THE UNIVERSITY OF MELBOURNE

Web management principles

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"The web is not the lost city of the geeks.
It is not there so that techies can take over the world.
The Internet was invented as a communication medium
and the web was invented as a publishing solution for content."
-- Gerry McGovern, Content Critical, p9

History of the Internet and the World Wide Web

The Internet and the World Wide Web had their origins in using technology to facilitate information or knowledge sharing.

Collaboration, standards, communication and publishing are key concepts.

> *"Academics were the original information workers.*
> *Universities were the original information organisations.*
> *The university is the home of the Internet.*
> *The Internet was invented by the US military in conjunction with several universities.*
> *The Internet was first embraced by universities.*
> *The web was invented in a research organisation.*
> *The web was first embraced by universities.*
> *The Internet and web were embraced by universities around the world because academics and students saw in them tools for better communication of ideas.*
> *Content is the fuel that drives universities and academia."*
> -- Gerry McGovern**,** Content Critical, p16

Timeline

1969	Advanced Research Projects Agency Network (ARPAnet), the first multi-node computer network used largely by the US military and academics to exchange text-only information -- the intellectual model for today's Internet, and continues as a core element of it. Robert E Khan and Vint Cerf worked out a set of protocols that would allow any computer network to talk to any other network.
1970s	Based around the ARPAnet, the early Internet was US government-funded and therefore restricted to non-commercial uses such as research at military sites and universities. Commercial uses were strictly prohibited.
1972	Previously restricted to local networks of computers in a single organisation, email developed into the first system of exchanging addressed messages between different, networked computers. Ray Tomlinson introduced the *name@computer* notation that is still used today.
Early 1980s	ARPANET network handed over to the US Defense Communications Agency. The network continued growing, with more connections to educational institutions and some companies such as Digital Equipment Corporation (DEC) and Hewlett Packard. Paul Mockapetris and Jon Postel devised the domain name system (DNS). Projects such as Gopher, WAIS, and the Archie search engine attempted to create schemes to organise distributed data and present it to people in an easy-to-use form. A permanent Australian email connection to ARPAnet was established by (now Professor) Bob Kummerfeld and (Sir) Piers Lauders at the University of Sydney, and Professor Peter Poole and Robert Elz at the University of Melbourne.
1985	Internet service providers (ISPs) emerged. Email and Usenet News were the main means of communication between individuals.

1986 The US National Science Foundation established NSFNet, connecting several supercomputing facilities.

Late 1980s Regional networks were starting to appear in the USA and connecting with the ARPANET-based Internet. US Department of Defense decided the network was sufficiently developed, and stopped funding the core Internet backbone. ARPANET's last node was turned off in 1989, and access to the Internet became privatised. Commerce entered the Internet, amid fierce debate. Inspired by Vannevar Bush's concept of 'memex', the concept of hypertext was being applied to small, self-contained systems such as Apple's HyperCard.

1989 First international Internet connections. Australian Academic and Research Network (AARNet) established by AVCC, and linked to Internet via satellite between the University of Melbourne and the University of Hawaii. Robert Elz recalled later, "there were always social applications on the Internet - in the early '90s, [Roy and HG's] radio call of the Melbourne Cup was 'broadcast' and, very early on, there were text descriptions of Test cricket matches in Australia." Tim Berners Lee, a computer programmer at the European Organization for Nuclear Research (CERN), conceived a hypertext system for sharing information among physics researchers. He described the system as a "World Wide Web of random associations between arbitrary pieces of information." The WWW had three important features:

- the uniform resource locator (URL), a simple way to specify the location of a document anywhere on the Internet
- hypertext markup language (HTML), an easy way to embed codes into a file that could define the structure of a document and create links to other documents
- hypertext transfer protocol (HTTP), a network protocol for reducing overheads and improving speed during file transfers. Because the URL and HTML systems were backwards-compatible with existing protocols like FTP and Gopher, the new HTTP protocol was useful but not necessary for the web to work.

1991 Tim Berners Lee's World Wide Web proposal was released onto the Internet.

1993 Postgraduate student Marc Andreessen recognised the need for a graphical browser that could display both text and pictures. He and a team at the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign developed a browser with a point and click interface: Mosaic was available for Windows, Macintosh, Unix and Linux, and was free to download. Within a year, it had 1 million users.

1993 The first webzine, *The Virtual Journal*, published by a University of Maine student. The first web search engine, Lycos, was created at the Carnegie Mellon University, and at the end of the year it was indexing 800,000 web pages. Online brochures, online magazines and company web sites started appearing.

1994 Marc Andreessen established Netscape Communications Corporations and released the Netscape browser. It became the most popular browser on the web.

1995	Microsoft released Internet Explorer, starting several years of 'browser wars' as it competed with Netscape for market dominance. First wiki created, and called WikiWikiWeb.
1996	Yahoo's initial public share offering. Melbourne University's library home page created.
1997	Domain name *business.com* sold for US$150,000. The term 'weblog' was coined by Jorn Barger.
1998	Start of the dotcom boom. Compaq paid US$3.3 million for *altavista.com*. Google founded by Stanford PhD students Larry Page and Sergey Brin.
1999	E-commerce took off globally as people bought online during the Christmas season. Major problems with customer service and delivery of goods lead to disgruntled customers, disenchantment with the high-tech industry.
2000	Dotcom bubble bursts: the high-tech stock market crashes and many Internet startups go out of business.
2003	Internet adoption rates have surpassed those of both radio and television. Estimated 500 million users in just over a decade.
2004	Web is a primary information source. Online shopping and transactions are common. First podcasts appear, mostly amateur.
2005	Computer Industry Almanac estimates 1.07 billion Internet users worldwide, including 13.01 million Australians. Two-thirds of Australian Internet users are active, and nearly half have been online for five years or more. More than 2 billion mobile phone users in the world; mobile web applications growing. Web 2.0 meme spreads.

Types of web site

As the Internet industry matures, the technology is becoming less visible. People now use the web as primary means of finding information or completing transactions.

Like the old economy, the web industry now has various established categories. Each category has particular characteristics determined by its objectives, content and users' needs.

CATEGORY	CHARACTERISTICS	EXAMPLES
Community or not-for-profit	Design and content support the community's values and information needs Repeat users Often content-rich or highly functional	http://www.oxfam.org.au/ http://www.icaa.org.au/ http://www.ttgdcc.org.au/
Corporate	Content and design support company's brand, values Technology is invisible, transactional and secure	http://www.amp.com.au/ http://www.cadburyschweppes.com/ http://www.auspost.com.au/

CATEGORY	CHARACTERISTICS	EXAMPLES
Directory (portals, search engines)	Focus is on functionality, information, transactions High traffic, in top 10 of all sites Most traffic is from repeat users who want simple, fast, useful Some personalisation	http://au.yahoo.com/ http://ninemsn.com.au/ http://www.google.com.au/
E-commerce	Highly functional, easy to use Helps users complete transactions Local search is crucial Technology is invisible, secure Design supports brand	http://www.amazon.com/ http://www.ebay.com.au/ http://www.greengrocer.com.au/ http://www.readings.com.au/
Educational	Often large, complex, information-rich Distributed authoring User-centred content, design, navigation crucial	http://www.beyondblue.org.au/ http://www2.warwick.ac.uk/ http://wikipedia.org/
Entertainment (promotional)	Promotes user experience, reinforces brand values Users more willing to accept rich graphics or multimedia	http://www.cocacola.com/ http://www.louvre.fr/ http://www.serenitymovie.com/
News media	Online presence for offline brands or publications Content changes frequently, closely linked to offline production process Simple navigation and structure Database-driven	http://www.theage.com.au/ http://www.news.com.au/ http://ljworld.com/ http://www.google.com/news

Web 2.0

So what's next for the World Wide Web? Former Netscape staffer Janice Fraser (now with AdaptivePath.com) wrote in 2005:

> *"For five years we've been working to refine what we know, and rest a bit after the madness of the nineties. And now we're ready to dive in again — wiser, perhaps, but no less captivated by invention than we were ten years ago...*
>
> *"What will happen when amateurization and folksonomies make their way into enterprise web applications? What happens when IT managers can tag Oracle's product documentation with their own words? Where will our bookmarks go when the idea of the 'webpage' becomes obsolete?*

> *"Invention inspires invention. Ideas are collapsing into each other, recombining, and having powerful effects. The Internet has always been a medium for democratization, and by reconnecting with our idealism we're once again uncovering its poetry, nobility, and transformative power."*

Over the next 10 years we can expect to see some new types of online experiences emerge. These can be illustrated as points on a continuum.

Structured	Semi-structured	Unstructured
Marketing and communication sites, weblogs, search	Applications and tools	News feeds, XML feeds, services
Content-rich	Functionality-rich	Parts for Internet tools
Creator-supplied content	User-supplied content	Data from many sources

As the web moves more towards the unstructured, 'small pieces, loosely joined' model, users will become more interested in *doing things* on the web than in *visiting places* on the web. Our web browsers will change, and the way we develop web sites and applications will also have to change.

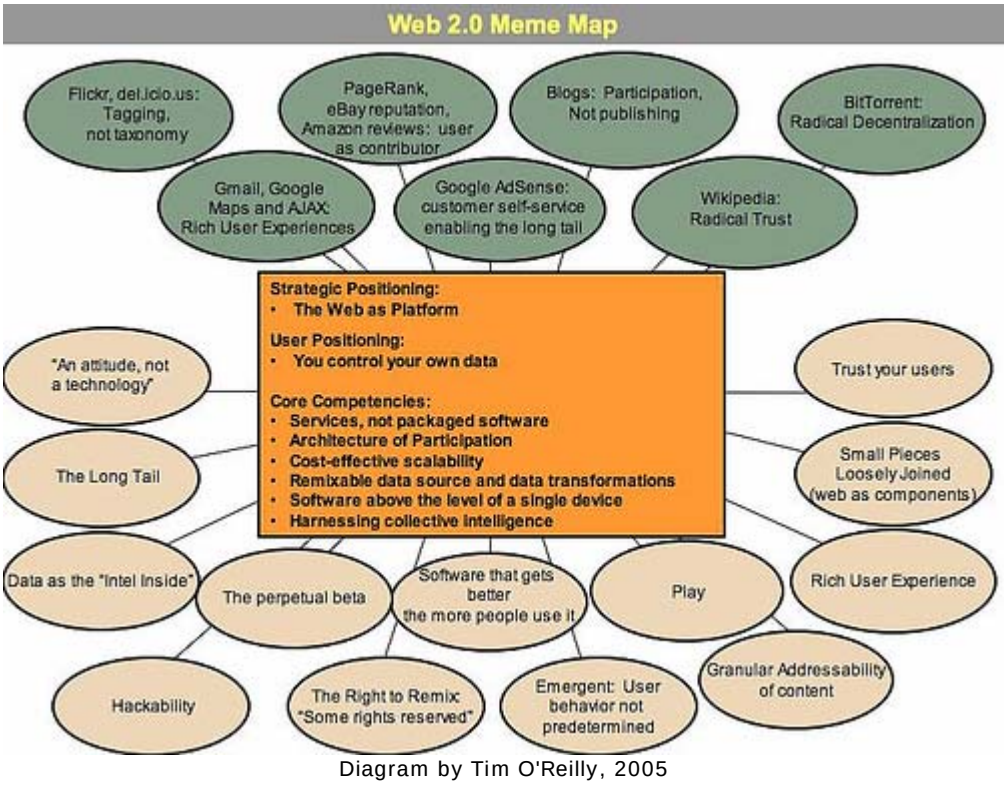


Diagram by Tim O'Reilly, 2005

This shift in how we conceptualise and build the World Wide Web has been labelled 'the Web 2.0 meme'. It's already happening, though for a few years it's unlikely to have a direct effect on most end-users of web sites.

WEB 1.0		WEB 2.0
DoubleClick	-->	Google AdSense
Ofoto	-->	Flickr
Akamai	-->	BitTorrent
mp3.com	-->	Napster
Britannica Online	-->	Wikipedia
personal web sites	-->	blogging
evite	-->	upcoming.org and EVDB
domain name speculation	-->	search engine optimization
page views	-->	cost per click
screen scraping	-->	web services
publishing	-->	participation
content management systems	-->	wikis
directories (taxonomy)	-->	tagging ("folksonomy")
stickiness	-->	syndication

Source: Tim O'Reilly, 2005

> *"None of our current crop of software based products is capable of delivering power and pleasure to people outside of the techno-smitten minority. The engineering community says merely that users will have to become 'computer literate'. I believe history will view that phrase in the same way that we treat Marie Antoinette's famously condescending phrase, 'Let them eat cake'. The French Revolution gave food to the masses, and the coming design revolution will give technology to the masses."*
> -- Alan Cooper, *The Inmates are Running the Asylum*, page 244

Organisational adoption of Internet and web

The web is in a state of flux, as a communication medium and as an industry:

- technology is constantly changing
- Internet uptake is growing exponentially
- users are more experienced and demanding
- business is integrating the technology and functionality as mainstream
- the industry is maturing and establishing global standards and conventions
- emerging professions: web managers, editors, designers, developers
- more sophisticated web analysis and performance monitoring.

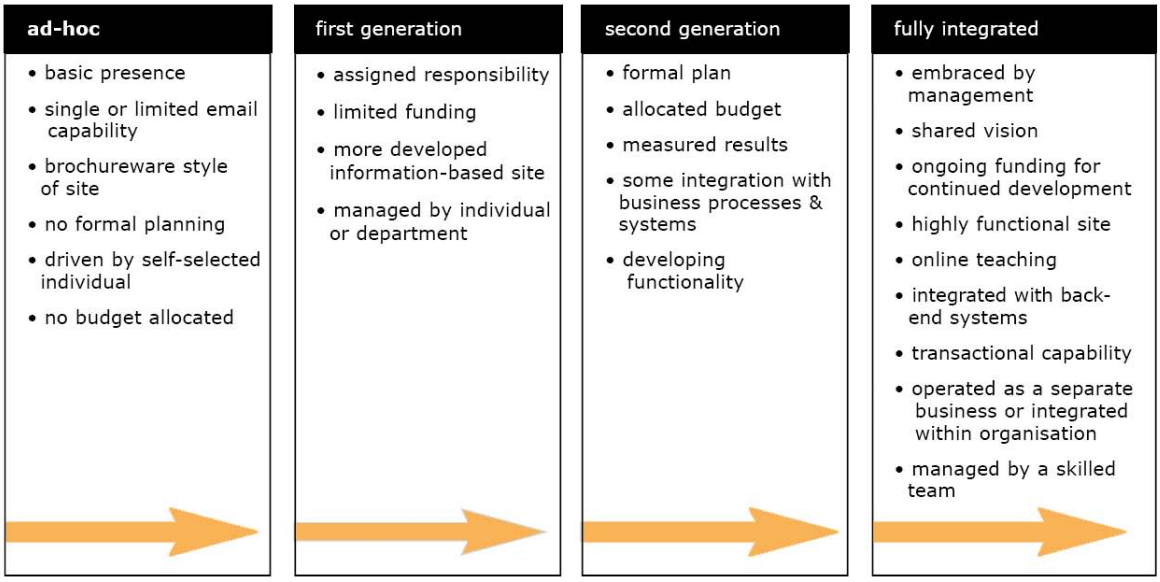
Originally, web sites were typically the responsibility of IT staff who were unfamiliar with marketing, communications and publishing information.

As the web becomes a primary communication channel and users become more experienced and demanding, it appears that an organisation's web site should be owned by the marketing department in order to ensure it fits within the rest of the organisation's communication.

Organisations move through different stages of Internet adoption, depending on their:

- organisational size and maturity
- budget and staff resources
- technical expertise
- strategic goals and business needs
- users' information and transactional needs

Typical stages organisations move through in internet adoption



MODEL ADAPTED FROM XT3: COMMERCIAL INTERNET SOLUTIONS

A fully integrated web site

An integrated, effective organisational web site involves a lot more than just IT, technical staff and a knowledge of HTML. To be competitive today, an organisation needs to manage its web site as a core business tool.

A web site should be an integral part of the organisation and support strategic, business and communication goals. Key requirements include:

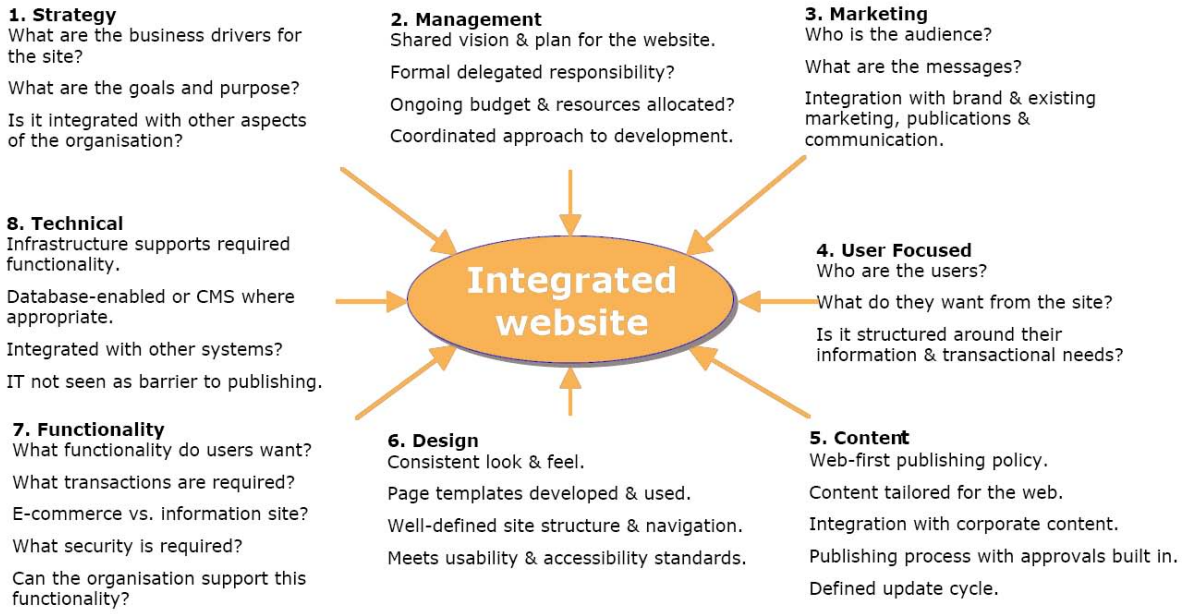
- a web strategy
- delegated management for the web site
- integration with marketing or communication strategy
- user-centred content, design and functionality
- an effective and integrated technical infrastructure

An integrated and effective web site is:

- linked to the strategic goals of the university or unit
- developed to meet a clearly articulated purpose
- integrated with other aspects of the organisation
- supported by the executive or management
- integrated with other branding, marketing and communication activity
- user focused; i.e. structured around their information and transactional needs
- tailored and written for the web
- consistent in its look and feel
- usable, accessible
- compliant with copyright and privacy requirements
- produced with an approvals-based publishing process that includes a clearly defined update and maintenance cycle
- integrated with other systems such as HR, finance and purchasing
- adequately resourced with a continuing budget and staff for maintenance
- constantly reviewed, evaluated and incrementally improved

The diagram below shows the components of an integrated, effective web site.

Characteristics of an integrated website



An organisation's Internet domain may host a variety of applications and content that create an administrative, promotional and professional communication channel. Any organisational web site can be developed with these principles in mind:

- Represent and enhance the organisation's public reputation
- Publish information about the organisation's activities, policies and people
- Enable transactions and conversations between the organisation, its customers, its staff and the public
- Foster interactive communication between users of the web site
- Combine data, design and user-generated content from a variety of sources, including individual end-users, to deliver a rich, participatory online experience

Usability and accessibility

> *"The web is the ultimate customer-empowering environment. He or she who clicks the mouse gets to decide everything. It is so easy to go elsewhere; all the competitors in the world are but a mouseclick away."*
> -- Jakob Nielsen, *Designing Web Usability*, page 9

Defining usability

Web usability advocate Jakob Nielsen said (1998) that usability is "the measure of the quality of the user experience when interacting with something - whether a web site, a traditional software application, or any other device the user can operate in some way or another."

The International Standards Organisation's usability specification (ISO 9241) says usability is "a measure of the effectiveness, efficiency and satisfaction with which specified users can achieve specified goals in a particular environment."

Whitney Quesenbery defined five Es of usability:

1. **Effective**: was the task fully completed? Were the user's goals met? Did the user get the right result? How well was the work done?

2. **Efficient**: was the user able to complete the task quickly and without undue effort?

3. **Engaging**: did the user have a good experience when working on the task? Was the user satisfied by how the application supported her work?

4. **Error-tolerant**: did the system help users avoid making errors? If there were errors, were they minor? Did the interface help with recovering from the error?

5. **Easy to learn**: does the interface build on the user's previous knowledge? Is the interface consistent?

High or increasing usage does not mean that a web site or application is usable: it may actually mean that users can't find things and are trying many options or going the long way around.

Checking for broken links is not 'doing usability', and nor is asking "Have the usability guys seen this?" the day before your new site goes live.

A usable web site is one that supports the user to find the information they need or to complete their transaction. Despite the tremendous amount of time and energy devoted to developing web sites, most have common usability problems. You have probably experienced all these problems while surfing the web:

There are many reasons to redevelop web sites:

- out-of-date content on the site
- limited potential for growth in its current form
- not user-focused, not meeting users' expectations or needs

- site is structured around internal organisational structure
- site navigation and structure are not easy to use
- usability or accessibility problems
- does not reflect University brand or visual design
- inconsistent with other University sites and online services
- feedback from users (positive and negative)
- a new manager or staff member takes responsibility
- new technology or functionality to implement

A web site with some or all of these problems probably does not address the strategic, business, marketing or communication goals of their organisation. In contrast, a usable web site:

- has content and structure that is user-centred
- follows usability conventions
- is accessible for people with disabilities and technological barriers
- is content rich, with well-written and up to date content
- is well organised and structured, with simple and consistent navigation
- is fast to download
- balances functionality with accessibility
- is easy to maintain, and updated regularly
- supports users to complete their tasks

Understanding accessibility

> *"In its most general sense, accessible web design refers to the philosophy and practice of designing web pages so that they can be navigated and read by everyone, regardless of location, experience, or the type of computer technology used.*
>
> *Accessible web design is most commonly discussed in relation to people with disabilities, because this group are most likely to be disadvantaged if the principles of accessible web design are not implemented.*
>
> *Failure to follow these principles can make it difficult or impossible for people with disabilities to access web pages."*
> -- HREOC World Wide Web Access advisory notes, 2002

Types of disability

Disabilities can be permanent or temporary. There are five broad categories of disability that can affect a person's use of information technology:

1. Vision: blindness, low vision, color-blindness
2. Hearing: varying degrees of deafness
3. Physical: inability to use a mouse, limited fine motor control, slow response time

4. Cognitive: learning disabilities, distraction, inability to remember or focus on large amounts of information

5. Seizure: various disorders such as photosensitive epileptic seizures

6. Literacy: difficulty with language, particularly written text

The Australian Bureau of Statistics estimated in 2004 that 3.95 million people had a permanent and continuing disability -- 20 per cent of the Australian population. Half of all people aged 65 and over, living in private dwellings, had a disability.

Though not disabled, many people in rural and remote areas encounter technological barriers in their use of the Internet. Vision Australia estimates that more than 55 per cent can operate at 14.4 kb per second or less, and 30 per cent at 9.6 kb per second. More than 30 per cent of rural users keep images turned off while they use web sites.

Who benefits from web accessibility?

Information technology, including the Internet and World Wide Web, is increasingly used to provide information and services for large numbers of people. The web has the potential to provide equal access for people with disabilities, often more cheaply and quickly than other communication channels.

The Human Rights and Equal Opportunity Commission (HREOC) gives several examples of how web sites can help people with disabilities:

- People who are blind or have vision impairments can use appropriate equipment and software to gain access to banking services, online grocery shopping, and electronic documents in Braille, audio or large print form.

- People who are deaf or have hearing impairments could have more immediate access to captioning or transcription of audio material.

- Many people whose disability makes it difficult for them to handle or read paper pages can use a computer, for example with a modified keyboard or with voice control.

- Web publications may provide an effective means of access for people whose disability makes it difficult for them to travel to or enter premises where the paper form of a document is available.

For these benefits to become reality, web sites must be accessible for people with disabilities. The World Wide Web Consortium (W3C) has published standards for accessible web content, applications and user agents (browsers), and HREOC recommends compliance with these standards in order to satisfy the requirements of the federal *Disability Discrimination Act*. Where an online application or feature does not itself provide equal accessibility, an effective and accessible alternative should be provided.

Accessible web sites and applications are beneficial for a wide range of people with:

- Disabilities
- Poor communication infrastructure
- Old computer equipment and non-standard equipment
- Restricted access to the Internet, or environmental distractions
- Temporary impairments

Accessible web sites also have benefits for the organisation:

- Easier to maintain and update, because content is separated from the 'presentation' aspects of the site
- Less bandwidth per page, more efficient use of technology
- Better indexing by search engines
- More interoperability for different users, different web technologies (portals) and different devices such as mobile phones and PDAs
- Demonstrate social responsibility

The web is different from print and other media

How people read on the web

Since the 1990s usability advocates and others have been studying how people read online. In particular, significant research has been published by:

- Jakob Nielsen and John Morkes
  http://www.useit.com/papers/webwriting/

- the Stanford University-Poynter eyetracking project
  http://www.poynterextra.org/et/i.htm

People jump around on the web: we enter sites from different angles, follow hyperlinks to other pages, and often go to other sites to find what we need.

Most people scan a web page, picking out individual words and sentences -- headings and links are particularly noticeable. Keywords and meaningful phrases should appear in these parts of the web page.

A short numbered or dot-point list can help make a page more scannable.

We read much less online: a web page should have half (or less) the number of words you would find in an equivalent printed publication.

We expect web sites to be more up-to-date than printed publications.

Use the 'inverted pyramid' to structure the page: start with the conclusion, or the most important idea, and work back to the less important details. This is how news articles are written, on the assumption that readers want to know the important facts but are unlikely to read the entire story.

Language on official University web sites should generally should be objective and neutral.

Nielsen and Morkes tested the of various writing approaches applied to the same piece of text on a promotional web page. They were able to demonstrate significant improvements in usability of the web page when text was rewritten in different ways.

WRITING STYLE	USABILITY COMPARED TO ORIGINAL TEXT
Original text, written as standard marketing material ('marketese')	N/A
Concise text -- about half the original length	58 per cent improvement
Scannable layout -- same text as the original, but laid out in an unordered list	47 per cent improvement
Objective, neutral language rather than subjective, boastful, or exaggerated language (otherwise the same as the original text)	27 per cent improvement
Combined version -- using all three improvements in writing style together: concise, scannable, and objective	124 per cent improvement

A sense of location: context and links

Users come to a web site from a range of starting-points: using a search engine, clicking a link in an email, copying a URL from a business card or newspaper advertisement, or simply guessing the address of a web site (try typing "wikipedia" into your browser's address bar).

Every page in a web site is a potential entry point to that site. A user follows a particular thread of thinking and logic, and ends up on your web site: how does she find clues to tell her what she's looking at, and whether she's found what she was seeking? Where does she go from here?

Unlike a book or magazine, it's not simply a matter of turning the page. A web site gives you little or no sense of:

- **Scale**. Even after using a web site extensively, you still have little sense of how big it is. Compare this to a magazine, a museum or a department store where you always have a rough idea of the ratio between what you've seen and what remains unseen.
- **Direction**: no left, no right, no north or south. Even 'up' and 'down' or 'forward-back' are only metaphorical concepts on a web site.
- **Location**. In physical spaces you accumulate knowledge about a space as you move through it; you learn where things are located and you can plan shortcuts to get to them.

Semantic markup

Hypertext Markup Language (HTML) is a standardised method of adding tags to a page of words and pictures. The tags describe the kinds of content, adding extra meaning to the visible content of the page.

As web publishing systems become more sophisticated, we are increasingly able to use semantic markup to make links between related information.

HTML CODE VIEW	WHAT THE WEB USER SEES
This is a heading at Level 1 in the hierarchy of headings This is a heading at Level 2 in the hierarchy This is a paragraph of ordinary text with some words emphasised and the letters <acronym name="Hypertext Markup Language">HTML</acronym> highlighted with an optional explanatory note in case the reader doesn't know what HTML stands for.	**This is a heading at Level 1 in the hierarchy of headings** **This is a heading at Level 2 in the hierarchy** This is a paragraph of ordinary text with *some words emphasised* and the letters HTML highlighted with an optional explanatory note in case the reader doesn't know what HTML stands for.

From metadata to folksonomy

Metadata is information that describes a web page, in the same way a library catalogue describes the books on the shelves. Metadata can be used to:

- improve search results and help users find a web page
- fulfil administrative tasks such as automatically notifying the author when content needs reviewing
- establish links between different online systems so that content can be checked, combined and repurposed

In the web's early days, some information specialists thought web content should be classified with formal taxonomic conventions (such as the US Library of Congress subject headings). This proved impractical, and improvements in search and content-management technologies have taken away the need for such rigorous classification.

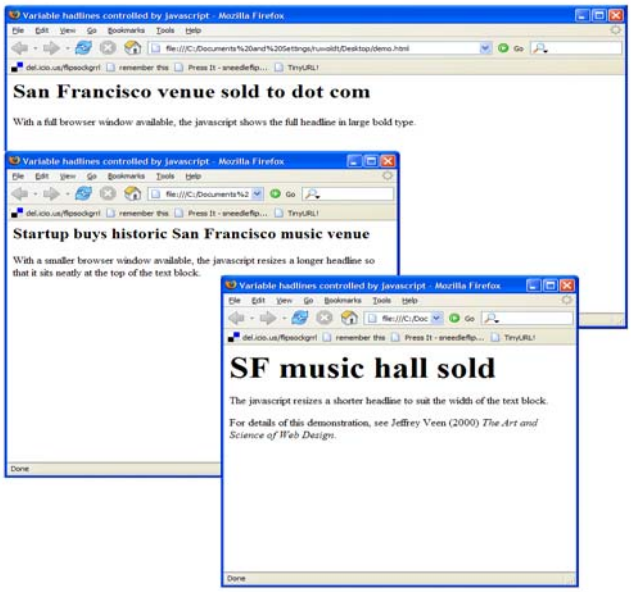
Today online bookmarking systems such as Connotea and del.icio.us allow users to add their own metadata keywords ('tags') to a URL. The photo-sharing site Flickr.com uses a similar 'folksonomy' system to tag, organise and search millions of images.

Formalised metadata schemas, such as the one adopted by the University of Melbourne, are mainly useful for administrative purposes and to enhance searching of large, well-structured sets of information.

Fluid design

Web users have different computer setups, different screen sizes and resolutions, different customisable preferences in their web browsers. Increasingly, they don't even use a desktop or laptop computer to access web content: Internet-enabled mobile phones, PDAs and other multi-function devices are being widely adopted.

Along with the inherent limitations of HTML as a design tool, this means the same web design will look different on any two computers. Using stylesheets and javascript, some layout problems can be solved relatively simply: see the example below, which shows automatic resizing of a headline to suit the width of the text below it.



Source: Jeffrey Veen (2000) *The Art and Science of Web Design*

The first headline has 35 characters, the second has 36 and the third has 15 characters.

This type of adaptive design is made easier and more flexible with well-written content and semantic markup.

Re-using content

Content on a web site can be broken into a hierarchy of 'chunks':

Site

Page

Paragraph

Sentence

Phrase

These chunks can be combined, separated and recombined in various ways. Each chunk can be reused, particularly if your site is created in a content management system that is built to enable content syndication and repurposing.

The *Washington Post* newspaper is a good example of re-using content chunks. This is a news article with headline, byline, dateline, lead paragraph and other standard content chunks for a newspaper report:

The newspaper's home page reuses some of these content chunks to highlight features and current stories:

In this case, the reuse of headlines, bylines and lead paragraphs is managed automatically by the *Post*'s content management system (CMS).A similar effect can be achieved with RSS/Atom newsfeeds or customised scripts such as the one that updates the University's home page hourly with news headlines and event listings.

Time

Most visitors to the University's web site stay less than 30 seconds per visit. They move quickly through the site, seeking pathways to information or transactions -- and this is normal behavior online.

As web and information technologies improve, and broadband access becomes more prevalent, web pages are becoming faster to download. In the past a page might take 15 seconds to appear in the browser window; today we expect a much faster response.

Studies by the Pew Internet research organisation (USA) and others show that people tend to multi-task while using the web: we chat via instant messenger, listen to music, watch TV, work in open-plan offices, check our email while a web page loads in the background. Your web page must compete with other distractions and still enable the user to quickly and easily achieve his task or goal.[1]

International audience

Any public web site potentially has an international audience. A University of Melbourne web site is likely to be visited by people from a variety of cultural and linguistic backgrounds.

The language we use on our web pages can be confusing, daunting or simply unintelligible to people who are unfamiliar with English idiom or the University's internal jargon and organisational culture.

We also tend to make assumptions about how much the user already knows: will an academic in Sweden understand that she needs to add '834' to the start of a phone number that is written as "x44900"?

Putting effort into writing web content that is clear, concise and grammatical can produce a web site that is more usable and accessible for all its audiences.

Credibility

Since 2000, researchers at Stanford University have been analysing how people decide what is trustworthy and credible on the web. Other studies have tended to confirm the Stanford findings.

For many of our web audiences, the University of Melbourne has a head-start in the credibility stakes: the University's public reputation inspires a degree of trust even before a user visits our web site.

Once on the site, however, that trust can be eroded by:

- Poor proof-reading; unclear or incorrect information
- Systems that don't work easily, reliably and consistently

[1] Yes, that sentence contains a split infinitive ("to quickly and easily achieve"). In *Modern English Usage* (2 ed), Fowler notes that split infinitives were impossible in Latin, and that the prohibition against them in English is largely a 19th-century misapplication of Latin grammar rules.

- Confusing navigation, inconsistent design or writing style
- Lack of content, failure to provide sufficient detail
- Difficulty in finding the right person to contact with a specific enquiry
- Poor IT security and information privacy procedures
- Too much 'marketese' and too little 'real' content
- Outdated content

Most of these factors are related directly to the quality of the written content on a University web site.

Beyond the web page: other ways of communicating online

The tips, checklists and rules in these course notes apply to most kinds of web site. Some specific types of online communication are not covered in detail here:

- Email
- Newsletters
- Newsfeeds (RSS, Atom)
- Repurposed content on WAP/mobile devices
- Advertising
- Intranet sites
- Event listings
- News stories, media releases
- A-Z directory, site map, site index
- Glossary
- E-commerce catalogue and checkout process
- Interaction design

Such specialised areas of online writing are discussed in some of the texts in the 'sources' section at the back of these course notes. Web Services staff are available to provide specific advice where needed:

- complete the form at http://idservicedesk.unimelb.edu.au/
- email your request web-info@unimelb.edu.au,
- or telephone 8344 0888.

User-centred web development

> *"I had (and still have) a dream that the Web could be*
> *less of a television channel and*
> *more of an interactive sea of shared knowledge.*
> *The power of the web is in its universality.*
> *Access by everyone, regardless of disability, is an essential aspect."*
> Tim Berners-Lee, inventor of World Wide Web and W3C director

Web sites and the people who use them are closely linked. In developing web sites and, more importantly, the content on them, it's crucial to consider your potential users and their information and transactional needs.

Web sites can be used in a variety of ways to interact with people from your target audiences. Web sites allow you to:

- communicate with people
- provide marketing messages
- interact and connect with other people
- disseminate information
- provide feedback, answer questions
- strengthen brands
- facilitate transactions: purchasing, paying bills, asking questions, entering your footy tips, sending an RSVP for a seminar or social function...

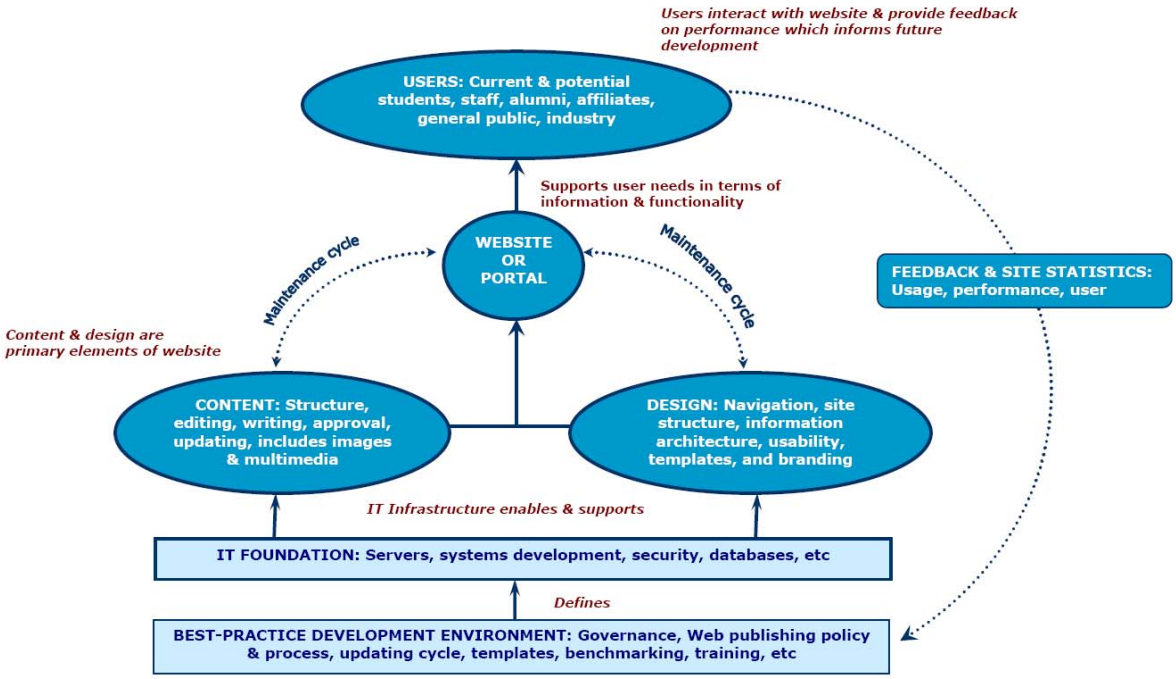
Integrated and effective web sites are developed and managed within a best-practice web development environment. In such an environment, quality assurance, policy, standards and guidelines are crucial part of managing and developing web sites.

For any organisation this means:

- research and benchmarking activity informs the development of web publishing policies and processes, templates, standards and training
- the IT and technology infrastructure is defined by these policies, standards and processes
- this IT infrastructure enables and supports the web site's functionality
- the site's content and design are separated from each other
- the web site is regularly maintained and updated
- interactions with and feedback from users is recorded and analysed to determine opportunities to refine and improve the web site
- continuous improvement and performance measures inform the development of policy, standards and processes

The amount of complexity in any of these activities depends on the organisation's size, complexity and resources.

The diagram overleaf shows how the end-user's experience is the focus of good practice in web development. This diagram was developed for a university: the same principles apply to any other organisation, with just the user-groups changed to reflect the type of business.



Getting to know your users

Finding out who uses your web site can be easier than you think. Often the user groups are similar to those who read your publications, come to your events, or call your office. You can also learn something about your web audiences by looking at how they interact with your existing web site.

You can identify your site's users by:

- analysing their email feedback: look for comments and suggestions that identify usability problems that warrant further investigation
- analysing your server log files and web search logs: this can identify key user groups for particular site sections, and show you which content and functions are highly sought after at different times of the year
- conducting surveys, both online and offline
- using existing intelligence about your target audiences in the offline world (HR or your IT staff may also have some data you can use)
- holding focus groups and workshops
- conducting usability testing and accessibility evaluations
- doing card-sorting exercises to find out what words and associations users expect to see on your web site
- asking front-desk staff and other knowledgeable staff about their perceptions of users' needs and interests (these staff often collect call logs, track enquiries and have a sound understanding of how the organisation currently treats its clients)
- interview individual users and stakeholders
- observe users as they do their day-to-day work ('contextual enquiry'), individually and in groups

Questions to ask during this research:

- How is the site being used now? What patterns emerge over periods of 6, 12 and 24 months?
- What information and services are being sought, and by whom?
- Are users able to locate the resources they seek?
- How do users feel about the web site? What aspects do they like or dislike?

> *"To dismiss basic contexts such as link colours, page layouts, navigation systems, and visual hierarchy as 'boring' or 'pedestrian' is akin to laughing at a car's steering wheel as unimaginative."*
> *--Jeffrey Veen,* The Art and Science of Web Design*, page 30*

Understanding your user groups and their specific needs allows you to develop web site content that meets those needs.

Fictional 'user personas' can be developed to ensure all content, design decisions and development work supports user needs. These personas embody information about the users, and outline typical tasks or scenarios.

Common elements in a user persona include:

- name, age, gender
- education level
- family, home life
- computer and internet experience & skills
- scenarios depicting typical tasks or content needs

Regardless of whether you develop user personas or not, there are some commonly accepted generalisations about web users you should remember:

- very task oriented
- short on time
- looking for content and services

They come to your web site with the objective of finding information that will make them more knowledgeable, or that will allow them to act.

Australian Internet and web usage

There are various estimates of Australian Internet usage in 2005:

- 1.07 billion Internet users worldwide (Computer Industry Almanac)
- 13.01 million Internet users in Australia and 571 Internet service providers (CIA World Fact Book)
- 9.8 million active Internet users in Australia (Nielsen//NetRatings)
- Two-thirds of Australian Internet users are active (Nielsen/NetRatings)
- Nearly half of Australian Internet users have been online for five years or more (Red Sherriff)

- 51 per cent of users have used online banking
- 53 per cent of the online Australians bought something online in 2003; security is a major concern for those who don't shop online

These statistics are detailed in the ClickZ.com reports listed in the 'sources' section of this document.

> *"Basically, over the past couple of years people have worked out what they want to purchase online and what they are happy purchasing through existing channels. Of course, the degree to which business has pushed online distribution has had a big influence too (eg banks promoting online banking). This is all part of the Internet and its users maturing."*
> James Burge, Director of Research, Red Sheriff

Australian Bureau of Statistics (ABS) figures from the 2001 Census give more indications of the level of adoption of Internet and web technology:

- 7,881,983 people (42 per cent) had used a personal computer at home
- Home computer use by age:

0-19 years	14.2 per cent
20-44 years	17.9 per cent
45-64 years	8.7 per cent
65 years and over	1.2 per cent

- There were 6,966,687 Australian Internet users in 2001
- 5.4 per cent of Australians used the Internet only at work, 18.7 per cent only at home and 3.8 per cent only elsewhere
- 9.2 per cent used the Internet in two or more of these places
- 33 per cent of households have Internet access
- 800,000 of these went online in 2000
- 482,000 Australian businesses are connected to the Internet
- 1.3 million Australians shopped online in 2001, a 66 per cent rise on 2000

In June 2004, 71.7 per cent of Australian small businesses reported to the ABS that they were using computers in their business operations, and 62.3 per cent had Internet access. Access to the Internet was more common in larger businesses.

The most common uses for these small-business users were email (86.9 per cent), research (82.6 per cent), and 'other' (89.1 per cent). The Internet was used by 34.4 per cent of all small businesses for 'making or receiving payments', an increase of 5.1 percentage points from June 2003. 'Making or receiving payments' is not a measure of e-commerce: that is defined as ordering goods and services electronically or via the Internet, not as the method of making/receiving payments.

Usability evaluation and testing

> *"Keep testing simple - so you do enough of it...*
> *"Repeat after me: Focus groups are not usability tests...*
> *" If you want a great site you've got to test...*
> *"Testing one user is 100 per cent better than testing none...*
> *"Testing one user early in the project is better than testing 50 near the end...*
> *"Testing is an iterative process. Testing isn't something you do once. You make something, test it, fix it, and test again."*
> --Steve Krug, *Don't Make Me Think*, pages 138-143

Usability evaluation or testing can happen in a variety of ways during all stages of the web development process. Common usability techniques and tools include:

- evaluation via heuristics
- expert site evaluations and walkthroughs
- formal usability testing in a laboratory
- contextual enquiry - observing users doing their day-to-day work in their usual office, lounge room, classroom, library or other location
- surveys and opinion-seeking with paper or wireframe prototypes
- card-sorting, affinity diagrams
- focus groups and workshops
- ongoing relationship -- user diary, advisory group, beta testing
- competitive research - comparing your site with those of competitors
- reviewing published information from outside your organisation
- customer support data, eg from an IT helpdesk or reception desk, and unsolicited feedback received from your web users

Be careful when devising tasks for usability testing. Sometimes the way you present a task can unduly influence the user's behavior. Usability consultant Jared Spool gives this example about testing a web site that sold furniture:

- The client asked users to use the web site to find a bookcase they might want to buy. Every user in the study went straight to the search box and typed the word 'bookcase.' The results implied that the search engine should give better results for that search term.

- Spool's consultants asked a different question: "*imagine you have 300 hardcover and paperback books strewn around your living room. You need a way to organise them so that you can find the books you like, and your friends will be impressed with the collection*." The participants in this study clicked links, typed different words and phrases into the search engine, and browsed through the site. None of these users typed in the word 'bookcase.'

Defining a purpose and goals for your site

> *"'I'm sorry,' I said... 'But I don't really understand what you're trying to do here. I know you want a web site that has something to do with these cars, but what is this site for?'*
> *... After a few minutes of discussion it became apparent that there was no objective or strategy in place. The project had no reason to exist except that the client wanted a web site and the web designers sitting across from me liked money, so it seemed like a natural fit. Oops."*
> Greg Storey, 2005

Having a defined strategy for your web site helps contain the scope of work you need to do in developing and maintaining the site. A clear, well-written site strategy helps everything run more smoothly: it establishes clear expectations among all stakeholders and keeps you focused on work that will have a positive, measurable effect on the organisation's customers, staff and business.

> *"A good web strategy fits in with the overall business strategy. It's usually best to* ***start with a focused, service oriented site*** *and keep expanding from there. If you define the audience as 'all teenagers' or 'all people surfing from noon to 1 P.M.,' you will have to launch something the size of CNET to be successful."*
> -- David Siegel, *Secrets of Successful Web Sites*
> (emphasis added)

Try to express your site's objective in a single plain-English sentence that describes what you want the site to do. Greg Storey gives an example of an objective for the online magazine, *A List Apart*:

> **To establish *A List Apart* as the magazine of choice for anyone who wants to create better web sites.**

The strategy statement defines how you will meet the objective: the who, what and why of the web site. Here is Storey's sample strategy for *A List Apart*:

> **To convince...** anyone who wants to create better web sites
> **to read...** *A List Apart*
> **instead of...** *Reader's Digest*
> **because...** *A List Apart* actually has articles on the subject whereas *Reader's Digest* contains none.

This strategy identifies concrete, measurable actions; identifies the site's competitor; and describes how *A List Apart* differs from the competitor.

Once you have a clear strategy for your web site, you can measure each new idea against the strategy. Ask how the idea will support the strategy -- and if it doesn't, then the idea is probably not worth following up.

(Don't throw the idea away! Keep it on file somewhere -- if your strategy changes in the future, you may need to refer back to previous ideas.)

Getting buy-in: link your site strategy to business needs

Particularly if you need additional resources to complete a web development project, linking your site strategy to broader organisational needs is a powerful way to get management support.

First, identify the organisation's high-level strategic goals that are relevant to your project. Do the same for departmental and business-unit strategies, and your work group's operational plan. Create business objectives that support these 'higher' goals.

Often, high-level goals are written in broad brushstrokes:

> Improve access to...
> Provide timely and accurate information about...
> Increase awareness of...

In contrast, your site's goals must be specific. They are about tangible actions, and you must be able to measure and report on them.

Here's an example:

OBJECTIVE	GOAL	TASK
Improve access to student help information	Reduce help requests via feedback forms, emails and phone enquiries Identify problems in accessing student help information	Audit and analyse content Identify gaps in user pathways Improve navigation for 'findability"

Identify goals that can be met in short, medium and long term. For example, a central web team in a large organisational unit is responsible for managing a large part of the unit's web site. It is impractical to redevelop the entire site at once because:

- There will be other conflicting priorities
- In most cases there will not be adequate resourcing
- There may not be adequate skill base in current staff

Instead, the web team might redevelop smaller, focused sections of the site, one after the other. This provides a series of 'quick wins' that help maintain stakeholders' enthusiasm -- and the enthusiasm of the project team.

It's important to identify goals that are achievable and can be measured.

OVERALL STRATEGY	BUSINESS GOALS	SMART GOAL FOR THE WEB SITE
Enrol more high-quality students in a particular course	Increased number of applications from suitably qualified students Minimise cost of processing applications	Stage 1: Increase in online applications; demonstrably faster processing of online applications over offline applications Stage 2: number of successful applications that were lodged online, compared to successful applications lodged by other means; calculate staff time saved in processing online applications versus other methods

OVERALL STRATEGY	BUSINESS GOALS	SMART GOAL FOR THE WEB SITE
Increase profits from selling books	Reduce cost of selling books Sell more books online	Stage 1: Number of sales via web site; number of books located in catalogue via search Stage 2: Fewer abandoned shopping carts; more books purchased via search
Improve profile of University in local community	Attract more people to attend free lectures and campus events Ensure high-profile public lectures are not overcrowded	Number of online RSVPs received for a public lecture, compared to overall attendance Number of podcast downloads of the lecture

A web development framework

This framework is based on several sources such as Garrett (2003) and Goto and Cotler (2004).

The framework consists of five stages that are self-contained, and each stage has outcomes that inform the next stage of the development process. Quality, continuous improvement, best practice, research and documentation are key elements of the framework.

The framework is actually a cycle: stage 5 leads back into stage 1, starting the continuous improvement process again.

Timeframes for the development of web sites vary depending on availability of resources, complexity of existing sites, skill level of team members and support from management.

STAGE	TYPICAL TIMEFRAME
1. Evaluate the current web site and environment	Continual
2. Define the site's goals and the next steps required to meet those goals	3-6 months
3. Develop and test new content, navigation or features	Up to 6 months, depending on the complexity of the development
4. Document the new system and procedures	About 1 month for new documentation, plus continuing maintenance
5. Launch, handover and maintain	About 1 month, followed by continuing maintenance

A user-focused development framework

Usability testing helps prevent costly mistakes. Spending time upfront on usability testing during your development project can save time and money on redevelopment later.

You can test before development/redevelopment...

- Compare your site with competitors' sites
- Test the current site with users to find where content, navigation and functionality need improvement

...during development...

- Test at each stage, ie test navigation before the content is added

...and before implementation:

- Plan usability testing sessions with a variety of users and tasks
- Implement a pilot, eg release the site to a limited group for feedback

There are two types of usability evaluation in any web development project:

1. **User research**, where you learn general information about the site's users: their online behavior, goals, common tasks, opinions and attitudes

2. **Usability testing**, where you test specific parts of a web site (navigation, content, design etc) to see whether web users are able to use the site easily and effectively

The table below describes the different kinds of research and testing appropriate for the five stages of any web development project.

WEB DEVELOPMENT STAGE	USER RESEARCH		USABILITY TESTING	
	QUESTIONS	METHODS	QUESTIONS	METHODS
1. Evaluate the current web site and environment	Who are your users? What are they looking for? How do others develop, manage and maintain their sites? What models or processes can be adapted or adopted?	Site traffic, usage patterns Users' feedback on existing site Competitor research: look at the sites of other comparable organisations	How do people use your current site? Can people find what they want? Can they use your site, its forms and functionality? Does the site offer the functionality users want? How usable is your web site? Where are the main problems?	Survey Contextual enquiry Expert site evaluations and walkthroughs Focus group
2. Define the site's goals and the next steps required to meet those goals	Who do you want to attract? What content do they want? What functionality or services do they expect?	User profiles, personas and scenarios Advisory group	What are the users' needs and expectations?	Interviews Workshop or focus group

WEB DEVELOPMENT STAGE	USER RESEARCH		USABILITY TESTING	
	QUESTIONS	METHODS	QUESTIONS	METHODS
3. Develop and test new content, navigation or features	What user data should we collect in the future?	Review user data from stage 1; implement new systems for collecting and reporting on user behavior, feedback, expectations	What words and actions do users look for?	Card sorting Wireframe and paper prototypes of page layouts, navigation schemas Walk-through evaluations of interactive functions, eg search forms and results Survey or focus group assessing users' comprehension of language and editorial style in the proposed content Accessibility assessment for draft content, especially any multimedia elements
4. Document the new system and procedures	Who are the target users? What do they expect from the site?	User profiles Market research Mechanism for collecting and analysing feedback Advisory group	Are the 'help' files easy to find and understand? Is the system documentation usable?	Heuristic evaluation Contextual enquiry Peer/user review of draft documents
5. Launch, handover and maintain	How has user behavior changed?	Analysis of feedback Regular reporting on site traffic	Does the site meet expectations? What further improvements could be made?	Survey Focus group User diary

Stage 1: Evaluating your web site

As web sites become mainstream business systems and primary communication and marketing channels, they should be evaluated in the same way other systems are.

Analyse and evaluate all aspects of the web site to get a clear picture of its performance. Is the site performing as expected? What is the return on investment? Is the site delivering value or reducing costs in other areas?

Here are some examples of performance measures for an organisation's web site.

How many people visit?	Compare your site traffic with your competitors using web measurement companies such as Hitwise or Red Sheriff or free tools such as Alexa http://www.alexa.com/ Analyse your web server log files to determine how many visits, how many return visits, which pages are accessed, where people are coming from
Analyse user feedback	Requires some analysis of emails you receive Is the site meeting their needs? Can identify which parts of the site aren't working, or content gaps
Usability of the web site	Usability problems are common, identify through usability testing Can people find what they want? What search terms do they use? Are the results useful and relevant to the user's expectations? Can they use your site, its forms and functionality? Are online tasks either too hard or too long?
Content	Is content accurate, authorised? Do you have a content plan?
Business integration	Is the site integrated into the way you work? Are things published to the web first, or at the same time as in print? Are increasing numbers of people using your web site instead of other channels, eg phone, front desk? Are you seeing cost reductions in other areas as a result?
Technology and functionality	Sometimes technology is not practical or appropriate, eg plug–ins required Test on all platforms and browsers to make sure it works Fast downloads are related to design and construction of pages Does it offer the functionality users want?
Quality	People have high expectations: poor user experience on the web = bad perception of the organisation

This 'defining' stage represents the bulk of effort and the greatest amount of time for a web development project. The quality of work undertaken here has a direct impact on the following stages.

Ignoring these tasks, and rushing into the next stage of development, is a mistake that can cause lots of re-work and heartache later. One way or another, you need to answer these questions to successfully develop your web site -- and it's cheaper and (in the long run) more efficient to do it at the start of the project.

WHAT TO DO	WHAT TO ASK	TOOLS AND PROCESSES TO USE
Define users and their needs	Who are your users? What are they looking for? How do they use your site?	Anecdotal evidence Email feedback Server logs Surveys
Evaluate usability of current site	How usable is your web site? Where are the main problems?	Heuristics Site evaluation Usability testing
Identify and map current site content	How much content? What format and type? How current? Quality? Authors and authorisers?	Content mapping Content analysis Site maps Content types
Site structure and navigation	How is the site structured? Is navigation clear? Is it usable? Is it consistent?	Content mapping (site inventory) Site maps
Resources	Who does what? What skill level? What is the process for publishing?	Publishing process Role statements
Technical	How many, what type of servers? What functionality? What publishing software? Security?	Technical documentation Functional specifications
Stakeholders	Who else in the organisation has a stake in this project? What are their needs? How will you manage your relationship with them?	Stakeholder identification Communication channels Calendar of organisational and external events that may affect the project

WHAT TO DO	WHAT TO ASK	TOOLS AND PROCESSES TO USE
Competitor research	How do others develop, manage and maintain their sites? What models or processes can be adapted or adopted?	Look at other organisations that offer similar products or services If your site serves a particular industry (eg news media), look at leading sites in that industry to get an idea of users' expectations Analyse what they do and how they got there. What can you learn from them?

A one-day site evaluation

This exercise is a useful training and team-building activity to do when you first bring together a project team to develop (or redevelop) your web site.

It involves the whole team spending one day doing an 'expert walkthrough' of the existing web site. If you don't yet have a web site, use a competitor's site instead.

In this evaluation, several different usability evaluation methods are rolled into a single day of work. It's not a thorough assessment of the site, but gives you a good starting point for identifying the high-priority problem areas.

Preparation:

1. Identify the areas of the site to be evaluated.
2. Develop user profiles and scenarios (personas) that represent user groups.
3. Develop a list of typical information needs or tasks relevant for that user group.
4. Confirm web evaluation heuristics to be used.

Conducting the evaluation:

5. **In the morning**, each team member adopts a user persona, and navigates through the site while attempting to complete the specific tasks for that user. Results are recorded by each team member on a matrix of site areas and heuristics. Record general comments or feelings as well as task-related results.
6. **In the afternoon**, the whole team collates and analyses the data to determine themes, issues and problems.

Stage 2: Define the site's goals and next steps

WHAT TO DO	WHAT TO ASK	TOOLS AND PROCESSES TO USE
Define users and their needs	Who do you want to attract? What content do they want? What functionality or services do they expect?	Develop user profiles and scenarios
Develop site content	What content do you need to publish? Who owns it? How often should it change? Who should authorise it?	Content analysis Site management plan Style guide Publishing process (flowchart, draft procedures)
Define site structure and navigation	What are the users' needs and expectations? What words and actions do users look for?	Global, local and contextual navigation schemes File structure (may not be the same as navigation scheme) Test your ideas with card-sorting and paper prototypes
Resources	What roles are needed? What skills and expertise are needed? How will the publishing process work, including authorisation?	Role statements Workflow and process documentation
Technical environment	What functionality do you need? What kinds of transactions will you support? What does this mean for you current servers, security and software?	Functional specifications Technical specifications Risk analysis User interface design models
Stakeholders	Who else in the organisation has a stake in this project? What are their needs? How will you manage your relationship with them?	Rapid planning session Stakeholder consultation Communication plan

Test and prove the outputs of Stage 2 before you move on to Stage 3. Useful testing methods at this stage include:

- Wireframe and paper prototypes of page layouts, navigation schemes
- Walk-through evaluations of interactive functions, eg search forms and results
- Risk assessment for the project
- Survey or focus group assessing users' comprehension of language and editorial style in the proposed content
- Accessibility assessment for draft content, especially any multimedia elements

Making a content inventory

A content inventory is an essential first step in redeveloping a web site. Viewing, analysing and recording every page on your current site is the most effective way to gain a thorough understanding of the content you already have, and how your site is currently structured.

Jeffrey Veen describes the content inventory concept and process in a short essay at:
http://www.adaptivepath.com/publications/essays/archives/000040.php

The essay also provides a downloadable Microsoft Excel template for a content inventory.

For a University of Melbourne web site, consider adding some extra information to the Adaptive Path template:

- Design template used on the page
- Use of photos or other illustrations
- Date created: this should be in the footer of the page – it gives an idea of history of the page and content
- Date of last update
- Maintainer and email: this should be in the footer of the page, and identifies the person who publishes the page – often this is not the author but a web publisher
- Authoriser: this should be in the footer of the page, and identifies the person who authorises the content as accurate and appropriate to publish to the web

Record only the information that you will be able to use later in a site management plan: avoid the temptation to go into too much detail. For example, if the same person will write all the content on a web site, you only need to record that person's details once -- not once for every page listed in the inventory.

Once the content inventory is completed, you will be able to use it to develop a content plan for the redeveloped site.

Donna Maurer provides some tips about doing a content inventory and describes briefly how the finished inventory can be used during the redevelopment process:
http://www.maadmob.net/donna/blog/archives/000669.html

Content planning checklist

The site inventory (see previous section) can be used as the basis for a content plan. Add extra columns to the Excel spreadsheet as needed to record the information described below.

Like the site inventory, completing the content planning checklist is mainly a learning process for you as the author or site manager.

ELEMENT	WHAT TO CONSIDER AND RECORD
Content	Brief description of content
Type	What type of content is it? (see content types)
Owner, author, authoriser	Who "owns" the content? Who needs to authorise it before publication?
Static or dynamic	Is this static content (in a text file)? Does this need to be dynamic, searchable (database)?
Audience	Who uses this content? Why do they use it? When do they use it? What do they do with it?
Frequency of use	How often is the content used or accessed: • daily • weekly • as needed • infrequently
Existing content	Does this content exist in some format already? If so, where? Can the content be extracted or repurposed automatically for this web site?
Current formats	What format is it in? • Microsoft Word • Desktop publishing program • HTML (web page) • Database (structured information) • Printed documents (hard copy – difficult to reuse)
Update cycle	How often does the content change? This determines how often it needs to be updated. Changes can be driven by external factors.

Stage 3: Development and testing

This is a fun bit – the stuff everyone is in such a rush to do. Having completed the first two stages, this section should be relatively straightforward.

WHAT TO DO	TASKS	OUTPUTS
Develop content	Edit and update old content Develop and write new content Identify and document the authors, publishers and authorisers	Content plan Metadata Editing and style guides
Develop the new site	Develop site structure, information architecture and navigation model Test to confirm usability and user focus Develop pages using templates Card-sorting and paper prototypes	Site map Navigation structure Page layout Customised web publishing templates
Resources	Identify and train content authors, publishers, authorisers Develop the new publishing process - who does what, when?	Role statements Publishing process Web training program
Technical environment	Static pages or database Feedback mechanism Server or site statistics Support for secure transactions Feedback tracking Iterative bug testing Iterative usability and accessibility testing	Technical specifications Test site Production site
Reporting requirements	Regular reports on feedback, usage, performance Analyse, document and use this data to inform future development or modifications	Reporting requirements and report formats Distribution schedule

The site and back-end systems must be thoroughly tested before approval is given to launch the new site. Examples of features to test before launch:

- Programming bugs
- Server load
- Database load, robustness, security
- Security of data
- Download speeds, accuracy of rendering, compatibility of web site across different browsers and platforms
- Features and functions are working correctly, per the functional specifications
- Usability and accessibility of finished site
- Compliance with relevant regulations, policies and laws

Stage 4: Documentation

This stage is mainly about synthesising and updating the documentation produced in stages 1 to 3. The updated documents you produce here will be useful in the handover stage, and will give you a big head-start in the next round of iterative site development.

WHAT TO DO	WHAT TO ASK	DOCUMENTS
Users	Who are they? What do they expect from the site?	User profiles and scenarios Market research reports Mechanism for collecting and analysing users' feedback
Content	Content types, formats Currency expectations and issues	Editing style guide Quality assurance, version control, archiving Rights management, copyright Metadata standards Content management plan Style guides Online help
Site structure, navigation	Site structure, information architecture and navigation model	Site map Navigation structure
Resources	What is the publishing process - who does what, when? What authorisation is required? Skills required for each role?	Role statements Publishing procedures and policies Workflows
Technical	What are the standards, performance, specifications, security, and functionality required and supported?	Technical specifications User manuals Design guidelines
Reporting	What reports are required? When are they published? How is this data used and shared?	Communication plan Distribution schedule Reporting requirements and report formats

All documentation, especially 'help' documents and reports, should be tested for usability before this stage is concluded. Remember, you can test paper-based documents as well as web pages.

Consider the layout, choice of language, method of access, organisation of information, and use of metadata and other microcontent to enhance clarity and comprehension.

Stage 5: Launch, handover and maintenance

Understanding leads to buy-in: implement a program of communication, awareness-building, education and training at all organisational levels.

Celebrate your milestones: hold a launch party for the project team.

Ensure the site will be maintained effectively: provide training and information sessions for staff and stakeholders.

Define the structure and standards expected of any subsites that are linked from your site. Redevelop subsites where possible and appropriate.

Implement the site maintenance plan. Check that processes are working properly, and regularly review the reports on site performance and usage.

Start planning for the next iterative development of the site. Consider integration of online and offline processes.

Legal and policy environment

Businesses, associations and public-sector organisations typically provide their clients, members, staff, suppliers and peers with information tools that enable people to work, learn and exchange knowledge or data effectively. Internet technologies, including the World Wide Web, are among these tools.

Understanding your organisation's legal and policy environment will help you make better decisions about what content to publish, how to design your site, and how to store and protect the data collected or used on your web site.

Legal environment

The web is a business tool, and laws that apply to other aspects of your organisation may also apply to the content or functionality of your web site. If in doubt, get legal advice.

Web publishing and other online activity may be governed by a range of laws, at both State and Commonwealth levels:

- Administrative law, including freedom of information, official secrets
- Business law, including consumer law, fair trade practices, e-commerce
- Civil and human rights law, including discrimination and privacy
- Communication and media law, including copyright

The National Library of Australia provides a list of law-related web sites for each State and Territory:
http://www.nla.gov.au/oz/law.html

Legal and policy environment

The University of Melbourne provides its students, staff and affiliates with information tools that enable people to work, learn and exchange knowledge effectively. Internet technologies, including the World Wide Web, are among these tools.

The University's web presence is not limited to a single Internet domain, nor is it limited to passive publication of information. The World Wide Web is one of several Internet-enabled communication channels, and the University aims to provide a coherent, consistent user-experience across all these media. Our web and Internet presence should demonstrate Melbourne's standing as a high-quality, research-led university.

We therefore aim to develop a highly usable and accessible online presence that uses current technologies to enhance scholarly, business and community-related activities.

The content, design, structure and interfaces of a University web site should generally be developed to satisfy the end-users' needs and supported by relevant business processes.

University web sites and systems must be accessible and comply with all relevant legislation, University statutes and regulations, and any other relevant University policies.

Sites, interfaces, processes and content should be user-focused and highly usable.

Web-enabled systems should use applicable web standards and application protocol interfaces (APIs) to ensure interoperability, consistency and accessibility across the University.

Transactions and web-enabled applications must behave consistently with each other, regardless of which University business unit is responsible for their development and management.

Content should be capable of being repurposed and delivered via more than one platform or medium.

Standards and guidelines for University web sites and systems are approved by the Vice Principal, Information, and published by the Information Division.

Laws, statutes, regulations and policies

Copyright Act 1968 (Cwth)

Disability Discrimination Act 1992 (Cwth)

Education Services for Overseas Students (ESOS) Act 2000 (Cwth)

Privacy Act 1988 (Cwth)

Telecommunications Act 1997 (Cwth)

Freedom of Information Act 1982 (Vic)

Information Privacy Act 2000 (Vic)

AARNet Pty Ltd Access Policy 2005

Regulation 8.1.R7 Under Statute 8.1- Computing and Network Facilities Rules

Regulation 8.1.R7 Guidelines

Statute 14.1 Intellectual Property

Compliance Manual

Information Technology Security Policy

University standards and guidelines for web publishing

Accountability for compliance

Every University web server or business unit's web site must be managed by staff members who are delegated responsibility for three web-related roles.

The web site manager:

- Defines the web site's strategy and purpose
- Manages stakeholder relationships and consultation
- Plans and manages creation and maintenance of the site
- Ensures quality and compliance with all relevant laws and university requirements

The system administrator:

- Installs and maintains web server hardware and system software
- Configures and maintains the web server environment
- Provides system support for installing, integrating and testing web applications

The web site authoriser is accountable to the University for:

- Development, resourcing and management of the web site
- Legality and compliance of the published web site

The web site manager, system administrator and web site authoriser should be readily contactable about their business unit's web presence.

Should a University web site be found to breach relevant laws, or fail to meet University standards and guidelines, the web site authoriser is responsible for either changing or removing the site in a timely manner.

Web management roles and skills

Just as web sites are about more than technology, managing your web site involves more than updating content once or twice a year. Managing a web site involves:

- An understanding of your users and their needs
- Knowledge of the content, including writing and editing
- Identification of the business drivers or purpose for the site
- Developing and maintaining site structure, information architecture and navigation
- HTML, technology, databases and servers
- Compliance with relevant web policies and standards
- Evaluation of effectiveness and performance of the site
- Development of publishing and approval processes
- Project management, communication and stakeholder liaison.

Can you answer these questions? If not, you probably need to improve how you manage your web site.

- Do you know who is publishing to your site?
- Do they have the appropriate skills and experience?
- Do you know exactly what content is on your site?
- How up to date is it?
- Is the content in your publications similar to content on your web site?
- What is your technical environment?
- Is your site's performance evaluated?
- Is it supporting your business goals?
- How much funding is made available in terms of staff, money, resources, infrastructure?
- Who is managing the web in your unit?

The diagram below shows the broad range of skills and knowledge you need to manage a web site effectively.

Publishing process: who, what when?

The publishing process takes the confusion out of maintaining your web site. Think of it as a quality process - everyone knows what is going on and what their role is, and you get a consistent outcome.

The publishing process defines:

- how content is published or updated on your site
- who authorises the content or changes
- who does what: roles and responsibilities
- any documentation or paperwork required to complete stages in the process.

It is important that the process:

1. is documented
2. is consistent
3. produces quality outcomes
4. is known by all staff

A collaborative approach

Developing a web site requires a collaborative approach, working with a team of staff across the faculty or unit with a range of skills and experience.

This includes:

- marketing and communication expertise
- an understanding of our users and their needs
- content skills: writing, and editing
- analytical, consultative and project management skills
- web design, usability and information architecture skills

- web development skills: HTML, database programming, etc
- server administration, IT infrastructure skills, etc

At some point in the development project, skills might be bought in for the short-term, however up-skilling existing staff and recognising the diversity of skills required to develop and maintain sites is crucial to the effective long-term management of University web sites.

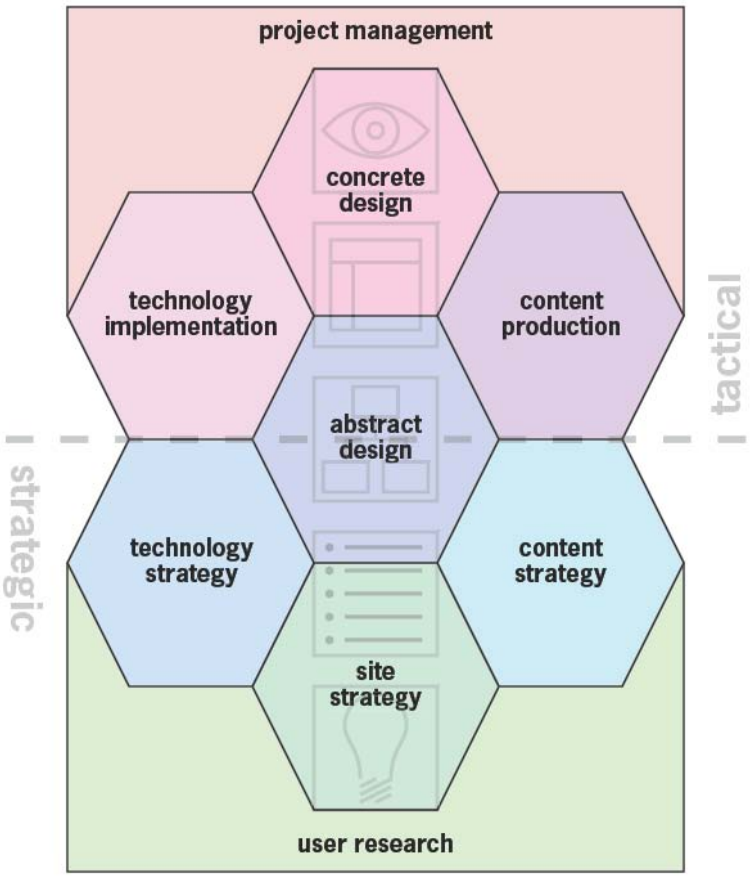
Some faculties or units have recognised this and appointed skilled and experienced web staff to manage and coordinate web development activity within their area. Gone are the days when the LITE or an administration officer can put things up on the web when they get a chance!

Roles and skill sets

In Australia, as far as we know, there are no university degrees in web management *per se*. A good foundation for a career in web management will include the principles of marketing, communication, project and line management, editing and web production. A background or interest in computers and technology can be beneficial, as is an understanding of behavioural science.

Jesse James Garrett has defined the 'nine pillars' of successful web teams as a matrix of core competencies that overlap and intersect.

The competencies and related processes and roles, are described in Garrett's 2003 essay, "The Nine Pillars of Successful Web Teams" (see the 'sources' section of this document).



Source: Jesse James Garrett, 2003

In a large organisation, some aspects of this model (such as abstract design and technology strategy) would be managed or supported centrally, for example by the central web/IT team or by the marketing manager. Other 'pillars' require local expertise

and resources in individual departments: obvious examples are content strategy, site strategy and content production.

Building web into the organisation

A 2004 research study identified standard web roles and responsibilities for the University of Melbourne. These roles will be built into the University's web content management system and form the basis of related policies and standards.

In many University business units, it's tempting for managers to add web responsibilities onto another full time role such as that of administrator, IT support or communications officer. This is usually based on a misconception that the web work takes little effort and needs no special expertise.

An effective way to change this organisational culture is to go back to setting goals for the site and listing all the tasks that are required to get a site running, to maintain it and continually improve it. A web site is never truly finished, and the workload can ebb and flow, but if they are not documented then it is difficult to build a case for additional hiring of skilled staff.

In fact, developing a web site requires a collaborative approach, working with a team of staff across the organisation with a range of skills and experience. This includes:

- marketing and communication expertise
- an understanding of our users and their needs
- content skills: writing, and editing
- analytical, consultative and project management skills
- web design, usability and information architecture skills
- web development skills: HTML, database programming, etc
- server administration, IT infrastructure skills, etc

At some point in the development project, skills might be bought in for the short-term, however up-skilling existing staff and recognising the diversity of skills required to develop and maintain sites is crucial to the effective long-term management of a web site.

The roles and responsibilities described below may help you identify the types of web work that happen (or need to happen) in your organisation. Building web responsibilities into a person's job description is a good start to ensuring adequate recognition and resourcing for the web site.

ROLE	EXAMPLES OF SPECIFIC RESPONSIBILITIES
System administration	Installing and maintaining web server hardware and system software. Ensuring server and site security. Guaranteeing server and site availability. Running regular backups and providing data recovery services. Configuring and maintaining the web server environment, eg assigning permissions and user groups, setting server-level redirects. Generating statistics and reports for sites and servers. System support: installing web applications and testing at both application and system levels. Integrating applications with non-local systems (eg for login authentication).

ROLE	EXAMPLES OF SPECIFIC RESPONSIBILITIES
Web development	Analysis, design, development and testing of usable, accessible web applications. Developing and customising web templates where required for use in web applications. (Excludes user interface design and graphic design.) Writing technical and end-user documentation for web applications. Supporting and maintaining web applications. Handing over web applications to client/user (eg training, documentation, installation and testing, integration with other systems, helpdesk services).
Site management	Defining site strategy and purpose: user needs; business and support needs; communication and marketing needs; budget and resources; publishing policy and process. Stakeholder relationship management and high-level consultation. Planning and managing creation and maintenance of site (including subsites). Determining site presentation, interface design, information architecture, URLs and subdomain names, template development/customisation and implementation. Initiating and approving new developments. Assigning areas of responsibility to web staff. Coordinating all web tasks. Delegating web tasks where appropriate. Ensuring quality and compliance: usability and accessibility; copyright and other legal compliance; consistent with University policy and guidelines; best practice. Monitoring and analysing site and systems performance, web user activity.
Web maintenance	Creating and maintaining web pages. Transforming edited content (including metadata and non-text content) into web pages. Checking web page quality, accessibility and usability. Proof-reading text. Checking for broken links and valid code. Checking that copyright clearances and other legal requirements are satisfied. Maintaining site/content inventory. Ensuring published content is current. Periodically auditing and mapping site content. Coordinating content review process. Coordinating creation and supply of fresh content. Acting as the first point of contact for content changes and feedback from web users.
Web editing	Assessing the suitability of drafted text or other content for web publication: context, appropriateness, relevance and usefulness to the intended audience. Editing text and other content intended for publication via the web/Internet. Revising content to ensure its quality: accuracy, authority, clarity, accessibility and usability. Proof-reading and line-editing for grammar, spelling, punctuation, voice and style. Applying relevant University style guidelines. Ensuring compliance with copyright and other relevant legal requirements. Writing or refining metadata for the edited content. Supplying text and other content in a suitable format for publishing on the web.

ROLE	EXAMPLES OF SPECIFIC RESPONSIBILITIES
Content authoring	Creating new content for publication on the web/Internet. Revising existing content. Writing metadata for the content. Ensuring content is user-focused, appropriate, accurate, authoritative, relevant and useful to the intended audience. Obtaining copyright clearances where required.
Approval	Approving new content or changes to existing content before publication. Checking accuracy and integrity of web content. Approving new sites and URLs before publication.
Authorisation	Being accountable to the University for the development, resourcing and management of web site/s. Being accountable for the legality of the published web site.

Advice, tools and support

Web Services, located at 780 Elizabeth Street (Parkville campus), is responsible for:

1. Developing and managing University web sites
2. Determining policy, standards and guidelines for University web sites
3. Providing professional development opportunities for the University's web staff

Web Services staff have skills and experience in:

- web development and management
- usability and accessibility, including interface/interaction design
- information architecture, content creation and management
- training and communication
- project management

The Web Services web site http://www.unimelb.edu.au/webcentre/ contains:

- downloadable course materials, templates and examples
- web development tools and guidelines, including Dreamweaver templates
- information about a range of web topics
- information about the web training program for University staff
- news about current web development projects managed by Web Services

For help with web-related IT and network problems, please use the Information Service Centre request form:
http://idservicedesk.unimelb.edu.au/

Networks and conferences

Web Forum email discussion list, web cuppa and brownbag lunch seminars for Melbourne University staff
http://www.unimelb.edu.au/webcentre/

Web Accessibility Network for Australian Universities (WANAU) email discussion list and seminars
http://wanau.org/

World Wide Web Consortium (W3C) discussion lists
http://www.w3.org/

Web Standards Group: discussion list and regular meetings
http://webstandardsgroup.org/

Ausweb, the annual World Wide Web conference, held in Australia each July
http://ausweb.scu.edu.au/

OZeWAI, the Australian Web Adaptability Initiative, holds an annual conference in Melbourne
http://www.ozewai.org/

Sources of material in these course notes

Martine Booth designed many of the diagrams and developed the original "Web Management for Managers" course on which this workshop is based. Claire Spencer and Margaret Ruwoldt redesigned the workshop and wrote new material in November 2005.

Other inspirations and sources of content are listed below.

Internet and World Wide Web history

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History of Internet and WWW http://www.netvalley.com/intval1.html

Roger Clarke (2004) "Origins and Nature of the Internet in Australia"
http://www.anu.edu.au/people/Roger.Clarke/II/OzI04.html

Profile of Robert Elz http://en.wikipedia.org/wiki/Robert_Elz

Wikipedia http://wikipedia.org/

Internet Archive and the Wayback Machine http://www.archive.org/

ClickZ worldwide Internet usage statistics
http://www.clickz.com/stats/web_worldwide/article.php/151151

ClickZ Australian statistics
http://www.clickz.com/stats/sectors/geographics/article.php/3090361
http://www.clickz.com/stats/sectors/geographics/article.php/3491501
http://www.clickz.com/stats/sectors/geographics/article.php/3490516

Stages of Internet adoption in organisations: diagram by Martine Booth, adapted from XT3 Commercial Internet Solutions.

Integrated web site: diagram by Martine Booth.

Janice Fraser (2005) "It's a Whole New Internet"
http://www.adaptivepath.com/publications/essays/archives/000430.php

Tim O'Reilly "What is Web 2.0" 30 September 2005
http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html

David Weinberger (2002) *Small Pieces Loosely Joined*. Perseus Publishing, USA. ISBN 0-7362-0850-7.

Usability and accessibility

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http://www.infodesign.com.au/

Steve Krug (2005, 2 ed) *Don't Make Me Think: a common sense approach to web usability*. New Riders Press, USA. ISBN 0321344758.

Jakob Nielsen (1999) *Designing Web Usability : the practice of simplicity*. New Riders Press, USA. ISBN 156205810X.

Resources and presentations by Dey Alexander http://deyalexander.com/

International Organization for Standardization ISO 9241
http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=16883&ICS1=13&ICS2=180&ICS3=
or http://tinyurl.com/dgxl7

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http://www.hreoc.gov.au/disability_rights/standards/www_3/www_3.html

Vision Australia papers and presentations on accessible web design
http://www.visionaustralia.org.au/info.aspx?page=640

Decision in *Bruce Lindsay Maguire v Sydney Organising Committee for the Olympic Games*, 2000
http://www.humanrights.gov.au/disability_rights/decisions/comdec/2000/DD000120.htm

World Wide Web Consortium: evaluating web sites for accessibility
http://www.w3.org/WAI/eval/

WAVE web accessibility checking tool from WebAIM
http://www.wave.webaim.org/

Using the Opera web browser to check your web page's accessibility
http://webaim.org/techniques/articles/opera

Andrew Arch et al (2003) "Getting Started with Accessibility Assessments", paper presented at Ausweb 2003 conference
http://ausweb.scu.edu.au/aw03/papers/arch2/

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ClickZ worldwide Internet usage statistics
http://www.clickz.com/stats/web_worldwide/article.php/151151

ClickZ Australian statistics
http://www.clickz.com/stats/sectors/geographics/article.php/3090361
http://www.clickz.com/stats/sectors/geographics/article.php/3491501
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Jared Spool's example of designing user tasks is described in Peter Merholz (2005) "Jared Spool on User Research Methods"
http://www.adaptivepath.com/publications/essays/archives/000516.php

Mike Kuniavsky (2003) *Observing the User Experience: a practitioner's guide to user research*. Morgan Kaufmann Publishers, San Francisco. ISBN 1-55860-923-7.

Defining a purpose and goals for your site

Greg Storey (2005) "Never Get Involved in a Land War in Asia (or Build a Web site for No Reason)", article in A List Apart
http://www.alistapart.com/articles/landwarinasia

Web development framework

Jesse James Garrett (2003) "The Nine Pillars of Successful Web Teams"
http://www.adaptivepath.com/publications/essays/archives/000242.php

Kelly Goto and Emily Cotler (2 ed, 2004) *Web Redesign 2.0: workflow that works*. New Riders Press, USA. ISBN 0735714339. Related templates and tools downloadable from:
http://www.web-redesign.com/