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Facilitating virtual networking for Design for All in Europe: The HERMES platform

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Abstract: This paper reports on HERMES, the virtual networking platform of the European Design for All eAccessibility Network (EDeAN) that was established in 2002 by the European Commission in order to stimulate European network activities within the area of Design for All, with particular focus on ICT and e-Accessibility. The paper reports on the development and utilisation of the networking platform developed to enable the cooperation of EDeAN members through an accessible interface over the World Wide Web. HERMES is available at <http://www.edean.org>.

1. Introduction

The eEurope 2002 and eEurope 2005 action plans recognise the need for “an Information Society for all”, and point out four lines of action, namely policy measures, dissemination of good practices, benchmarking indicators to monitor progress, and overall coordination activities, as primary means to achieve the designated targets.

The European Design for All e-Accessibility Network (EDeAN) was established in July 2002 with the goal to promote awareness and application of the Design for All and Universal Access principles: "To ensure the establishment and networking of national centres of excellence in Design for All and create recommendations for a European curriculum for designers and engineers". EDeAN aims to facilitate the exchange of ideas, knowledge and experience, by fostering common activities among the European Union member-states. The exchange and interaction within the network is organised by topics in Special Interest Groups (SIGs). Five such groups are active since mid 2003, namely Policy and legislation, Standardisation, Curricula on Design for All (DfA), Benchmarking, and Proactive Assessment [2].

To enable systematic co-operation among EDeAN members, and to support the virtual networking activities of the SIGs, a virtual networking platform, named HERMES (<http://www.edean.org>), has been developed by FORTH-ICS in the context of the D4ALLnet project (IST-2001-38833). A screenshot of the HERMES home page is shown in Figure 1.

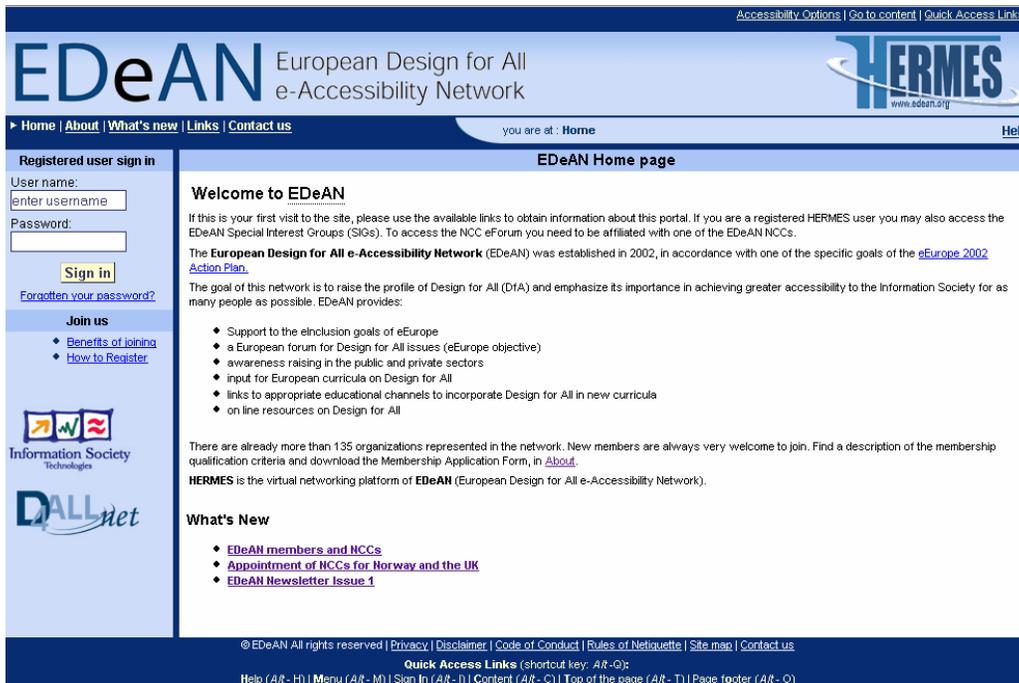


Figure 1: HERMES home page

2. Methodology

A user centred approach [3] was followed for the design and implementation of the HERMES web portal. The aim was to develop a highly interactive, accessible and usable tool for on-line collaboration. User-centred design is an approach to interactive system development that focuses specifically on making systems usable by iteratively involving potential users in the design process.

Such a design process helps to:

- reduce the risk that the resulting system will under-deliver or fail
- avoid or reduce risks to their users and operators
- better meet user and organisational needs
- avoid the risk of recycling of analysis, design and implementation, thus reducing development and maintenance time and cost
- significantly improve the productivity of users and the operational efficiency of organisations.

The design of HERMES has undergone four main phases: task analysis, design, implementation and evaluation.

In the context of the HERMES portal, the purpose of the Task Analysis phase was to define which tasks are to be supported by the system and how. In order to identify system tasks and their major characteristics, task analysis techniques were employed. With the use of questionnaires and structured interviews the target users' point of view was acquired. Furthermore, observation and activity sampling techniques were employed to extensively analyse tasks into more detailed tasks steps and take into consideration potential problems and non-standard events. The facts that were gathered regarding the contents of the tasks, the workflow and the need for information, targeted to appropriate modifications and enhancements of originally developed mechanisms. Based on the collection of virtual networking requirements, user duties and tasks according to different user roles were determined and analysed.

The objective of the design team was to propose alternative approaches, not only for the “look and feel”, appearance and aesthetics, but also for the functioning of the web portal in accordance with user requirements and functional specifications of D4ALLnet and EDeAN. The result of the design phase was the creation of prototypes (mock-ups), initially on paper and later on the computer, of the HERMES user interface. Among the alternative plans for the user interface design that were proposed, the best were selected based on the feedback received from the user community.

The development of the HERMES web portal was based on mechanisms that have been initially developed by FORTH-ICS in the context of the SEN-IST-NET project (IST-2000-26449). The original platform was modified, enhanced and partly redesigned, redeveloped, and configured according to specific requirements and purposes of D4ALLnet and EDeAN. Thus, the development of the resulting new tool has taken into account:

- The virtual networking requirements identified during the first months of the D4ALLnet project lifecycle.
- Comments and feedback from the EDeAN secretariat, EDeAN Members and the EC, that resulted in producing new requirements, to support the networking activities of EDeAN
- The results of expert evaluation.
- The implementation of the online discussion forum of the EDeAN National Contact Centres (the EDeAN NCC eForum), and the necessary networking facilities to support it.

Three different approaches to evaluation have been followed [4]. The first was to systematically collect, analyse and feed into the design, feedback received by the two involved user communities. The second was to perform heuristic evaluation by usability experts, who worked closely with the design team and have evaluated the sketches and the design prototypes (mock-ups) that were proposed, and have suggested changes for improvement. The objective of this approach was to determine as early as possible usability problems, evaluate alternative plans, as well as to propose solutions to the design team about the problems that were identified. The results of this approach have led, to a certain extent, to the re-design of particular tasks. The third was an independent evaluation performed by the Institut für Technologie und Arbeit (ITA), Kaiserslautern, Germany [6].

3. Virtual networking facilities

The term “networking”, is traditionally used to describe the formation and maintenance of connections and relationships between individuals, organizations or other interested parties. Virtual or online networking is a form of interpersonal communication that is characterized by the use of electronic means of communication between the different parties and the exchange of messages and information in electronic forms. Hence, virtual or online communities perform virtual networking.

An online community [5] is a virtual community composed of individuals who:

- Form and maintain online communication
- Share common goals, interests and needs that provide the reason of community existence
- Share common sets of rules and regulations that are accepted by all members and provide guidance to the community
- Use a common technological platform that supports their networking and communication activities
- Have common access to information resources.

Virtual networking is, to an increasing extent, replacing or enhancing traditional ways of community formation and covers a wider spectrum of thematic areas.

HERMES was designed and implemented in order to facilitate and support the virtual networking activities of the EDeAN Special Interest Groups (SIGs). The EDeAN SIGs are in effect online communities that share common interests and goals in the field of Design for All. To support the virtual networking activities of EDeAN, the portal supports the following:

- The operation of Special Interest Groups in selected areas of interest in “Design for All”
- The “Design for All” virtual Resource Centre infrastructure (ARIADNE). ARIADNE is a dedicated knowledge base facilitating sharing and consolidation of DfA knowledge amongst members of the on-line community. It aims to compile a wide knowledge base with the objective of becoming a focal point in Europe for the dissemination of current knowledge and best practice in Design for All. ARIADNE is an open system to the DfA community. Its contents include results of SIGs work, case studies, information about related national or international, best practice reports, design tools, benchmarking tools and results, product assessment reports, etc.

In order to effectively facilitate the virtual networking and communication activities of EDeAN SIGs, HERMES is designed to provide appropriate tools and support for three user types, namely System Administrator, SIG Moderator and User.

The tools that may be used for the support of the above roles include:

- A mechanism for creating and processing a user’s individual profile
- A message board for the exchange of messages and participation in asynchronous conversations
- A documents area for retrieval and deposition of documents
- A tool for synchronous on line discussions (on-line “chat”)
- A mechanism for retrieving and managing information regarding users’ profile
- A mechanism for creating and sending emails
- A mechanism for creating and sending invitations to future users
- A mechanism for context-sensitive on line Help.

An overview of these tools is illustrated in Figure 2.

The screenshot shows the HERMES Message Board interface. The header includes the EDeAN logo and the HERMES logo. The main content area is titled "Policy and Legislation : Message Board" and displays a list of topics. The topics are listed in a table with columns for Topic, Activity, Last modified, and Messages. The topics include:

Topic	Activity	Last modified	Messages
<input type="checkbox"/> UN Disability Convention Towards a Comprehensive and Integral International Convention on the Protection and Promotion of the Rights and Dignity of Persons with Disabilities	open	10 February 2005	5
<input type="checkbox"/> Citizen web portals Discussion and information	open	21 March 2005	3
<input type="checkbox"/> Globalization Please note that in the coming IST EVENT 2004 (Den Haag 15-17 November) there are sessions on Competing and partnering in the global economy; EU and China, India, Latin America, Russia. Best regards, Erkki.	open	10 February 2005	2
<input type="checkbox"/> Ambient intelligence Ambient intelligence is something which is related to an environment, and in our context, to ICT. What is its policy and legal relevance? The idea of responsibility? What if it gives wrong advice? Privacy? Transparency? Best regards, Erkki.	open	04 November 2004	7
<input type="checkbox"/> Digital TV What opportunities for increased accessibility or barriers for accessibility are there in the digital TV. Have they legal relevance? Best regards, Erkki	open	05 August 2004	4
<input type="checkbox"/> Design for All and Assistive Technology Discussion concerning the relationships between Design for All, universal design, mainstream products, and assistive technology, and other related concepts.	open	21 February 2005	13
<input type="checkbox"/> New legislation Under this topic we discuss new laws and other legal acts. We have already interesting exampoles from Germany and Italy. It	open	02 March 2005	20

Figure 2: Available facilities in HERMES - The Message board

HERMES supports the following Special Interest Groups:

- Policy and Legislation
- Standardization
- Curricula on Design for All
- Benchmarking
- Proactive Assessment
- The EDeAN NCC eForum
- Moderators
- Participants area

Two special purpose groups, namely the “Moderators” and the “Participants’ area”, are available to the moderators and the project partners. These groups are intended to facilitate the organization of project work, and the cooperation and support of these particular user groups.

Registered users of HERMES are the EDeAN NCCs, representatives of EDeAN member organisations, experts in the field, as well as other members of the broader Design for All community. At present, there are more than 360 registered users in HERMES.

4. Accessibility of the HERMES portal

Accessibility has been one of the major focal points in the design of the HERMES web portal. There are two sets of standards that are generally used by developers for accessibility compliance. The first is the Web Content Accessibility Guidelines 1.0 (W3C-WCAG 1.0) from the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C) [8], while the second is Section 508 of the USA Rehabilitation Acts Amendment [7]. There have been several studies comparing these two standards both in kind and scope of the accessibility insights delivered. These studies reveal that the two de facto standards are compatible but not identical. A primary objective in the development of HERMES was to adopt the principles of “Design for All” and to pursue W3C-WAI (Level A and Level AAA) compliance for all modules of the portal. Subsequently, responding to comments and feedback received from the EDeAN user community, it was decided to develop a new approach for a user-customisable accessible interface. This new approach would comply with the “Design for All” principles and ensure access to the HERMES portal to users with different disabilities, needs and preferences, and support users that can be connected to the portal using a variety of assistive technologies. Following this approach, each user can define their personal preferences regarding the presentation of the portal not only in terms of its appearance (e.g. colors, fonts) but also in terms of information structure.

This is achieved through the Accessibility Engine [2], a software package which allows for dynamic transformations of web pages into personalisable versions, in accordance with the individual needs of a user. The Accessibility Engine is designed in such a way so that the web pages that are generated as a result of the HTML transformations are fully compliant with widely acknowledge standards for web accessibility, such as the Web Content Accessibility Guidelines of the Web Accessibility Initiative of the W3C (WAI-WCAG) and Section 508 of the Federal Information Technology Accessibility Initiative.

Each user is able to define their personal preferences regarding the presentation of the portal not only in terms of its appearance (e.g. colors, fonts) but also in terms of the structure of the page. So, for example, it is possible to perform table linearization, or to change the position of the navigation bar within the page and more.

Initially, the user must choose a disability profile. Disability profiles define a set of transformations to be applied on the web pages of the portal. Furthermore, the user is able

to customize some of these transformations in accordance with his/her accessibility needs regarding disability or the assistive technology he/she is using to access the portal. So for example, users choosing the “low-vision” disability profile can “fine-tune” the presentation of the web interface by declaring exactly the font-size or the color contrast they prefer according to the degree of his disability.

The personalization capabilities of the Accessibility Engine are different for registered and unregistered users. An unregistered user may simply choose an initial disability profile. Each disability profile represents a fixed web interface. These fixed interfaces are the following:

- standard
- default
- for motor impaired users
- for low vision users
- for blind users

It must be noted that different profiles will prompt registered users to make different customisations, depending on the type of disability that was originally declared.

5. HERMES Usage

The HERMES platform has been fully operational since July 2003, supporting the virtual networking activities of EDeAN. Baring in mind that the platform has been made available to representatives of 140 organisations from around Europe, actual user statistics show a more than high level of user adoption. Based on the server logs of the HERMES platform, statistical information on its actual use has been collected, mainly with regards to the number of registered users, portal visits, messages posted and document uploads and downloads.

The actual increase in the level of user adoption of the platform is illustrated in Table 1, where usage statistics between the first year of operation (Period one: July 2003 – July 2004, 12 months) and the following six months (August 2004 – January 2005) are compared.

Table 1: HERMES usage

	July 2003 – July 2004	August 2004 - January 2005	Totals	Difference
Portal visits	49982	29965	79947	59%
Unique visitors	2769	7031	9800	254%
New registered users	121	247	368	204%
New disabled users	21	13	34	62%
New disability profiles	12	18	30	150%
New discussion topics	31	17	48	54%
Posted messages	180	244	424	135%
Message views	2783	4197	6980	151%
Document uploads	105	90	195	85%
Document downloads	219	200	419	91%

A summary of this data for the period July 2003 to January 2005 shows that the HERMES website has had in total:

- 79947 visits (an average of 148 per day)

- 9,800 unique visitors (2200 of which visited more than once)
- 368 registered users, of which 34 were users with disability
- 48 discussion topics and 424 posted messages
- 6,980 message views
- 195 document uploads
- 419 document downloads
- 30 stored disability profiles in use

Although these usage figures might seem relatively low compared with commercial websites, it is worth noting that there was no attempt to advertise in search engines and capture passing Internet trade. The only promotional activity for the HERMES web portal involved direct advertising of the URL to the EDeAN audience.

6. Conclusions

Towards the creation of community consensus for Design for All, the HERMES on-line collaboration platform provided by the D4ALLnet project for EDeAN, provides a fully accessible virtual networking environment, and ARIADNE, a Resource Centre infrastructure makes widely available the knowledge consolidated through networking. These efforts substantially contribute towards increasing awareness about Design for All, promoting the diffusion and adoption of such approaches and practices, making appropriate resources and benchmarking instruments available to the European IST community, facilitating education and training in all related issues at a European level, and stipulating policy recommendations on a range of topics.

Today, the HERMES web portal has been established as the online virtual collaboration tool for the EDeAN network, and has been efficiently used by representatives of more than 140 EDeAN member organisations to coordinate activities and exchange information in 25 European member states. A number of interesting discussions are taking place in the virtual discussion fora that have been established, and numerous resources related to Design for All are available through the ARIADNE Resource Centre infrastructure. A future challenge remains to study the actual impact of the tool, in shaping an online community in its own respect and whether it can remain a tool for the mobilisation of the community towards shaping and promoting future policy and legislation as well as standardisation activities in Design for All in Europe.

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Centres of the European Design for All e-Accessibility Network (EDeAN) established in July 2002 in the context of the eEurope eAccessibility Action Plan.

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