

Wireless Web For Public Libraries

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Abstract:

The development of wireless technologies over the past twelve months has seen rapid expansion of the types of services that can be provided to mobile phones and personal digital assistants, with much more to come. Libraries must acknowledge the change in communication methods as a long term opportunity and begin planning for expanding market share by developing different types of services that take advantage of the new medium. The City of Joondalup Libraries have trialled a wireless website that offers basic services in order to better understand the challenges of the future.

Introduction

Much has been said about wireless technologies in the previous twelve months. If we are to believe the hype the world is about to be transformed into a mobile society where there is no need to stop moving, even for a moment, as all our daily requirements are catered for whilst on the move. Of course, the hype is being fuelled by telcos and handset manufacturers who have a vested interest to ensure the vision becomes reality.

Literally billions of dollars have been outlaid by global communication giants such as Vodafone, Hutchison, Nokia and Ericsson in a gamble that wireless online services will become a major force of the future. The almost mythical third generation (3G) services have been said to almost be the salvation of societal problems.

In reality the wireless domain to date has shown glimpses of opportunity, shrouded in clouds of irrelevance. Much of today's wireless content is unlikely to appeal to the average user, things being much simpler and easier to use on standard land-based computers. Likewise there is a substantial growth in the wireless entertainment market, which might affect other entertainment forms such as radio, but are not critical to everyday function.

The products of most use are already becoming clear as those that people require with a sense of immediacy, for which a wait of even a few minutes can make a difference; areas such as online broking, email messaging, bank balances and bookings. General surfing of websites is something that will be more of novelty value than long term interest, at least until substantially redesigned networks and devices are available.

In terms of public libraries the wireless evolution provides some possibilities for extending the reach of the service both to existing users, and also to current non-users. This is likely to require something of a redefinition or addition of service goals, but is perhaps a promising opportunity to expand market share in the increasingly crowded information provision market.

Wireless Technologies

What's Available Now?

WAP

Wireless Access Protocol (WAP) has been available in Australia for over 12 months by all major mobile phone carriers. To date the most common method of accessing WAP is through standard Global System for Mobile communication (GSM) mobile telephone calls. WAP interprets Wireless Markup Language (WML) in order to provide the equivalent of web pages on a mobile device such as a mobile phone or personal digital assistant (PDA). WML is a scripting language, similar in many ways to Hypertext Markup Language (HTML) or Extensible Markup Language (XML), but with a significantly reduced tag set.

One of the drawbacks with using WAP is the data speed capabilities of most mobile phones and mobile carriers. At present it is limited to 14.4K in most situations. Clearly this provides a reduction in the service people already expect through landlines and is partly responsible for the slow take-up of mobile services. The aim of WML is to allow very small files to describe information pages, thereby making downloads quicker.

One of the advantages of WAP is that it utilises the existing Internet infrastructure to access web sites. Therefore it is possible to place WML files on a standard web server and make them accessible to WAP users. A WAP gateway, generally located at the mobile carrier performs the translation required to display the WML files on the mobile phone.

Use of WAP requires a mobile telephone that has WAP capability built-in.

SMS

The Short Messaging Service (SMS) is a considerably simple concept. It is an addition to the GSM standard which allows text messages of up to 160 characters to be sent from device to device. Although around for a long time the popularity of the service has only just begun to take off.

One of the main disadvantages of using SMS from a mobile phone is the limited ability to enter text via the telephone handset, however some phones such as the Nokia 7110 have attempted to reduce this problem with features such as predictive text input (ie. the phone guesses the word by looking at the first few characters entered), and input devices such as a roller ball instead of buttons.

The biggest benefit of SMS is the fixed cost of sending a message as opposed to the time charging that applies to a normal mobile call. Also SMS has the instant method of delivery which does not require "logging in" as is necessary with voice mail.

SMS has recently been pushed by telecommunications carriers in Australia and progressive charging schedules have seen significant use of this technology in the past twelve months. It has been estimated that over 9 billion SMS messages were sent worldwide in August 2000 (Needleman, 2001).

i-Mode

Japan has traditionally been quick to accept technological advancements. This has been no different with mobile phone usage. However, as with items such as video recorders and television transmission (eg. Beta versus VHS) the dominating standard is different to the majority of the world.

The Japanese telco NTT DoCoMo developed a product called i-Mode which essentially is intended to provide a similar type of service to WAP. The main difference between the two is i-Mode uses Compact HTML (C-HTML) as its programming language (as opposed to WML in WAP). In reality this makes programming for i-Mode easier than WAP as C-HTML much more closely resembles standard HTML than does WML. However, with XML becoming the standard web programming language WML is likely to be a more attractive option long term. However,

i-Mode does hold a substantial position with DoCoMo reporting approximately 28 million i-Mode subscribers as of September 2001.

The i-Mode service also has one major advantage over WAP in that it is always online. It is not necessary to dial up every time a connection is required. This uses the packet radio technology that has just begun to be made available to Australian WAP users (see GPRS below).

What's Coming Soon?

GPRS

The most exciting breakthrough in wireless service delivery is the introduction of General Packet Radio Services (GPRS), or so called second and a half generation mobile data service (2.5G). GPRS is already available in limited release and will be made much more widely available over the coming months. This system has two major advantages over standard mobile WAP calls – speed and cost. GPRS should provide approximately 200K+ data speeds (or 15 times as fast as previous methods), making higher bandwidth applications such as music and video possible. Likewise, whilst mobile calls are timed calls GPRS is costed based on the amount of traffic sent and received. Therefore users can stay connected all day without prohibitive costs. This has major implications for services such as e-mail and stock quotes where remaining online semi-permanently is much more effective for the user. Also, mobile telephone calls can be made and received on the handset even whilst a GPRS connection is active.

Of course GPRS requires yet another new mobile phone which has GPRS built-in. In fact, in order to keep up with the latest service offerings the consumer is expected to consistently upgrade equipment. (Setiawan, 2001) *My friend has changed his mobile phone virtually every three months, and the rapid development of such types of technology is just amazing.*

Bluetooth

Another standard that has been mooted for some time is now beginning to be implemented across products. Bluetooth is a personal wireless network (or piconet), which provides wireless connectivity between products over very short distances. This allows the myriad of portable devices now available to be linked without the need for cables running between. For example, mobile phones can connect to PDAs to provide an online Internet connection without requiring the infra-red ports to be aligned, or a hands free kit can be attached to the ear without needing to be cabled back to the phone handset.

One of the big immediate benefits of Bluetooth will be the ability for people to have mobile phones within 10 metres to their bodies (eg. on a desk, hanging on a belt, in a drawer) and still be able to communicate to PDAs and laptops.

At a data rate of 1Mbit it is not the quickest communication standard, however it has some key benefits – low power consumption and flexibility.

One good example of potential Bluetooth usage is the possibility of walking into a store that has a Bluetooth network and immediately seeing on a PDA or phone screen the products and costs

within the store, or store directory. The flexible nature of the protocol allows for such scatternets, or sharing of multiple piconets.

3-G

The problem seen with such rapid deployment of new wireless technologies is the movement from the traditional mobile phone network to the third generation network. Where the first generation system was purely analog voice communications, 3G is intended to be a complete and flexible digital communication medium accounting for voice, data and video. The current wave of products are merely seen as a bridging method between the old and new, slowly moving people to new ideas. Therefore it is expected that WAP, i-Mode, GPRS and other current standards will be incorporated or outmoded by 3G when it arrives.

Unfortunately the implementation of 3G has been hampered by many factors, not the least of which has been the prohibitive costs that bidders have arbitrarily placed on 3G licences.

Why Use Wireless?

In General

(Internet, 2001) *The wireless Web is a technological frontier, open and beckoning. The technology has already taken off in Japan and Finland, where schoolchildren watch cartoon characters and check horoscopes on their Web phones, and businessmen participate in lotteries, gamble, and even pay for soda from vending machines with their personal digital assistants.*

It sounds promising, and there will inevitably be substantial benefits from the wireless infrastructure. However, it will not be the immediate panacea that some predict, with technological, economic and traditional reasons creating some consumer reluctance.

Greg Lindsay (2000) identifies some interesting statistics. A Fortune survey of 1700 people shows the following:

| | Current wireless owners | Non-wireless owners |
|-------------------------------------|-------------------------|---------------------|
| Would use a wireless email service: | 31% | 28% |
| Would visit news or portal site: | 16% | 13% |
| Would buy from e-tailers: | 12% | 10% |
| Would trade with a broker: | 8% | 3% |
| Would bid in an auction: | 5% | 6% |

These are reasonably low figures and suggests consumer expectations and confidence are negative in regard to wireless services at present. It is somewhat surprising that even many owners of wireless equipment do not consider its use worthwhile in the current form.

Therefore, whilst there will be undoubted significant exploitation and usage of wireless service options in the future, organisations must carefully evaluate the cost of implementing a wireless service against its perceived usage. Some services can be implemented relatively cheaply with

low ongoing costs and it is these that might be the most prudent options in the interim period before a critical mass of accepting wireless users are online.

(Manes, 2001) *Fortunately, wireless data does not have to be about surfing Yahoo a couple of dozen characters at a time. It's better thought of as a way to gather crucial information in real time, to respond to e-mail when you're out of the office or dash off a quick message when phoning might be inappropriate.*

There is little doubt that accessing time-critical data will be the paramount niche of wireless information services. The portable nature of the wireless handset will always be such that it will be more difficult to input and extract data than a desk-bound alternative. Therefore it is inevitable that all but the ardent technophiles will defer any business that can wait until it can be accomplished with the greatest amount of comfort and ease.

DoCoMo based the success of i-Mode on the strategy of carefully selecting the services available on the system. (Rohwer, 2000) *Using her editorial talents, Matsunaga [i-Mode guru] started selecting services useful to people on the go: bank balances, reviews of restaurants, the ability to make a date for 9:30 that night. Natsuno made sure the software was user-friendly and lined up service providers. Some critics still complain that mobile screens are too small to be useful.*

Enoki [i-Mode controller] counters that with the "individualized media" available on a mobile phone, the small screen size makes no difference to users. He says: "This tool is optimal for killing time, or making use of it."

The time-wasting factor should not be underestimated in terms of a way to attract users. Many people now turn to the mobile phone as a way of filling in spare time on the road. For example instead of reading old magazines in doctors waiting rooms many people now play the games built into the mobile phone. Think how more satisfying this would be if the games were more sophisticated and online, competing against others around the world, or if you could achieve other tasks such as online shopping or banking.

The great task for libraries is to identify those services that are time-critical and work to providing wireless opportunities in such areas. This will likely be provision of things not previously offered by libraries or extensions of existing services. For example, by retaining structured online profiles of users it could be possible to deliver SDI services in more defined bursts direct to clients via SMS or similar push technologies. It will require thinking outside the box to widen the service area of the library to provide a different type of information service to a new type of client.

Likewise the concept of who pays for the services will be a deciding factor on how quickly wireless usage takes off. With sites that sell physical products it is not difficult to see a simple fee structure, where the purchaser pays for the wireless delivery through costs passed on through the purchase price of the product. However the same is not true for the much larger market of service provision.

The standard Internet has predominantly been based upon free information provision with advertisers paying for the ongoing costs of keeping a site afloat. Many argue that this is a significant issue with the ongoing viability of the Internet at stake. With wireless there is the opportunity to introduce a new fee structure where users pay for access to information. This has certainly been the idea in Japan's 2.5-3G strategy (Gurley, 2000) "*NTT has allowed content providers to put their charges on NTT's bills.*" Librarians immediately recognise the dangers of introducing this concept, whereas businessmen see the dangers of it not being introduced. The most effective result will likely be somewhere in-between.

(Fox, 2000) *Across the world, on the shores of San Francisco Bay, Alain Rossmann is sceptical. Actually, he does think Savander and his fellow Finns might be willing to pay for mobile weather reports, as would the Japanese and the French. But not Americans. "In the U.S., you have no hope of that," he says. "You just can't charge the consumer--you just can't do it."*

In this respect Australia is likely to be much the same as the United States.

(Fox, 2000) *Most Americans who sign up for the wireless Internet will already be familiar with the wired one. So they'll expect to pay for it as they do for Internet access now--unlimited access for a flat monthly fee--which is already the direction in which U.S. wireless providers are headed with their early Internet offerings. Americans will also look to the same Internet companies they rely on when using the wired Web to help them find things on a wireless one.*

With global economic downturns this could have an impact on wireless development. Advertisers will be fewer and it is likely that either fee-based services are accepted or not developed. At the very least this will identify those services that have served a real demand as the others will not remain viable.

WAP Websites

As previously identified WAP websites can be implemented for very little additional cost if an existing standard web server is available. Even so the number of exceptional sites is still relatively low. This is primarily due to the low uptake in compatible handset sales and commensurate usage by owners. It appears that the development of new technologies is now so fast that even before critical mass is reached for a service to be useful the next standard is already being marketed by the manufacturers and providers. This makes the mobile technology market one in which it is currently very difficult to get a high return on investment.

There are many people already prophesying the death of WAP as other technologies such as GPRS negate the need for it due to the speed boosts likely to arrive. In Australia it is suggested that approximately only four percent of Internet users are WAP enabled, compared to sixty percent being mobile phone enabled. (Colquhoun, 2001). Likewise, some major manufacturers remain unconvinced. (Costello, 2001) "*Ericsson is now reported to be out of the WAP-enabled mobile phone business.*"

There remains at least short term acceptance however that WAP is providing some kind of service in the evolution of mobile service take-up. Michael Leung, CIO of Bank of America (Asia) says (Saw, 2001), “*don’t believe the media hype that wireless application protocol (WAP) is dead.*”

A likely winning strategy is to ensure any wireless offerings are integrated into an overall organisational online service structure. For example sites that already offer e-commerce over the standard internet build up large customer management databases which record many details. If these can be used to reduce the input required when using a wireless site it immediately makes the service more attractive. (McCracken, 2001) *Amazon already knew my credit card details, address, and shipping preferences, so the tapes were on their way to me after a few clicks.*

A few example sites that display timeliness include:

Kizoom: Train timetable planner for UK trains. Enter from and to data and the times will be displayed. (<http://www.kizoom.co.uk/#main>)

ExitSource: A U.S. trip planner that will provide details of every business or service on the off ramps of all interstate highways. (<http://www.exitsource.com/>)

Financial Times: Provides up to date market quotes and news, business news and associated information. There are many similar in this vein (<http://wap.ft.com/>)

Public Library Service Delivery

Use of online services is an area where public libraries have begun to develop. There is now the potential to tailor services to what individuals require rather than catering for the majority, or even for specific minorities. The author firmly believes that personalisation is the key to the next era of information provision.

The City of Joondalup Libraries for example allow people to create a user account through the library automation system. This single account allows them to select a number of services:

- Place online requests – now fairly standard in many library systems
- Receive emailed request availability notices
- Receive emailed overdue warning notices to reduce the possibility of fines
- New Book Alert Service: users select up to three Dewey categories (defined by the 100 subdivisions), and each week receive an email alerting them to the new items entering the system in those categories.
- Search some commercial online databases including some from home – eg. EBSCOHost; e-Library
- Receive emailed upcoming community events

People can select online which of the services they wish to use and what parameters to apply. This is all done without human staff intervention, therefore providing a much higher level of personalised services for very little cost to the organisation.

Similarly efforts to offer a more flexible library service at Joondalup has included a variety of other opportunities:

- WAP mobile phone site – catalogue access; requests; events; community information; opening hours
- electronic texts – Project Gutenberg non-copyright texts have been added to the library system, simply becoming part of the searchable catalogue, with the actual books popping up on the OPAC screens ready to read;
- Local Studies photo collection online – digitising the thousands of photos and incorporating into the central catalogue, with pictures simply coming up as part of a normal catalogue search;

The aim with all of these services is to provide a centralised system that can be accessed from a wide variety of access points (not just the branch libraries), and offer simplification yet with a high degree of personalisation.

Wireless offers one avenue of creating highly personalised services directly to an individual regardless of physical location. A WAP website is perhaps the simplest most basic level of entering the domain of wireless information provision.

City of Joondalup WAP Site

Demographics

The City of Joondalup is one of the largest local government authorities in Western Australia, approximately forty kilometres north of Perth, containing a population of over 150,000. It has four library branches, all of which are in the top ten largest public libraries in the State. Altogether the City library service possesses over 230,000 items, 105,000 members and circulates more than 1.2 million items per annum.

The largest branch, Joondalup Centre Library, acts as a regional hub and is the largest and busiest public library in WA housing over 70,000 stock and performing approximately 600,000 issues per annum.

In addition the City provides access to its automated library system to the City of Wanneroo, a neighbouring authority, which has another four smaller branch libraries.

Size helps when implementing technological innovations. The ability exists to utilise a larger pool of resources and, in the event of failure it can generally be more easily absorbed than in smaller authorities.

Technical Considerations

In order to provide a wireless option as easily and cheaply as possible, yet still retaining a flexible opportunity for dynamic service the infrastructure upon which a wireless website is based can be critical.

Key to any strategy is access to an open database standard and a web server that can integrate with that standard. The City of Joondalup is predominantly based upon a Microsoft platform. Although there are good arguments to using other market leading products the ease of using a single manufacturer for the entire web deployment chain (including organisational client desktops) also has good advantages.

Internet Information Server comes free as part of the Windows Server operating environment (ie. NT, 2000, etc.). As part of this product the Active Server scripting engine is included which allows full use of JavaScript and VBScript development languages. This provides a powerful tool with which to create complex web applications at no cost other than the purchase of the Microsoft operating system (which many organisations already have installed) and the staff programming costs.

Active Server (like the other leading commercial web scripting tool, Cold Fusion) takes scripts and interprets them at the server then outputs standard HTML pages to be sent to the user. This has significant compatibility and maintenance benefits with the end user simply requiring a standard web browser rather than any plug-ins or other software.

In order to integrate to third party systems the simplest method is through ODBC a standard Microsoft protocol that enables databases to be accessed. All major databases such as SQL Server, Access, Oracle, Informix, Paradox and dBase can be connected to an NT/2000 server in this way. Although ODBC does not offer the most efficient connection method it has proven satisfactory at the City of Joondalup, even for relatively high volume processes.

It should be noted that there are many different ways to obtain the same results, the above are merely the way the process was undertaken by the City of Joondalup.

What Is Offered

The initial phases for the WAP site have been:

- catalogue searching;
- online reservations;
- community information searches;
- upcoming community events; and
- library opening hours.

The City of Joondalup WAP site was instigated as a trial of concept late in 2000, to see what could be done inhouse using these new technologies, and how they might be applied within libraries. The above list of services were simply processes already provided online, that were identified as technically possible to easily convert to a WAP format.

Since that time there has been the opportunity to reflect upon those services which are not only feasible, but perhaps more useful to the mobile data user. For example, services such as catalogue searching are not only somewhat impractical under a WAP service, but also less likely to be required in a mobile situation.

In order to ensure best usage there are a number of factors to consider and one of these will be identification of key users. This is not as obvious as one may first think. Whilst business use is expected to be high it is the consumer market that has driven the products in key markets such as Japan, Singapore and Scandinavia. Youth is one of the high use groups with recreational products heavily targeted. Therefore, choosing the right product for the right people can place public libraries at the forefront of wireless service provision.

Some new services which might be more useful include:

- Providing e-books/audio books direct to devices (useful for train commuters)
- Allowing people to place bookings/make payments for upcoming events
- Renewal of items (in order to minimise fines)
- SMS messaging (or similar) to alert users of upcoming overdue items
- Delivery of floor plan location services within libraries
- and any killer application for youth could make the difference in breaking a new market...

Development Costs

After fourteen years the City of Joondalup implemented a new automated library system in 2000. The Geac Plus system offered the potential to move from a proprietary mainframe database to an open standards database. This was key in the possibility to cheaply implement a wireless catalogue interface.

The use of Informix (the underlying database of Geac Plus) allowed an ODBC connection between the web server and the library system, providing a method of extracting data using the standard set of Microsoft technologies identified above.

The library already provided a world wide web service to its clients for the provision of a wide variety of online information and services, such as community information, community events, online registrations, and much more. The existence of such hardware meant that there was no additional upfront capital costs to the organisation in order to be able to create a basic wireless WAP website.

The only costs associated with the entire product were related to the human resources required for programming. Due to the nature of the staff structure at Joondalup a Systems Librarian is on staff to manage the day-to-day maintenance issues as well as any development issues. The position had the necessary skills to create the entire WAP interface, thereby negating any need to outsource programming.

Another key aspect to restricting any costs was the creation of a predominantly dynamic website, deriving its informational content from data sources, rather than simply creating flat WML pages. Through the use of Active Server VB Scripting four of the five elements of the Joondalup WAP site are dynamically created from corporate data sources. This has meant that no changes have been made to the original pages in the past two years yet the site has remained up to date. This approach has provided a truly low maintenance WAP site.

Development Risks

When developing such customised solutions that seek to implement back-end integration to corporate data sources there are three key inherent risks.

The first is that the developer, either inhouse or external, must possess a detailed understanding of the data structures that underlie the products which are being interfaced to the online systems.

For example, the Geac Plus database consists of hundreds of tables, each consisting of many fields. To be able to recognise which of these fields hold relevant data and how they relate to other tables and fields is vital to making coherent Internet-based solutions that utilise the library system data source. If the relationships are misinterpreted or the wrong type of data is entered into any given field it has the potential to create long term errors in the running of the parent application. Obviously such errors will not normally be covered by maintenance agreements with the vendor as the problems will have been created through negligence of the customer, and could therefore prove very costly to correct.

Some of the data structure can be gained from application vendors who often provide SQL courses or fact sheets. Most of it, however, can only be gained by using data query tools to examine tables and the data stored within, ad nauseum.

The second risk and probably the most likely is the inevitability that a vendor will change the data structure and application from release to release. Most integrations to web sites, wireless or otherwise, rely upon basic interfacing and specific data constraints; change any of the pieces and the interface is likely to fail. Therefore the size of this risk depends upon how customised the solution and, how reliant the organisation becomes on the customised interface.

The final key risk is true of any inhouse developments – adequate technical documentation of any coding, both internal to the code for programmers and external for administrators. If structured development is not undertaken it can produce a good working product that cannot be enhanced if the original programming resource is no longer available to the organisation (eg. a staff member leaves employment).

Putting this into context at Joondalup, where the interface is relatively basic and only one function of the wireless site interfaces to a third party system (ie. the Geac library database), the site has continued to function without problem for the past two years, despite two product releases by the library vendor.

Product Development

The nature of utilising the same platform for both standard and wireless websites not only allows for maintenance economies, but also for the ability to share code. Because the initial product offerings on the WAP site were derivations of those provided on the HTTP site, it was possible to port much of the logic and coding from one to the other without significant re-engineering. This provided an opportunity to greatly reduce the development cycle and thereby have a wireless product in place much more quickly.

The only WAP-specific developments undertaken were in the creation of simple search and request modules for the catalogue. The City uses the Geac Geoweb solution for its standard online OPAC and this proprietary code could not be ported.

Therefore, the ability to create effective wireless access to both community information and upcoming community events was simply a process of placing the existing scripts into a WML “skin”. This took approximately two days part-time development work to achieve.

Catalogue Access

In the creation of a catalogue interface the process was significantly more complex.

It was believed that if someone was willing to accept the cost and speed issues of searching the system via a wireless interface it was most likely for a specific item. Therefore Joondalup undertook to develop only title and author searching.

Subject searches generally are a three step process where a search is entered for a subject stem which provides a list of authorised subjects, before listing the titles associated to a specific subject heading. Unless using keyword searches, which often bring up larger numbers of hits, this takes much longer than a simple title or author search. Neither of these things was seen as advantageous to a wireless solution given current GSM restrictions.

If subject searching were introduced it is thought that it would need to be a completely innovative approach, rather than merely copying traditional OPAC methods of access.

Input Considerations

There is always going to be a problem with text entry using small handheld devices. Whilst fold-away keyboards exist for personal organisers such as Palm Pilots and iPAQs, they are not easily managed and most people use what is supplied with the standard devices.

For phones this has always meant using the number keys in sequences to create letters. Newer phones have options such as rollerball and predictive input which do help speed the process, however only the bare minimum of input should be expected from users, otherwise the site is unlikely to become popular.

To try and help users Joondalup chose to allow stem searching on title and author, which allows the first few letters to be entered in order to retrieve all hits on that stem. Obviously the fewer

letters typed the more hits retrieved and the less direct the search. However, it allows users to choose whether to type a little more or scroll through more results.

Results Display

Following a successful search results are displayed in groups of five. This allows the compromise between unnecessary scrolling and information provision. Likewise, the data for each title is minimised to provide a limited display, restricted to title, author, shelf number and format. This ensures a client can narrow down a search to the type of item required, but without the other extraneous information generally provided on a standard OPAC, such as description, publisher, ISBN, etc.

Similarly the holdings list is limited to the branch name and the availability status, the latter having been coded to either “on shelf”, “unavailable” or “on loan”, rather than the myriad of codes that normally apply, such as “missing”, “damaged”, etc.

Request Placement

If all holdings are not on shelf the system allows a request to be placed. This is one of the few areas where information is put back into the library system database. After entering a valid client barcode and password combination a request record is generated. This then becomes part of the normal library system request process with notices being generated automatically upon return of a copy of the title.

Completion

The creation of the entire Joondalup WAP site, including catalogue and request modules, upcoming events and community information, comprises only fifteen small pages. Due to the succinct nature of the protocol it will not often be the case that a WAP sites comprises large and cumbersome pages.

Whilst the development of appropriate logic and integration to the back-end library system was a significant task, it was not insurmountable and did not require highly specialised knowledge other than web scripting, SQL and basic WML.

The end product is simple yet dynamic, uncostly yet effective.

Conclusion

The City of Joondalup Library and Information Service can state that the wireless web site has not altered customer behaviours to date. However, it has provided an opportunity to examine the concept of service provision via the medium and highlight those things that can be done well.

With this knowledge it is intended to embark upon a wider strategy of a Council-wide wireless website that provides options for much expanded services. Matching the current sub-site structure of the City of Joondalup website which identifies client types (eg. TourismJoondalup, LivingJoondalup, BusinessJoondalup), the wireless site will seek to provide targeted results and enhance the client's ability to interact with the local government authority.

Wireless is not seen at this moment as being able to replace any single aspect of service provision for libraries. However, it is important to be aware of how the medium is developing in order to be able to plan future services. In conjunction with traditional and other online services prudent implementation of wireless can already provide some effective uses. It is also highly likely that this form of communication will develop in the next twelve months to be a significant force in consumer and business transactions.

The potential exists to use wireless as a means of attracting new users to the library service, although such users will never likely enter a library building. Methods of providing services will inevitably change as technology and society allow, to ensure better, more effective services. This is not seen as important so long as the central mission of the library remains constant.

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