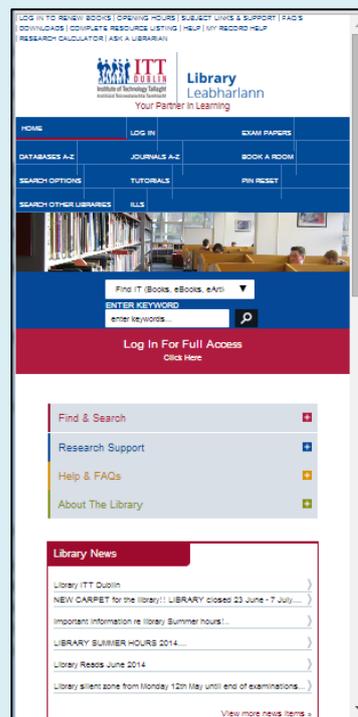
At the end of a project that lasted approximately ten months, IT Tallaght went live with a responsive web design (currently only the top-level pages) at the beginning of 2013. (See the main body of this report above) This was designed by Digital Crew (www.digitalcrew.ie), a web design company based in Cork. Now the ITT Library is working on implementing the same for their website, using the same company on a project costing under €5000. They were hoping to go live in the last month, but as the whole library website is hosted and sharing the LMS Millennium server, there have been some glitches. Unlike the overall ITT website, the entire library website should be responsive, down to the lowest level content pages.

If the responsive web design is successful, the library would reconsider its use of the Library Anywhere app.

After this interview, the library website at IT Tallaght did go live, towards the end of 2013.



Desktop layout of IT Tallaght library website opening screen



The page re-aligned for smartphone size screens

Why pursue the Library app idea?

There is a degree of user pressure to create apps, notwithstanding the strategic importance of a whole-site responsive approach as outlined in the case studies above, here is a comment pursuing this line of argument:

“People want apps; they have been trained to expect apps for their mobile devices. Library software must keep up with the demand.”²³

At the present time they are very popular, Andrew Walsh has this to say, for example:

“Without a doubt, smartphone owners prefer the “app experience” to browsing the web, and will tend to use a well-designed app in preference to even the best websites”²⁴

A ComScore report noted that 2011 saw strong growth in use of apps in the US and EU, and this reached parity with the mobile browser audience by the end of that year.²⁵

A CISCO survey from 2012 of Generation Y – 18-30 year olds - found that as of late 2012 the overall situation regarding apps was as follows:



This raises a key question for libraries - can a library app become a regularly used app, rather than a “download it and never use it again” app?²⁶

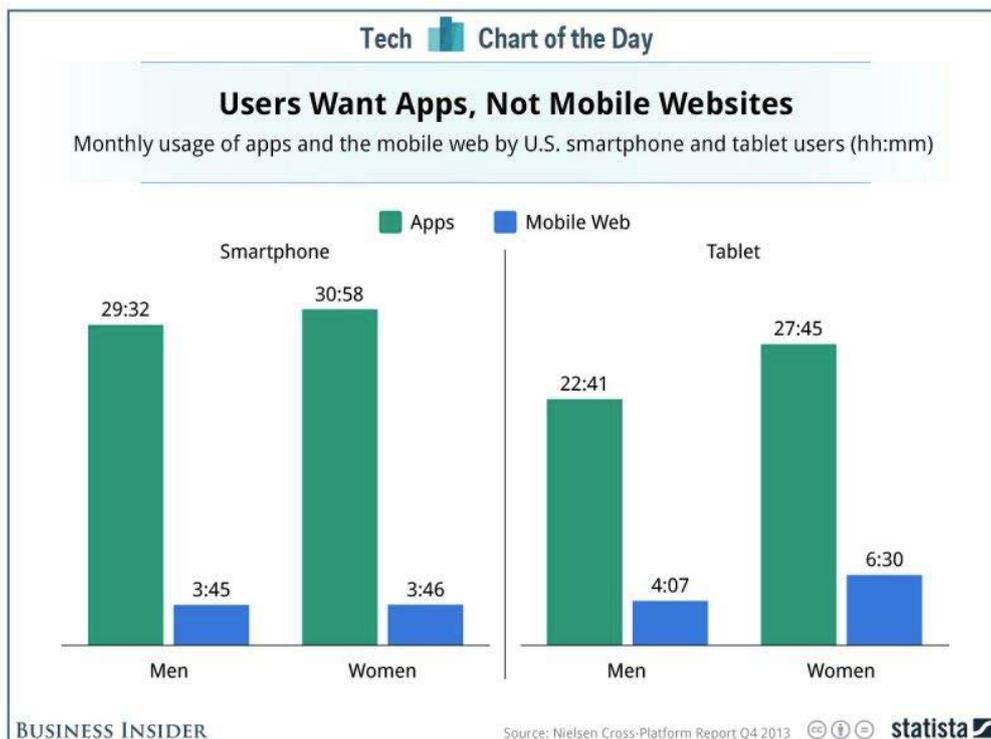
The following slide really drives home the user preference for apps on their smartphones:

²³ Clark, J. A. (2012). Building Mobile Library Applications. London, Facet Publishing.

²⁴ Walsh, A. (2012). Using Mobile Technology to Deliver Library Services: A Handbook. London, Facet Publishing. p. 55

²⁵ Comscore (2012). 2012 Mobile Future in Focus: Key Insights from 2011 and What They Mean for the Coming Year. p. 4

²⁶ Cisco (2012). Gen Y: New Dawn for work, play, identity. CISCO Connected: World Technology Report. p. 10 Available at <http://www.cisco.com/en/US/solutions/ns341/ns525/ns537/ns705/ns1120/2012-CCWTR-Chapter1-Global-Results.pdf> Accessed Jan 4 2013



In: Steve Kovach. "It Turns Out People Don't Really Surf The Web On Their Smartphones." *Business Insider*, March 6th 2014 <http://www.businessinsider.com/apps-versus-mobile-web-2014-3>

There is an argument that at the present time both mobile optimized websites and apps should be offered to users: a ComScore report looked into use of the BBC and Sky news mobile media, both app and mobile website and usage suggested that at present there is more or less parity of use between mobile browsers and apps and it may be necessary to consider parallel developments, giving alternatives and this may be true of library mobile media as well.²⁷

Market research and evaluation

Many libraries are following quick wins at this time rather than a marketing cycle regarding app development. What is being offered is often mobile sites or apps available from vendors which are relatively easy to set up, or apps that make use of available project students. Our small survey is just a snapshot but certainly very little market research at any level about the mLibrary was reported for Ireland there.

There is also a gap at the evaluation and feedback part of the cycle: after things are put in place feedback on their use and reception by users plus quantitative analytics would seem to be fairly rare.

Andrew Walsh sums up the importance of market research well:

²⁷ Comscore (2012). 2012 Mobile Future in Focus: Key Insights from 2011 and What They Mean for the Coming Year. p. 26

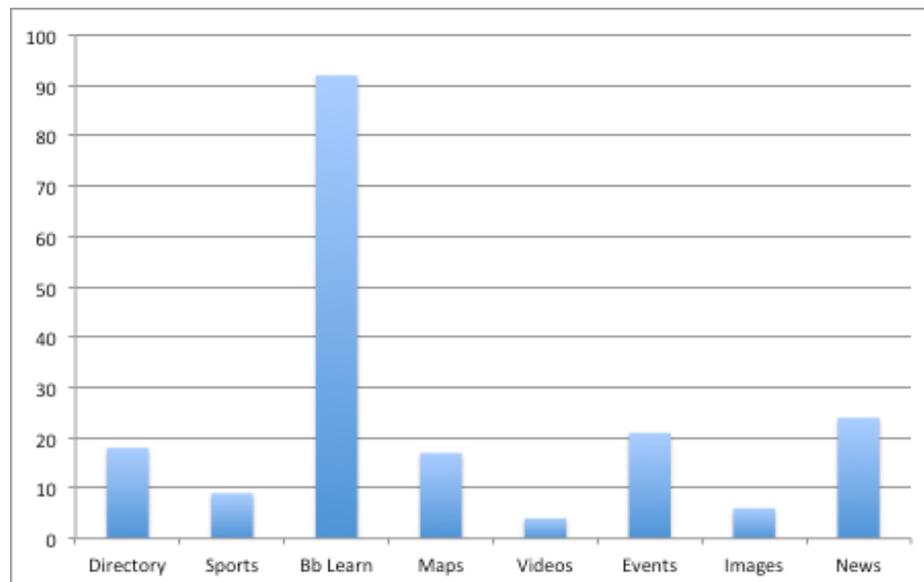
“A common thread running through all the examples that we can find of best practice in providing mobile-friendly information is that they start by investigating those user needs and desires. At a minimum you should find out what sort of devices your users own..”²⁸

A mixed set of feedback snapshots

1. UCD Mobile app development and user feedback

Following implementation of an app for UCD (see Case Study Two above), the IT Services team undertook some user feedback and as well as rating the functions included, users were asked what other functions they would like to see in the next development phase of this general university app.²⁹

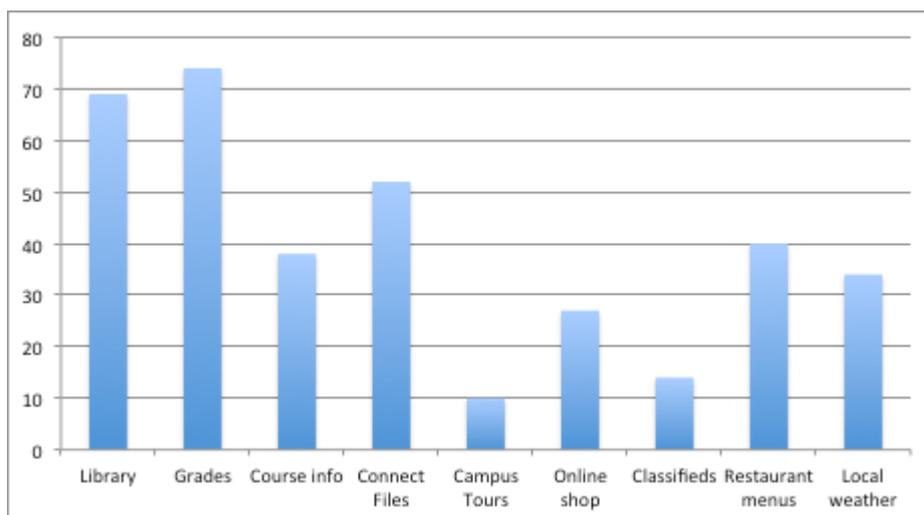
- As of September 2011 66% leaving feedback felt that it's 'very useful' or 'useful' to have services on mobile devices
- It was clear that of the services developed, the one that users really wanted was the Blackboard VLE environment: others got low numbers of users:



- The desire for dynamic functions of direct practical utility to students undertaking their course work with authenticated personal course timetables, grades and also access to information resources also emerged when users were asked what they wanted developed in the next phases of app development (UCD Connect is the student portal environment)

²⁸ Walsh, A. (2012). *Using Mobile Technology to Deliver Library Services: A Handbook*. London, Facet Publishing. p. 54

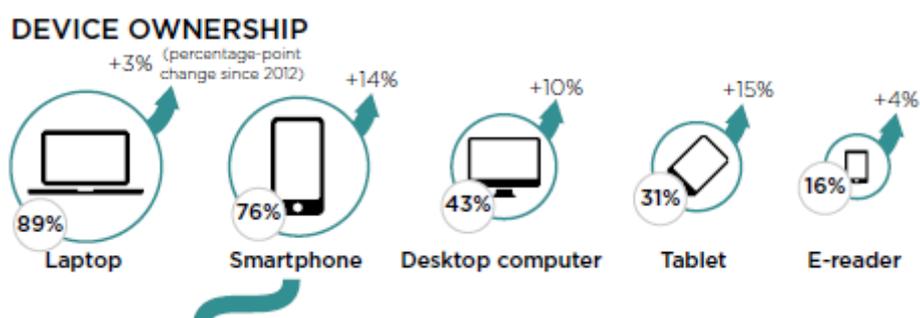
²⁹ McKiernan, P. (2011). UCD Mobile: delivering services to mobile constituents, UCD Dublin. Conference presentation available at <http://www.heanet.ie/conferences/2011/files/18/Brian%20Morrissey%20-%20UCD.pdf> Accessed Dec 16 2012



2. Educause ECAR 2013 survey of students and technology

Though primarily US and Canadian in scope and limited to undergraduates, the annual ECAR report, “ECAR Study of Undergraduate Students and Information Technology” provides some good pointers both to ownership of mobile devices and the type of service and resource students want to receive on such devices and which may be relevant to app development by libraries³⁰ An infographic summary is also produced by Educause each year from this survey.

The key role of the mobile device as a whole to students is quite evident in the ownership summary published September 2013, though the tablet and e-reader is still very much at an early phase of ownership, tablet ownership was growing at the most rapid rate of all:

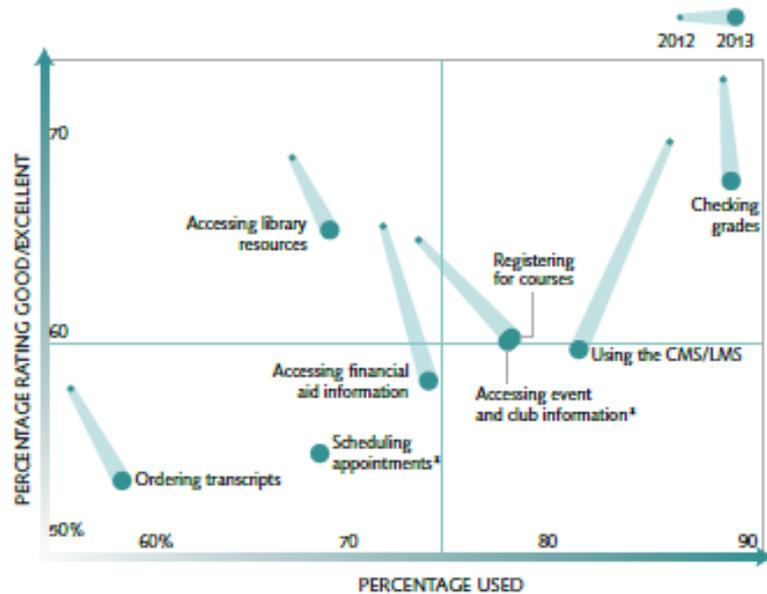


90% of phone ownership was Android or iPhone, about equal numbers of each.

The things students wanted to do on their mobile devices echoed the older UCD feedback mentioned in the previous section on the UCD mobile app: accessing library resources had gone up somewhat since 2012 although satisfaction with the service declined and it is not a top priority for student mobile use. The most popular were Blackboard-type learning systems, and grade and course registration related environments.³¹

³⁰ The 2013 ECAR survey in full can be accessed at <https://net.educause.edu/ir/library/pdf/ERS1302/ERS1302.pdf>, the infographic at

³¹ ECAR survey 2013, p 31



*No data for 2012
Figure 21. Use and Ratings for Mobile Device Access to Institutionally Supported Services, Applications, and Websites, 2012 to 2013

4. Edinburgh University Library

The Library at Edinburgh undertook a survey in November 2011 in this area. This is a summary of their findings:

“Both the survey and the focus groups revealed that students wanted to be able to search the catalogue, view their library account, check PC availability in the library, book study rooms, and have access to a map or GPS for finding their way around the library building.”³²

University College Dublin input from March 2013 Roadshows

For this project we undertook some market research in March 2013. We were influenced by the University of Glasgow approach, of which the market research aspect is summarised in the slide below: while this was to inform a general library mobile strategy we felt the same approach could guide us in the best content to consider for app demonstrators.³³

³² Reported by Gillian Andrea Nowlan, (2013), "Going Mobile: Creating a Mobile Presence for Your Library", *New Library World*, Vol. 114 Iss: 3, EarlyCite version accessed online 07-02-2013

³³ Munro, K. and R. Stenson (2011). *Developing a Mobile Strategy for the Library*, University of Glasgow Library. Presentation available on Slideshare at <http://www.slideshare.net/evidencebase/developing-a-mobile-strategy-for-the-library> Accessed Dec 18th 2012.

University of Glasgow **But what do our users want to do on their mobiles?**

Don't assume – ask!

Establish a programme of regular surveys of users to establish mobile device ownership and use:

- What kind of devices do they have?
- What Library services do they currently access via their mobiles?
- What Library services do they want to be able to access via their mobiles?

Win a £20 Amazon voucher
Take part in our short survey about your mobile phone use.



Fill in our short survey at bit.ly/UCG23 (it takes less than 5 minutes) and you might win a £20 **amazon** voucher!

University of Glasgow Library approach to mobile strategy formulation

We ran the feedback exercise as part of its major monthly promotion these for February and March 2013 “UCD Library is Mobile, UCD Library is Social”. The event was half promotion and half feedback exercise, for which users could be entered into a draw for an iPad mini.

The questions we asked of them are shown in the table following: here we only reference results of particular relevance to app development.

1.	Your course of study, level of study and year
2.	What mobile devices do you own? (feature or smart phone, tablet, ebook reader) <i>Excludes standard laptops and notebooks</i> What operating system - (iOS, Android, other)
3.	Do you have plans to buy any more mobile devices by end of 2013? If so, what?
4.	Do you know that the Library has a mobile website? If yes, have you ever used it?
5.	Do you know the Library has a mobile catalogue that you can access direct, via the library mobile site or via the University app? If yes, do you use this?
6.	Did you know the Library has a Facebook page? If so, have you liked it?
7.	Do you know about the Library on twitter? Do you follow this?
8.	Do you use any social networks apart from Facebook and twitter?
9.	Have you downloaded the University mobile app?
10.	Do you use any mobile apps from database suppliers e.g. JStor, Web of Knowledge, Elsevier?
11.	If the Library had its own app do you think you would download and use it? Any thoughts on what you would like to see in it?
12.	Do you know what a QR code is? If yes do you have the software on your mobile device?
13.	Would you like us to offer SMS texting from the Library for notices or reference queries?
14.	Any other comments about the Library and mobile?
15.	To enter for the draw for an iPad mini please provide a contact email here

The iPad mini proved to be a very popular prize. The intention had been to sit with each respondent and assist them in filling out the questions, and thus be able to prompt them on questions like what could be included in a mobile app.

The popularity of the prize meant that we were so overwhelmed with respondents that this was not at all possible and the quality and depth of answers was in many cases rather vague and sketchy.

834 people responded and the bulk of them were undergraduates. The 3 locations influenced the subject range so this can only be viewed as an informal snapshot.

Undergraduates	738 (302 year 1, 201 year 2, 235 year 3+)
Postgraduates all	85
Staff	2
Exchange students	6
Not specified	3

The variety of user experience of online environments

A general point of interest is the great variation in the mobile devices that students own, ranging from those with nothing or just a feature phone through to those equipped with 3 or 4 items of up to date mobile kit.

4% (33) claimed to own no mobile devices of any kind, including basic feature phones

Ownership and intentions to purchase

Tablets

Ownership and plans in this area were low among the mainly undergraduate respondents and this is a useful finding: at this time the small screen Smartphone is where all investment and plans are concentrated and on the face of it therefore there is a point to designing for that at this time, though this may rapidly change.

7% only owned a tablet in early 2013 (62) of which half of them specified that it was an iPad (32)

13% of the respondents had an intention to purchase a tablet by the end of 2013 (109) which is 34% of those intending to make a mobile purchase. Of that 109 intending to purchase a tablet, 66% (72) want to buy an iPad: whether they and others would settle for a cheaper Android tablet now that these have mushroomed remains to be seen.

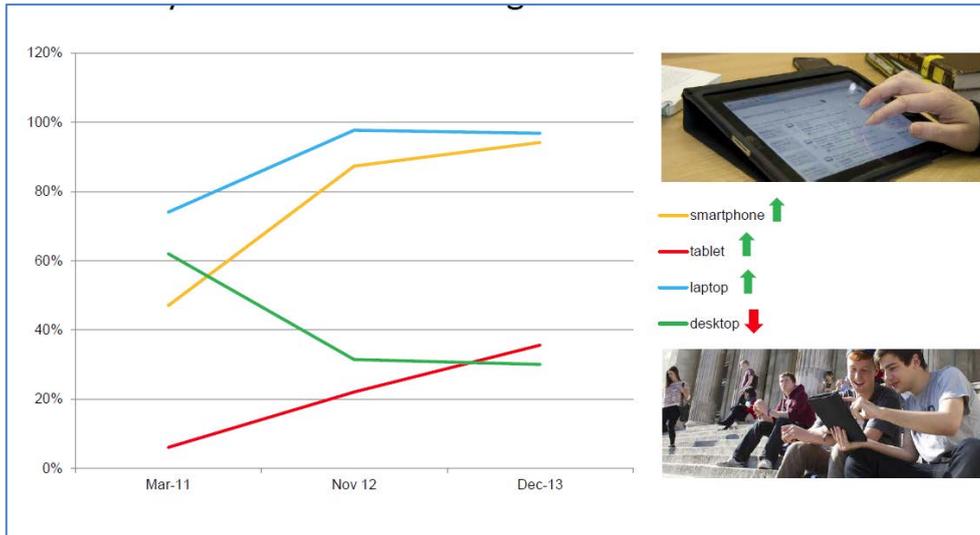
These purchase intentions were mainly not upgrades but first time tablet purchases which, if followed through, would bring tablet ownership to 20% of the group by the end of 2013 to compare to the existing 82% smartphone ownership.

This is perhaps a lower figure that would be expected on tablet ownership: a survey of students by Endsleigh in the UK in summer 2013, for example, found that almost a quarter of surveyed students owned an iPad already, along with 96% owning a laptop and 90% a smartphone.³⁴

The University of Leeds Library ran a survey in late 2013 and the following slide, shown by Lizzie Caperon at the mLibraries 2014 conference in 2014 shows a clear picture with students there of smartphone/laptop as dominant with a much lower but growing tablet ownership

³⁴ Insurance company Endsleigh, which polled around 1,700 students about their possessions. Reported in Times Higher July 22nd 2013, accessed online October 16th 2013.

<http://www.timeshighereducation.co.uk/news/laptops-and-tablets-in-ascendancy-for-student-viewing/2005889.article>



*Mobile device ownership from a late 2013 survey with 604 responses at University of Leeds
Slide presented at mLibraries conference 2014*

Phones

12% (99) had a basic feature phone only

82% (685) had a smartphone.

The smartphone and laptop/netbook combination is currently the dominant one we can assume – we did not ask about laptop ownership in our survey but other UCD feedback has put ownership of laptops above 90%

Smartphone operating systems

Of those who said that they had a Smartphone:

46% (315) were Android

41% (280) were iOS

7% (47) were Blackberry

3% (19) were Windows Phone

3% (24) were other or not specified

Since the survey we would expect Blackberry ownership to have declined much further.

When it comes to plans for phones, which were a mix of first smartphone purchases and upgrades, 24% (197) of all respondents intended to purchase a smartphone by the end of 2013 which is 61% of those with a purchase intention. Regarding purchases in 2013, the balance of operating system is set to alter: iPhones are what the majority wanted to purchase at that time (116 of the 197 specified this). Again, the arrival to market of high end Samsung and HTC models, for example, may have changed this picture in the year since.

The survey did not delve into the versions in each case. But clearly there is a large variation in capacity and capabilities, particularly of Android phones. There were quite a number of comments

that people had low end Android phones and could not, for example, load the University app at all as it was too big or had to remove it because it slowed their phone down – and requests that any library app be much smaller.

The minority without iOS or Android made some complaints about the lack of apps for them, the University app for example, and requests that we provide for them.

Intentions to purchase summary

61% (511) had no plans to purchase any more mobile kit in 2013

39% (323) intended to make a mobile device purchase by the end of 2013; lack of finance was a regular comment.

Awareness and viewpoints

SMS texting from the Library

76% (633) said they would like the Library to offer SMS texting

24% (201) said no

QR codes

It seems possible that respondents use these but do not know what they are called and perhaps we should have included a sample image. But on the face of it awareness is poor and any project to use these would need a full PR and support package to be accompanying it.

27% (226) said they knew what a QR code was and of these 67% of those who knew what they were (152) had the software on their smartphone

18% of the total respondents are therefore both aware of and ready to use QR codes.

73% (608) said they did not know what a QR code was

Awareness of Library mobile website

43% (360) were not aware that the Library had a mobile designed website

57% (474) were aware of the Library mobile website.

Of those aware of it 62% (295) had actually used it – that is a third, 35%, of the total survey respondents had used it

Awareness of mobile catalogue

58% (480) were unaware that there was a mobile library catalogue available.

42% (354) were aware that there was a mobile catalogue

Of those aware of it 34% (119) had actually used it – this is 14% of the total survey respondents who had used it.

It is quite possible that users access both catalogue and website via mobile devices and get the mobile version, without being aware of it as such, which these questions did not focus upon.

Download of University mobile app

50% (415) had not downloaded the University mobile app

50% (419) had done so

There was some comment about it being unavailable for their operating system, being too large to download etc.

View on a Library app

85% (711) said that they would use a Library app

12% (98) said that they would not

3% were undecided

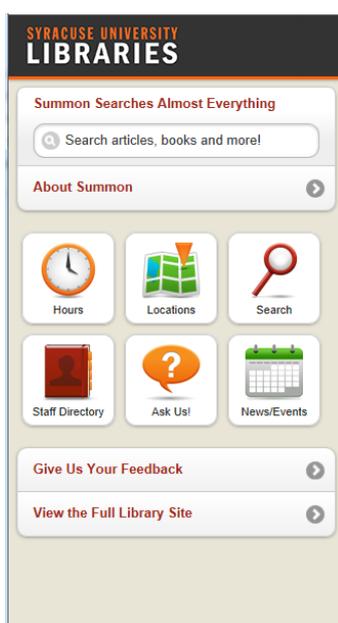
Users may well have thought a positive response would better place them to win the prize draw, which has to be borne in mind here.

What to put into it

Free text comments on what could go into a Library app were not as plentiful as we would have liked – 43% of those in favour of a library app made no comment about what could go into it. Of those that did so:

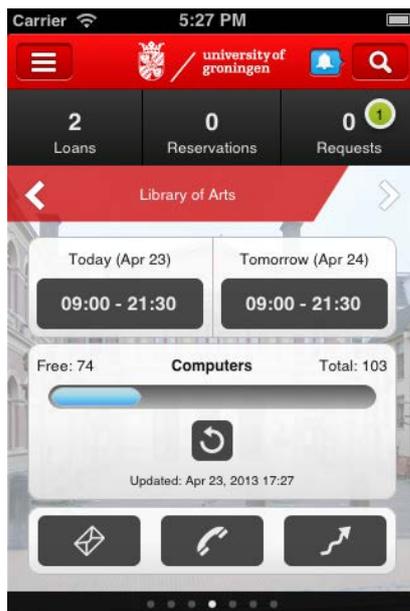
- Number one was the catalogue and its functionality by a huge margin with checking book availability, requests, renewals and my account mentioned quite specifically numerous times

What students meant by the catalogue is not easy to know, but from a library perspective the presence of an all-encompassing resource discovery portal layer such as Summon, as UCD Library is introducing in 2014, would enable a wide range of resource discovery from a simple single box: here is the app from Syracuse University and the single Summon search box:



The Syracuse University web app <http://m.library.syr.edu/>

If libraries can offer the catalogue in an app plus some surrounding practical functions such as room booking, and indications of opening and PC availability it would seem that students would be very happy. Reading of the free text comments suggests that users would like an added-value “catalogue-plus” which pulls salient information to a launch page. The University of Groningen app, available since October 2013, gives an idea of the sort of added value that users may like: the user loan and reserves status, today’s opening hours, and how many computers are available right now in the library are pulled together on the opening screen for the user.



*University of Groningen Library app*³⁵

- Other comments suggest users do not have the view that library staff have of the information supply chain and what that imposes on resource discovery and access: they would like full text of books and journals and articles available right in the app it seems comments were generalised: “as many databases as possible, eBooks, journals, articles pdfs etc.” were the type of comment in this area
- Recommended reading for courses features as did lists of new books in subject areas.
- Self-check featured. This is being tried in some libraries, and with RFID desensitising can also be effected on a mobile device - it is interesting that some respondents saw the potential there

³⁵ See the Proud2Know website for this and other examples of best practice library apps at <http://proud2know.eu/5librarymobilesites/>

- Opening Hours featured next in popularity to catalogue
- Floor maps got relatively high numbers of mentions, some specifying that it be smart enough to indicate where class ranges were or where individual books are, in a few cases specifically mentioning using GPS etc. to relate that to where they were standing too.
- Checking on availability of study rooms, PCs and just seats/how busy the library was i.e. pulling in data from the gate system featured and in some cases the request went beyond that to online booking of these facilities, certainly the first two
- News, events, announcement, updates featured only a little
- Generally replicating what was on the website also featured a bit
- What did not really feature was eLearning and library skills training, not did things like chat get mentioned and contact with library staff.

Looking at the functionality found in library apps

Scanning the apps available

Having looked at what users say they would like, we now move on to scanning what existing library apps have included. Here are some entries, nothing more than a snapshot of examples for Apple devices which were discovered using the app search engine uQuery (www.uquery.com).³⁶

From reviewing such existing library apps, combined with review of some surveys that have been undertaken in the recent past, as part of the JISC-funded mLibraries community support project (<http://mlibraries.jiscinvolve.org/wp/>), for example, a fairly lengthy list of possibilities does emerge, comprising of a core that nearly all library apps offer (catalogue or web-scale resource discovery and My Account, for example) and then a second selection, some of which are excellent ideas, but are more rarely seen, perhaps in some cases due to the technical and data sharing requirements between systems that would be involved.



uQuery results display (left) and further details (below)

³⁶ A 2014 web entry by Vanessa Proudman on her company blog provides an interesting look at 5 library mobile sites, most of them apps. <http://proud2know.eu/5librarymobilesites/>. Accessed February 12 2014.

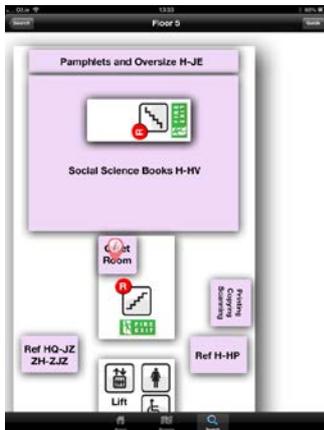
A selection of academic Library apps and their content- March 2013

Institution	Name of app	Date loaded to App store	Brief content range summary
San Diego State University Library	SDSU Library	July 16 2012	Search for books check library hours floor plans of library call number summary view new book titles email a librarian
Karolinska Institutet University Library	KIB Mobile	Apr 09 2011	Opening hours today Facebook content display Chat included (unavailable 15.33 Fri Feb 22) Internet phone Email window RSS News feed Bus timetable and when next bus leaves Information generally – opening hours, courses, library contact, feedback form, rules, service summary, maps of area Catalogue search and Loan renewal List of mobile databases and direct links to them Group study room availability calendar (note to book you have to use the library web page, this is just display of availability)
Cornell University library	cu-library	Sep 08 2011	Featured mobile database Map of library on campus Opening Hours summary of all branches today Built in email, texting and questionpoint instant messages , just list of phone numbers search the library catalogue manage your library account
University of Cambridge	UCAM Library Search	Aug 30 2011	Catalogue search but added features is directs you from location to google map to find which of the 31 included libraries you need
Curtin University Library	Curtin University Library`	Mar 30 2011	Catalogue search Account management Built in barcode scanner for barcodes and QR codes Opening Hours today Library locations and google maps Database listing including links through to databases (complete listing possibly) Link to Libguides collection New Books display Exam papers linkage Room Bookings Computer availability display Library news Contact Us (just lists) with option to get this included in the device Contacts listing
University of Warwick	Libmap	Dec 02 2013	A new edition of their app which originated with floorplans but is now more wide-ranging
Ball State University	Ball State University	May 11 2011	Built with Boopsie Search library resources which opens to extensive menu of choices for catalogue, singlesearch, articles, ejournals, digital media repository exam videos research help opening to main website guides Ask a Library opening to submenu of chat, text sending, email, internet phone built in My Account Computer availability in libraries Location and hours and uses GPS to show you your

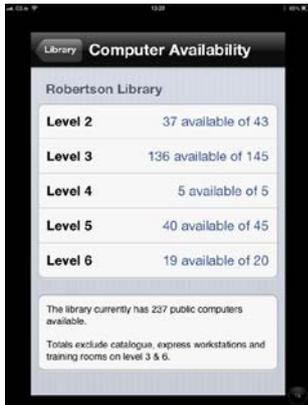
			<p>distance from them Study room booking (just website link) Built in comments and suggestions form Could argue is too much in it and subpages a bit complex in choices</p>
University of New South Wales Library	UNSW Library	May 09 2012	<p>Built with Boopsie Catalogue search MyLibrary account and loan management Opening hours with built in internet phone calls Library news Contact Us including: query form, internet phone calls (only) Directions and Maps Links to website subject guides, news on resources New Books listings Facebook and twitter links</p>
University of Auckland Library	UoA Library	Jun 30 2010	<p>Built with Boopsie Catalogue search with their own interface Articles and more just takes to a library search box My Account for renewals etc. Book a PC – link to web page of info New Books listings Library opening hours Library workshops booking (not working at Feb 27 2013) Library Locator with built in internet phone calls and email Library blogs links (extensive range) Twitter and Facebook linkage to accounts</p>
LA Sierra University Library	SmartCat	Jan 16 2013	<p>Built with Boopsie Catalogue search Union catalogue My Account Ask Us including phone and email built in News and Events RSS Location and Hours Facebook, YouTube and twitter account links</p>
Grant MacEwan University	MacEwan Lib	Sep 17 2012	<p>Guest or login initial screen Catalogue search Full text access My Account management Feature lists of books with covers Location information including maps No contact channels built in?</p>
Eindhoven University of Technology For iPad	TUeLibrary iPad Edition separately available	Apr 12 2011	<p>One of very few to have a dedicated iPad version Catalogue search is opening screen Library news Library floorplan MyInfo for loans, reserves, and fines management</p>

A gallery of screenshots of app features in addition to resource discovery

Floor maps at Warwick



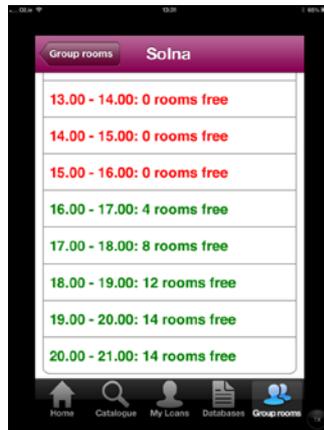
Computer availability – Curtin University Library



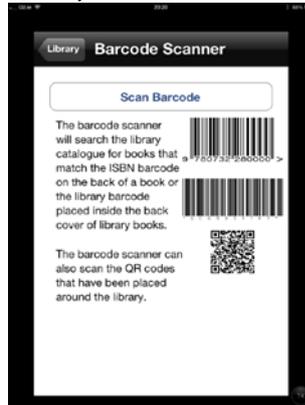
Comments and Suggestions – Ball State University



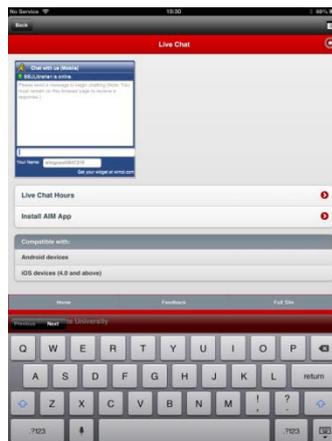
Group study room availability – Karolinska Institute Library



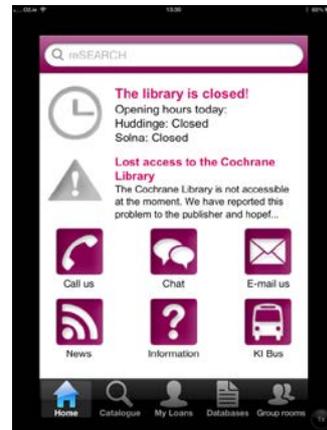
Built in barcode and QR code scanner – Curtin University Library



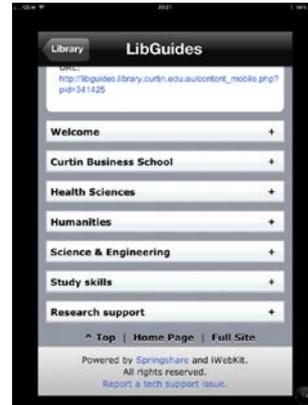
Chat – Ball State University



Good range of contact options – Karolinska Institute Library



Link out to LibGuides – Curtin University Library



The General Purpose Library App – a composite listing

A common approach is to produce what you could call a general purpose library app. Some of the functions included would already be available on a standard desktop site e.g. catalogue, website, online reference perhaps. Others would be taking advantage of specific functions of the mobile situation e.g. augmented reality tours, SMS texting, QR codes. The following is just one listing of the possibilities:

- Catalogue and/or Resource Discovery tool embedded search box
- New Books display, can be visual scroll based on book covers
- Account management including book renewal
- Self-checkout on mobile device
- Mobile payments systems
- Mobile printing
- Mobile versions of databases and full texts easily accessed and read within the app (ideally within a resource discovery tool interface, to avoid complex authentication issues of the vendor native interfaces via mobile)
- eBooks to download - making available easy checkout and read to mobiles and/or Kindle, services like Overdrive for academic library use
- Text a Librarian/ email a librarian/internet phone a librarian/ Chat to a librarian/comments and suggestions and query forms. Good apps already developed often have quality contact us sections which include some or in the best cases all of the above functionality within the app. Cornell is an example, including text, email and chat in the contact section of the library app cu-library
- Facility built in to use in teaching as clicker substitutes e.g. Poll Everywhere via twitter, text, web.
- Online exam papers
- PC availability display in the Library
- Building a barcode and QR code scanner into the app is a very useful. Whilst these are available built into phones or as separate downloadable apps, and use of QR codes could be considered beyond the scope of an app there is some merit in including them in a library app if the library intends to offer many QR codes around its buildings and shelves.
- QR codes functionality. Here is one library's use of QR codes accessed via mobile device, from Humanities and Social Sciences Library Nanyang Technological University, Singapore:

“Another way the HSS Library has sought to improve relevance is by enhancing content and services through the use of QR codes to link books to resources in other media. The HSS Library has placed bookmarks in books on display, the bookmarks have QR codes linking to video interviews with the book's author, the author's website and book review sites. QR codes are also used to access

popular e-journals, the QR codes being incorporated in the display of the title page in the library.”³⁷

- Some actual content within the app itself, rather than being pulled in from elsewhere
- Library floor plans
- Library google maps
- Embedded social media feeds from library accounts
- Information skills tutorials and guides including access to online guides, video, tutorials, podcasts, streaming in the app
- Advertising library workshops and events with access to book if relevant
- Computers available in library displayed
- Booking rooms in library particularly group study rooms or at least showing availability
- Special exhibitions e.g. cultural heritage exhibition.
- Library tours – virtual
- Augmented Reality (AR). Real life view with layer of digital information. Point camera at something, use GPS and compass so device knows where is pointing at, bring up digital layer based on coordinates. It does not work well indoors! Big limitation for libraries. Some time off. When read list of possibilities can easily see how useful this could be for users about the Library but just not viable presently in all buildings using GPS. But you can also have image or icon triggers – see Case Study Four for some examples of this.
- Geolocation function e.g. from classmark to where it is in library via a map – other Bluetooth enabled context specific content onto the device as users move about e.g. show info about library location users are actually in only. Show advice on using the facilities near where the user exactly is. Again some time off, totally hampered by lack of signal indoors. How to map the library building and shelves – triangulate Wi-Fi signals best indoors, but that does require a large number of routers to be in place.

The niche library app: highly specialised approaches

It could be argued that responsive websites are going to provide adequate mobile access to the full array of online library functions and services and the place of the future library app is better envisaged as a very specific app, going in depth in one particular area or aimed at one particular user group.

A couple of libraries have been involved in developing apps that are specially about referencing. The m-biblio project at the University of Bristol³⁸ wanted to look at the potential for smart phones to be used for the recording and organisation of bibliographic information for students within a library context. One deliverable was a prototype app that used barcode scanning to create and manage citations.

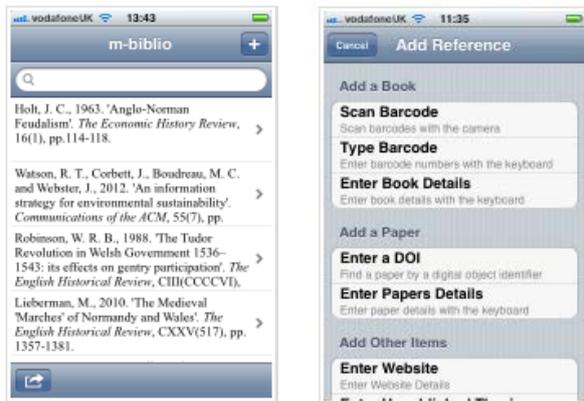
One of our demonstrators fits into this category: an app designed especially for the brand new student.

³⁷ EarlyCite pre-publication article: Emma Wilcox, Yew Boon Chia, (2013), "Fostering a Sticky Relationship with Academic Library Users", Library Management, Vol. 34 Iss: 3 (Date online 22/1/2013). Downloaded on: 07-02-2013

³⁸ <http://mbiblio.ilrt.bris.ac.uk/>

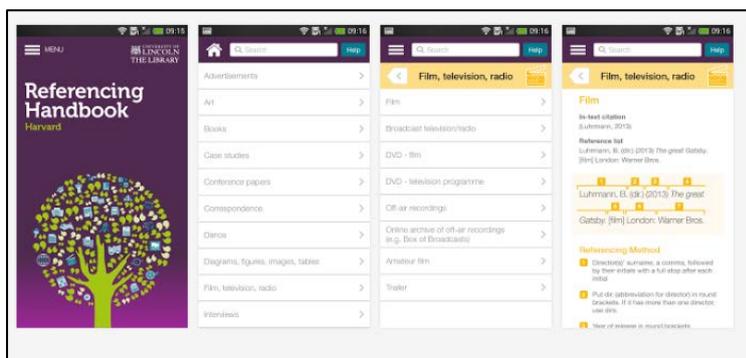
These niche apps could go in 2 or 3 directions:

- Ones that rely on GPS, compass, camera and thus good Wi-Fi or 3G signal available which can be a problem in some buildings
- Ones that rely on good connectivity to pull data in from external resources such as bibliographic databases or digital library image servers
- Ones that are more or less free-standing and do not need any connectivity.



Screenshots from the prototype m-biblio app developed by University of Bristol Library

University of Lincoln have turned their Harvard referencing guide into an app for iOS or Android³⁹.



The University of Lincoln Harvard referencing handbook app

³⁹ <https://itunes.apple.com/gb/app/referencing-handbook-harvard/id720736245> and <https://play.google.com/store/apps/details?id=uk.co.optimadesign.referencinghandbookharvardphone>

Part Three

Development options and our Demonstrator Apps

In this section we present a simple summary of on different coding approaches and a introduce a couple of app demonstrators that have been developed for this project, one of which will be tested out with new students in September 2014.

Apps: working definitions

Apps

Technically there is a big differences between web and native apps but to users these may not be so obvious and in some of the literature they are put together, as in this summary:

“Mobile applications, apps for short, are stand-alone, dedicated pieces of software or web applications/sites that enhance our phones’ or tablets’ capabilities and access information in elegant, consistent ways, and are the means for creating new services for our mobile patrons”⁴⁰

Native application

At the time of writing (2014) consumers prefer native apps to mobile web apps and 4 out of 5 mobile media are generated from native apps.⁴¹

What people usually mean in general parlance when talking about mobile apps is native apps. The first were apps like calendar and email included at an early stage on the mobile devices. Then a whole range of native apps became available to pick and choose individually. The fact that discovering them is via the “walled gardens” of separate app stores is seen by some as a disadvantage, compared to the retrieval in search results of a web app.

These native apps are downloaded and then run on the mobile device.

They can be developed using the development kits for the platform – but are very commonly developed using a higher level language from which the native code can be generated.

They offer a rich experience because they can tie into local device hardware and software function like camera, compass, messaging, geolocation, offline modes, local file system access and use the proprietary functionality to its full advantage.

You have to develop a different application for each device operating system: and this is seen as a big issue with the native app path. In our own UCD Library case Google Analytics tells us that iOS and Android would cover the bulk of mobile device use at UCD but with small screen and tablets available for both of these you would ideally be talking about 4 developments of native app demonstrators if going down this route: offering just the small screen iPhone app to use on an iPad is not a great approach. Apple apps are regulated for quality by the company so standards are high and to get certified and you have to pay to

⁴⁰ Ibid.

⁴¹ 2013 Mobile Future in Focus white paper (Reston VA: ComScore, February 2013) available at http://www.comscore.com/Insights/Presentations_and_Whitepapers/2013/2013_Mobile_Future_in_Focus accessed 24/10/2013

register; with Android this is far easier and the Google play store is a less regulated environment.

If coding yourself, then this is a somewhat complex development process. For iOS apps the components of the app (Objective-C, APIs, frameworks, functions, and classes) are all part of the app and are packaged up when delivered to the user. All the basic functionality is written in Objective-C and requires a Mac – unless using higher level third party development interfaces: cross-platform app development tools that would probably be a preferable route to take: they reduce the coding requirement and will then take the core app and envelope it in the proprietary code required to lodge it as a native app into the App Store and Google Play stores among others (see below)

Web application (aka In-Browser app)

Webapps can be thought of as web pages that mimic the appearance and function of an installed native app experience in the web browser - but they can be used by any device being platform-independent.

Smartphones now have advanced web browsers so these open up the possibility of developing application-like experiences using the mobile web browsing approach.

Whilst users view these in the browser, it is very easy to create an icon for the mobile device home page - so users start them up in a very similar way to an app having done this – they do not have to move to launch the web browser to use the web app if they do this. Unfortunately, this little process may be a serious hindrance and Bohyun reports that in his own experience users just do not do this⁴²

What distinguishes a webapp from a touch-enabled mobile website is not just the look of it but also the increasing extent of the downloadable elements that make use of the device functionalities such as touch, GPS, camera etc. Mark Power sums up the approach well and a number of its advantages:

“Fortunately the mobile web is no longer limited to simply delivering ‘plain’ web content optimised for smaller screens but is now making serious in-roads into being a viable alternative for building cross-platform mobile applications that need no dedicated app store, no 3rd party approval processes and can be developed using existing (and improving) open web technologies, with development skills that institutions already have available to them in their existing web designers and developers. While there is still a gap between the capabilities of mobile web apps and their native counterparts, work continues on open web technologies that looks to close this gap and make the web a powerful and viable option for creating feature-rich applications.”⁴³

⁴² Library Technology Report 49:6 Aug/Sep 2013, p 14

⁴³ Power, M. (2012). Delivering Web to Mobile. TwechWatch Report, JISC Observatory CETIS UKOLN. May 2012. Pp.12-13. Available online at <http://observatory.jisc.ac.uk/docs/delivering-web-to-mobile.pdf> Accessed Dec 20 2012.

To develop a web app requires HTML, CSS and JavaScript or jQuery skills if coding it yourself. The web server is hosting and therefore there is no need to download or compile the application or pay to get the app into the proprietary app store required. Developers can update these web apps on a regular basis which is another advantage.

There are downsides though. It can be tricky to get web apps to work on all devices. These apps may lack some functionality of the smart device sometimes like geolocation, camera, offline storage, device audio etc. though with HTML5 and device API development this is changing, but not all the local device functions can be used. They may be slower than a native app in use to do the same things because where native apps are locally installed on the device with the web app all elements needed have to be downloaded from the internet; and they may lack the sophistication of a native app.

Mark Power provides a very clear tabular summary of the features that HTML5 is bringing to web apps together with a good summary of the benefits of the Device API in the mobile web app mix – another new development that enables local device features to be made use of:

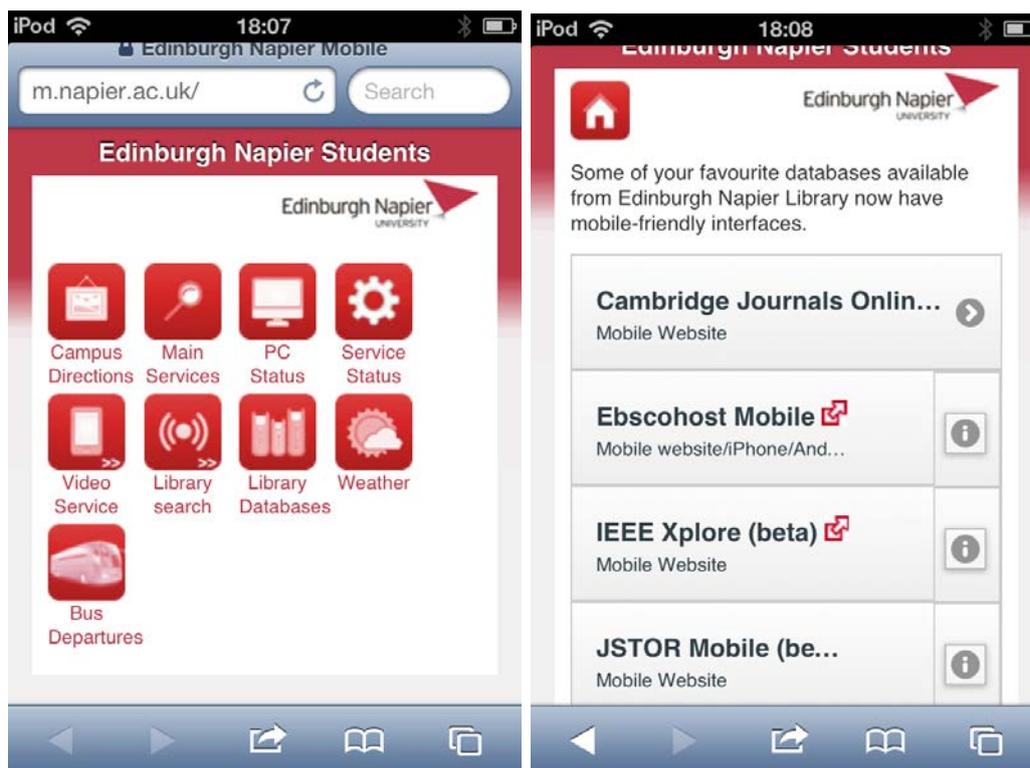
“Device APIs are client-side APIs – written in JavaScript – that enable the development of web applications that can interact with the device hardware, for example; the camera, GPS, compass and accelerometer, as well as hooking up your web app with other functions like the calendar, the messaging system and address book to create more context-aware web applications.”⁴⁴

James Elder sums up the web app route in a non-technical and friendly manner:

“There are only a few things libraries need to learn right away as they dive into Web app development and it starts with learning HTML. This is the coding language used to tell Safari what the content is on the page. HTML uses tags like “<p>” to say the content is a paragraph or “<h1>” to say the content is a header. The second is CSS, which tells Safari how the content looks to the end user. JavaScript, Webkit, and AJAX (additional languages that can be learned) can be used to add some extra functionality, such as animations or transitions. A good metaphor for how this works is to compare the HTML page structure with a cupcake. The content is the cupcake, warm and delicious. The HTML is the wrapper; it wraps the content up for the Web browser. The CSS is the icing, which makes the cupcake look more attractive and tasty. JavaScript is the extra decoration, adding a little more fun to the Web cupcake but is not required. Together these elements complete a Web app.”

Here is an example library following this path. The Edinburgh Napier University developed their own web app using a web app approach, rather than any 3rd party solution or native app development.

⁴⁴ Ibid. pp. 14-15. Available online at <http://observatory.jisc.ac.uk/docs/delivering-web-to-mobile.pdf> Accessed Dec 20 2012.



The Library search option just links to Library Anywhere for catalogue search. However the Library databases link on the springboard page provides a content listing of key databases at the top level of the institutional app, and it is unusual to find this at such a high level in an institutional app, probably reflecting the benefits to libraries of a merged Library and IT service as they have there.

A further good example of the web app approach is the Ryerson mobile <http://m.ryerson.ca> an ongoing university level web app project described in a case study by Walsh⁴⁵.

In terms of workload however, a Ryerson spokesperson points out that even with the web app approach, which avoids native development for iOS, Android, Windows and so on, there may be a need to maintain multiple webapp versions: they are still having to maintain 3 versions to meet all platform needs, including still supporting the text-only internet devices:

- High-graphic version for newer smartphones that support WebKit or Opera mobile. These have mobile web browsers that are cutting edge. WebKit browser engine runs within mobile Safari and Android browser and BlackberryOS 6+ can both support HTML5 and CSS 3 features like geolocation, device orientation, off line storage on the mobile device, video without plugins or Flash, media queries to determine screen dimensions to resize, easy form handling and background scripts. The growing number of Device APIs can also make things like SMS and email, contacts and calendar available to the mobile web app⁴⁶

⁴⁵ Walsh, A. (2012). *Using Mobile Technology to Deliver Library Services: A Handbook*. London, Facet Publishing. p. 59

⁴⁶ A good summary of these features in HTML5 is given by Mark Power in his JISC/CETIS briefing paper Power, M. (2011). "Web apps: a briefing paper." Available at http://wiki.cetis.ac.uk/images/7/76/Mobile_Web_Apps.pdf accessed 17 Dec 2012

- Medium-graphic version for older smartphones supporting graphics and JavaScript but not WebKit
- Basic WAP version to cover the rest of devices that do not support JavaScript or images.



The Library option on the springboard page provides another nested library springboard or home page, with the library-specific options, shown right above

This library aspect of that project and some interesting information about the relatively advanced state of app development, primarily web app development, in Canadian academic libraries can be referenced in a good overview article by Gillian Nowlan who summarises the findings of a survey of 6 Canadian academic libraries thus:

“The other option of developing a web application seemed to be a better fit for most of libraries Libraries that developed a web application utilized in house IT staff who had experience of using HTML5 and CSS. The cost for developing this type of mobile site was low and the mobile site would be accessible from any mobile device by using a responsive design that allows the mobile site to conform to the size of different screens. One drawback with using the web application is that the experience for the user was not as personalized ... For

instance, some individuals may not be able to use all of the features that were built into their specific mobile device....”⁴⁷

Hybrid apps: best of both worlds?

Perhaps at time of writing (2014) the best way to cover all bases is to adopt a 2-stage approach: create a web app using HTML5 and with the assistance of development frameworks such as jQuery Mobile (JQM). This gives a downloadable web app that can be used on any platform. Then feed it into a product such as PhoneGap Build, which will “convert” this into native apps so that you can also lodge these into the relevant app stores where users may expect to find them and to cover those who much prefer these over websites.

This type of native app is going to render HTML pages – but in the case of the native app versions that will be using an app-embedded browser.

Frameworks and higher level languages for the technically skilled

If coding skills are available then there are a wide range of frameworks and higher level languages that are used to produce both native and webapps. Here is just a sample range:

a. Molly – ready to use templates

This is an open source framework from the Erewhon project, a specialised web framework with mobile-friendly widget-style HTML templates for common campus applications. This was used to build the Mobile Oxford web app <http://www.mollyproject.org>

b. Dedicated, HTML-based mobile frameworks

These take standard HTML, CSS and JavaScript and from them produce touch-friendly, app-like products. Among them are:

Jo <http://joapp.com>

PhoneJS <http://phonejs.devexpress.com/>

Appcelerator Titanium <http://www.appcelerator.com>

Corona <http://www.anscamobile.com/corona>

Corona is a subscription solution whose SDK enables developers to build a single app that can then be deployed on iOS and Android.

jQuery Mobile <http://www.jquerymobile.com>

JQM dominates the field presently. The UI elements are basic and fairly generic but can be styled through the CSS. A useful tool to assist in this is ThemeRoller for Mobile (<http://jquerymobile.com/themeroller>)

Here is a quote from a user of this approach:

⁴⁷ Gillian Andrea Nowlan, (2013), "Going Mobile: Creating a Mobile Presence for Your Library", New Library World, Vol. 114 Iss: 3. EarlyCite version accessed 07 Feb 2013

“For what it's worth, we decided that mobile web and not native was right for our user community, and went with jQuery mobile as our html5 framework. We found their online documentation and user community to be very helpful. And, it had almost no appreciable learning curve, assuming you have a reasonable grasp of html to start with. If you'd like to take a look, we've posted our code to GitHub. You can also see the final product at <http://langsdale.ubalt.edu> if you visit on a phone, or <http://langsdale.ubalt.edu/m> on a desktop or tablet. “

-Bill Helman, Integrated Digital Services Librarian. The University of Baltimore, Langsdale Library

c. Use a higher level tool preferably cross-platform tool which easier to use and builds a web app and then it converts into the proprietary code required for native apps:

“In a library with limited developer resources, development of an iPhone application using the iOS platform can be a daunting task...tools, like PhoneGap and Sencha Touch, now exist that allow a developer to build a standard HTML mobile site and compile that site into a native app version for iOS devices.”⁴⁸

PhoneGap. <http://phonegap.com/> Enquiries of our own Computer Science department at UCD elicited a recommendation to use this package if pursuing this particular cross-platform route: Adobe have a cloud-based version, PhoneGap Build, based on Apache Cordova.

“Overall I'd suggest to develop a generic mobile app using [PhoneGap](http://phonegap.com/) that can be compiled to a native app for iPhone, Android, Windows etc.”^{49 50}

Sencha <http://www.sencha.com>

SproutCore <http://sproutcore.com/> is another example.

We don't have any coding skills!

Outsource the work

If no suitable skillsets exist within the Library or available to the Library from another university support unit, academic school or project team, then one option is to outsource.

There are downsides, an obvious one being cost. But there are others:

“Most libraries would need to outsource the production of an app, sometimes to more than one external expert if apps are wanted for multiple platforms and devices. Once you had your app, you

⁴⁸ Clark, J. A. (2012). *Building Mobile Library Applications*. London, Facet Publishing. p. 37

⁴⁹ Personal communication, Mel Ó Cinnéide, School of Computer Science and Informatics, University College Dublin, Ireland. February 2013

⁵⁰ Mobile First by Tom Arah, an article in PC Pro May 2014 elucidates this approach in non-technical user-friendly language

would then need to continue to buy in this expertise in order to maintain its working as operating systems were updated, solve issues that users raised and, preferably, build additional functionality over time.”⁵¹

Use a ready to go template based solution – library specialist

We have already touched upon this type of solution in this report. These are basically quite inflexible hard-coded solutions with fixed templates, providing an easy solution for libraries if their functionality suits your app needs.

Here are the main players:

a. Library Anywhere

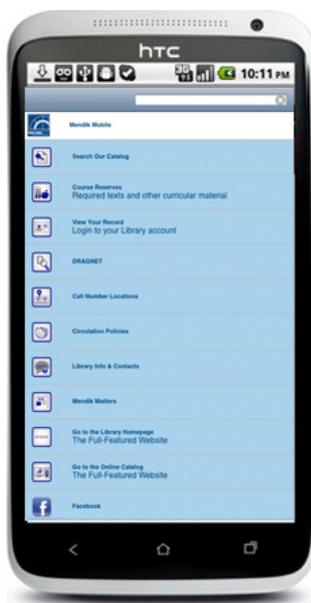
www.librarything.com/forlibraries⁵²

b. Boopsie

<http://www.boopsie.com/library/> App developed for OCLC that runs on all major mobile platforms. A little more detail is provided on this template solution here, as it did not feature in the Irish survey or case studies above as Library Anywhere has done.

SPL mobile Seattle Public Library is an example that went live in May 2010, and a case study of this is presented in Walsh’s 2012 text⁵³. UB Ghent university library is another example

<https://itunes.apple.com/be/app/ub-gent/id362022518?mt=8>



The key feature is a mobile catalogue interface. Additional features include RSS feeds and maintenance is easily achieved via spreadsheets stored in Google Docs which are picked up every 10 minutes.

<http://www.boopsie.com/library/the-boopsie-benefits/> lists what this app template will give you

Boopsie at Mendik Library New York Law School

⁵¹ Walsh, A. (2012). *Using Mobile Technology to Deliver Library Services: A Handbook*. London, Facet Publishing. p. 56

⁵² Keele University Library provide a case study of implementation at <http://mlibraries.jiscinvolve.org/wp/case-studies/libraryanywhere-at-keele-university-a-case-study/> (Accessed June 28 2013)

⁵³ Walsh, A. (2012). *Using Mobile Technology to Deliver Library Services: A Handbook*. London, Facet Publishing. p. 57

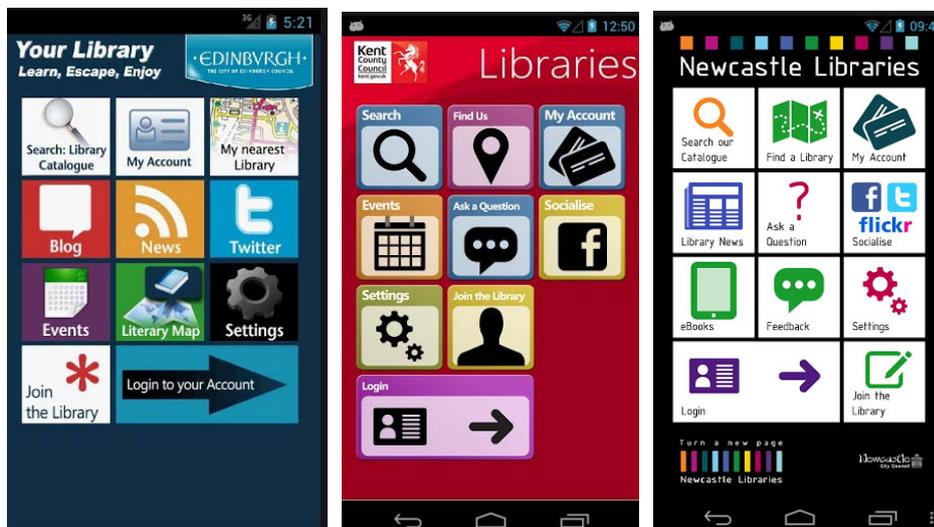
c. SOLUS

<http://www.solus.co.uk/>

Solus is a newer solution and offers an alternative to both Library Anywhere and Boopsie, and for €5,500 approximately can deliver an app that runs on Android, iOS, Blackberry and Windows Phone. It is a similar modular solution to these but offers perhaps a wider range of choice and pulling in of data both from external sources and from its own complementary cloud-based CMS which is a key part of the package and can also be used to feed various forms of digital signage from the same information content. It offers a rather more snappy user interface.

The company has worked primarily with public libraries and the NHS, but is beginning to market towards the higher education sector in both the UK and Ireland. Edinburgh, Glasgow and Kent County Councils are large public library customers and University of Western Scotland will be the first academic customer for an app.

<https://play.google.com/store/apps/developer?id=Solus+UK+Ltd&hl=en> provides a showcase of the Android options and customer range to date.



All of these library-focused template solutions provide a mass produced app, with limited ability to alter the functionality included or alter the look and feel, so it provides a solution but with a lack of customisability.

d. LMS vendor solutions

A variant on this is to purchase and use the app available from your library vendor of which Sirsi/Dynix and shortly Innovate Interfaces are referenced in prior report sections: other LMS suppliers may also have offerings, we have not encountered these in our research.

e. Hook into augmented reality apps

We do not cover this in detail here, but one visit we made to Birmingham City University explored some experiments that they undertook with Augmented Reality apps for library use. DCU have been experimenting in this area also since around 2012 and University of Bath library services have undertaken a number of experiments also: these are just examples of a very different approach to apps which may have considerable potential, based on solutions such as Layar, Aurasma, blippar, junaio and wiktude.

Use a cloud-based zero-coding solution

There are a variety of cloud-based application solutions. Some require coding skills, others completely remove that requirement but as would be expected tend to be very basic and inflexible as a result.

They are normally on a modest month by month subscription basis.

The range varies all the time, with new entries to the market and others going out of business – as of June 2014 a good summary article of offerings claiming to need no coding *10 Excellent Platforms for Building Mobile Apps* is available at http://mashable.com/2013/12/03/build-mobile-apps/?utm_medium=feed&utm_source=rss

Just a few examples are:

<http://seattleclouds.com/>

<http://www.snappii.com/>

Live Code Mobile <http://www.runrev.com/>

“Write code in an English-like language that makes sense – so quick to learn that even non-programmers can use it. “

Appmakr <http://www.appmakr.com/>

<http://myappbuilder.com/>

<http://www.appbreeder.com/>

The “no code required” cloud based options are obviously attractive to libraries with limited coding skillsets available and/or limited resources to buy in that expertise.

But what can you really do with them? They are likely to be good for including brief multimedia content and providing an app front door to other mobile environments like catalogue search, eLearning, online guides, online booking and other services. They are likely to impose rigid layout template, and also to be pretty poor at any sort of pulling in of data dynamically from other apps, though widgets may be supported. This is key, to explore the extent to which you can:

“..extend functional tentacles into enterprise systems and through password-protected barriers”⁵⁴

Decisions on what to try out as demonstrators during the project

We wanted a couple of usable demonstrators to test out with users – we by no means accept that library users will avail of the technology and apps simply because we have created them and hoped to be able to do at least limited user testing and feedback with the demonstrators.

In the end we opted to develop two contrasting demonstrators:

⁵⁴ 7 things you should know about Mobile App Development, Educause briefing paper <https://net.educause.edu/ir/library/pdf/EST1102.pdf> accessed February 18th, 2014.

A webapp of a general nature highlighting our key online services and resource discovery tools, to be developed by a team of Computer Science masters students based at UCD, but in their own time and at agreed flat rate cost. In the event we do not feel that this is ready to put into live pilot usage.

A niche app providing new students in September 2014 with a welcome app, trying out a cloud-based, zero-coding monthly subscription solution and working with the Library professional in charge of the new student welcome and other members of the welcome team.

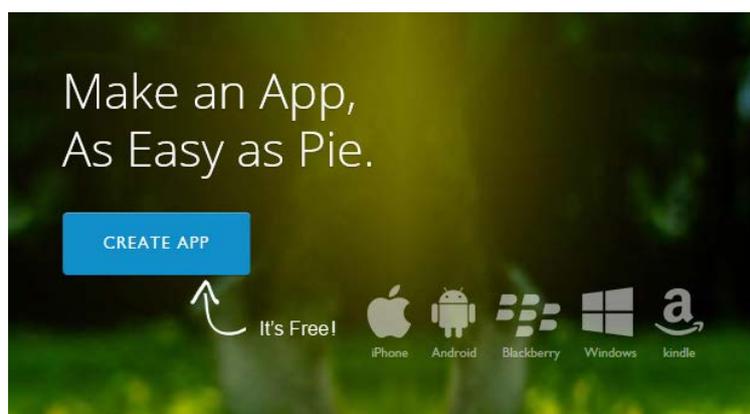
DEMONSTRATOR ONE - ZERO-CODING CLOUD BASED SOLUTIONS

A cloud solution with no coding skills required to build a new student orientation app

There are literally hundreds of cloud-based packages offering the ability to build apps. We decided to try out a zero-code cloud based solution, and after reviewing a number of possibilities that tend to score as top choices and with good reviews, we opted to use Appy Pie for the demonstrator (www.appypie.com) because it was truly a zero-code option and offered a reasonable range of functionalities.⁵⁵

The demonstrator was aimed at our new student intake and was envisaged as a new student orientation app. We worked with the head of our Orientation effort on developing this demonstrator from May 2014. The idea was that if it was felt to be adequate we would adjust it post-project to reflect changes in our resource discovery service that were taking place and offer it as a real option to our new students: if the demonstrator proved inadequate we would view it as a hypothetical exercise only.

Whilst dynamic content calling on other systems, particularly catalogue and resource search, would also be helpful, we felt that for this target new student orientation topic, an app of flat static information that could possibly be used offline could have a place.



⁵⁵ A google search will produce many reviews and summaries of the product, a couple can be found at <http://www.prweb.com/releases/appy-pie-com/top-app-builder/prweb11406591.htm> <http://www.appbuilderz.com/reviews/appy-pie/>

Scoping out the Package

The first thing to do is choose your template type. The two most obvious options for us were choosing “Information” or “University” for the purpose; the “University” option included calendars which was quite attractive as an option. No tour option was available which was a downside. The template options actually were all pretty much the same – they offered slightly different default page types but once you got familiar with changing these it made little difference really where you started!



The next stage is providing some basic information, including the name of the app. We decided on the simple title “UCD Library Welcome” so that students could easily find it in the app stores :



The clip art provided has that typical rather dated shareware look, but you can upload your own icons and images so this can be overcome quite easily.

The design aspects are all very simple, but very limited. Below, for example, is the colour theme choice, nothing else can be used - no hex values can be entered or similar functionality.

The page layout options offered are a quite basic selection of four options – for example, you cannot adjust the size of the rows or icon numbers featuring on these page layouts. We decided to create a minimalist version with only six touch icons, so chose the “Matrix2” layout option here, which creates three rows of two icons – very nice looking.

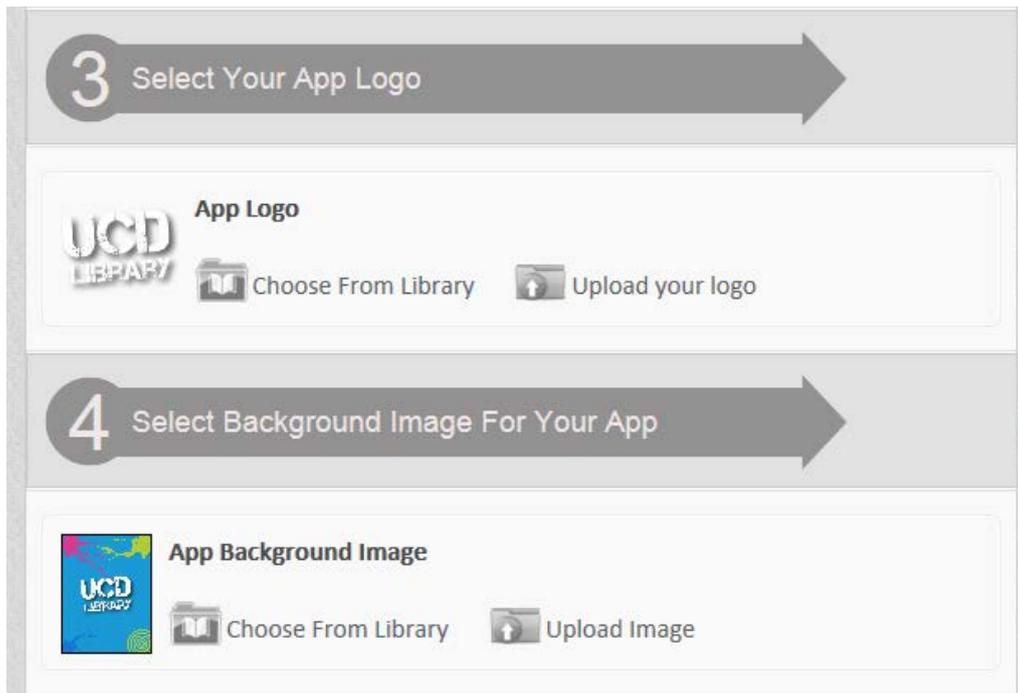


Choosing one of 4 page layouts

The background colour scheme choice

Colour scheme limitations can be overcome: our own graphic designer created a background for the app, which was in line with the overall promotional theme for our new students orientation drive. This was easily added using AppyPie’s tools:





Uploading your own logo and background look and feel

At this point you have a basic look and feel. And now the launch page can be created with links to external environments or, where relevant with an app information page.

Adding pages for the content types and links that you want

At this point you really need to have thought out what you want to include in the app, as you now have to decide on the pages that you want to include here.

You can add certain pre-built types of page, this works very nicely to get your Facebook, twitter, Instagram, website, and contacts included.

The only scope you have to develop your own content actually within the app is to create text pages, code pages and directories.

You can rename all the pages and alter the icons used, choosing from the Library or uploading your own.

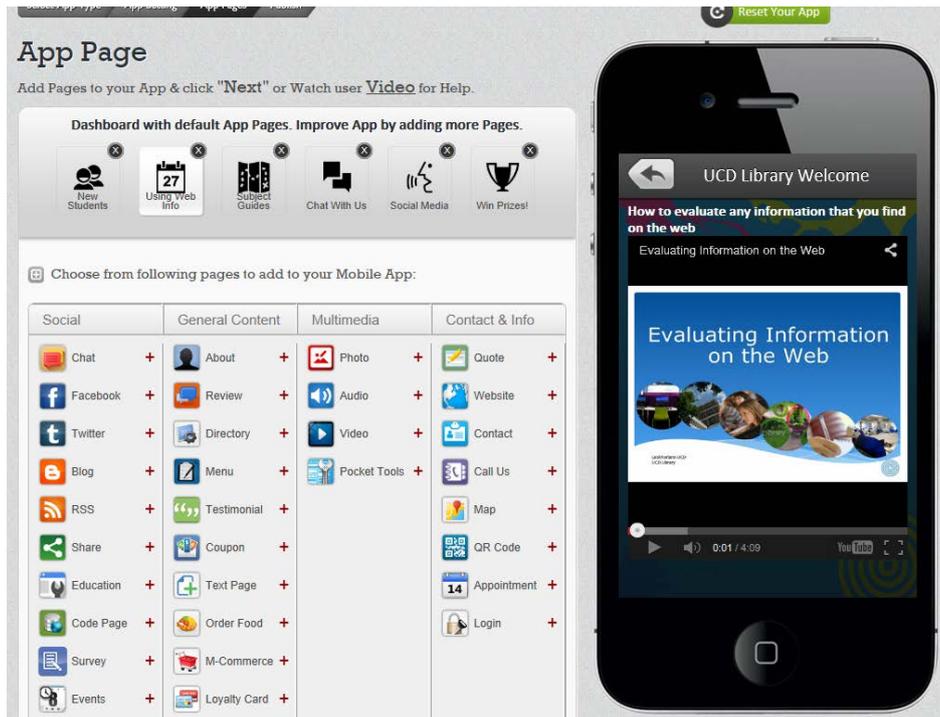
This is how the interface presents itself after some work on page type selection and setting up: this is the basic working interface with your launch page at right and the individual icons at the top for editing. This is very easy to use once you remember basics like moving out of a field to get the changes to take effect and saving things before exiting.



Choose from following pages to add to your Mobile App:

Social	General Content	Multimedia	Contact & Info
Chat +	About +	Photo +	Quote +
Facebook +	Review +	Audio +	Website +
Twitter +	Directory +	Video +	Contact +
Blog +	Menu +	Pocket Tools +	Call Us +
RSS +	Testimonial +		Map +
Share +	Coupon +		QR Code +
Education +	Text Page +		Appointment +
Code Page +	Order Food +		Login +
Survey +	M-Commerce +		
Events +	Loyalty Card +		
LinkedIn +	E-reader +		

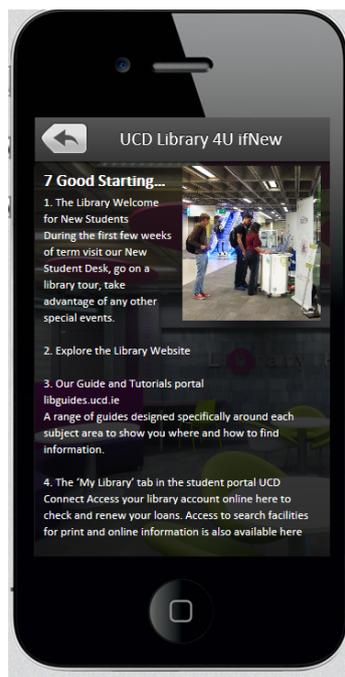
Range of AppyPie content types to choose from



You can test changes you make to the content straight away in the right hand faked up app image as seen above having added code to embed a YouTube video, which works well.

Building content with the text page type

The text page type does not hot link any URLs in it, which is a disadvantage. Another limitation is the fact you can also only add one picture to it at top right:

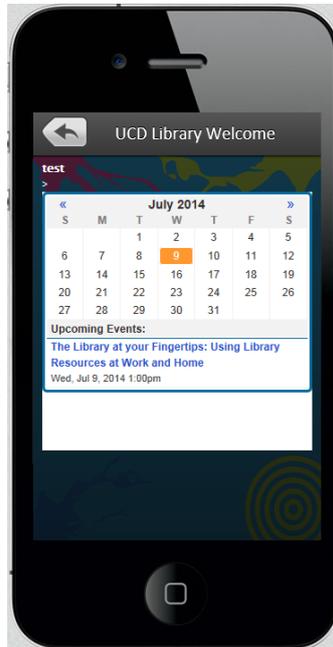


Text style pages are very limited

The code pages

The code style is the way round these limitations but you do have to know HTML or use a website build tool first to get the relevant markup. If it is very simple things like URL links or images or widget code that is required then this will not be a problem for most library staff using the app builder.

Whilst there is no API or similar facility you can include widget code, which to some extent gets round this problem: for example we could have included our library classes calendar as a widget.



Widget code can be added, providing links to other library services

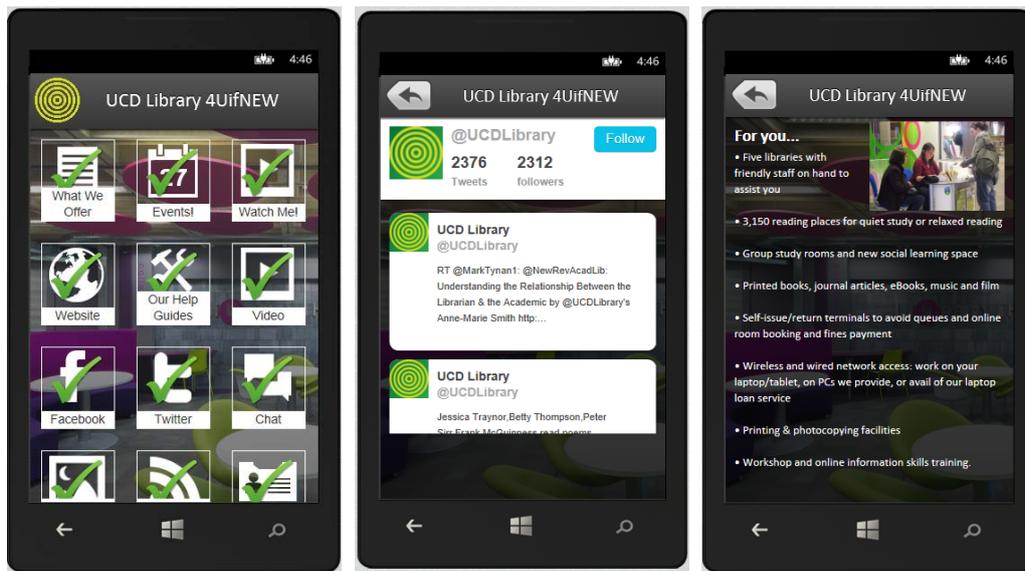
Develop the content in half a day!

At the end of the scoping out we had a few pages of information built within the app, various embedded widgets, their social media default page selected which exposed our news, twitter and Facebook content, and a few links out to other Library websites and guides.

With access to our photo galleries and other design work available to pick from, it took around half a day to get the scoping development to this point, not very long at all, so this is noteworthy.

A good feature of the app is that when you include links out to web-site these are presented in an in-app browser and you still get the app navigation options showing to go back to the app launch page: when coming on to demonstrator two below this proved to be a significant complicating factor that was not successfully addressed there.

It looked like this after one set up session (the green ticks are just administrative features):



Early demonstrator layout design/content:

Discussions with the Welcome Team at UCD Library

The next stage was a demonstration and discussion with the welcome group leader and plans on how to take this forward. After an initial build, the group went back to discuss how many icons should be displayed in the app. The app content was discussed at length and it was decided that any deliverable should contain just basic information, with a link to fuller information in the form of our LibGuide. Most icons link to mobile-ready third party services – LibGuides and our chat service. Only one icon links to a text page created within AppyPie.



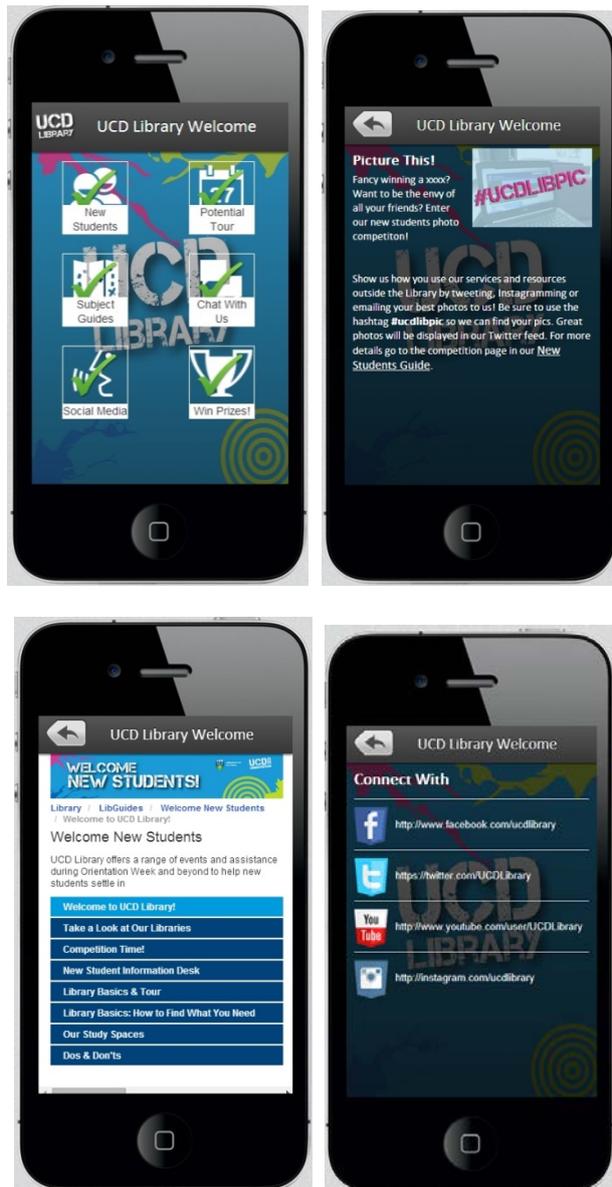
The Libguides new student environment where fuller details are given

As stated earlier, the group finally decided on six icons linking to orientation information for new students.

- Our New Students LibGuide – the main location for all Library information for new students.
- An embedded video to start which may be upgraded to a virtual tour if this is available in time: you can make edits once the app is published which is a good feature
- Our overall range of subject guides (LibGuides)

- Chat
- Our social media channels
- Information about our prize competitions for new students
- At time of writing a couple more things have been added in: a widgets with our library classes calendar and a link to the mobile version of our group study room booking portal (both Springshare hosted services)

The other key development was uploading our new student splash background and customised logo.



Limitations of Note

There is no nesting of pages into a hierarchy, so if you want to have seven pages of starter points or tour this will take up seven slots on your home page: you cannot have a second level of launch page in the system which is a major limitation – it is flat.

There is no font choice of style or size available to you that can be seen.

As with most of these cloud-based app builders, Appy Pie is limited in design and functionality, though it did seem to mostly serve our purpose here. Some of the content types, even for an education-based app, are more business oriented. Many of the content types presented were thus not applicable to what we were trying to achieve.

Costs

The company deal with all the administration of developers etc. You can just operate it as a web app on their own platform but are likely to want to also get it into the iPhone and Google Play stores. Costings are modest, as of July 2014 \$19-25 a month to get both Android and iOS native apps created from the web app which you can also offer to users so that all platforms are covered.

Testing

Will the app get any use is a key question.

This app will be tested with our large new student intake in September 2014, forming one part of our new student welcome effort.

At time of writing both the icon style and the row style to the launch page were still under consideration – these can be altered at the click of a button.



DEMONSTRATOR TWO – A GENERAL PURPOSE LIBRARY WEB APP

A web app with a generic launch page linking to existing pages

We also decided to try and build a generic library app, an alternative to the current separate mobile website that we have.

This app needed to use touch control as a minimum and include the ability to access key online services on other library servers: catalogue and resource search, fines payment, online room booking, and provide the ability to get back into the webapp after using any one of these. These requirements were seen as the minimum specification of the demonstrator, theoretically replacing our current presence in the University mobile app, which is primarily a presentation of catalogue search.

Outsourcing the work

We did not have the skillset required to develop the app ourselves or any other Library staff with both skills and time to do this work.

After some initial emails to key academic staff in UCD's School of Computer Science and Informatics for advice on the way forward, and the brief consideration of using outside developers, we decided, given our limited finances, to try and utilise UCD's student talent in this case. In early 2014 a campus news item brought to our attention "Team Swift" – a group of Computer Science Masters students led by Damilare Fagbemi. They had developed as a course project an Android app called UCD Navigator, which was effective and received considerable local publicity. See <https://play.google.com/store/apps/details?id=com.ucdnavigator> for an overview of their app on the Google Play store.

We approached this group to see if they would be interested in developing our demonstrator and, despite the modest flat rate funding available (€900), they agreed to take the job to add to their portfolio.

The plan for the web app

We held a number of initial meetings with the group in the Library to scope out the project. After some discussion, group members decided that given the timeframe and funding they would opt to develop a web app. This app would consist of:

- A graphically-based launch page, or dashboard, complete with buttons which linked to our existing mobile webpages and third-party mobile-ready services.
- The dashboard would include an embedded search box at the top, complete with a link to the full mobile version of our III Encore catalogue.

Upon the drafting of a six-week schedule and the signing of contracts, Team Swift commenced work.

During this time, we agreed to hold weekly progress meetings and continuous email communication.

Development

Naturally, there were a number of pitfalls and issues that arose as development progressed.

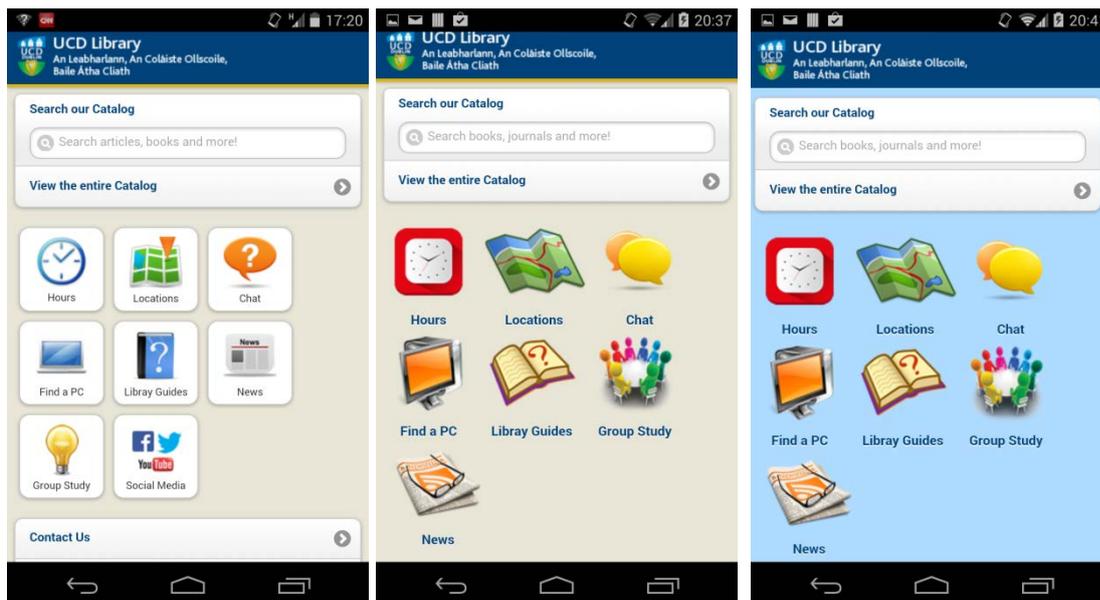
As we did not have access to a staging or test server, we had to create a complete copy of our mobile website on the live Apache web server so the team could test functionality of new pages.

This setup was not ideal since the team had no direct access to the server. They had to send us updated files by email, which we then had to upload to the server. This ultimately slowed down development, and in the end we finally had to give them access rights to the FTP server for easier and more efficient editing and testing.

Since this project was essentially a linking of older existing mobile pages with a new graphic interface, there were some issues with integrating the two due to different CSS styles and JavaScript functions. Linking the old and the new required some updates of previously existing code.

Some of the features developed required the popular and widely-used PHP technology, which surprisingly was not supported by our web server. In response to this, the team had to implement certain workarounds for some features, while others could not be implemented at all. For example, the embedded catalogue search feature on the launch page should have been processed on the server via PHP, but instead it had to be implemented via client-side JavaScript and JQuery. Also, the contact form we had wanted was not completed as the mail function required PHP. This proved a significant challenge.

Early samples



Some design elements that the team came up with had to be reviewed. For example, we decided the clip art proposed for the app icons was not up to required standard or “feel” required, so our own graphic designer stepped in to supply button icons and contributed greatly to the look and feel we wanted. This was an interesting shortfall in the team’s offering, we thought.

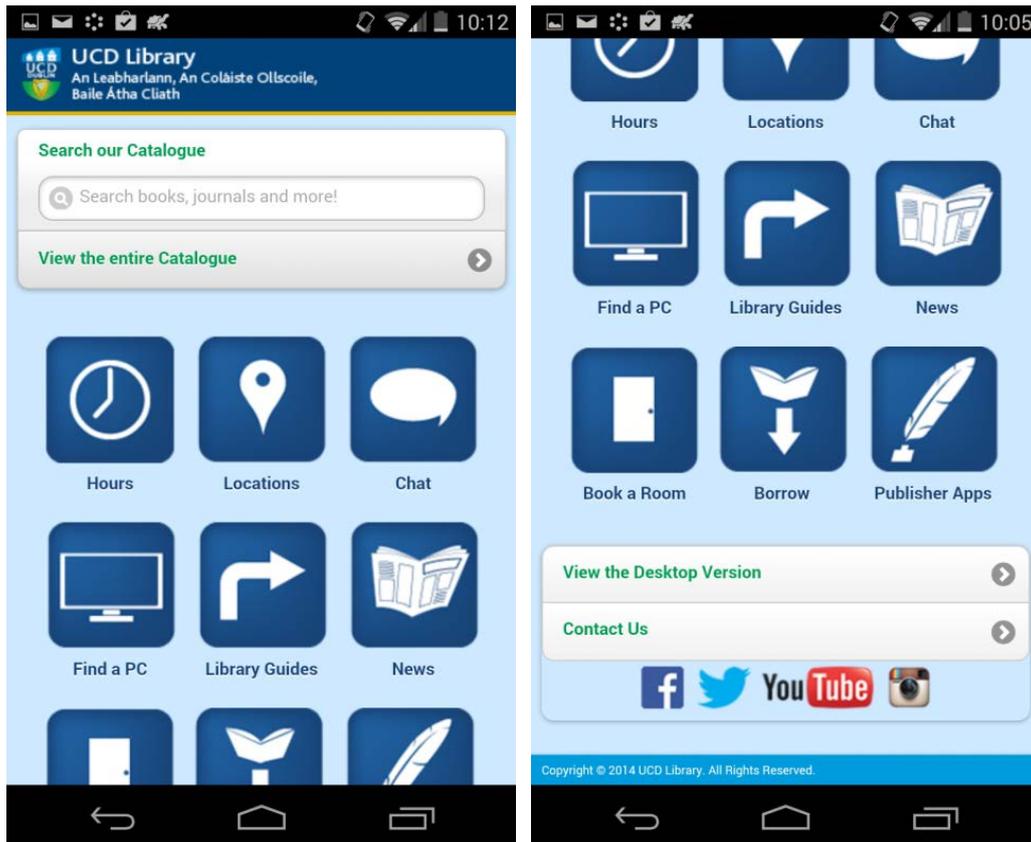
The layout of the icons on the launch page configure differently depending on the device’s screen size. This is a drawback in that the page and icons do not configure as well on a smaller iPhone 4 as they do on a much larger iPhone 5 or Galaxy S3 or S4.

Other issues included the fact that third party services opened a new browser window in most cases, creating a delay in returning to the launch page. Ideally all pages and services would have opened in the same window, with clear navigation back to the launch page. This seamless user experience

would be more easily achieved in a native app, rather than a mobile website solution, which this essentially is.

The team created the new pages in Dreamweaver CS6 and used Adobe Photoshop where necessary to tweak existing UCD Library banners and icons.

Programming languages used were HTML5, JavaScript, JQuery, JQuery Mobile and CSS for look and feel.



Final layouts showing at left top of screen and at right bottom of screen

Deliverables

The following features were implemented:

- Launch page with clickable icons
- Embedded Library catalogue search box
- Mobile-ready contact form (but not working due to stated reason above)
- “Find an available PC” feature that integrates existing university IT Services functionality, focusing on Library PC labs only. Original is not currently live.
- Integration with existing mobile webpages and services such as:
 - Library catalogue (full mobile version)
 - Opening hours information
 - Library branch pages (locations)
 - Chat (third party widget)

- Library news
- Group study room booking (third party website provided by Springshare)
- Borrowing information
- Listing of publisher mobile sites and apps
- Library guides (mobile-ready LibGuides provided by Springshare)
- Icons and links to social media channels (Facebook, twitter, Instagram, YouTube)

Overall we enjoyed a good working experience with Team Swift, though we feel more could have been done in the time allowed. In future this web app could form the basis for a move forward in improving our mobile presence. The fact that there are talented student programmers within UCD is important to keep in mind, especially when financial resources and in-house skillsets are limited.

We had not fully understood the need to consider not just the launch page, but adjustments needed to the entire suite of mobile-optimized website pages that we had, and a clear issue emerged of the need to involve those running the websites and servers in any real-life project, to bring to light gaps in available software and shape the project so that these are not required.

Appendix 1 – Project Outline and Work Packages

Project Definition

Title: Strategic mobile library development: the place of library apps and the options for creating them

Context: UCD Library has a number of mobile offerings for users. UCD has a mobile app for users. Given that more users will access internet via mobile than desktop device by 2014 in current estimates, the library needs to consider how it delivers its mobile offering and the place of apps in that strategy

Goal: To gain full understanding of the current development of the mLibrary, the amount of development and interest in mobile app development as one option, and understanding and some practical experience in using various approaches to such development

Scope: The scope of the project encompasses desk research and conference attendance, visits and/or survey, development of demonstrator apps, report writing and presentation.

Out of scope:

Visits beyond Europe [*note: in the event a presentation was made at the 2014 mLibraries conference in Hong Kong*]

Live apps for real life usage [*in the event one app is being tried out with new students*]

Sponsor: ANLTC/Swets, UCD Library management

Project Manager: Ros Pan

Deliverables: a report; a range of demonstrator library apps; a conference presentation; a published paper

Milestones :

05 Nov 2012 commence project

31st May 2013 interim project report to Ann Mitchell (funder requirement)

07 Oct 2013 final submission of report and other demonstrator deliverables etc. to ANLTC funders (funder requirement)

31 Oct 2013 internal consideration of anything want to mainstream from the project

31 Dec 2013 done any conference presentations, papers etc. want to do on the project

[a time extension to end of June 2014 was granted, mainly to allow for development of demonstrator apps]

Resources: 2k grant from ANLTC/Swets plus other Library contribution

Assumptions: Ros Pan and Josh Clark will spend considerable amounts of their working time on the project over its lifetime

UCD Library will provide additional funding as required, over and above the 2k grant Examples would be spending of personal conference allowance to attend conference event, purchase of Microsoft Project, assistance with price of external app development on 50:50 basis with grant monies

Constraints: the main constraints are time and money. The project team have to fit this into a full schedule of other work and cannot therefore be exhaustive in their desk research and investigations. The finance provided is modest and this will require choices to be made regarding visits, conference, bench books and affordability of various application development options

Main risks:

Lack of time to complete the work given other workloads

Difficulties in specifying demonstrator apps

Lack of skill set required to develop apps

Little response to surveys or visit requests from other libraries

Approach:

The project will be run in six work packages as outlined below. The work in many of these can run concurrently, following an initial desk research period

The work will be done by Ros Pan and Josh Clark in the main, other UCD Library staff may be involved in scoping meetings and discussions.

Project Plan

Work Breakdown Structure

time to allow for each and the sequencing and dependencies of these to be done at the task level – into project if have the software (have enquired of SD)

Accountable person RCP or JC to be indicated, though both can share the work on a task

Work package 1: The preparation and project information organisation

DELIVERABLES FROM THIS WORK PACKAGE

- An online project environment – shared drive will do plus Endnote
- A system for storing references and to do/read lists
- A detailed list of actions, timelines, Gantt chart and work split in Microsoft project

- A final report skeleton
- A small library of bench books for the project
- A set of memberships of suitable communities
- A meeting schedule Will add at end of weekly Wednesday meeting and take this bit more seriously
- Some basic statistics on current ownership of mobile devices and library mobile offerings usage

Work package 2 Reading up on all areas: desk research& conference information gathering

DELIVERABLES FROM THIS WORK PACKAGE

- Draft final report chapters summarising desk research topics and findings
- A grid summarising libraries of interest to explore further via visits (UK or Ireland)
- A grid of options for app development

Work package 3: Flesh out knowledge of what goes on in Irish libraries

DELIVERABLES FROM THIS WORK PACKAGE

- Draft final report chapters summarising the Irish mLibrary situation and plans
- A survey designed, run and analysed and/or
- A report on visit interviews for each of those visited

Work package 4: the demonstrator apps

DELIVERABLES FROM THIS WORK PACKAGE

- A set of demonstrator apps available, online in stores where possible
- A final report section written on each approach covering skills required, costs, the app developed and pros and cons and experience and content limitations

Work package 5: writing and delivering

DELIVERABLES FROM THIS WORK PACKAGE

- An interim report to ANLTC/Swets
- A final report
- A paper
- A conference presentation

Work package 6: Closure and Exit Strategy

DELIVERABLES FROM THIS WORK PACKAGE

- A set of decisions about what if anything to carry forward to mainstreaming and future development

Appendix 2 - Select Bibliography

- Al-Khalifa, Hend S. "A Framework for Evaluating University Mobile Websites." *Online Information Review* 38, no. 2 (2014): EarlyCite accessed February 5th 2014.
- Ally, Mohamed and Gill Needham. *M-Libraries 3: Transforming Libraries with Mobile Technology*, 2012.
- Anderson, Janna and Lee Rainie. *The Future of Apps and Web* 2012.
- Bean, Elaine. "QR Codes: Engaging Library Users at Nui Maynooth."??
- Bishop, Bradley Wade. "Analysis of Reference Transactions to Inform Library Applications (Apps)." *Library and Information Science Research* 34, no. 4 (2012): 265-270.
- Bohyun, Kim. *The Library Mobile Experience: Practices and User Expectations*. 2013.
- Bomhold, Catharine Reese. "Education Use of Smart Phone Technology: A Survey of Mobile Phone Application Use by Undergraduate University Students." *Program: electronic library and information systems* 47, no. 4 (2013): 424-436.
- Bomhold, Catharine Reese. "Mobile Services at Academic Libraries: Meeting the Users' Needs?" *Library Hi Tech* 32, no. 2 (2014).
- Centre, Pew Research. *The Web Is Dead?*, 2012.
- CETIS, http://wiki.cetis.ac.uk/CETIS_Wiki (accessed Dec 17 2012).
- CISCO. *Gen Y: New Dawn for Work, Play, Identity*. 2012. Survey report.
- Clark, Jason A. *Building Mobile Library Applications* The Tech Set, Edited by Ellyssa Kroski. London: Facet Publishing, 2012.
- ComScore. *2012 Mobile Future in Focus: Key Insights from 2011 and What They Mean for the Coming Year*. 2012.
- Dalton, Pete, Jo Alcock, Yvonne Graves and Sukhvinder Kaur. *Report on Current M-Library Activity*. Birmingham City University, 2012. Report on survey findings.
- ECAR. *2012 Ecar Report*. 2012.
- EDUCAUSE. "7 Things You Should Know About Mobile App Development." 2011.
- Educause. *Ecar Study of Undergraduate Students and Information Technology 2013*. 2013.
- Elder, James. "How to Become the "Tech Guy" and Make iPhone Apps for Your Library." *The Reference Librarian* 53, (2012): 448-455.
- Fling, Brian. *Mobile Design and Development: Practical Concepts and Techniques for Creating Mobile Sites and Web Apps* Freely available online version. ed.: O'Reilly, 2009.
- Freeman, Eric and Elisabeth Robson. *Head First Html5 Programming* Head First Series. Beijing ; Sebastopol, Calif. : O'Reilly, 2011.
- Gardner, Lyza Danger and Jason Grigsby. *Head First Mobile Web* Head First Series: O'Reilly, 2012.

- Gayhard, Lisa, Bilal Khalid and Gordon Belray. "The Road to Responsive: University of Toronto Libraries' Journey to a New Library Catalogue Interface." *code4lib Journal* 23, no. 1 (2014).
- Hahn, Jim. "Mobile Augmented Reality Applications for Library Services." *New Library World* 113, no. 9/10 (2012): 429-438.
- Hanson, Cody. "Libraries and the Mobile Web: A Library Technology Report [Kindle Edition] ", (2011).
- Hoivik, Jingru. "Global Village: Mobile Access to Library Resources." *Library Hi Tech* 31, no. 3 (2013): 467-477.
- Horizon. *2012 Horizon Report*. 2012.
- Iglesias, Edward and Wittawat Meesangnil. "Mobile Website Development: From Site to App." *Bulletin of the American Society of Information Science and Technology* 38, no. 1 (2011): 18-23.
- Johnson, L, s Adams and M Cummins. *The NMC Horizon Report: 2012 Higher Education Edition*. 2012.
- Kroski, Ellyssa, "10 Ways for Your Library to Go Mobile Parts 1 and 2" <http://oedb.org/blogs/ilibrarian/2012/10-ways-for-your-library-to-go-mobile-part-i/> and <http://oedb.org/blogs/ilibrarian/2012/10-ways-for-your-library-to-go-mobile-part-ii/> (accessed Nov 12 2012 2012).
- Kroski, Ellyssa. "Libraries to Go: Mobile Tech in Libraries." 2012.
- Library, University of Glasgow. "University of Glasgow Library Mobile Strategy." 2012.
- The M-Library Project: UK Academic Libraries Going Mobile. University of the Highlands and Islands Edinburgh Napier University, 2011? Report.
- McKiernan, Peter. "UCD Mobile: Delivering Services to Mobile Constituents." UCD Dublin, 2011.
- Munro, Kay and Rosemary Stenson. "Developing a Mobile Strategy for the Library ": University of Glasgow Library, 2011?
- Murphy, J. *Mobile Devices and the Library: Handheld Tech, Handheld Reference*. New York: Routledge, 2011.
- Nowlan, Gillian Andrea. "Going Mobile: Creating a Mobile Presence for Your Library." *New Library World* 114, no. 3/4 (2013).
- Oller, Rick. "The Future of Mobile Learning." edited by Educause Centre for Applied Research (ECAR): ECAR, 2012.
- Peters, Thomas L and Lori Bell. "The Handheld Library: Mobile Technology and the Librarian." (2013 (March)).
- Power, Mark. "Web Apps: A Briefing Paper." (2011).
- Power, Mark. *Delivering Web to Mobile*. JISC Observatory, CETIS, UKOLN, 2012.
- Proudman, Vanessa, "5 Mobile Library Sites" <http://proud2know.eu/5librarymobilesites/> (accessed February 12 2014).
- Quinn, Clark N. *The Mobile Academy*. John Wiley & Sons 2011.
- Trott, B and R Jackson. "Mobile Academic Libraries." *Reference & User Services Quarterly* 52, no. 3 (2013): 174-178.
- W3C, "W3c Mobile Web Best Practices" <http://www.w3.org/TR/mobile-bp/>.
- Walsh, Andrew. *Using Mobile Technology to Deliver Library Services: A Handbook*. London: Facet Publishing, 2012.

- Wilson, S and G McCarthy. "The Mobile University: From the Library to the Campus." *Reference Services Review* 38, no. 2 (2010): 214-232.
- Wolber, David, Hal Abelson, Ellen Spertus and Liz Looney, "App Inventor: Create Your Own Android Apps"
<http://www.appinventor.org/projects>
- Wong, Kae Perng. "Library Services for Mobile Devices: The National Institute of Education Library Experience."
Library Hi Tech News 30, no. 9 (2013): 7-11.

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