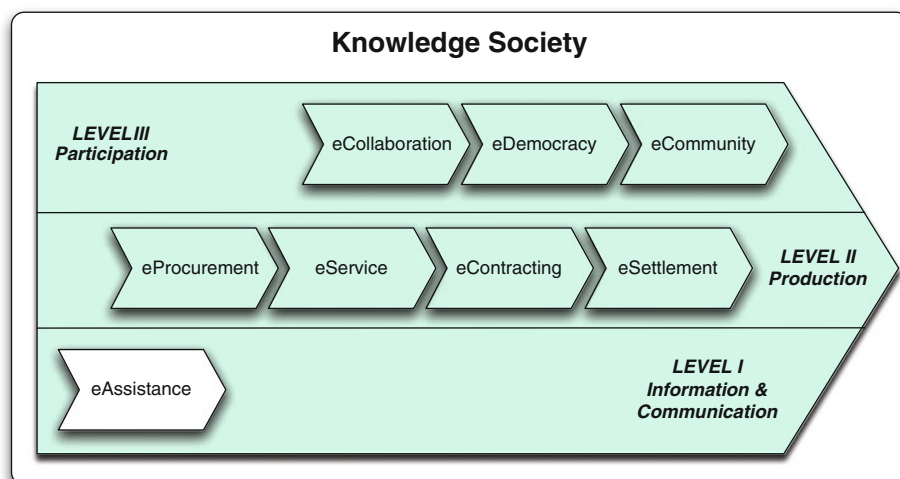


2 eAssistance



Chapter 2 procures the basic principles for Web-based information and experience exchange. To this end, Sect. 2.1 outlines the most important Internet services. Trends in the Internet, known by the name Web 2.0, are displayed in Sect. 2.2; in addition to that, a classification of social software is given. In Sect. 2.3, a list of criteria for municipality Web sites allows to make an estimate of the content. A gross architecture for more ample eGovernment portals is presented in Sect. 2.4. The guidelines for barrier-free Web access were created by the W3C and constitute the basis for all public Web sites (Sect. 2.5), with the goal that people with mental or physical handicaps can profit from Web-based information and services as well. In order to assure quality in the Internet, there are criteria for usability, content and ethics to be taken into account, as displayed in Sect. 2.6. Section 2.7 contains bibliographical notes. The case study of the Swiss Foundation for Handicapped Accessible Technology Use deals with barrier-free access to public Internet platforms. It discusses the most important results of the Swiss accessibility study.

2.1 Search and Web Services in the Internet

The network of networks

The Internet, or network of networks, connects a variety of computers worldwide by use of a protocol (TCP/IP or Transmission Control Protocol/Internet Protocol). It consists of a multitude of computer networks and facilitates the worldwide interchange of data and information. Over the past years, the Internet has established itself as the most important communication platform. Furthermore, it is the basis for electronic exchange relations (eCommerce, eBusiness, eGovernment etc.) and with its multimedia services, it is changing bit by bit even telephony, radio, and television.

As Internet services are considered the following:

Hypertext documents and navigational aid

World Wide Web or WWW: The WWW is one of the most important Internet services and makes it possible to interconnect multimedia documents (hypertext documents) from all over the world by links. With the help of HTML (Hyper Text Markup Language), documents are developed, and text, graphics and pictures are arranged on a WWW page. Every hypertext document can link on other web sites that are located on any computer (server) around the world and that are accessible.

Setup of e-mail addresses

Electronic mail or e-mail: The e-mail allows the correspondence and the exchange of electronic documents between Internet users. The users deploy electronic mailboxes on computer systems (mail servers) of an Internet provider. Every e-mail address has the fixed form "username@serveraddress." The server address is composed of different domain names that are separated by dots and end with the name of a main domain or top-level domain (abbreviations like, e.g., .eu for Europe, .ch for Switzerland, .de for Germany, .au for Austria, .org for non-commercial organizations, .com for commercial companies, or .edu for research facilities and universities).

Push principle in the Internet

Discussion lists or mailing lists: Discussion lists are electronic newsletters. These are regular, often daily released electronic bulletins on an appointed topic or technical subject. The subscribers of the mailing list send their messages via e-mail to the operator of this list (list server), which forwards all incoming messages via e-mail to all the participants. Discussion lists work according to the push principle (cf. communication strategies in Sect. 9.1), that is, each participant receives the bulletins automatically, without needing to tend to it. The condition for this to work is a subscription, that is, the user has to file his own e-mail address.

Pull principle for a variety of topics

Newsgroups: In the Internet, a discussion forum on a given topic is called newsgroup. Unlike mailing lists, the newsgroups work according to the pull principle (Sect. 9.1). Each participant of a newsgroup has to pull the desired discussion entries actively from the designated server (newsgroup server). Some newsgroups have developed into extremely fast news media, because they cover an up-to-date event.

File Transfer Protocol, or FTP: This service makes it possible to copy files from a remote computer onto your own computer or vice versa to load your own files to a remote computer.

Exchange of files

Apart from these Internet services, comprehensive catalogs, and elaborate searching services that make working in the WWW easier developed. Topical catalogs organize an area of knowledge in an hierarchical index. These catalogs can be searched for topics and subtopics in a well laid-out manner. Virtual libraries are topical catalogs that are provided by libraries or public institutions.

Catalog services

Search engines or search services help the user to find information in the WWW. With the help of a few search criteria, search engines or search robots are capable of compiling the most interesting WWW sites in very short time. Search terms can be connected with each other by logical operators AND, OR, and NOT, in order to narrow down the quantity of relevant hyper-documents. The operator NOT permits excluding WWW sites that contain a certain term. In addition to that there are search terms like NEAR that permit finding documents in the vicinity of a term. Beside textual information, pictures, videos, or audio elements can also be found with adequate search engines.

Search engines and search services

Location-based search services provide, in dependence of the location, the necessary information about near facilities, services, or partners. This search function is mainly needed for mobile applications.

Location-based search services

2.2 Development of the Web 2.0

Any advances in software development are often marked by a version number. The term Web 2.0 originally was used as a key word in a conference on computer science, to describe the coaction of different Web technologies and the possibilities of social collaboration in the Internet (social software). The term is associated with the following concrete developments:

Key word Web 2.0

Democratization of the Internet: The Internet is seen as a platform for communication and exchange, in which the contents are contributed dynamically by independent persons and are changed and extended continually by the users. The operators of such platforms do not put up any access restrictions, anyone interested can contribute. The users can arrange a subscription service (e.g., RSS feed, see Sect. 7.4), in order to get continuous updates.

Subscription services are possible

Combination of existing contents: Text, pictures, audio and video are newly arranged in collages and put at the disposal. This is referred to as mashup. Mashups use open interfaces, so that different Web applications can be embedded. For example, it is possible to design electronic invitation cards with text elements, personal photos geographical maps (e.g., extracted from Google Maps), and music sequences.

Mashups are spreading

Formation of social networks: With the help of Web-based applications, communities are built in the Internet and relationships are cultivated. After entering

Maintaining and strengthening relations

the profile information, the user can get to know the other participants of the network and, if desired, utter a request for new relationships and cultivate the exchange.

Social software takes the individual and its wishes into account and at the same time makes it possible that interested individuals connect with each other and the community grows into becoming a social network. While other collaborative applications, like e.g., groupware (see Sect. 7.5), support the users in their project work, the main concern of social software is the social context.

Figure 2.1 gives a classification of social software. The three basic goals of such solutions are publication and distribution of information, communication among Internet users, and nurture of social contacts.

*The
subscription
service RSS*

The subscription service RSS (Really Simple Syndication, see Sect. 7.4) is a distribution service for Web content, which can be drawn on by any participant in an easy way. With it, the user can request news, findings or recent discussion entries on a particular topic or knowledge domain, which are delivered automatically in case of a change.

*Weblogs and
corporate blogs*

Personal or group-related diaries or journals (Weblogs or blogs, see Sects. 7.4 and 9.6), that administer content chronologically, belong to the focal topic information. The readers of such blogs can comment on content or add to it, in order that the participants of social networks can profit of new findings. Blogs are often run by private individuals (bloggers) without commercial background, they are subjective and reveal personal opinions and assessments. Also, blogs are often interconnected, by embedding other sources of information via RSS.

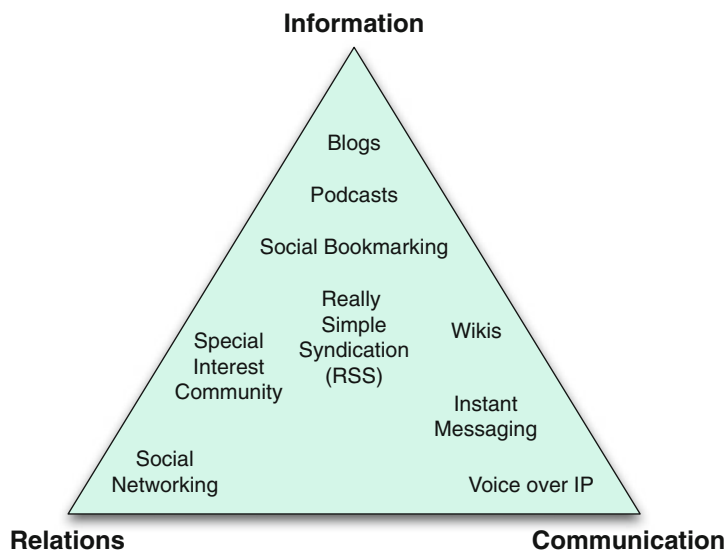


Fig. 2.1: Classification of social software, adapted from Hippner

Podcasts have a purpose similar to blogs, transmitting spoken words instead of information. The term podcasting denotes the production and distribution of audio files (often as MP3 format), whereby RSS is used, once again, as a distribution service for spreading spoken news, reviews, audio dramas, readings, music, etc. When podcasts are complemented with video sequences, the result are multimedia podcasts.

*Emerge of
multimedia
podcasts*

Social bookmarks are personal link collections that are published and indexed by other participants. Hereby, taxonomies and ontologies are generated by the participants of social networks, this means, there is no central authority that determines the key words (descriptors) and classification hierarchies. The users of social bookmarks manage their personal bookmarks to their liking, but at the same time they can search collections of bookmarks. The frequency with which a particular Web site is recommended by the users serves as an indicator for the quality of that Web site (social choice theory).

*Creating a
personal link
collection*

Wiki tools (see Sect. 7.3) make it possible to post entries on a topic or a document quickly. Such tools also facilitate search functions, editing possibilities and protocol functions, so that various authors can work on the same document. The most popular wiki probably is the knowledge library Wikipedia, which grants free access for everybody.

*Functioning of
wiki tools*

A representative of the focal topic of communication is instant messaging. This transmission of messages in the Internet works in real-time and the recipients are able to respond immediately. Applications of Internet telephony (Voice over IP, IP standing for Internet protocol) widen the set of communication possibilities (cf. www.skype.com).

*Instant
messaging*

Software solutions for special interest community or social networking belong to the focus Maintenance of Relations. They include building social networks that occupy an area of interest or discuss socially relevant topics. While sometimes it is possible to register in social networks yourself, in other occasions, an invitation is necessary for participation. Tools like discussion forums, chats, or swap sites further the community formation (cf. Chap. 9). The users' contributions are evaluated by the community or by the software system itself, in order to close the feedback loop.

*Social
networking*

Social networks are self-organized communities, they are not subject to any hierarchical order or a set purpose. They live on the variety and intensity of relations: the denser a social network is, the more familiar are the participants with each other. The looser the network is joined together, the less interactions take place. In case of lacking network relations it is possible that the Web-based social network will wither and show little or no interactions any more.

*No hierarchy in
social networks*

2.3 Catalog for Municipality Web Sites

Many municipalities have their own Internet presence and maintain an according Web site. These Web sites often differ immensely regarding presentation and contents. The information offers are structured differently and complicate the collaboration between municipalities. The possibilities of communicating are

*Internet
presence of
municipalities*

Public Services	<ul style="list-style-type: none"> • Organizational structure of the Municipality • Contacts and responsibilities • Services offers and Download of Forms • Communication range
Location Promotion	<ul style="list-style-type: none"> • City Map • Traffic Information • Maps of Districts • Commercial Structure
Education and Social Services	<ul style="list-style-type: none"> • Public Schools • Libraries • Social Institutions • Youth programs
Politics	<ul style="list-style-type: none"> • Council Members • Protocols • Budget • Parties
Leisure Time, Culture and Sport	<ul style="list-style-type: none"> • Events calendar • Cultural Institutions • Associations • Sporting Events
Tourism	<ul style="list-style-type: none"> • Tourism Bureau • Virtual Tours • Restaurants • Hotels

Fig. 2.2: Catalog for municipality Web sites, adapted from Geiser and Kohler

very different as well, more recent forms like blogging, podcasting, or instant messaging are rarely found. When having a closer look on the services that these Web sites offer (for service offers cf. Chaps. 3–6), it shows that some electronic services are already available. Nevertheless, there are mainly mere pilot tests for eDemocracy (cf. Chap. 8) available, because the identity management and the application of digital signatures are still in a developing stage.

Figure 2.2 gives us a topical catalog for municipality Web sites. The information and communication offers are mostly wide-ranging and include administrative information, educational offers, cultural, and sporting events up to touristic offers.

*Objectives and
target audience
for public Web
sites*

In order to build a Web site or to evaluate an existing one, some basic questions have to be discussed: What goal does the municipality pursue with the Internet presence? What is the target audience for a municipality Web site

(citizens, companies, and/or administrative institutions)? What kind of information and services should be offered? How should the offers be structured, what languages have to be supported, which navigation possibilities should be planned?

As discussed in Chap. 1, the Capability Maturity Model for Web-based services in the eGovernment comprises the four steps information and communication, production, and participation. If small and middle-sized municipalities want to serve all process levels in their Web site project, they reach their limits not only for financial reasons. Also from the point of view of citizens and companies, it is time-consuming and difficult to consult different Web sites on different communal levels and to find out where to place their request. For this reason, more and more eGovernment portals are becoming popular, concentrating all municipality offers and services for a region.

Bundling offers and services

2.4 Design of eGovernment Portals

A portal is a Web site that concentrates information services on certain topics and to that end offers searching, communicating, catalog, and mediation services. eGovernment portals serve the citizens as a gate or entrance to the following services:

What does the eGovernment portal comprise?

- Communication platform of the governmental institution (cf. Fig. 2.2)
- Use of governmental services (Sect. 4.2)
- Drawing on services offered by companies (see Sect. 4.3)
- Electronic votes and elections (cf. eDemocracy in Chap. 8) and
- Processes of community formation (Chap. 9).

When an eGovernment portal is to be designed, there are several possible functional areas to consider:

Provision of information: The eGovernment portal provides information about administrative activities and offers possibilities to communicate. Topics and contact information for different administrative activities are listed; plans, documents, forms, event calendars, among other things, can be found.

Discussion forums: An administration can run discussion lists, newsgroups, or chat-rooms for specific problems of its own activity and thereby interest the citizens in the concerns of public authorities.

Catalog services: A catalog service makes it possible to build, maintain, and use information and services in a structured way. With the help of a dialog control and adequate searching services, citizens gain efficient access to all areas of interest and required services.

Profile maintenance: The municipality or administration can use its Internet portal to call for profile information of those citizens who regularly draw on services (cf. Online Community Member and Online Citizen, respectively, in Sect. 9.4). The citizens can submit their preferences and contact information. They subscribe to get information on selected administrative projects or particular factual issues. Together with members of the administrative institution and other citizens, they can continually exchange experiences. In case the citizens have expert knowledge, they may be poised to offer it to the administrative institution when needed.

*Public Offering
via portal*

Exchange relations: The eGovernment portal can be used for the exchange of experiences and services. This means that the portal becomes an electronic trading place, in which prices (see Public Offering in Chap. 3.5) may be negotiated openly or are set by auctions. An administrative unit can consider providing the citizens with particular services for less or even without charge, and bill the remaining claim groups (companies, institutions) normally by the market price.

*Promoting
forms of
collaboration*

Project management and groupware: Many administrative units develop their activities in form of projects, sometimes with the support of citizens. In order to run those projects with the aid of computers, the administrative unit can purchase suitable software for project management or groupware and put it at the disposal of the project members (cf. Chap. 7). Such services make it possible to carry out Web-based planning, project documentation, and publication. This is especially efficient if the members of the administrative unit and voluntary citizens are geographically widely distributed and want to contribute their know-how at different times of the day.

eGovernment portals can offer the same structure, contents, and design for all users, or differentiate between claim groups (citizens, companies) or even individuals. Such individualized services pay off in case that the portal offers ample information and additional services, yet the citizens need customized offers.

*Using concepts
for
personalization*

By personalization we understand the possibility to adapt the content of Web sites, communication channels, products, and services to the citizens' preferences and make them available to them. A personalized service uses personal characteristics and behavioral patterns in order to direct the service to the individual needs of the user.

Figure 2.3 illustrates how personalization works in an eGovernment portal. Visitors and members of the portal use different services such as e-mail, discussion forums, search functions, and service exchange. In doing so, they either enter actively a profile containing their preferences, or a profile is gathered bit by bit by the behavior of the user and the employment of services. The profile data regard the citizen, services, Web site content, project contents and records, work reports, behavioral patterns and behavioral norms in communities, respectively.

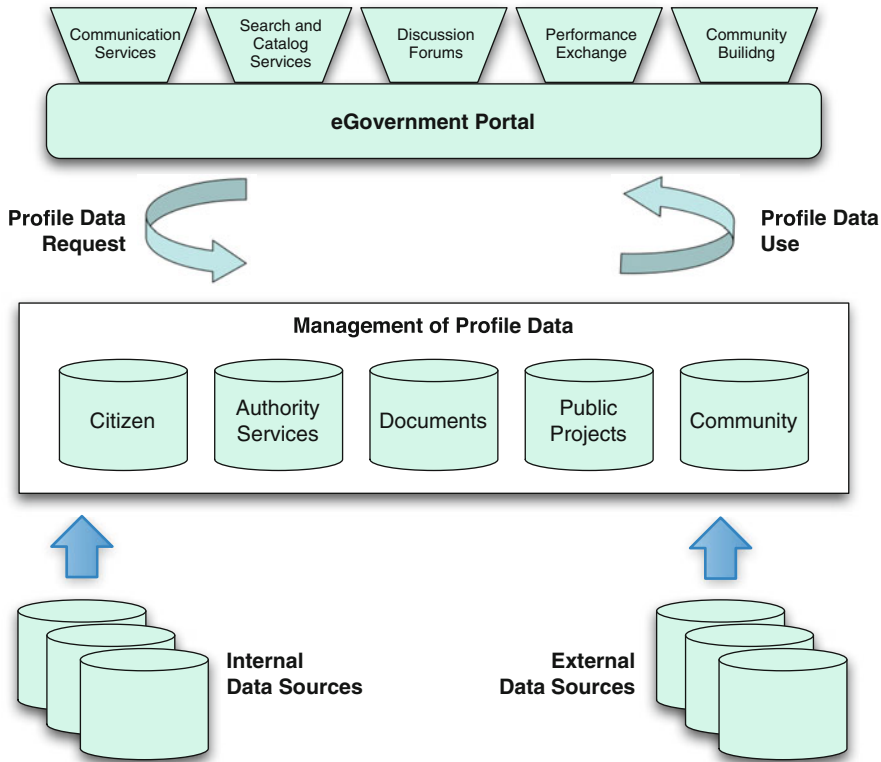


Fig. 2.3: Use of personalized services in the eGovernment portal

2.5 Barrier-Free Web Access

Accessibility, or barrier-free Web access, is the ability of a Web site to be readable and usable to all users. Web sites and eGovernment portals especially have to be accessible to handicapped people, e.g., to the visually impaired, colorblind, or hearing impaired. Moreover, people with difficulties to move or people who can neither operate a keyboard nor a mouse also have the right to be able to consult Web content of public institutions. People with language difficulties or language disorders, or people with learning difficulties also must be granted the access to the eGovernment portal.

In the legislation of many countries there exist laws for the equality of treatment that protect people from discrimination due to, e.g., a physical or mental handicap. Apart from that, there is legal equality between all citizens, independent of their origin, sex, age, language, or social rank. In 2006, European ministers signed a declaration during the ministerial conference in Riga (Ministerial Declaration of Riga, June 11, 2006) cf. Riga Ministerial Declaration in bibliographical notes (Riga, 2007), in order to ensure a barrier-free Web access to all

Definition of accessibility

The EU declaration for barrier-free Web access

public Web sites until the year 2010. The groundwork for the declaration is provided by the recommendations of the World Wide Web Consortium (W3C), that are published under the name Web Content Accessibility Guidelines (WCAG).

In the ministerial gathering in Riga it was recognized that the information and communication technologies are a strong driving force for growth and employment. What is more, applications and Internet technologies further the exchange even beyond social and cultural boundaries.

*Main claims of
the EU*

The most important claims of the ministerial conference can be summarized as follows:

- Programs are to be developed in order to promote the Internet access and Internet use for elderly people. In particular, the employment ability, working conditions, and the compatibility of family and career are to be improved by innovative Internet solutions.
- Geographical discrepancies have to be diminished by forms of exchange and collaboration between the public and the private sector. In rural and underdeveloped areas, the Internet infrastructure has to be improved by use of broadband technologies, in order to heighten the connectivity and Internet use rate in schools, health centers, and public administration.
- For people with handicaps, access to the Internet must be facilitated and the use of Web-based services promoted. In particular, electronic content and documents for the blind or visually impaired have to be developed according to the WCAG.
- Digital skills and alphabetization have to be improved by specific initiatives. In this enterprise, measures must be directed at the needs of those groups that are threatened of marginalization because of their social situation.
- Cultural and linguistic diversity are to be expanded in the digital space, in order to further the European integration processes.

Using information and communication technologies is hoped to enable an integrative eGovernment, in order to promote public services and further democratic decision making processes on all levels (see Chap. 8).

WCAG

The WCAG demonstrate, how Web content can be made accessible to handicapped people (see Fig. 2.4). Providers and developers of content are invited to take those Internet users into account who have disabilities or difficulties to see, hear, or move. Perhaps Internet users have difficulties to read or understand a text. With regard to the infrastructural environment, it must be considered that users do not have a keyboard or a mouse, or that they are not able to use them. Furthermore, they might have a display that shows only text, or a small display and a slow Internet connection.

*Priority levels
for Web access*

The WCAG contain an overall of fourteen guidelines, ten of which are given in Fig. 2.4. Each guideline contains precise recommendations, together with priority indications (priority 1 = must, priority 2 = should, priority 3 = may). The

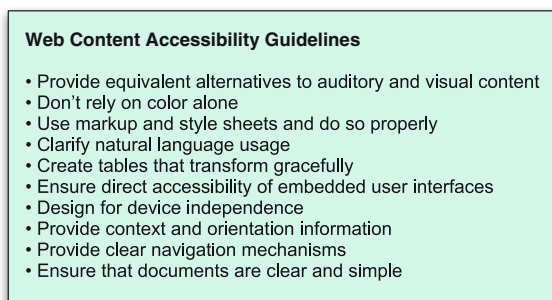


Fig. 2.4: Excerpt from the W3C guidelines for Web content access

first guideline postulates to create text equivalents for pictures, symbols, maps, drawings, video, and audio. Such text content could be presented to the user in form of synthesized speech, braille, or visually displayed text. Furthermore, text and pictures should be understandable if seen without colors.

The incorrect use of markup commands compromises the users' access. When tables are misused for layouting purposes or for titles, in order to, for example, change the font size, the structure of the site may be difficult to understand and the navigation complicated. Apart from that, it is recommended to use style sheets to control layout and presentation.

Repairing defects

Other important postulations are: device independence, information on orientation and navigation, and clearly written documents.

2.6 Quality Assurance in the Internet

Apart from security concerns, quality assurance in the Internet constitutes an important challenge. The quality of Web sites or Web portals is difficult to define. In most cases, evaluations take into account usability, content, and ethics.

How is quality defined?

Among the usability criteria are the following:

Accessibility: It has to be checked whether the Web access has been implemented without barriers: Do people with handicaps have access to the Web site or portal? Can the contents be retrieved via voice output for the blind or visually impaired? Are there text equivalents for pictures or charts? Can the content be retrieved even without a keyboard or a mouse? etc.

User-friendliness: This is about evaluating structure, navigation and comprehensibility. Is the information clearly structured? Is the build-up comprehensible? Are there navigational aids? Is the language simple and understandable? Are complex terms explained? Are there search options? Is help provided (e.g., FAQ)? etc.

Communication: There must be possibilities to interact and communicate. Is there an e-mail address for contact? Do they provide a discussion forum for the topic? Is it evident who is the contact person for each concern? Are the citizens encouraged to voice their opinion or comment? etc.

*The quality
certificate
HONCode*

It is a particular challenge to screen the content of Web sites. In Web sites or portals dealing with health problems, it is mandatory that the facts be correct and reflect up-to-date medicine. To give an example, the foundation Health on the Net certifies Web sites containing medical information with the quality label HONCode, so that the Internet user can gain trust in the quality of the information provided by the Web site. The HONCode is based on the following eight evaluation criteria:

Authority: Any medical advice will only be given by medically trained and qualified professionals unless clearly stated otherwise.

Complementarity: The information provided on the site is designed to support, not replace, the relationship that exists between a patient and his or her physician.

Confidentiality: The Web site designers and owners commit themselves to the confidentiality of data relating to individual Internet users, including their identity.

Attribution: There must be clear references to source data. On Web sites with clinical information, the date of its last modification must be displayed.

Justifiability: Any claims relating to the performance of a specific therapy, treatment or medical product will be supported by scientific, balanced evidence.

Transparency: It is mandatory to state contact data of the authors and owners of health Web sites; further help is offered.

Financial disclosure: Funding organizations and sponsors of the Web site are displayed.

Advertising: If advertising is a source of funding it will be clearly stated. There has to be a clear distinction between advertising and medical contents.

Apart from the HONCode, there are further certificates for medical and health related Web sites or other information services.

Ethical criteria

Among the ethical criteria for evaluating a Web site or eGovernment portal are the following:

Authenticity: The name and address of the institutions and the authors of the Web site are displayed.

Protection of privacy: Privacy policies and data security is guaranteed. The citizens' e-mail addresses may not be divulged.

Due to a drastically growing number of Web sites (information overload), it is necessary to automatize the quality assurance and to use the computer to do it. There are Internet technologies which can analyze the presentation and content of Web sites, and give indications to quality improvements. For example, it is possible to have the above mentioned guidelines checked regularly in an automated or partly automated way.

The key element of automatic quality checks are methods of Web Mining (cf. Sect. 10.3) and Web Measurement. For example, there are different models of information retrieval that are able to evaluate the quality of electronic documents. One approach is to rate the quality of certain Web content as good if that content is referenced by links by as many Internet users as possible. In this, scoring models are used, which rank Web contents according to how often they are cited (ranking). According to the hypothesis, higher evaluated Web content comes with higher quality.

*Automatic
quality check*

2.7 Bibliographical Notes

An introduction to Web technologies is given in the book by Wöhr (2004); apart from client and server technologies, it deals with aspects of architecture and Web services. Under the headline of Web analytics, the analysis of the behavior of Internet users is understood. Kaushik (2007) reference book gives important basics on this topic, and addresses the issue of Internet technologies and search engines. A handbook on Web mining and related methods of information retrieval was written by Liu (2007).

*Basic concepts
for Internet and
search engines*

Gisler and Spahni (2001) compilations, as well as Picot and Quadt (2001), show concrete application examples of eGovernment projects. A survey of Internet portals of municipalities is provided by Geiser and Kohler (1999). Riesch (2007) took an inventory of barrier-free Web access of public Web sites in Switzerland.

The declaration of the European ministerial conference in Riga (2007) postulates a barrier-free Web access to all public Web sites until the year 2010. The access criteria are set by the W3C in their Web Content Accessibility Guidelines (WCAG 1.0 and 2.0). The HONCode (2007) is considered as a specific quality standard for medical and health relevant Web sites and is awarded by the Health on Net Foundation. For the automatic evaluation of Web site quality, the habilitation of Mandl (2006) gives different techniques.

*WCAG and
quality
standards*

There are some first books and compilations on the topic of Web 2.0 and social software on the market. Alby (2007) and Beck et al. (2007) describe Web 2.0 technologies and applications, Hildebrand and Hofmann (2006) deal in more detail with the possibilities of application of social software. An approach to classify social software is taken from Hippner (2006) article.

*Literature on
Web 2.0 and
Social Software*



Dipl. Betr. and
Prod.-Ing. ETH
Markus Riesch

*Swiss
Foundation for
Handicapped
Accessible
Technology
Use*

2.8 Case Study—Handicapped Adapted Internet Use and Results of the Swiss Study on Accessibility

2.8.1 Background: More Independence for Handicapped People

Most people nowadays take the Internet for granted. Information is available on the Internet around the clock, on any possible topic. Also, more and more services of all kind are handled over the Internet. But not everybody benefits from this trend. Mostly people with handicaps find themselves confronted with insuperable obstacles on the Internet over and over again, in spite of the fact that the Internet opens unexpected opportunities especially for the handicapped.

Some examples show the multiple advantages that the Internet offers to handicapped people:

- While in the past a blind person depended on the help of someone who can see in order to handle his or her payments, today he or she can do it independently over the Internet. Apart from the independence, he or she enjoys more privacy.
- A person with impaired motor skills can partly compensate his or her lack of mobility with the Internet. For this person, online shopping means not only more comfort, but the independence also makes him or her more autonomous.
- For the hearing impaired, who are often excluded from interpersonal communication, the Internet is not only an additional channel for communication, but an opportunity to integrate themselves better into the social environment.
- The ability of the Internet to present information in a user-adapted way also helps the mentally disabled to access educational content which was kept from them by different barriers in the past. For these people, the Internet represents a chance for education.

The opportunities of the Internet can, to a great extent, not be seized by people with handicaps. The EU assumes that a mere 3% of all eGovernment Internet platforms have barrier-free access, which means that people with handicaps, that is approximately 15% of the population, have only limited access, or none at all, to Internet contents.

In Switzerland, also, most public and private Web sites do not have barrier-free access. With the help of legal regulations, it is tried to promote the equal treatment of people with handicaps when using public services via Internet. This is a long and stony road, on which many obstacles still lay ahead. In September 2007, the foundation “Access for all” published a survey on the accessibility of public Web sites. The contribution at hand describes what results can be retrieved from the study regarding the Internet use by visually impaired or blind users.

2.8.2 Case Study—Public Web Sites Often Not Barrier-Free

The foundation “Access for all” tested 50 Internet portals on federal, state (“Kantone”) and municipality level with regard to their accessibility to people with handicaps¹. In comparison to the first accessibility study of the year 2004, what jumps to the eye most is a significant improvement of accessibility in Web sites of the central federal administration. The Internet portals of federal states, municipalities and semi-public companies are, on the contrary, mostly ill-suited for people with handicaps.

Especially people with handicaps and senior citizens find themselves confronted over and over again with insuperable obstacles on the Internet, in spite of the fact that the Internet opens unexpected opportunities particularly for these groups. A Web site is considered barrier-free if it complies with the standards of accessible Web sites and can therefore also be used by, e.g., blind people (with a screen-reader), the visually impaired, deaf or people with impaired motor skills or the mentally disabled. A barrier-free Internet is a decisive contribution to strengthening the autonomy of people with handicaps and facilitating them the participation in social, political and professional life.

In the course of the accessibility study 2007, the Web sites of all ministries (“Eidgenössische Departemente”), other Web sites on a federal level and semi-public companies, all federal states (“Kantone”) and further public Web sites were analyzed. The Internet portals were checked according to the federal guidelines for the design of barrier-free Web sites and the International Web Content Accessibility Guidelines by people with handicaps and experts of the foundation “Access for all”.

None of the 50 tested Web sites complies with all of the requirements for barrier-free Web sites and can be called “barrier-free.” The degree to which the Web sites are accessible varies.

The best accessibility was reached by Web sites of the central federal administration (www.admin.ch, www.eda.admin.ch, www.edi.admin.ch, www.efd.admin.ch, www.ejpd.admin.ch, www.evd.admin.ch, www.uvek.admin.ch, www.bk.admin.ch), which were remodeled in the course of the changeover to a unified appearance. Also well-suited for people with handicaps are the Web sites of the Swiss Portal ch.ch. This is a pleasant result and it corresponds to the legal instructions and deadlines, because according to federal standard, all Web sites of the central federal administration must have barrier-free access.

On the other hand, the Web sites of the semi-public companies and the ones of the two Swiss Federal Universities of Technology (“Eidgenössische Technische Hochschulen,” ETH) are far less accessible. There are particular high obstacles for people with handicaps on the Web site of the federal court (www.bger.ch).

Among the federal states, the results are variable. In comparison to the Web sites of the federal ministries (“Departemente”), the federal states tend to fare clearly worse. Except from some positive examples, like the states of Bern, Genf,

¹ See Swiss accessibility study in the reference list under Riesch (2007).

Glarus, Uri or Waadt, the Web sites of the federal states are still not appropriate for people with handicaps. None of the Web sites of Switzerland's five biggest cities was sufficiently barrier-free.

The body politic has a particular responsibility to put accessibility into practice. Citizens with handicaps have the right to make use of public services in the same way as their non-handicapped fellow citizens do, and this of course is also valid for those services of the body politic that are offered online.

It is important to pay attention to this responsibility, particularly with regard to new or future services offered on the Internet, because an eGovernment portal can ease the access to public offices and services for people with handicaps, who, today, often cannot call on those offices or utilize those services without the help of others. This is only valid, if the public Web sites are designed in a barrier-free way. The right to have barrier-free access to Internet services of the body politic is fixed by the Disability Discrimination Act ("Behindertengleichstellungsgesetz," BehiG).

Since early 2008, a Swiss standard for barrier-free Web sites, called eCH accessibility standard, is available. This standard was released by the standardization organization eCH and developed by the foundation Access for all, in collaboration with representatives of the union of federal states and municipalities, professional organizations and representatives of the economy. Apart from the eCH standard, there are guidelines available for its implementation. The standard and the helping device are directed at the federal states and, even more so, at the municipalities that wish to make their Web sites barrier-free. Now and in the future, the purpose of this is to make available more and better Web sites to the handicapped. It is necessary that everybody, independent of their restrictions, can utilize the eGovernment single-handedly and with equality of possibilities.

Regarding the barrier-free Internet, the foundation runs tests to check the accessibility of Web sites with the help of handicapped test subjects and gives advice on the implementation of barrier-free Internet portals to public and private organizations. Since 2006, "Access for all" is offering a certificate for barrier-free Web sites. The label is awarded to Web sites that are accessible to everybody, independent of their restrictions (www.label4all.ch).

2.8.3 Examples of Barrier-Free Web Design

A Web site is barrier-free if it can be used by everybody, independent of their restrictions or capabilities. Barrier-free Web sites are suitable for alternative input and output devices (e.g. assisting technologies, mobiles, or PDAs) and for search programs.

The implementation of barrier-free Internet projects requires the collaboration of all project partners and has to be taken into account during all stages of the project. The starting point for creating an accessible Web site are the Web Content Accessibility Guidelines (WCAG) 1.0 of the World Wide Web Consortium. In Switzerland, as well as in many other countries, these guidelines are

defined as legal standard for barrier-free Web sites. The guidelines leave much room for interpretation. Therefore, it is important to carry out the success criteria in a sensible manner. Sensible means that people with handicaps have to be able to use the Web site without obstacles in a user-friendly way.

The following examples show how a barrier-free Web design can be implemented:

2.8.4 Well-Designed Navigation with Lists

On the Web site of the Swiss Federal Chancellery, appropriate list elements of the HTML code like ``, ``, or `` are employed consequently. As a navigation basically is nothing else than a list of links, the navigation is, most appropriately, embedded in a list. Several hierarchical levels are grouped accordingly in a nested list. Assisting technologies, like for example a screen reader, recognize the nesting and read them to the user.

In case the navigation is designed with the help of layout tables, this kind of navigation is not possible. This is one of the reasons why a strict separation of content and layout is the basis for a barrier-free Web site.

2.8.5 Correct Separation of Content and Layout

The separation of structured content and layout is one of the central aspects when creating barrier-free Web sites. Alternative output devices like screen readers, mobile phones or Personal Digital Assistants (PDAs) interpret Web sites in a different way and must be able to display it. This turns out to be a problem, if the HTML code has complex nested tables that have been designed exclusively for display on a personal computer screen. The screen reader has difficulties in serializing and reading this code. In Fig. 2.5 stated below, the table borders are highlighted. On the Web site of the Swiss Federal Department of Defense ("Eidgenössisches Departement für Verteidigung, Bevölkerungsschutz

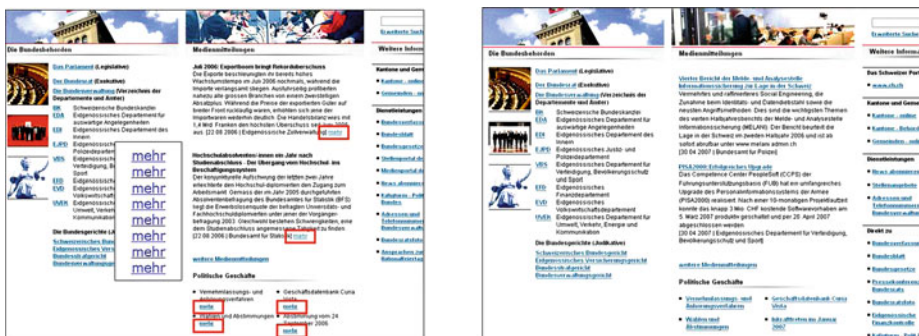


Fig. 2.5: Need for clear link texts

und Sport,” VBS) it becomes clear how many layout tables are necessary to display the design correctly. On the page of the Federal Chancellery, no table borders are visible, and as a result this Web site can be displayed easily on different output devices.

2.8.6 Clear Link Targets

On many Web sites, short teaser texts are given that lead the reader to a longer main text. Often, at the end of the short text it says “more.” This link is absolutely meaningless to a blind person and he or she can only guess, where it could lead.

On the page `admin.ch` (Fig. 2.5), after a revision all links are labeled meaningfully. Instead of “more” or “full story,” a precise link text is defined.

On Web sites, non-HTML documents like PDF files are always identified with the type and size of the document. This serves to inform the user that a new application will be opened and helps him or her to decide whether to wait for this file or not. The user may or may not have the respective program installed on his or her computer. Apart from that, the user can estimate according to the file size, how long it will take to display the file.

2.8.7 Well-Designed Headlines

The federal state of Bern is one of the few federal states with a Web site that is well-suited for people with handicaps. Since the first accessibility study, the Web site has been completely revised and the accessibility requirements, based on the WCA guidelines 1.0, have been implemented.

Headlines and lists are semantic elements. They are extremely important to blind users, in order to understand the build-up of a page and thus to use the Web site reasonably. On the Web site of the federal state of Bern (Fig. 2.6), there is a hierarchically correct headline defined for each area of the page: The Web site displayed without CSS (on the left) and the structure of the headlines `h1`, `h2` in the HTML code (on the right).

Well-designed Alternative Texts

The Web site of the Swiss Television (SF, www.sf.tv) serves as an example for the sensible implementation of alternative texts. The alternative captions of the weather forecasts are particularly well resolved. Instead of using the usual “weather,” “forecast” or no text at all, the `alt` attribute in fact describes what is apparent on the weather icon for those who can see (Fig. 2.7).

The content management system is configured in such a way that the forecast information is passed generically to the `alt` attribute of the corresponding picture.

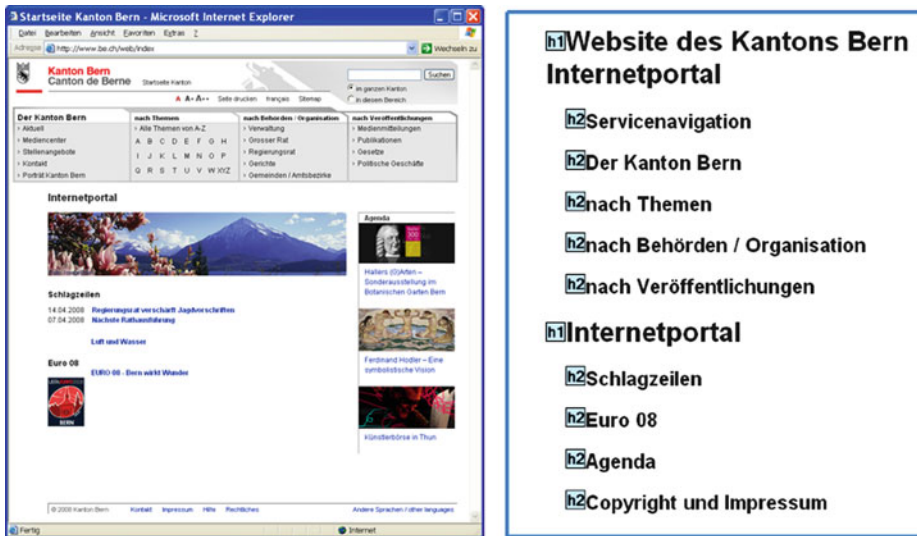


Fig. 2.6: Declaring clear headlines



Fig. 2.7: Use of alternative texts

2.8.8 Barrier-Free CAPTCHA

The Swiss radio DRS is, generally speaking, still insufficiently accessible to people with handicaps. The youth channel Virus is an exception (www.virus.ch). On its Web site, it can be observed how so-called CAPTCHAs can be implemented in a barrier-free way. CAPTCHAs are employed in order to make sure that a user is actually a person and not a machine that wants to submit massive spam.

In order to leave a comment to a blog entry on virus.ch, the user has to identify a security code in a picture and enter it into a form field. In order to make this possible for a blind person as well, the security code is offered as an MP3 audio file with the link “barrier-free—listen to security code.” The audio document is well intelligible.

The Swiss Federal Office of Communications and the Federal Chancellery, together with the foundation “Access for all,” have developed a guide to barrier-free Web sites, this checklist for accessibility is available under <http://www.ch.ch/accessibility>.

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Markus Riesch works for the Swiss Foundation for Handicapped Accessible Technology Use "Access for all" and is in charge of the accessibility section. In different national and international committees, Markus Riesch represents the needs that handicapped people have when using information and communication technology. In 2005, Markus Riesch directed the Swiss Accessibility Pavilion at the UNO world summit on the information society in Tunis. In the year 2006, Markus Riesch introduced the Swiss certificate for barrier-free Web sites of the foundation "Access for all." In 2007, Markus Riesch was author of the Swiss Accessibility study and in 2008, he launched the first national Accessibility Day.



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