E-Democracy and Community Networks:
Political Visions, Technological Opportunities, and Social Reality

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Abstract. Political systems and technology are interdependent and influence each other. On the one hand, political systems and political leaders aim at influencing the technological development and benefiting from technological progress; on the other, technological development has a considerable proportion of its own dynamics and potential to influence society and political systems. This chapter particularly focuses on electronic democracy and virtual communities and accordingly discusses recent ideas and plans of political leaders, derives requirements for technology, presents systems and prototypes, and reports cases demonstrating how and what technology is really used.

1 Introduction

The interdependence of political systems and technology is unquestioned. In various initiatives of single countries and associations of countries visions for changes and improvements are tightly coupled to technological development. The ‘eEurope 2002—An Information Society for All’ initiative of the European Union (EC, 2000) or the ‘National Partnership for Reinventing Government’ (NPR, 2001) and the ‘National Information Infrastructure’ (NIST, 2000) of the USA are good examples. In fact, one of the objectives of eEurope is for Europe to become the ‘most competitive and dynamic economy in the world’(EC, 2000). And in the USA it is claimed that the NII ‘can help unleash an information revolution that will change forever the way people live, work, and interact with each other’ (NPR, 2001).

Many of these governmental initiatives offer huge incentives—in general, in the form of research funding—and have therefore the potential to highly influence the technological development. Nevertheless, the actual technological development and progress is hard to predict and even harder to control. The history of information and communication technology can be seen as a path where for some steps the development could be

controlled and for other steps it could not. The Internet and all the services and applications that have become available on top of it are an essential basis for today's information society, e-government and e-democracy. And, yet, its development has neither been foreseeable nor controllable. For instance, the ARPANET and TCP/IP were developed by the Department of Defense of USA; whereas applications like Internet Relay Chat, Multi-User Domains, Internet Gopher or the World-Wide Web were not developed in governmental organisations (Leiner et al., 1997). The controllability of social development and social change through technology is also unclear. In many cases technological development is stimulated by the social changes; and technological development itself entails social changes (Coleman, 1999).

It is obvious that these interdependencies are very complex and cannot be analysed in one book chapter. This chapter focuses on electronic democracy and community networks. In the next section political ideas and plans concerning information and communication technology are discussed and requirements for technology are derived. Then electronic communities—virtual communities and community networks—are introduced and their technological requirements are derived. Systems and prototypes providing functionality for e-democracy and community networks are introduced. Finally, we will discuss the actual use of systems.

2 Electronic Democracy

Electronic government can be seen from the addressees', from the process, from the cooperation, and from the knowledge perspective (Lenk & Traunmueller, 2000). The same holds true for e-democracy. This chapter primarily focuses on aspects related to the cooperation between the public sector and the citizens and among citizens as well as the support for cooperation by modern information and communication technology. The public awareness and desire for e-democracy have been there for years. Already in early 1994 the MacWorld magazine polled 600 randomly selected adults and found that more than half of the respondents said that online voting in elections is the most desirable service; that sixty percent of the respondents had a moderate or strong interest in participating in online polls; that almost sixty percent liked to take part in interactive, electronic town-hall meetings with political leaders and other citizens; and that almost half of the respondents would like to have electronic contact to elected representatives (Piller, 1994).

Subsequently requirements for e-democracy are discussed. Basically, citizens need to be able to access information and to discuss political issues, and to vote electronically.

2.1 Public Access to Information

In order to take actively part in democratic processes citizens need various types of information. They need information with respect to elections—that is, only well-informed citizens guarantees that good and adequate decisions are taken. Furthermore, they need information about possibilities of their own involvement in policy discussion and decision making. Examples of information about current policy-making are information about current and future committee meetings and votes, text and status of pending bills and regulations, position papers and background research material on current issues.

Examples of information on the output of current governments are scientific research results, legal documents, surveys, reports, and public announcements. Frankenfeld (1992) calls this the *rights to knowledge or information*.

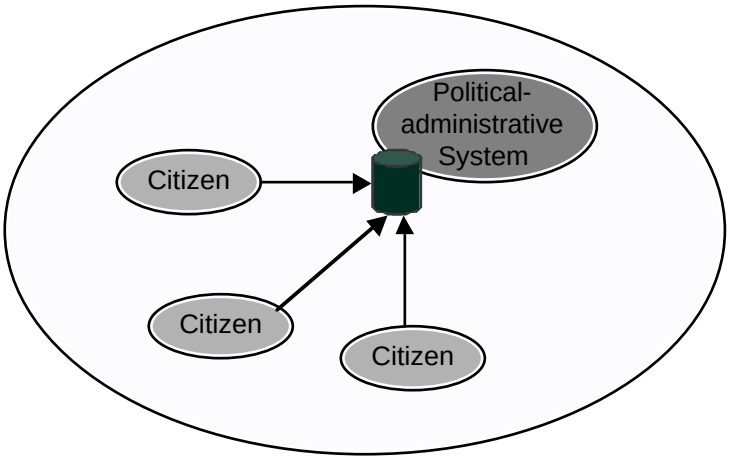

Figure 1. Public access to information for the political-administrative system.

On a whole the information can come from the public sector via information gatekeepers or directly from citizen to citizen. Figure 1 shows an example where the citizens access information provided by the political-administrative system. The case where no information gatekeepers are in place can be referred to as disintermediation (Bonchek, 1997). From a technological point of view this means that citizens need to be able to retrieve information and documents, which others have stored. This goes far beyond concurrency, access control, or transaction scheduling. During democratic processes citizens have to take many decisions based on information that was produced by others. Therefore, they often have to proof the validity of the information. They require transparent information sharing, which shows the creators of the information and the motivation that led to the information. Also knowledge of the perspective that led to the solution and that caused the information and decision, and that served as a basis for further information production and decision making is essential. Ideally the system presents the relationship between the conceptual frame, the knowledge, and the information produced or the decision taken (Robinson, 1991). Furthermore, the information consumers should be able to correlate their share of knowledge and their points of view to a problem. This allows them to consider alternative perspectives on the respective subject. A holistic representation of the problem sphere, of the relations among the different perspectives on the problem space and on possible solutions that can be matched to the solutions are necessary.

2.2 Open Discussion Participation

Open discussion and the citizens' possibility to take part in them is the second major requirements for e-democracy. Open discussion has to take place in a top-down direction—that is, citizens need possibilities to contact elected representatives and directly interact with them. Furthermore, the bottom-up direction—that is, discussions among citizens—is equally important. These latter discussions can be held among two individuals, between one person and a big number of other citizens, or among the broad

public. Figure 2 illustrates this citizen-citizen communication and citizen–political-administrative system communication. Frankenfeld (1992) calls this *the right to participation*.

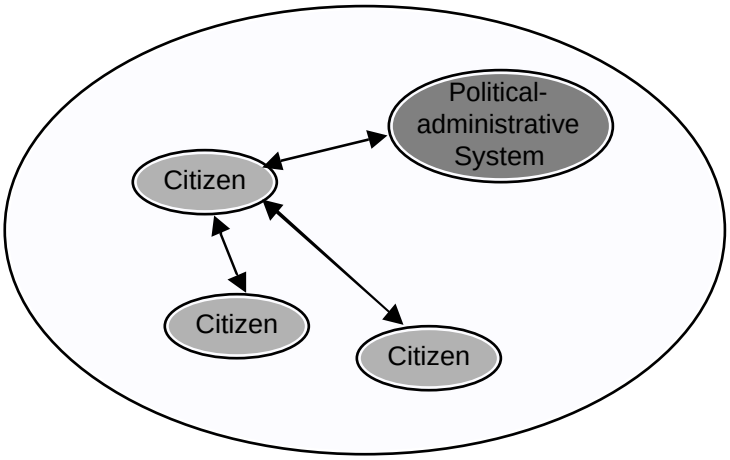

Figure 2. Open discussion among citizens and between citizens and the political-administrative system.

Through open discussion the citizens can broaden their understanding by exchanging information, views, and feelings with other citizens. From a technological point of view support for communication among citizens can take place through the exchange of symbolic messages or through the exchange of non-symbolic messages like changes of states, communication can support the processing of results of one step, the planning of steps, or the discussing and evaluating of results. Communication can take two forms: the distribution of messages to certain people and the aimed interpersonal communication in a particular work arrangement. Communication is a key requirement for e-democracy. Effective communication requires a mutual understanding of the subject of conversation, a common language, shared references to things that are known to all communication partners, and so forth. Clark and Brennan (1991) call this mutual understanding ‘common ground’.

Efficient technological support for communication among citizens does not only provide functionality for information exchange, but also provides the citizens with information about the other citizens. In traditional town hall meetings this information can be captured by the participants automatically. In electronic systems that are used by geographically dispersed citizens this information has to be provided by the system. In particular, information about the presence of other citizens in the system, the availability of other citizens, and the attention, interest, and emotional state of other citizens is important for smooth discussions—this is often referred to as group awareness (Gross, 1997b).

Anonymity is a very tricky aspect, because on the one hand it is often good and important to identify individuals and to make them responsible, but on the other hand there are several situations where it is desirable and legitimate to stay anonymous. Another trade-off can be identified between free speech and censorship. However, a thorough discussion of these aspects would go beyond the scope of this chapter.

As a result of information sharing and open discussion citizens can establish a shared knowledge—community memory—over time. Marshall and associates (1994) emphasise the importance of community memory for online communities and argue that it is

important for the participants to construct and maintain a shared understanding ‘of what they are doing: the task, the pertinent body of material, preliminary findings, progress, and methods’. In order to create, maintain, and increase community memory, systems have to support the acquisition and continual updates of the contents and the structure of the community memory and the identification of the relevancy of material found. The authors further argue that the Internet is an effective vehicle for communication and for collections of materials and that community memory has the capacity to greatly extend the reach of the individual.

3 Community Networks

In general, community networks are communication and information systems that aim at enhancing community and enriching lives; they are often based locally and driven locally (Miller, 2000). According to the Association for Community Networking (Gonzalez, 2001) Community Networking projects bring together local people to discuss and decide upon community issues. These projects explicitly focus on the whole community—they want to particularly include those who are traditionally left out (e.g., low-income groups, minorities, senior citizens). They, therefore, often provide information and training concerning general computer skills, the Internet, and basic research skills. And they include inexpensive public access to libraries, schools, businesses, and non-profit organisations. Figure 3 shows a community network where the citizens and the political-administrative system are part of the network. In contrast to Figure 1 and Figure 2 here the citizens are really part of the system—in many community networks the members feel as part of the community and are prepared to contribute their time and effort for the other members.

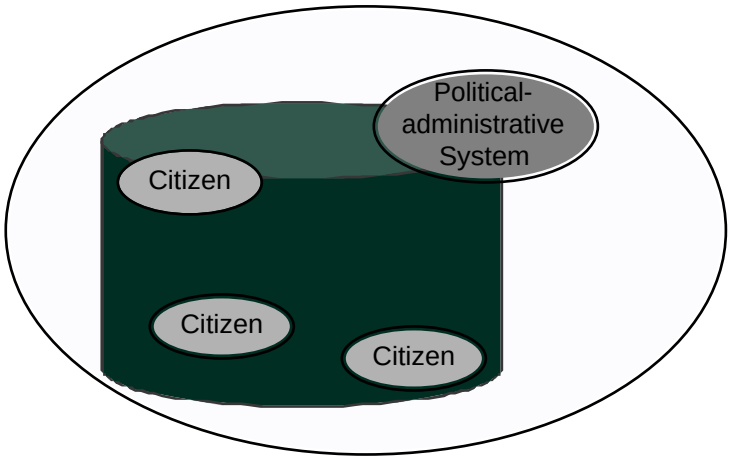

Figure 3. Community network where the citizens and political-administrative system are part of.

Howard Rheingold argues that virtual communities have the potential to revitalise democracy (Rheingold, 1993). In fact, community networks have the potential to vastly influence e-democracy initiatives. Kubicek and Wagner (1998) have analysed the evolution of community networks and argue that their role has changed drastically. They distinguish four generations of community networks. It started with *community memories* in the 1970s—a public forum, where everybody could freely publish their

opinion electronically. In the 1980s *free-nets* were the first publicly accessible information and communication systems; they provided free email and Internet access for their users. In the 1990s the perspective of *community networks* like the Boulder Community Network changed. As most people have a private email account and access to the Internet, these systems mainly focus on providing public access terminal for less privileged people and on providing all kinds of local information about the community for people within and without the community. More recently, a fourth generation of *professionalised community networks* can be identified, where the basic assumption is that more and more users of community networks take the perspective of customers and consequently expect professional services (e.g., professional contents) and do not necessarily want to contribute themselves. The Digital Cities project of AOL, the Sidewalk project of Microsoft Network, and the New York Today project of the New York Times are mentioned as examples. During these decades the nature of community networks has changed considerably. The first two generations aimed at a dissemination of information and power. In the fourth generation concentration might increase again—the decisions of what kind of information, in which format, and so forth are taken by professional providers. The third generation—that is, the current community networks—can be seen as an intermediate form. This scenario contrasts several assumptions underlying new communities, which are described as 'fundamentally devoted to problem-solving' with 'principles based on equity', and so forth (Schuler, 1996).

De Cindio and others (1997) did a similar analyses of the evolution of community networks. They call the early attempts of community networks *civic networks*, which provided members of the local community with access to a vast amount of resources and bi-directional communication. Later, civic networks split into *community networks* or *citizen networks*, which were often based on bulletin board systems; *civic nets*, which were often promoted by local administrations and offered residents information and contacts to city officials; and *city nets*, which served as 'window-shows' for the public administration with hardly any interaction with the users. According to the authors the first two types (i.e., Civic and Community Networks) clearly emphasised bi-directional communication and user involvement, whereas the third type (City Nets) offers less interaction.

Whereas, Kubicek and Wagner see these developments as mutually exclusive, De Cindio and others do not. Rather the different types of community networks are seen complementary. On a whole, De Cindio and others are more optimistic concerning the democratising power of community networks. They argue that 'instead of reducing interactive communication to a new broadcasting medium, we need to transform it in the tool of choice able to sustain the local community—intended not as a mere recipient of electronic services offered by public and private organisations, but seen as a great resource for social development'.

With respect to the underlying information and communication technology today often the term *community informatics* is used (Gurstein, 2000). Community informatics refers to the very general use of information and communication technology in order to foster online communities among citizens. It is emphasised that through computer-mediated communication normally disparate individuals who share interests rather than geographical proximity can form communities. In these communities individuals can interact socially, economically, and politically. Furthermore, community informatics also

covers the use of information and communication technology to support local communities of people who might even know each other before starting to interact electronically. On a whole the notion of community informatics is considerably broader than the terms discussed before.

4 Technological Opportunities

In this section we will present systems that can be used to support e-democracy or community networks. We will include both systems that have been designed and developed specifically for e-democracy and community networks and systems that have initially been designed for other purposes, but offer adequate functionality.

4.1 Sharing Information

Public information systems can be technically based on email for personal communication, email distribution lists for announcements and so forth, newsgroups for discussions, the WWW for any type of multimedia information. Some more specific systems are shared global information spaces, annotation systems, and social filtering systems.

4.1.1 Shared Global Information Spaces

Global Internet-based information systems like the WWW provide basic mechanisms for information sharing between the public sector and citizens, but mainly among citizens. Shared global information spaces offer additional functionality such as access and concurrency control, meta information on the shared artefacts and on their current state. Two very prominent examples are the BSCW system and Lotus Notes.

The Basic Support for Cooperative Work (*BSCW*) system offers functionality for information sharing via the WWW (Bentley et al., 1997). Being implemented as Web server extension, it can be accessed from any standard Web browser without extra installation. The BSCW information space is structured into workspaces containing any kind of objects (e.g., text documents, spreadsheets, links). Different services are offered for the objects such as versioning, notifications about changes, and so forth. Access to workspaces is restricted to workspace members. Figure 4 shows a screenshot of a BSCW workspace. Icons to the left of the objects indicate the file type; icons to the right of the information objects indicate changes (in this case read events).

Figure 4. BSCW workspace with objects.

Lotus Notes provides similar functionality for sharing and exchanging information (Lamb, 1995). It does require proprietary clients and servers, but they are available for any platform. The information is also presented in workspaces. Objects are stored in a special database and can therefore be edited concurrently—the system later on tries to merge the changes. For close cooperation among users the system also offers a shared calendar and an integrated email system. For instance, Lotus Notes can be used as an Intranet and via the Internet integration in Domino, which allows the automatic generation of Web pages from workspaces information can be provided to the public.

4.1.2 Annotation Systems

Annotation systems allow users to comment Web pages. So, Web pages can either be commented by governmental organisations or by citizens and the citizens then can read the Web pages and its comments and comment again. HyperNews, the W3 Document Annotator, and ComMentor are interesting annotation systems.

HyperNews allows users to annotate and comment Web pages as well as annotate and comment annotations and comments at an arbitrary depth (Laliberte, 1995; LaLiberte, 2001). It is based on an extended Web server and can be accessed with any standard Web browser without installation. Annotations and comments are stored along with the name of the author and the date of creation and are kept persistently, so they can be accessed

anytime. Figure 5 shows a Web page with HyperNews annotations and comments. On the left of the annotations and comments the type (e.g., a question mark for a question, an exclamation mark for a statement) is indicated; on the right author and creation date are added.

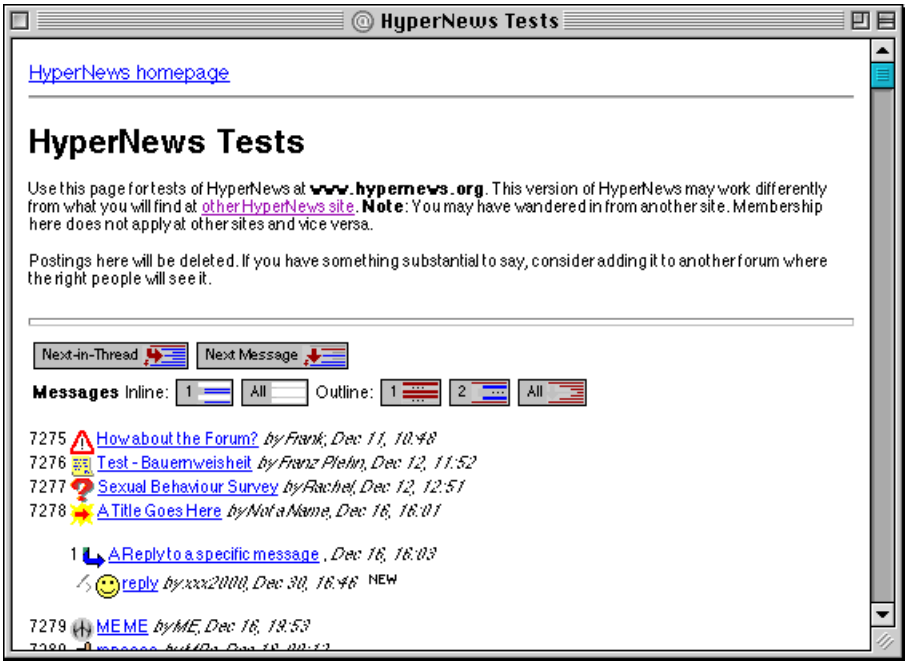

Figure 5. HyperNews window with annotations and comments.

The W3 Document Annotator (WDA) offers functionality that is similar to HyperNews. Whereas in HyperNews annotations and comments can only be added on the bottom of the respective page, WDA allows to add comments in any paragraph of a Web page. Comments and annotations are represented by a little icon, that represents a hyperlink to the comment. WDA can be accessed from any standard Web browser (Schenk, 1995).

ComMentor is also similar to HyperNews. As opposed to HyperNews and WDA comments are not stored on the same Web server as the base Web page. Therefore, in ComMentor any Web page can be annotated—the author of the base Web page does not even have to know that the page is annotated. However, ComMentor can only be used with special browsers; standard Web browsers can not display the annotations and comments (Roescheisen & Mogensen, 1999; Roescheisen, Mogensen & Winograd, 1995).

4.1.3 Social Filtering Systems

The filtering and rating of information by humans is often referred to as social filtering. Systems supporting social filtering are called social filtering systems or recommender systems and can either be active or passive (Resnick & Varian, 1997). In active social filtering systems the users who find information with potential interest to another person actively send it to them (Maltz & Ehrlich, 1995). In passive social filtering systems the interested users have to query for recommendations (Goldberg, Oki, Nichols & Terry, 1992). Interesting examples such as GroupLens are briefly described below.

GroupLens is an example of a passive social filtering system (Konstan et al., 1997). It was initially developed for social filtering of Usenet newsgroups. Users who have read an article rate its relevancy. Users who come later are not only provided with the new articles, but also with the other users' ratings. Figure 6 shows the MovieLens system, an adaptation of GroupLens for the recommendation of movies.

Figure 6. MovieLens window.

Examples of further social filtering systems that are based on similar principles are the Self-Enriching Library Facilities (SELF) project (King et al., 1994) and Group Asynchronous Browsing (GAB) (Wittenburg, Das, Hill & Stead, 1995).

4.2 Exchanging Information

Open discussions are often explained with the metaphor of an electronic town hall meeting. Benjamin Barber (1984) claims that a strong democracy requires 'a form of town meeting in which participation is direct yet communication is regional or even national'. In the 1970s most electronic town meetings were based on two or more media. Often the meetings were advertised by newspapers and then broadcasted by TV and citizens could participate using the telephone. Therefore, there was not a feeling of a real meeting among citizens. Since the 1980s computers have been increasingly used for the communication.

4.2.1 Text-based Chat Tools and Virtual Environments

These systems are purely text-based and consequently only have very limited hardware and network requirements for the users and can be used by a broad public. The Internet relay chat and multi-user domains are presented as relevant examples.

The Internet relay chat (*IRC*) is a multi-user multi-channel chatting network that allows people all over the Internet to talk to one another in real-time. Users of IRC are known to the other users and the system by their nickname. The IRC structure is built up of channels—virtual places, usually with a topic of conversation. Nicknames have to be unique per channel. Channels can have three different modes: *public mode*—this is the default mode where the user can be seen by all other users and anyone can join the conversation; *private mode*—this means that anyone can see that a person is logged in,

but not the person's channel; and *secret mode*—this means that the person's name is not displayed on the list of active users (Fryatt, 1996; Harris, 1995; Lowe, 1996).

Multi-user domains (*MUDs*) are network-accessible virtual realities for multiple participants who can freely extend them. The user interface is entirely textual. Users have the appearance of being situated in a place, which is artificially constructed and contains all users who are connected at the same time. The first MUDs in the 1980s were multi-user adventure games where users were fighting each other. By the end of the 1980s several MUDs for social interaction were developed. For instance, the TinyMUD was developed in 1989 to invite people to hang around, chat, meet friends, and discuss a variety of topics. In TinyMUD, players can create their own rooms with their own interior. TinyMUD users can get help from Colin, a robot that answers questions that are directed to it via messages. Colin gives information about the universe of the MUD such as players or rooms, provides maps for roaming, and delivers and forwards messages between players (Mauldin, 1994). An example highlighting the use of MUDs and MOOs for serious purposes, is the tele-education, which is offered at the Diversity University in the interactive classroom. Users can enter the interactive classroom via Telnet and choose one of the classrooms (e.g., a class room with a course on C++). As in any MOO, users can navigate by typing textual commands and receive textual descriptions of the environment they are in. Examples of commands users can submit are `look list` to receive a list of other participants who offer help, `map` to receive a map of the Diversity University, and `objects` to receive detailed help about the objects and possible actions in a room (DU, 1996).

4.2.2 Combinations of Text-Based Virtual Environments and the Web

These systems combine the strengths of text-based virtual environments such as MUDs and the strengths of Internet-based information systems such as the Web. Often the room-based structure of the MUDs is used to allow users of the Web to have social encounters and communication with other users of the Web such as in WAXWeb and WWW-MUD.

The WAXWeb system, for instance, is a cooperative hypermedia system (Meyer & Hader, 1994). The system particularly aims at supporting groups of authors or scientists or students to write and publish hypertext documents. In a MUD-based shared workspace hypertext documents can be shared among users. These hypertext documents are immediately available in the WWW. The users of WAXWeb can create their own documents, comment the documents of other users, discuss documents with other users who are logged in at the same time, or participate in online seminars and workshops.

The WWW-MUD integration is a tool for tele-education (Newberg & Rouse III, 1995). Teachers and students interact in a MUD—they can exchange ideas and knowledge and send them in text format or picture format to other users. The system can also be used for presentations.

4.3 Sharing the Web

Systems that allow the common navigation through the WWW basically inform users of the WWW about the presence and current locations of other users and allow them to move through the WWW together. Interesting examples are CSCW3 and Virtual Places.

The CSCW3 prototype is an extension of the WWW and offers a broad range of extensions to the standard WWW (Gross, 1997a). Users can send their bookmark lists to

other users, users can have shared bookmark lists where they can collect and manage bookmarks together, users can annotate Web pages, and users can exchange electronic business cards with contact information, and so forth. In an IRC-like chat tool they can chat with other visitors of the Web page. And they can couple their Web browsers—so, a specific users can guide others through the Web. Figure 7 shows the CSCW3 main window and the room view with a list of current and past visitors of the Web page.

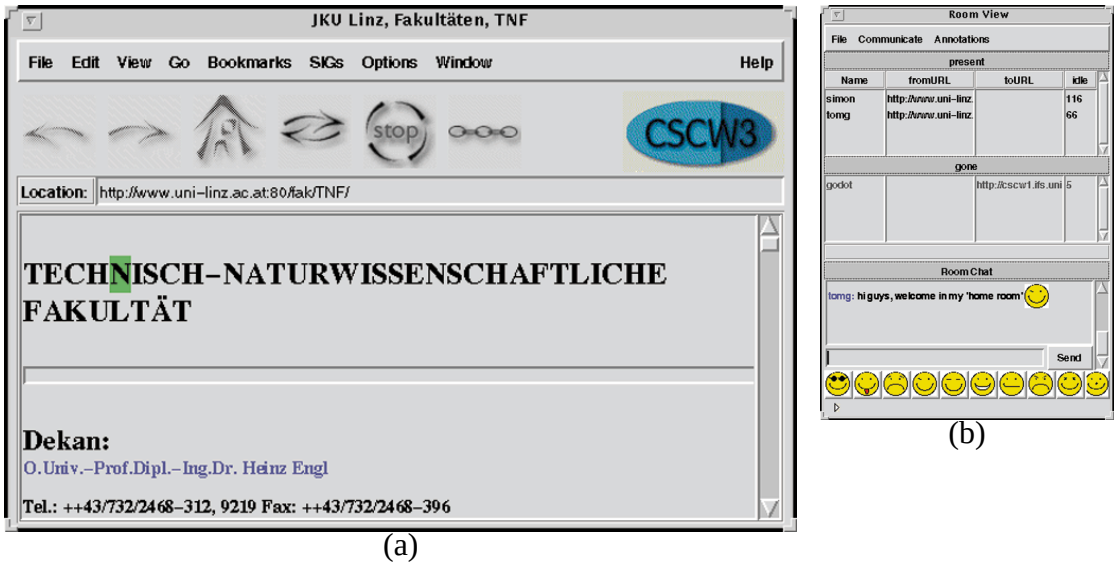

Figure 7. CSCW3 windows: (a) main browser window; (b) room view with other visitors.

Virtual Places extends the WWW with user presence (GNN, 1996). Virtual Places can add presence to any Web page; however, users have to use the Virtual Places browser to have the presence information visualised. Small avatars of the present users are overlaid over the unmodified Web page. Users can contact other users by clicking on the respective avatar—depending on the hardware equipment a text chat or an audio conference is started automatically. Furthermore, Virtual Places allows users to synchronise their Web browsers—a user can lead other users through the WWW.

Besides the above mentioned systems that offer specific functionality for sharing and exchanging information, for discussions, and for voting some toolkits that allow users to share single-user applications are available. Examples of application sharing toolkits are NetMeeting, Timbuktu, and VNC. NetMeeting (Microsoft, 2000) allows users to share any office applications and offers video and audio conferencing, a shared whiteboard system, and so forth. So, for instance, NetMeeting could be used to share a Web browser and at the same time communicate with the integrated video conference system. Timbuktu (Netopia, 2000) and VNC (AT&T, 2000) offer similar functionality and are available for various operating systems.

Furthermore, new and upcoming types of technology are currently influencing e-democracy initiatives and will certainly do so in future. Examples are mobile and nomadic systems that will be available for users anytime and anywhere (Gross, 2000). Other examples are context-aware systems—that is, systems that are able to analyse the current situation such as physical environment, other persons in the vicinity, and so forth. This

information is then used to adapt the information and services for the user. For instance, an e-government application could then only provide the users with confidential information about his income and taxes when the person is in a private environment without other persons (Gross & Specht, 2001).

5 Discussion

This section discusses public access to information, open discussion participation, and community networks: the systems that are currently used and the technological potential of the systems described above.

5.1 Public Access to Information

Most public access initiatives aim at (1) supporting citizens who cannot afford to be online with an online connection and (2) providing the information via Web sites and via personal email or email lists. Concerning the connection *per se* there are still some big differences among different nations. The Center for Democracy and Technology has presented a survey of the Internet access in Central and Eastern Europe (CDT, 2001). The survey shows that among the East-European countries Slovenia with over 500 Internet users per 10000 inhabitants is doing far best, the next countries are Czech Republic, Slovakia, and Latvia with less than 200 Internet users per 10000 inhabitants respectively. The situation is worst in Moldova and Belarus with less than one Internet user per 10000 inhabitants. So, overall Internet connection *per se* can not be taken for granted. In South America and particularly in Argentina the situation is not much better (Finquelievich, 1999).

Concerning the contents, Doctor and Ankem (1996) have studied several hundred systems and the contents they provide. They have developed a three-dimensional taxonomy. On the first dimension situational (or subject) categories are introduced such as education, governmental process, social services. On the second dimension the type of help is distinguished including advocacy, counselling, directional, factual, and interactive communication. The last dimension takes into account socio-economic identifiers such as age group, educational level, gender, or income. Applying their matrix they found that directional and factual help dominated and that most of the systems targeted towards middle and upper middle income.

Concerning the underlying technology none of the systems presented above are used. In particular, public access to information could be facilitated with shared global information space systems. They allow to set up shared community spaces that can only be used by the members of the community spaces. This particular feature could be used for the administration of semi-official information. By semi-official information we mean information about a city of a country that should be only accessible for citizens from the city or country. With shared global information spaces this functionality could be provided easily. The only disadvantage for citizens is that they have to type their user name and password anytime they want to access the documents.

5.2 Open Discussion Participation

Open discussion and citizens' participation in it are supported by mailing list and bulletin board systems. Occasionally, Usenet newsgroups are used. The use of chat varies considerably—whereas in some systems it is used, some authors of guidelines to set up public commons explicitly recommend not to use chat, because it is not suited for the purpose of public political discussions. It is rather argued that the Web should be used for providing information and mailing lists should be used additionally in order to also have a push channel (Clift, 2001).

Concerning the systems presented above annotation systems and social filter systems offer useful functionality for supporting open discussion participation. With annotation systems citizens are able to annotate and comment existing material. For instance, with a system similar to ComMentor it would be possible for citizens to annotate and comments information on any Web server. Such a system would allow citizens to comment and annotate the official information from political-administrative systems. So, citizens have the advantage of receiving the original information plus the annotation and comments. The price is that the download of the material is slower, because anytime the material is accessed the comments and annotations are also downloaded.

Social filtering systems would allow citizens to rate information they read and then provided the rates to citizens who read the information later on. Active social filtering systems allow citizens to easily send interested other citizens the information they just discovered. If organised by topics and interest, such a system could work as follows: citizens can subscribe to topics of interest; citizens who discover interesting document can then send the information to an email server with the topics that the document included as keywords; the email server could then automatically forward the new document to the citizens who have subscribed to the respective topic. Some challenges for the citizens with this approach are the additional effort for the sender of sending the recommendations and the potential disturbance of citizens who receive recommendations they do not need.

5.3 Community Networks

Community networks, in general, offer a broader functionality and try to integrate citizens into a community and set up a community memory. Often community networks integrate functionality related to public access to information and related to open discussion participation. The Milano Community Networks, for instance, offers email in the form of mailing lists and as Web mail, electronic forums for discussions, and interactive real-time chat tools (De Cindio et al., 1997). Hecht did a great survey of community networks in the USA (Hecht, 1999). Hecht distinguishes the following service types: community involvement, educational services, economic development, government and democracy, health and human services, quality of life information, technology training, and telecommunications access.

Concerning the systems presented above community networks already use a broad range of systems. Besides, standard technology such as the Web, email and Usenet newsgroups also text chat such as IRC and MUDs are used (Smith & Kollock, 1998). In the digital city of Amsterdam, for instance, also an annotation system (HyperNews) is used for annotating and commenting the Web pages contained in this virtual city. The digital city of Amsterdam as of today has more than 150000 inhabitants heavily using it

(DDS, 2000). Nevertheless, applications for navigating the Web in groups are not yet used. Such applications would add some interesting new opportunities for the citizens of digital cities like Amsterdam. They could navigate the digital city together and citizens who know some areas well could guide others through these areas. Also, social encounters would then be possible. So, in fact, the digital city would get several strength back that normal cities are having. However, citizens might feel uncomfortable if other citizens can constantly see where they are navigating and if other citizens can approach them anytime. And, as Sclove argues: '[e]ven hypothetical new media (e.g., advanced virtual realities), conveying a dimensionally richer sensory display, are unlikely to prove fully satisfactory substitutes for face-to-face interaction'. However, if community networks are—at least to some extent—built around local communities, citizens can meet in both the electronic space, but also the physical space (Sclove, 1995). Finally, Doheny-Farina argues that community networks entail the danger that citizens do not meet any more in real life and that unplanned encounters will hardly happen any more (Doheny-Farina, 1996). As this book was published back in 1996, it could be argued that with today's technology this danger is reduced. For instance, if combinations of text-based virtual environments and the web or shared Web applications are used, these social encounters can and do happen electronically—citizens can meet incidentally on Web pages on communication channels, and so forth and have spontaneous chats.

6 Conclusions

In this chapter we have mainly focused of *technological* opportunities for e-democracy. For obvious reasons progress in e-democracy does not only depend on technology and technological development.

For instance, in the USA e-democracy were used as arguments for the creation of the new National Information Infrastructure (NII). Miller (1996, p. 212) writes that '[o]ne of the most powerful arguments for the creation of the new National Information Infrastructure (NII) is that it will strengthen democracy'. At the core of the NII lies a universal service for everybody in the USA, but similar ideas and approaches are spreading quickly in other countries as well. A universal service can according to Miller be defined as 'eliminating barriers so that everyone has the opportunity to use our evolving telecommunications systems for meaningful and effective participation in all aspects of society'. For several years the technological basis for the NII has been available now.

Nevertheless, there remain several non-technical challenges. A particular challenge of a universal service lies in the fact that the training, experience, and resources vary considerably among citizens. Furthermore, preferences and interests are different. In fact, universal service does not mean that everybody can and should be able to do the same things in an equal way. Rather, the minimal level of service that is needed for meaningful participation should be defined. Miller enumerates five requirements for a universal service. Although he primarily focuses on the situation in the USA and challenges relating to the NII, the requirements are general and can be applied for other countries as well. A universal service should provide access to the service from anywhere; create an adaptive and adaptable interface for the service; offer flexible training and support; support

systems and services for personally and socially meaningful tasks; and make sure that the universal service is affordable.

The challenges do not only concern the citizens, but also the persons in the public services. Coleman (1999) reports an interesting case in this respect about the Westminster parliament. According to Coleman the Westminster parliament has witnessed at least two what he calls 'information revolutions'. The first information revolution was the rise of the printing press, which allowed printing bills in the sixteenth century. Before that, bills had to be read aloud. Coleman reports that this was only accepted with resistance of some members of parliament arguing that the secrets of the parliament should not be disclosed. The second information revolution of the Westminster parliament was the rise of telegraphy, radio, and television. Until 1954, BBC was the sole broadcaster and BBC was forced to broadcast discussions only fourteen days after the discussion really took place. Only in 1978 radio microphones were allowed and only in 1985 cameras were allowed in the House of Lords.

On a whole this chapter is mainly driven by technological opportunities; it presented systems and prototypes that offer functionality with a potential to improve and facilitate e-democracy. Although, we also glanced at some challenges with technology as well, this was not the primary aim. We, therefore, also did not address the issue of functional overload of systems.

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