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ПРОГРАММА ОРГАНИЗАЦИИ ОБЪЕДИНЕННЫХ НАЦИЙ ПО ОКРУЖАЮЩЕЙ СРЕДЕ

Assessment of the ICDPR Information System – Danubis

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1 Executive summary

UNDP/GEF Danube Regional Project, which is a partner of the International Commission for the Protection of the Danube River (ICPDR), contracted UNEP/GRID-Geneva to review and evaluate the existing ICPDR information system (IS) called “Danubis”, to define its strengths and weaknesses in order to give guidance and recommendations for its further development. The work carried out is based on research on their audiences, contents and an understanding of the project’s strategic focus. The main emphasis of the evaluation was placed on the „Internal working area“ of the IS, but includes also the public part.

The current, web-based information system allows the technical experts – and partially the public – access to information made available through the International Commission for the Protection of the Danube River (ICPDR). This includes most notably textual documents that are associated with ICPDR meetings, taking place at regular intervals, which are either preparatory or terminating in origin. As a matter of fact, documents are mostly prepared and published (within Danubis) by the Technical Experts (TEs) of the Expert Groups (EGs) located at Headquarters in Vienna, and then downloaded by the users.

The IS has evolved with its own dynamic over the years, without having a proper and sound information architecture (IA) as a basis that would ensure the reliability and consistency of the system. At the same time, considerable effort has been undertaken to improve the functionality and ability of customisation of the “Internal Working Area”. But although there is a great deal of valuable content, the four major components which form an IS – the organisation, labelling, navigation and searching systems – are poorly developed and not explicit as such components should be.

Consequently, our strategic recommendations are as follows:

- Develop a solid architecture, by paying special attention to these four principal components.
- Concentrate on the user needs and render the usability of the system as easy as possible, since Danubis is much used by thematic, but not evidently technically-skilled, experts.

However, the decision taken already by the ICPDR Secretariat to develop a new Content Management System (CMS) in order to enhance usability, improve flexibility and ensure a wider acceptance of the system neither addresses nor resolves the root causes as mentioned above. Although the current software used limits certain developments and hinders basic organisation, labelling, navigation and searching issues, the most evident obstacles are produced internally, that is by not applying most vital rules and strategies of an IS.

By applying the recommendations in this report to develop the strategically important foundations of an information system, Danubis will make it easier for users to browse and find information. It will result in a higher level of user satisfaction, which in turn will encourage the same persons to more regularly access the system.

2 Introduction

For the evaluation of Danubis, an inception meeting was held on the 9th June 2004 in Vienna, consisting of an introductory and a closing session, plus several individual consultations with the ICPDR Technical Experts (TEs) at ICPDR headquarters.

Participants of the group sessions were Phil Weller, Ivan Zavadsky, Marcella Fabianova, Karoly Futaki and Alex Hoebart. The interviews have been conducted with Igor Liska, Michaela Popovici, Jasmine Bachmann, Ursula Schmedtje, Karoly Futaki and Alex Hoebart.

Per the ToR, factors to be taken into account for assessing the strengths and weaknesses of the Danubis IS, are:

the existing visions and goals for the project activities and especially for the IS;

- Have the visions and goals been defined? Are they still accurate? Are they exact enough to base an IS strategy on or are they too general?
- Who is the user? Are they well defined? How many different groups in terms of “technical” as well as “thematic” expertise are there?

the existing structure and the design of the IS;

- Is the site attractive to users?
- Is the site well structured¹?
- Are the components of the site organised in a meaningful way and divided into distinctive, self-explanatory, homogenous categories?
- Are these categories and the links leading to them logically and correctly labelled?
- Is the navigation logic and easy to follow?

the availability of functions of the IS;

- Do the functions meet the user’s needs? Are there too many? Not enough?
- Are the functions easy to find? Is it easy enough even for non-experienced users to use these functions? Are they well documented?
- Are there functions which are used only by a minority? Which functions are used by most of the users?

the quantity and quality of the content;

- Are the documents² relevant for the project?
- Are they up-to-date?
- Is there old, obsolete, out-of-date information³?
- Is the information well documented?
- Are the fields of the metadata well chosen? Are they completely and correctly filled in?

the use of the system by the key institutional users;

¹ “Structuring involves determining the appropriate levels of granularity for the information “atoms” in the site, and deciding how to relate them to one another.” (L. Rosenfeld & P. Morville, “Information Architecture”, 2002)

² Documents encompass all sorts of content items, such as Word files, Excel sheets, images, databases, articles, etc.

³ Information and documents is sometimes used in the same sense, thus information means all sort of “stuff” hold by the IS

- Does the defined audience use the system? If not, why not? Is it because people are overloaded with other work? Because they are not paid for this work? Because there is a “mental barrier”?

the structure, content, purpose and use of the databases;

- Who is the intended user group? Are they satisfied with the given IS elements?
- Can apart from the experts “normal” users reasonably use it?
- Is the functionality enough or too complex? Can perhaps the design be ameliorated in order to enhance usability?
- Are the data kept up to date?

existing organisational set-up and management of the IS.

- Does the organisational structure enable/facilitate/complicate the use of the system? What are the implications?
- Are the tasks clearly defined and agreed upon?
- Where does the quality control take place? Are there managers checking the content? Are there communicators, facilitators?

Additionally, several other questions need to be raised and answered, building another main pillar for the evaluation analysis. They encompass the whole process of assessment, and have (partly) been raised in the interviews and used during the whole review process.

- What are the limitations, what the strengths of the current system?
- What worked in the past? What didn't?
- What do you expect from a new system?
- What are the short- and long-term goals?
- What's the schedule and budget?
- Who are the intended audience(s)?
- Why will people come to the site? Why will people come back? Why would they share their information on the site?
- What is the purpose of the content? What format does it have? Is it dynamic or static? How is it created and managed? Who maintains it?
- What type of tasks should users be able to perform?

For the interviews themselves, a list of more specific questions – in addition to those above – has been utilised. This was not a very rigid questionnaire that had to be followed, nor was it exhaustive. Often, users share their views, experiences and impressions in a more open and personal form, when the interviewer does not stick very closely to a formal questionnaire..

- What is your job? And what is your role within the ICPDR?
- Since when are you using the system? How often per week or per month?
- What parts of the IS do you use? How? What information do you retrieve?
- Was it easy for you to find this information?
- Which functions of the IS do you use? Which functions don't you use?
- Are you satisfied with the current IS? Do you have any criticisms? Do you have any suggestions for improving the IS?

The following aspects are introduced to better understand this evaluation report and how it was prepared. In order to better understand the method used for identifying the strengths and weaknesses of the IS, several theoretical chapters have

been included. These are to explain the basics aspects of the overall design, and are also used as a basis for the current analysis.

In general, psychologic and mental aspects can never be underestimated in the design and use of web sites. Different personal backgrounds, distinct levels of experience and use, different technical skills etc. all play a very important role in the success – or the failure – of an IS. There is thus not one general solution to a problem.

When something in this document is marked as “irritating” or “confusing” or criticisms are reported, then this can be a very personal impression. Other users might see it differently, understand the structure more easily, find the documents faster, and don’t get irritated by the navigation. But, as someone who took the time to understand the structure and the content of Danubis, it may point out weaknesses. Why should someone else, perhaps even less familiar with the system, will not have the same problems of understanding then others? Thus, in short, questions of the following type are to be ignored: “But why didn’t you find this and that? It is right there!”, or “Why is it confusing? It is so easy to use this or that function!” In this report, when weak points are presented, it is mostly because there were several problems using the system, or we judge that others will have similar difficulties.

3 History of the development of the ICPDR Information System⁴

The development of the ICPDR Information System started in 1999. At that time, Windows NT and Oracle Database Server have been provided by the Austrian Government as an input and used as the system's platform.

Oracle was chosen as the system's underlying database because of its reliability, scalability and security. As a logical consequence, Oracle WebDB was added. This tool highly integrates with the Oracle database and provides ready-to-use tools for managing a website and developing and deploying database applications.

Based on these components, the system was built up: a public website, an internal working area for sharing information among experts and database applications for water quality, emissions and other purposes.

Later, Oracle integrated WebDB in their Oracle Application Server, changed its scope and renamed it to Portal. With this new release, Oracle has added specific features for the creation and management of centralised business portals.⁵

Although the mentioned changes were not useful in the context of the ICPDR Information System, the migration from WebDB to Portal was done in 2002 to take advantage of other improvements and bug fixes for common features, such as user and group access management, content management and control of the layout. The migration turned out to be relatively complicated and many customizations had to be adapted to the new structure. Additionally, the overhead of the Application Server installation is considerable, as many components have to be installed which are not used later.

This already shows the dependency on Oracle's market strategy, because of which WebDB had to be replaced by the more complex and costly Oracle Application Server.

In 2003, the hardware platform was upgraded to meet the increased need for capacity and connectivity. At that occasion, also the operating system was changed from the then unsupported Windows NT to RedHat Linux⁶. The decision for this change was based on the better stability and support of the Oracle software on the Unix/Linux platform, saved license cost (for Windows 2000 Server), and increased security (less virus threats). As Oracle Database and Portal are independent from the operating system, this change could be done without any other implications to the system.

⁴ taken from the ICPDR document "ICPDR Information System – Development Strategy", Alex Höbart, 01/2004

⁵ So-called "portlets" can be made available to users of the web portal. Said portlets can be software applications, reports, or Web pages, among other possibilities. Among those companies that provide customized portlets for deployment are Autonomy, Ernst & Young, InfoSpace, and Net Perceptions.

⁶ Linux is a free Unix-type, open-source operating system which became a widely used platform for web servers in the recent years.

But the hardware upgrade had implications on the cost of the software: the license and support cost for the same software (Oracle Database and Application Server) was increased considerably, as the pricing policy of Oracle is based on the power of the underlying hardware platform.

In the same year, the system was further developed to increase its usability and training workshops for the users have been organised. Both activities revealed shortcomings of Oracle Portal:

- Limited flexibility in the layout of the user interface:
The appearance of search results, folder contents, content management tools and report parameter forms cannot be changed or only to a small extent, or only with complicated workarounds (unnecessary options which confuse the users cannot be removed, custom options cannot be added). But this would be necessary to make them more intuitive and user-friendly.
- Bugs in commonly used features (e.g. checking-out items, pagination of reports, Excel export). ICPDR has reported 14 bugs in Oracle Portal to Oracle Support in 2003. Only 4 have been solved by applying a software patch and 3 by applying a work-around. 7 bugs were not solved and are still open or only fixed in the next release. In difficult cases, the support reaction turned out to be quite slow as different departments of Oracle have to be involved or even inappropriate. Another problem is changing contact persons who are not informed about the problem history which results in repetitive explanations.
- Limited support for national languages: currently supported languages for the user interface are Czech, German, Hungarian, Romanian, Slovak and English (and other languages not relevant for the Danube region). Oracle has no plans to add more languages.

Instead of storing files in the file system, Oracle Portal stores them in the database, creating additional complexity and hindering access by other common tools (e.g. anti-virus software, FTP)

4 The user-perspective

An information system is worth nothing if there are no users – or if the users, for which the system had been developed, are not using it. So, one of the principal and very key questions is:

Who are the users?

As in many cases in the development of larger IS sites, the “users” are a pretty heterogeneous group of people, who are more or less closely attached to the organisation that set up the IS and are involved on different levels in the projects. Mostly, the range of users goes from the general public, over journalists and scientists, to collaborators, technical experts and ministries.

All of them have self-explanatory different backgrounds and skills. An IS can hardly satisfy the needs of all these (potential) users. So one must concentrate and pick out no more than two or three groups that are essential or at least very relevant for the work.

4.1 Actual situation

In the case of ICPDR we can identify the following groups of (potential) users⁷:

- president, heads of delegations, chairpersons of Expert Bodies;
- ministries of participating countries;
- technical and support staff of the Permanent Secretariat;
- members of the Expert Bodies;
- technical experts to the Expert Bodies;
- project-related users and consultants;
- observers;
- special target groups like media, IFIs and donor organizations;
- general public;

This list shows that, although the term “technical” has been mentioned a couple of times, a minister (or probably his secretary) will still have other computer skills than the TEs. This demands different requirements for the multiple user groups.

Next constraint the developers and administrators are confronted with: The user community can be somewhat fluctuate. The collaborators are not necessarily the same persons over the years. So, the ‘newcomers’ must – in theory – be trained how to use the system, as ICPDR did with the others. As this is linked with a lot of resource (time and money), this is strong reason for keeping the IS simple and straightforward.

The consequences for the development and management of the IS are manifold. It says: “The simpler, the better.” The more functionality the IS offers, the more difficult for the users the understanding is. Thus, this means conversely, that the more simple

⁷ partly from “Information Management Concept of the ICPDR”, 01 to 02 December 2003, Vienna, Austria. Internal Paper.

the IS is, the easier it is for the users to use the system. But: It is very difficult to balance the amount of functionality and thus complexity with the level of needs by the different user groups one wants to satisfy!

4.2 User groups

A more general, task-driven distinction of the users in respect to the “use” of the IS can be made by splitting them into:

- The developer and administrator: This group is not very important within this classification.
- The Technical Experts from the ICPDR Secretariat: these people, located at HQ in Vienna, use the IS to a high percentage for publishing documents. These can then be download by group c). The documents are mainly meeting reports, agendas, minutes and preparatory documents. One could entitle this group as the “active” members.
- The Expert Group members and other technical experts: These people learn of new documents published in the IS often via email. They will click on a provided link and download the document for local use (printing, reading, editing). One could entitle this group as the “responsive” or better “passive” members. Some specialised users from this group access the IS as well for querying the databases.

This definition will help us later to define the needs of the IS.

4.3 User needs

As already mentioned in the chapter above, there seem to be mainly two needs of the intended audience: uploading and downloading documents. In addition to this, but completely separated by structure and functionality are those users who query the databases.

So, the question to be answered is how these activities can be supported by the IS in order to facilitate all processes and actions evolving around it, such as uploading and downloading, browsing and searching, finding and accessing.

It seems that most of the users who access the Danubis know already what they are looking for. They access the IS either irregularly in order to look for new documents or get note by email that new documents have been published. So, very often no extensive browsing and searching was necessary to find the needed piece of information. Vice versa it can be postulated that further or additional browsing is hampered by different reasons as explained in the following chapters.

Most users are familiar with the IS as they have been trained in how to use it and are using it “regularly”. (The term “regularly” has been applied very differently by the users – some saying a couple of times a week, some others a couple of times a month.) So most of the users have accessed the site more than only once and know the basic structure and objectives. They are actually more or less “forced” to use the IS as it is often the only way to access the meeting documents.

The interviews clearly showed the distinction we suggested in 4.2. The technical experts from the ICPDR Secretariat are mostly “supporting” (a term heard regularly from almost all of the TEs) the members of their groups in a wide area of issues, especially often for the planning, the realisation and the post-processing of meetings. Thus, the TEs publish information such as agendas, lists of participants, preparatory documents, minutes etc. in the IS. Naturally, this is not the only way they use the IS. But it was striking how often this use had been mentioned.

On the other side are the technical experts in the country. Their almost principal way of using the IS is: downloading these meeting documents. Almost every person interviewed gave it the highest priority and often mentioned this task as the only way of using the IS. In a few cases, the usage of the databases has been stated as well, thus giving us the impression that the uppermost function of the IS to enable access to the documents published by the TEs from the Secretariat.

Please keep in mind, that we are not saying that the IS is exclusively used for these purposes. There are surely users who consult for example the address book or EG-related information. This doesn't either mean that they wouldn't use new functions. Often, improvements in functionality need time to get accepted by the users.

Apart from the question how the users do use the IS, it is important to analyse how they can find and access the information they are looking for. That is why, in the next step, we're going to look at the structural components of the IS. (Although users often access the IS only as a reaction to an email 'alert', there are visitors who browse or do search for other content. And a clean structure would encourage more people to do so.)

5 Information system components

Placing the right content into the IS – i.e. the content the user is looking for – does not ultimately lead to a satisfied user. A user has first to march an often uneven, uncomfortable path to find what he/she is looking for. It all depends on how the site is structured, if the user will, without losing time and energy, return safely into its haven and will voluntarily come back again when demand is needed.

The most basic components of information architecture are the following:

- Organisation Systems – How we categorise information.
- Labelling Systems – How we represent information.
- Navigation Systems – How we browse through information.
- Searching Systems – How we search information.

Without going into much detail, it seems adequate to underline the importance of these components at this place and explain shortly their definition and meaning for the success of an IS.

5.1 Organisation systems

Our whole life is affected by categorising our environment. So the aim of the developer of an IS must be to organise information so that people can find the right answer to their questions. “The organisation of information in web sites and intranets is a major factor in determining success, and yet many web development teams lack the understanding necessary to do the job well.”⁸

The organisation *schemes*, which are the shared characteristics of content items, are

- for exact schemes: alphabetical, chronological and geographical,
- for ambiguous schemes: topic, task, audience, or a hybrid.

The major organisation *structures* that are used for web site and intranet architectures include

- the hierarchy,
- the database-oriented model, and
- the hypertext.

5.1.1 Organisation schemes

Exact organisation schemes are easy to design, to maintain and to use. Be it alphabetical (phone books, dictionaries etc.), chronological (press releases) or geographical (travel sites), these are the most clearly defined and mutually exclusive schemes we can use. Unfortunately, exact and clearly separated organisation schemes are nice, but difficult to put in place, as they mostly do not match completely our content.

⁸ L. Rosenfeld & P. Morville, “Information Architecture”, 2002

Ambiguous organisation schemes divide information into categories that defy exact definition. However, they are often as important and useful as the exact schemes, as the user himself often does not exactly know what he/she is looking for. But, the success of ambiguous organisation schemes depends upon the quality of the scheme and the careful placement of individual items within that scheme.

Organising information by subject or topic is one of the most useful and challenging approaches. All web sites should provide some sort of topical access to content. The task-oriented schemes organise content and applications into a collection of processes, functions or tasks. If one has clearly separated user groups, then an audience-orientated approach should be included. As an IS has almost always to handle different audiences, but covers at the same time multiple topics and fulfils various tasks, a hybrid scheme will normally be used. So, hybrid schemes are widely used for ordering information “packages”. But by blending elements of multiple schemes, confusion often follows. Hybrid schemes must thus carefully be developed.

5.1.1.1 Main navigation menu

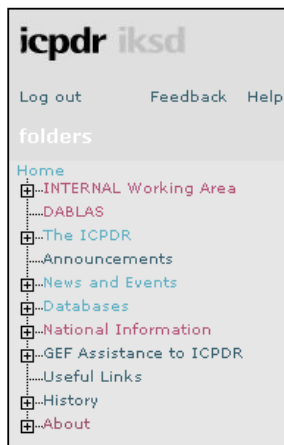


Figure 1: ICPDR main navigation menu

Let’s have a look at the main navigation menu (Figure 1). What are the organisation schemes? Not alphabetical, not chronological, not geographical. Partly topical, partly audience-oriented, partly event-oriented, partly object-oriented. This raises questions and provokes irritations. (More about specific problems of the main navigation menu, see 5.2)

As the ICPDR is geographically clearly defined, with distinct entities, why is there no geographical entry? Basins, sub-basins, countries, regions?

The information provided by Danubis is mainly environment related, covering broad themes like freshwater, groundwater, ecology, infrastructure, legislation & politics. These topics could be easily converted into a browsing and navigation system.

Another schema could be applied to the intended audience, offering different access to for example the general public, politicians, media and TEs.

5.1.1.2 Sub-navigation menu

What organisation schema has been applied to this country list (Figure 2)? Normally, for neutral and comprehensible reasons it would be alphabetical, which is not the case here. So how has the user to interpret this structure?

5.1.2 Organisation structures

“The structure of information defines the primary ways in

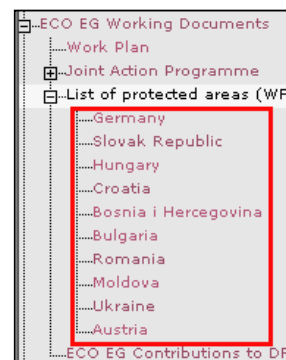


Figure 2: Non-alphabetical submenu

which users can navigate.”⁹ The major organisation structures implemented in web sites (see 5.1) possess unique strengths and weaknesses. Mostly, they are used in combination.

5.1.2.1 Hierarchy

The foundation of a good information architecture is a well-designed hierarchy. An elaborated, well developed hierarchy enables the user to easily understand the web site’s organisation and to develop quickly a mental model of how information in the site is structured and where it is located. Mostly, the hierarchical categories should be mutually exclusive, but this is not mandatory. Generally it helps to more easily browse and find information.



Figure 3: Menu hierarchy

So, this said, the appearance of “Annual Reports” and “Doc-Centre” in the main navigation menu (Figure 3) does not follow this rule. The user would probably expect to find the reports under “Doc-Centre”, as they are documents. And aren’t “databases” a type of information, that could/should be listed in a category of “document types”, alike Word or Excel document, tables, charts, photos?

It becomes more complicated when we see that this example furthermore spans organisation schema and structure. As schema, these pieces of information could be grouped as topical or product-related items, and then be called something like “ICPDR products” or “ICPDR documents” – and then listed as a sub-menu as “Annual Reports”, “Basic Documents”, “Finance and Administration”, ... , “Databases”. Or perhaps as sub-items “Documents”, “Databases”, “Maps”....

Why is the order of this navigation menu: ..., Expert Groups, Annual Reports, Observers, Legislation, Doc-Centre? Don’t “Expert Groups” and “Observers” belong to the same or at least closely related group? So shouldn’t they not only be listed one beneath the other, but eventually be listed only as one category with then these two sub-categories? Why are the similar categories “Annual Reports” and “Doc-Centre” spatially separated by two other items?

5.2 Labelling systems

Labelling is a form of representation. We are trying to fit thematically, geographically or otherwise familiar chunks of information into a group to facilitate comprehension by using a limited amount of details. “The goal of a label is to communicate information efficiently; that is, without taking up too much of a page’s

⁹ L. Rosenfeld & P. Morville, “Information Architecture”, 2002

vertical space or a user’s cognitive space. ... It’s fair to say that labels are as integral to an effective web presence as any other aspect of your web site, be it brand, visual design, functionality, content, or navigability.”¹⁰

The most common forms of labels are:

- contextual labels – hyperlinks to other chunk of information.
- headings – labels that describe the content that follows them.
- navigation system choices – labels representing the options in navigation systems.
- index terms – keywords and subject headings.

In the above chapters we have already proposed some changes, which are linked as well with the labelling system. So, calling for example a menu item “ICPDR products”, instead of mixing “Annual Reports”, “Doc-Centre” (very confusing label anyway!), is a question of a different structure and schema, and b) a subject related to labelling.

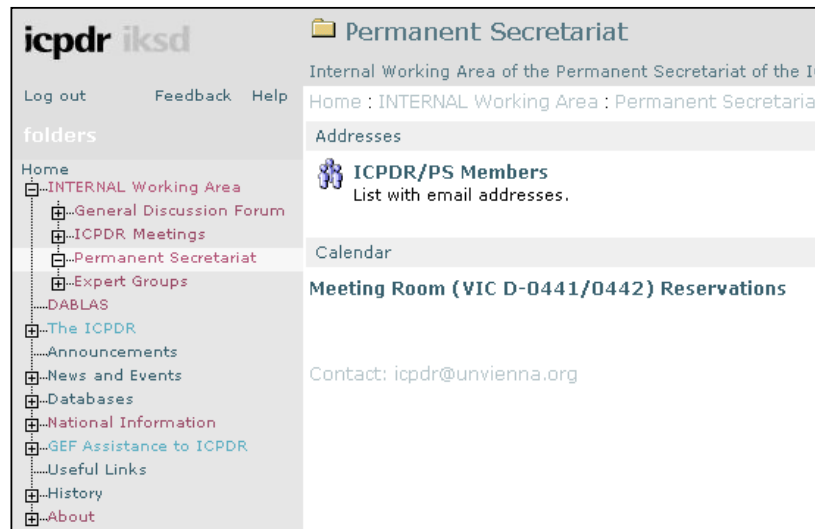


Figure 4: Meeting Room Reservations

A rather bad example for labelling within DANUBIS is the link under the “Permanent Secretariat”, which has a title labelled “Calendar” and an item called

¹⁰ L. Rosenfeld & P. Morville, “Information Architecture”, 2002

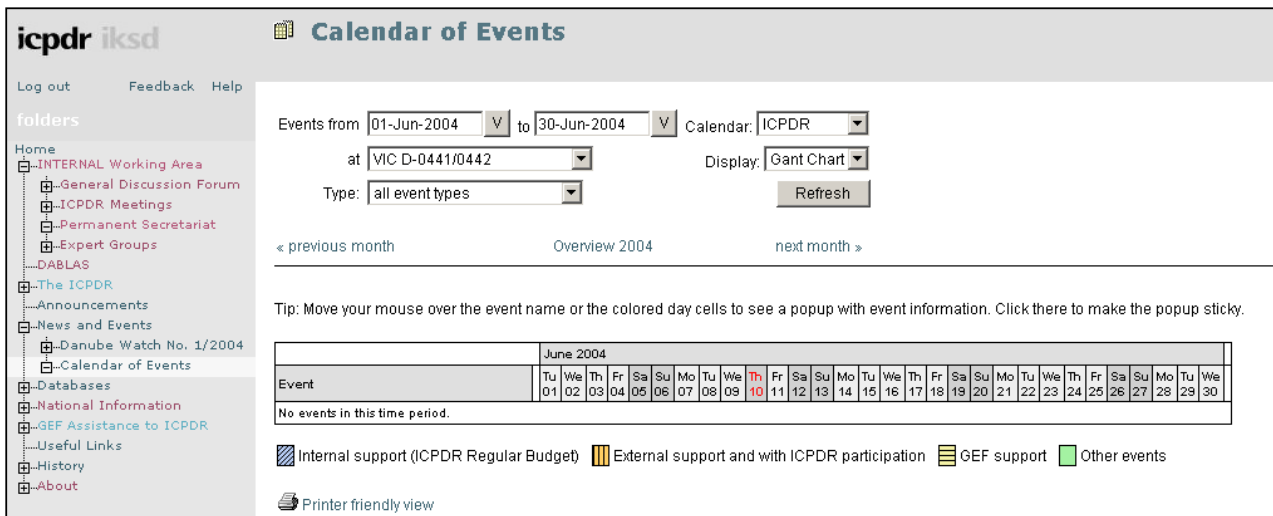


Figure 5: Calendar of events

“Meeting Room Reservations” (Figure 4). Already this arouses confusion: Do I find a calendar? If “Calendar” is the header, how is the “Meeting Room Reservations” linked with it? The user would expect to find furthermore a possibility to see and perhaps make reservations for the specific meeting room. But when one clicks on this link, one is be carried to a section called “Calendar of Events” (and not “Meeting Room Reservations”!) (Figure 5). Then, this section is more, as indicated by the title, a calendar of events then a possibility to see the room reservations.

Other examples of rather unconventional labelling are:

- The “About” item in addition to “The ICPDR” (Figure 3). Normally, a web site has only one of these. So what should the user expect to find under those headings? Generally, “About” stands for “more information about us”. But “The ICPDR” indicates the same thing.
- What is the difference between “Announcements” and “News and Events”? Mostly, these two items are used in the same context, thus making one of them superfluous. (Even worse, “Announcements” is empty.)
- Labelling in the context of page layout could be ameliorated as well. In the following example (Figure 6), a simple page turns out to be overloaded with headers of different orders, additional links, navigation bars and some text. It is very difficult for the user to develop a mental model of the structure of this sub-site with such unstructured and badly named and designed labels, including the headings, the navigation system and the contextual labels, e.g. hyperlinks.

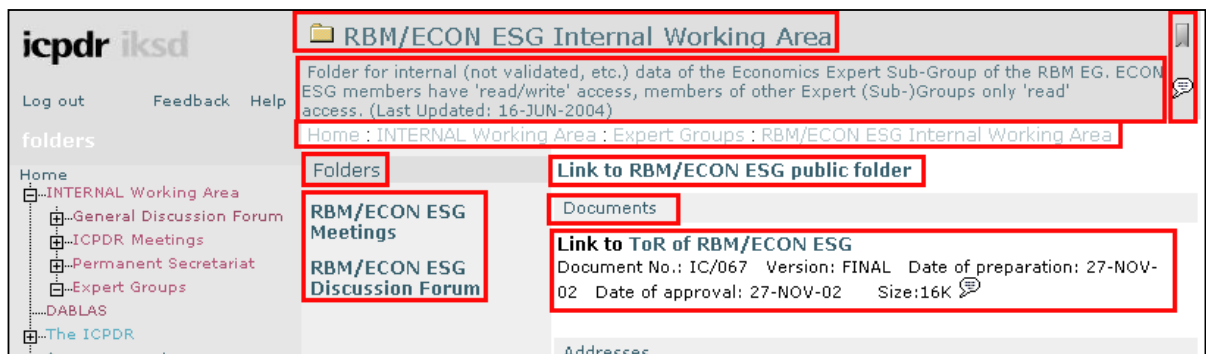


Figure 6: Labelling issues

5.3 Navigation systems

Getting lost in a large web site often goes in stages: confusion, frustration, never-come-back-effect. So, evidently, designing intelligently navigation tools helps guiding visitors through the wide world of information chunks, enabling him to easily find what he/she is looking for.

One distinguishes between embedded and supplemental navigation systems. The first group is typically wrapped around and infused within the content of the site. They are generally set-up of a global, a local, and a contextual navigation system. The second group includes kind of general overviews of the content presented on the site, mostly through the form of sitemaps, indexes or guides.

“The constant challenge in navigation system design is to balance the flexibility of movement with the danger of overwhelming the user with too many options.”¹¹

5.3.1 Embedded navigation systems

The global navigation system is by definition intended to be present on every page throughout the site. Often, one finds it at the top part of each page. These site-wide navigation systems do allow the user to access key areas and functions, no matter

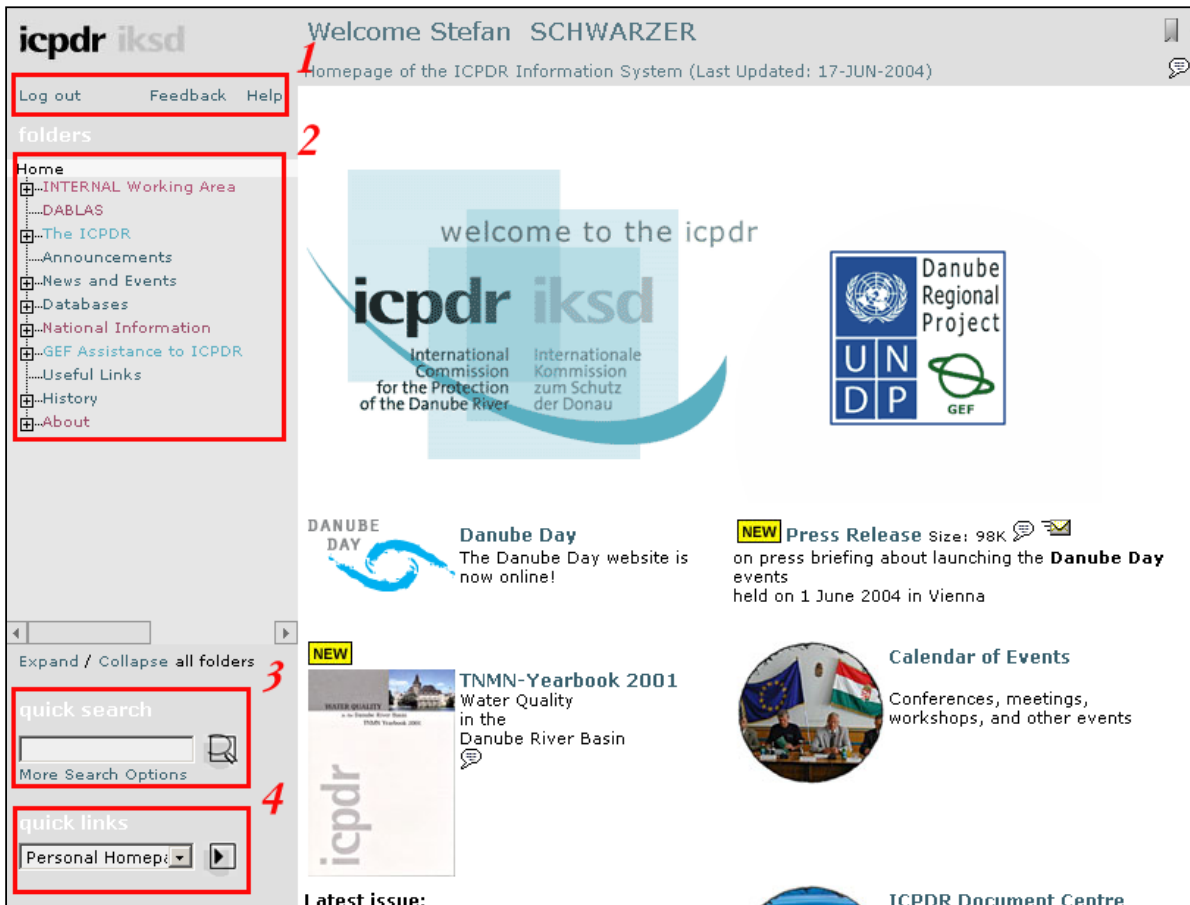


Figure 7: ICPDR homepage

where he/she travels in the site's hierarchy. In many cases, the global navigation provides a link to the home page, sometimes to the search function, to the site map, eventually to the help or FAQ section.

The local navigation system on the other hand enables the user to explore the immediate area, helping the user to travel easily within different subsections or more correctly sub-sites of the IS.

The ICPDR web site (Figure 7) is build with the following navigation systems:

- 1) This box offers the important entry point for the internal usage (“Log in”), a possibility to send comments (“Feedback”) and to access the help files (“Help”).
- 2) This is the main navigation system, offering access to all parts of the site.
- 3) A search interface embedded below the main navigation system.
- 4) A “quick links” box that offers the possibility to jump directly to a selected number of pages or sub-sites.
- 5) Once entered the IS, a “You Are Here” marks the location of where I am within the whole web site (Figure 8).

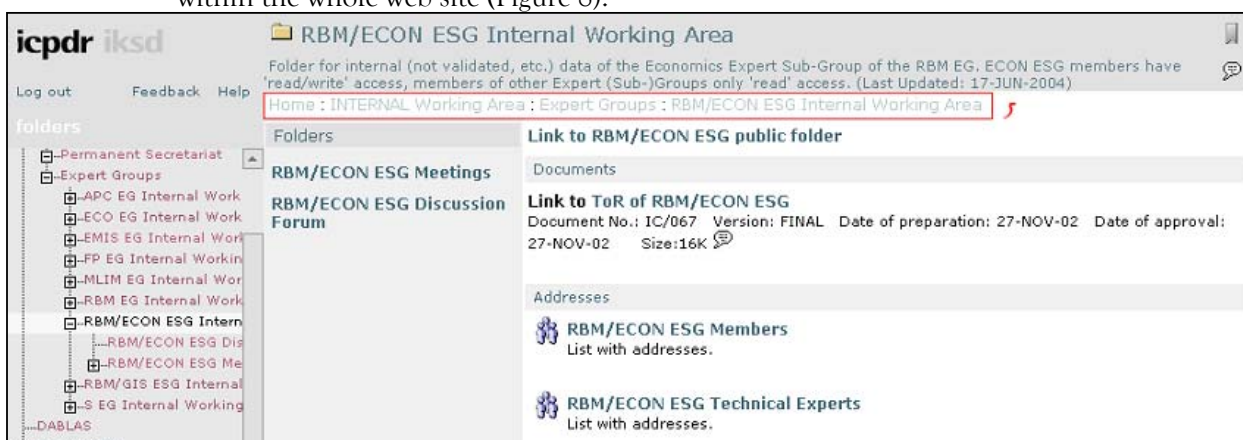


Figure 8: "You-are-here" navigation

It is interesting to note that the ICPDR site integrates the global and local navigation into a single, unfortunately inconsistent and not completely unified system. Whereas the majority of web sites separate the global from the local navigation, ICPDR does not offer different access points for its organisation and its content. It comes up with a “small version” of a global system, giving access to “Log in/out”, “Feedback” and “Help”, but no immediate link to “Home” or “About us” or “Major projects”. However, the access to the homepage one will find within the local navigation system.

¹¹ L. Rosenfeld & P. Morville, “Information Architecture”, 2002

As the integration of the two navigation systems results in a more complex one, the design, including organisation and labelling, must be very well developed in order to ease steering through the web site. In most cases, one would probably set-up a global navigation system, located at the upper right part, offering access to the “organisation”, e.g. mostly labelled as “About us”, to the log-in or the Internal Working Area, the feedback, the help and eventually a search (through a search icon or link). The local navigation instead would then only harbour the menu necessary to guide through the “real content”, that is EG, documents & background information, news etc.

The “quick links” box is often very useful, but the success depends very much on the expertise of the user in respect to the IS. Without knowing what I am looking for or without knowledge of the structure or as a first-time visitor, “quick links” are often not or only ineffectively used. However, for experienced users and regular visitors, this option can offer quite some opportunity to save time and energy.

The third type of navigational system, beside the global and the local navigation, is the contextual navigation. This is expressed as hyperlinks, which enable the interlinkages between related contents, within a single page, across web pages or even in the whole sphere of the Internet. Within the Danubis, hyperlinks are mainly used within the context of global and local navigation systems (folder titles and items, major link items), as links to documents and rarely as contextual hyperlinks. As the Danubis offers mainly access to lists of documents and reports, contextual hyperlinks are principally not of necessity, although some textual framing and linking would perhaps serve sometimes the orientation.

The “You are here” location mark is very useful when dealing with larger web sites, so that the user can easily see in which section of the IS he finds himself in the moment. Although this functionality has been correctly implemented within Danubis from a technical point of view, the design could be ameliorated. Above, the user sees the folder title, the folder explanation, and two icons; below, the title “Folders” with its sub-titles, and some other items at the right, which are rather difficult to develop a quick mental model of, the “Here you are” bar fails to get the attraction and to help to orientate the user through the web site.

5.3.2 Supplemental navigation systems

Supplemental navigation systems include sitemaps, indexes, and guides. As they are external to the basic hierarchy of the site they compose an important, complementary piece of orientation to the main navigation systems.

“Supplemental navigation systems can be critical factors for ensuring usability and findability within large web sites. However, they’re often not given the care and feeding the deserve.”¹²

¹² L. Rosenfeld & P. Morville, “Information Architecture”, 2002

ICPDR web site does not offer these orientation and finding help systems. A sitemap, similar to the table of contents in books or magazines, which shows the organisation of the document, and which enables a linear as well as random but selected access to chapters, is not available on the ICPDR web site. There is no way to see in a bird's perspective the structure, the hierarchy of the site and easily identify points of interest or entry into the system.

Similar to the index at the end of printed materials, a site index lists alphabetically keywords or phrases, without representing the hierarchy. A user can quickly scan the list to find the item he/she is looking for, and get them where he/she wants to go. There is no need to understand the site's structure or hierarchy; a simple click is sufficient to locate the point of interest. ICPDR does not offer this option.

A third supplemental navigation system is the guide, which can take different forms, including guided tours, tutorials and FAQs. Interestingly, but confusingly, ICPDR offers the access to all three types of guides (Figure 9). Again, the balance of the amount of functionality and thus complexity with the level of needs by the different user groups one wants to satisfy is very difficult. Thus, sometimes “less is more”, saying that offering the choice of three different, but closely related guides leads perhaps to too much confusion.

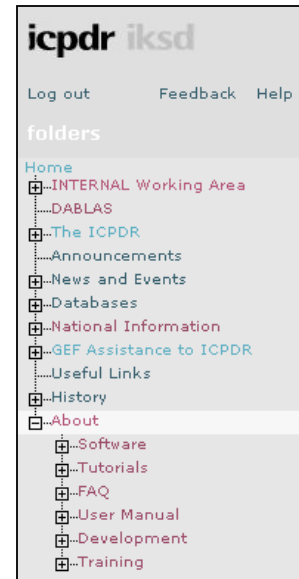


Figure 9: Additional materials

Not clear is furthermore how the “Help” is linked to the three guides. Is this a fourth way to get help in how to use the IS?

5.4 Searching systems

The success of the Googles in helping user to find (eventually) what they are looking for in the World Wide Web, seems to justify the integration of a search within a single web site. Evidently, the possibility to search a site often helps to quickly and easily drill down to the specific information one is looking for or, at least, to encircle the relevant pieces of information. But, implementing a search function can pose some important problems, such as the selection of what should be searchable, the correct use of metadata and keywords, the ambiguity of language, the determination of search zones, etc.

So, some important questions should be answered to assign the necessity of a search engine for a site:

- Does the site have enough content?
- Does one have the resources – time, money, expertise – to invest into a search system?
- Are there other, better alternatives, such as indexes or guides, instead?
- Will your users appreciate a search tool?

A search tool will help you, if you have a too much information to browse, if you deal with fragmented sites, if the user expect it to be there or if you deal with a very dynamic web site.

The ICPDR search seems to be very, very general, making no evident distinction between the occurrence of the search term in the title, in the metadata or within the document. Entering the term “water bodies”, already not such a very common term, shows 515 results without, and still 412 with the use of quotation marks. The term “Romanian river coding”, without quotation marks, results in a list 44 items. Used with quotation marks, it emits only one item, i.e. the one we were searching for and that had these three words in the title of the document. But it shows us only a relevance score of 11%. What does this exactly indicate? Why, although using the exact title, it does not result in a 100% match? Why is there no explanation, nor some highlighting of this feature?

The search system implemented by ICPDR indexes all words within the documents and metadata, without giving priority to titles or keywords or other specific, selected criteria. Although the algorithm behind is sophisticated, the search results don't seem to be very relevant. Clearly, these are general issues with search engines. But used within the web site it poses the danger of having unsatisfied frustrated users. We still mention the subject here to make aware of the fact of the difficulty and the risk of setting up a search.

By just using a couple of defined metadata fields, such as “title” and “keywords”, the number of results for a given search will be minimised. On the other hand, the quality of the search results depends heavily on the quantity and quality of keywords entered into the metadata field. (Should the words be singular or plural – “water body” or “water bodies”? Does one write the words together – “hydromorphological”, in two words – “hydro morphological”, or separated by a stroke – “hydro-morphological”?) A controlled vocabulary can help to standardise the contextual keywords. Clearly, the disadvantage of such a system is that the occurrence of entered keywords within the documents will not be taken into account.

(In this context belongs the fact that at least some of the TEs, who place documents into the IS, do not fill-in correctly the keywords. Instead, only the title of the document is copied and pasted into the metadata field.)

6 Features & functionality

Each information system is a unique form of symbiotic creature, living from inputs from different sources, from information retrieval by a wide range of users, and the interaction and communication between both. Depending on subject, objectives and user community of the IS, dozens of different features and functionalities can be implemented in order to make live for both parties – “givers” and “takers” – easier. We will briefly list a couple of them and discuss objectives, advantages and inconveniences.

6.1 Vision and goals

The “Information Management Concept of the ICPDR”, 2003, lists a number of visions and goals. This list is long and very broad. It encompasses almost all objectives, that an IS can have. In consequence, it is hardly possible to measure success and to fulfil all objectives. A more distinct, specific, audience-orientated re-definition should be developed. In addition, the different goals could easily be classified by importance, thus allowing a focussed work within the development team on specific topics and functions.

Such a list can be relatively precise, if you know your audiences – providers as well as users. So you could define your goals as the “Provision of a web-based platform for the distribution of meeting documents”; “Enable technical experts on the country level to easily and quickly access these documents”; “Provide in-depth query and analysis capabilities for specific databases for expert users”...

6.2 Standardising document structure

For the reasons of readability and quality assurance, similar documents in respect to content should be filled in and displayed with the same document format. See the following example:

Austria - List fo protected Areas

- (side comment: The “fo” is not a fault from our side, but taken from the original.)
- (side comment: There is no homogeneity of character coding here. Why are the words “List” and “Areas” written with capitals, but “protected” not? --> see importance of homogeneity in chapter 6.3. Although just a very small, negligible format problem can lead to user confusion.)
- This Excel sheet holds the relevant information in more than 30 fields!
- There are no explanation about the field titles and what they stand for, which unity they have eventually, what the different colours used are indicating.

Protected areas of Bosnia i Hercegovina

- (side comment: different form of writing as used in the above example. Not only that this time “areas” is not in capitals, but here first comes the “Protected areas” and then the country, whereas above it is vice versa. ? --> see importance of homogeneity in chapter 6.3.)

- Unlike the example above, there is no indication below the link of the status date.
- In contrast to the example above, this is a Word file, not an Excel sheet, and it gives only the name of the protected area, so just one of the 30 fields as used for Austria.

Without going into more details, we want to add here that a couple of other documents of the same folder are again in completely different formats and structures. This surely does not help to easily understand the information; it leads to irritation and frustration, to incoherent data and inexact, not scientifically based reports, if these data are used.

6.3 Homogeneity

Homogeneity means to always find throughout the web site the same form, the same style of writing or display. This helps the user to easily and quickly understand and arrange the information he/she sees.

- Links are on some pages displayed with a blue underline, on others they are not.
- Icons for Word documents are displayed from time to time for specific documents (Figure 11). But a) the icon hasn't been used for all Word documents but only for a few (why?) and b) to be coherent other document types such as Excel and Pdf should be displayed the same way, which is (partly) the case on this page but not on all.
- Stick to either writing the first letter of all menu items in capitals or in small letters. But don't mix it up, as in the example below (Figure 10).

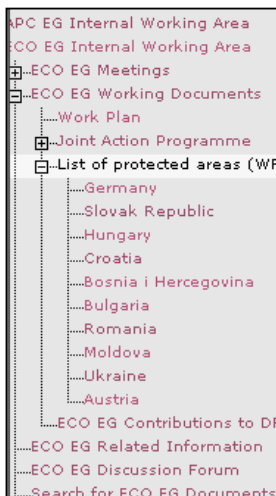


Figure 10: Homogeneity

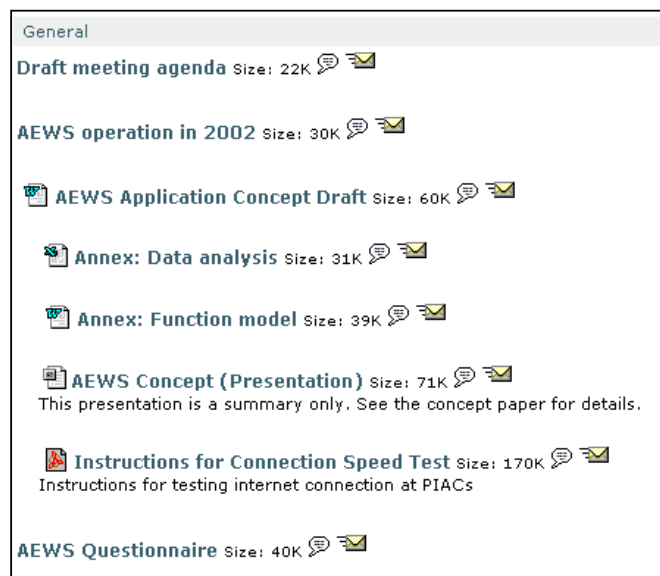


Figure 11: Icons used for document links

It seems as if we would be very picky on these small, negligible issues. (And you are probably right.) But don't underestimate these points: Accumulated they result in a irritated and later frustrated user, as he/she won't be able to develop a mental model of the site's structure, of the hierarchy, of the way you name things etc. So, these are small, and easy to improve issues, which will augment your user satisfaction.

6.4 Personal homepage

The screenshot displays the ICPDR Personal homepage for user Stefan SCHWARZER. The interface includes a left-hand navigation menu with a tree structure of folders. The main content area is organized into numbered sections (1-9) with 'Customize' links. Section 10 is a top navigation bar with links for account management. Section 11 is the 'What's new?' section, listing recent updates. Section 12 is 'Upcoming Events', listing seminars and meetings. Section 13 is 'Current Discussion' and Section 14 is 'Items awaiting approval'. The 'Owned Folders' section shows a 'Test folder for UNEP-GRID Working Area'.

Figure 12: ICPDR Personal homepage

One of the rather interesting features of Danubis is the availability of a “Personal Homepage” (Figure 12). It is aimed to help the users to stay up-to-date or to reduce the time and effort for browsing and finding important information. This is achieved through for example the “What’s new?” section, where the user can easily see the most recently added or updated documents. A list with upcoming events offers a good overview over what’s happening within the network in the next couple of weeks or one can add documents or folders into a “Favorite” block.

Although the functionality per se looks promising and useful, one has to a) check the log-statistics to verify if the customising options have been used and b) verify if the amount of options does not confuse the user. Assuming that most (internal) users have been trained how to use the system and these functions, one has still to say that the interface looks quite complex. We see, beside of the multiple navigation and search systems, 14 boxes, which try to attract the user’s attention. How sure are we, that the users understand all this functionality? How important are these customising and presentation capabilities? Would it be perhaps possible to offer a simple user interface with only a few selected for almost everybody important issues and separately an advanced one with additional options for “expert users”?

A weak point of the design of Danubis is the difficulty, once one has plunged into the system, to find its way back to the “Personal Homepage”. One clicks intuitively on “Home” in the navigation bar, which however leads then back to the homepage of ICPDR. The sole way to be brought back to the “Personal Homepage” again, is through the use of the “Quick links”. Once one knows that this feature is located at this place, it is convenient to use. But – at least for “first time” users – it may take some time and energy to eventually find one’s way through.

6.5 Language settings

One of the key features of Content Management Systems is often the possibility to change the language settings, thus enabling fast switching between English, French, German, Russian etc. Normally, the CMS comes directly with a translation for some of the widely used titles and commands. For information (e.g. titles, commands, paragraphs, documents) added by the content managers however, the translation has to be added manually as well.



Figure 13: Language setting Google

When changing the language options the user expects to get the same interface but with the newly selected language, as it is the case for example for the Advanced Search feature of Google (Figure 13): Whatever language the user selects, the interface stays the same; but all words, terms, phrases, sentences, paragraphs are translated.

So, what happens when the user changes the language settings in Danubis (Figure 14)? A couple of commands and phrases have been changed – but one has to look for them. Even the most basic components, like the search, the navigation menu, the titles for the boxes (“What’s new?”) have not been changed. So, what is this option for? Bear in mind two things:

Juni 18, 2004 [Change Password] [Account Info] [Preferences] Anpassen

About this page Anpassen
 This is your **Personal Homepage**. You can find your favorites (folder links), saved searches, and owned folders here. You also get an overview on what is going on on the web sites (new items, upcoming events and recent posts in the discussion fora).
 You see this page after log in. You can also reach it by clicking on the ICPDR logo in the top left corner or choosing "Personal Homepage" from the quick links.
New feature: You can try out the **Email Notifications** (see Notification Status box below). This new feature is now in test phase.

INTERNAL Working Area Anpassen
 Contact: icpdr@unvienna.org

Favorites / Interest List Anpassen
 Es wurde keine Zeile zurückgegeben.

Notification Status Anpassen
Email Notifications activated (set in your Preferences).
 You are watching no folder and no forum (see Interest List).
 Add [discussion fora](#) to your Interest List!

What's new? Anpassen
 17.06.04 Reducing disaster risk: a challenge for development
 17.06.04 GEO DATA PORTAL
 17.06.04 Website of the UNDP/GEF Danube Regional Project
 17.06.04 Point sources vs significant sources
 17.06.04 Agenda item 4 MLIM
 16.06.04 Map Deli Budapest
 16.06.04 Hotel Taverna
 16.06.04 Hotel Kristal
 16.06.04 Budapest map Ministry for Environment
 16.06.04 Nutrient workshop

Weiter

Upcoming Events Anpassen
 21.06.04 Seminar on Flood Prevention, Protection and Mitigation
 22.06.04 Water Directors Meeting
 23.06.04 The Danube and Europe : Integrated Space Applications in the DB
 24.06.04 3rd Surface Water Workshop
 25.06.04 Workshop on Groundwater

Figure 14: Language setting ICPDR

- The more functionality one applies to a site, the more difficult the use of it gets.
- The relation between not properly working functionality and user dissatisfaction is not linear. Thus, the more performance problems, exponentially more will the user be irritated and frustrated!
-

Offering a language choice is a very handy, and for the ICPDR perhaps almost a mandatory option. But it must go along a proper and almost complete translation of the site. It can't be that only a few sentences pop up in a different language. What sense does it make? Then better abolish this function completely.

6.6 Discussion forum

There is probably no urgent need to discuss the failure of the discussion forum. But it is one typical example of a feature developed without having consulted or assessed the need of the users. Adding new features is always a two-sided sword: on one hand users often seem to be satisfied with the existing functionality of ISs; on the other hand, when a new, "cool" feature has been added, they eventually don't want to miss it anymore. In such a way, the discussion forum could have been become as well a hot add-on. But it didn't.

In theory, the tool developed tries to strengthen the interaction between team members, as well as the sharing of knowledge. So, being such an important tool – and seeing the success of discussion forums in the WWW -, why didn't it succeed?

Possibly, because the user community uses the Danubis platform only for downloading documents, but not for “sharing” knowledge. Possibly, because the users are mainly engaged with other projects and fulfil certain tasks related to Danubis only in addition to their normal workload. So there is no time and energy left for ongoing discussions. Perhaps, because emailing is still the more normal, well-known form of knowledge sharing between people. And discussion forums are perhaps for certain audiences a too fancy, too technical tool, which can’t be accepted for daily usage.

In how much did the decision to set-up a discussion forum take this (or other different or additional) considerations into account? Have the users been interviewed beforehand?

6.7 Repeated items

It has become a widely used habit, to display at the left side of the web page the main navigation menu, which, when an item has been selected, loads the chosen page into the central part of the browser. Sometimes, an additional sub-menu is presented, but either it is slightly hidden that it doesn’t take up important parts of the page, or it is not in addition to the main menu. In Figure 15 the following navigation options are displayed in the main navigation menu, within the “content page” and one of this items again at the right side. This is a) doubled listing and b) irritating that one of the four submenu items (“General Discussion Forum”) is listed again separately.

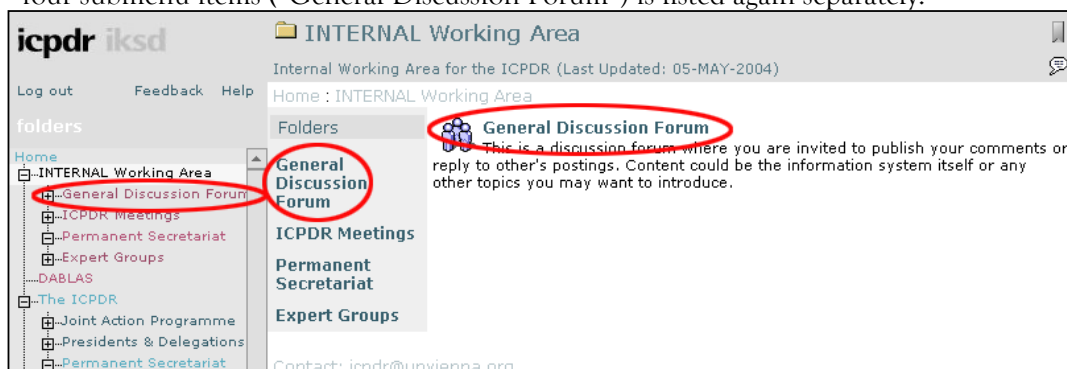


Figure 15: Repeated navigation links

6.8 Navigation

A few impressions:

- Complex, difficult, heavy, unstructured....
- Contextual navigation via hyperlinks not existent between the different Expert Groups areas.
- What does “History” mean? History of what? And if it’s related to the ICPDR, why isn’t it listed under the respective item?
- What does “folders” mean? What stands it for? Why can’t I click on it?
- What is the difference between “Announcements” and “News and Events”? Commonly a web site has either one of those notification items, but not both. How different is “News” and “Announcement”?

- Why can't the user see directly on the homepage a general description of ICPDRs projects, spatial range and objectives? Or is it not necessary for ICPDR to present itself to the users?
- The "Quick links" items are partly invisible, as the box is too small.
- The "Expand/Collapse all folders" option leads to Javascript errors, browser hang-ups, waiting-time, ...
- The navigation menu is complex and heavy. One has to wait sometimes a couple of seconds to see the changes as the design structure seems to be very heavy
- Why is "Dablas" not a sub-item of the "Internal Working Area"? It's irritating to see it only when being logged in but then as a separate item within the main menu.
- Let's go through the following example (Figure 16):

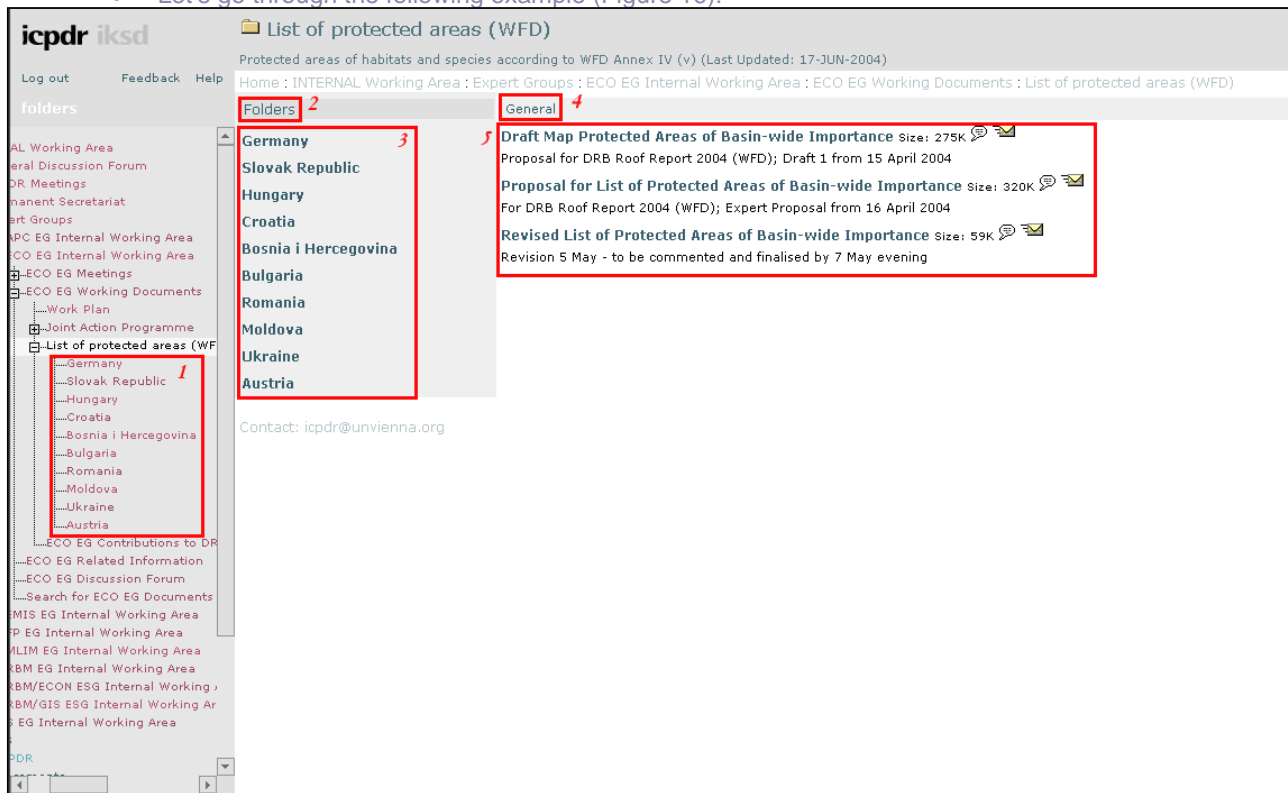


Figure 16: Navigation issues

- Box 1 is the sub-menu of "List of protected areas". Easy to understand.
- Box 2 holds a header called "Folders". Hmm, what does this mean? A folder – yes, the "Folder"-nature is impressed by the system, but the irritations caused by this should be mentioned here – is known to everyone when using Windows Explorer. But this isn't Windows Explorer. And why does
- Box 3 list exactly under the title "Folders" the same items as listed as sub-menu in Box 1? This causes irritations.
- And, as box 4, titled "General" is on the same level as "Folders", what distinguishes these two, or better where is the topical relation between these two?
- One has to read box 5 to guess (!) that this is somewhat an information encompassing the whole geographic area.
- But then why not, in a logical reasoning, list it under (or perhaps above) the country list, as for example item "Basin-wide information"?

- When one clicks on Expert Groups, a submenu unfolds only on the middle part of the page. The submenu within the main navigation system only opens, strange enough when one clicks on “ICPDR Meetings”...
- Or see the following (Figure 17): One browses the menu item “Databases”, clicks on “Bucharest Declaration Database”, and suddenly ends up with the menu “Internal Working Area – Expert Groups – MLIM EG Internal Working Area – MLIM Databases – Bucharest Declaration Database”. This is really irritating.



Figure 17: Changing menu

6.9 Structure

As discussed already in chapter 5.1, the structure of the IS hasn't been well developed. Another example is the fact that there are no interlinkages between the different EG folders and not topical, only organisational set-up. So if somebody looks for a document on groundwater, he/she has to either browse all EG folders or use the search instead.

Home : INTERNAL Working Area :	Home : INTERNAL Working Area : Exp
Folders	Folders
APC EG Discussion Forum	ECO EG Meetings
APC EG Meetings	ECO EG Working Documents
AEWS	ECO EG Related Information
Tisza Accident 2000	ECO EG Discussion Forum
APC related activities	Search for ECO EG Documents
Inventories	
Home : INTERNAL Working Area :	Home : INTERNAL Working Area : Expert
Folders	Folders
FP EG Meetings	EMIS EG Discussion Forum
FP EG Discussion Forum	EMIS EG Meetings
FP Action Plan	EMIS related documents
Documents	Emission Inventory
	Search for 'EMIS' in ICPDR Meetings

Figure 18: Diverging folder structure

Another structural problem is the different folder structure within the EGs (Figure 18). There is the problem of naming and that of ordering: Some EGs call a folder “Working Documents”, another just “Documents”, a third “related documents”. In one group one finds the item “Related information”, in another the term “Related activities”. In one group the “Discussion Forum” is the first entry, in another the

second, in again another the third on the list.

6.10 Feature list

No matter if an old IS shall be further developed and enhanced or a new system put into place, a list of requirements for such a system should, and especially when selecting a new one, must be developed. There is no single best list, instead, every organisation has unique needs.

ICPDR has not yet come up with such a list. This is rather unfortunate, as only with such a list one can pinpoint and discuss needs, as well as measure progress. This list is not only necessary for follow-on activities, but should provide guidance and feedback in the process of evaluation and user satisfaction. The development of such a list must include all stakeholders.

A short list of current features and its importance (from our perspective) for ICPDR has been attached as Annex I. Again: It is all about finding the balance between the amount of functionality and thus complexity with the level of needs by the different user groups one wants to satisfy. Thus, as the appended list is indicating: There are means of simplifying the Danubis, as unnecessary functions could be displaced (i.e. hidden as “Advanced functions” only for experienced users) or completely eliminated.

Notification is a good example of a successful, well-accepted and well-reasoned function. Slightly less than 50% (209) of the registered users (463) do have this function activated.

Even though the possibility to subscribe to one or more folders are less used, still 30% of the users do have activated this function, which is a reasonable percentage.

Some features, such as “Customize” on the Personal Homepage will probably hardly be used by many users. Instead, the majority will stick to some basic, very simple to understand and change options.

6.11 Quality control

To maintain a certain level of quality, each entry into the system must be controlled and verified. But as each EG folder is maintained by the TE of that group, there are very personal levels of quality control and assurance. There are no guidelines and no common understanding. Who is further responsible for the information in other, not-EG folders?

How can this level of QC & QA be assured, when for example we find a folder, which offers information about national protected areas for six or seven countries, but each

- in a different format (Word, Excel),
- in a different form (table, list),
- with different number of fields (one to 30 fields),
- without the description of the fields,
- without the units of the fields,
- without a date stamp,
- ...

6.12 Long-term strategy

Beside the important step of defining the goals and visions, a middle- and long-term strategy must be developed. How do you want that the system looks like in one,

two, five years? What amount and type of workload do you expect that it supports? Should it be manageable by only one administrator, perhaps only at half-time? What happens if the main developer leaves the project? Are you prepared for this? Will it cost much time/money/resources to get somebody from outside familiar with the system? Do you want to play a at-the-edge-of-technology-role, thus showing your capabilities but eventually missing the needs of your clients? Or do you want to maintain easily and at low-cost a system, thus truncating the IS to the very essential parts?

6.13 Communication

It is difficult to judge in how far there has been a communication between HQ and the members of Danubis before developing additional functionality. It is a common problem, that ISs gain over the time an own momentum and that the development is undertaken just for its own sake and not to respond to the user needs. Typical for such a system is as well a lack of general communication between the developers and decision-makers and the user community. Has there for example been a demand for a discussion forum? The idea in itself is a good one, but without the input from the users, as it is the case, it doesn't serve anything, at the very best only time and money has been spent, but eventually even worse, acceptance and credibility have been lost.

6.14 Databases

It seems that generally the databases have been appreciated and are used. Naturally, only a selected audience uses the query-functionality extensively, as one must be technically skilled to understand and make use of the data. Minor changes could be applied to the query interfaces, developing for example a simple and advanced interface. This would allow "normal" users to query the database as well without getting confused by the complete set of functionality. Additional modules, such as for drawing on-the-fly maps and graphs, should be seriously considered. Although one has to ask the question if this opens the audience to user groups which are not necessarily part of the intended audience.

The language used for the different query-options is very technical; sometimes even only abbreviations or units (for example "%") are used. This surely will not facilitate the use of the system!!

A question of credibility is the question if the databases are up-to-date. What idea of an organisation does the user get if, in the database's most recent year is 2000? Sure, sometimes it is inevitable as the acquisition of recent data is difficult, time-consuming and expensive. But staying up-to-date with the data is of utmost importance.

6.15 Layout

The layout and the design of the interface (Figure 19) could be extensively ameliorated. Headers, titles, subtitles, date, text are often too identical and too difficult to distinguish. A user, coming to a page like the one below, can't easily build a model. The differences of navigation, headers and content must be more easily visible, using clearly different forms and styles. Some reaction from the users were “boring colours”, “no attractive design”, “too complex”, thus indicating an improvement in design.

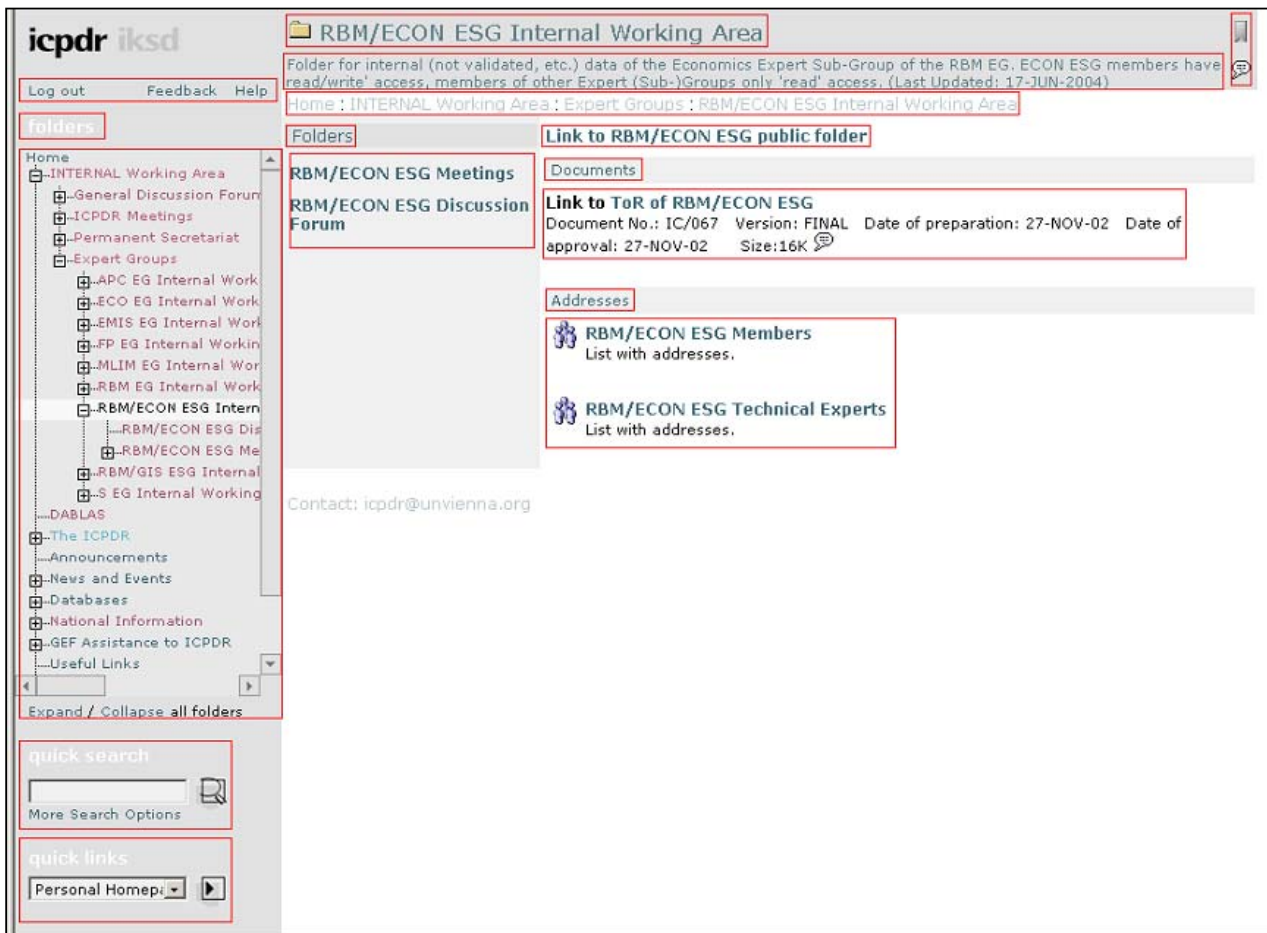


Figure 19: Layout with many elements

6.16 People

We have already discussed the need to concentrate on the user needs. Now, a slightly different point of view will be discussed. One of the team members said: “People make the story!” Honestly, one does not get this impression when bumping on the homepage and when surfing around. Somewhere, deep in the hierarchy, different address books can be found (why several?), thus indicating the participatory approach of the project. It is difficult to develop a sort of “team spirit” or “corporate identity” as

a member of the project. Perhaps this is not necessary as the members are only working in addition to their normal tasks for the project. Still, it would be nice to see the faces behind the big picture, to become more familiar with those people on whom the system builds.

A real staff directory could help out. Some photos of those involved. A short description of who they are and what they do, how there are involved into the project. The flag already used is a nice feature to show the international design of the project. The homepage should be ameliorated by adding some faces, for example a photo of one of the trainings.

6.17 Geography

The geography is within the commission's title: Danube. But why doesn't the user see any maps? Ok, somewhere there is a map, even somewhat dynamic. But for many visitors it would be helpful – and indicative for the project – to see the geographical extent of the region, most naturally already on the homepage. To see the countries involved and thus the international design of the project helps in the identification process.

6.18 Accessibility

The allocation of access rights to Danubis has been handled with care and was relatively restrictive. It seems that this reservation hasn't been found complete satisfaction between all team members. This is a management and thus communication problem, which should be solved to align all major players in the "philosophy" of the usage of the Danubis.

6.19 Intro texts

Many parts of the Internal Working Area, but also of the public section miss a possibility to see the sub-site in respect to the global picture. An explanation on each page, giving a contextual "where you are and what you can expect" – introduction, will help to grab the smaller pieces within the big one. This should help users to

understand the content and the objective of specific parts of the web site.

Naturally, this component of an IS should be used carefully, as it

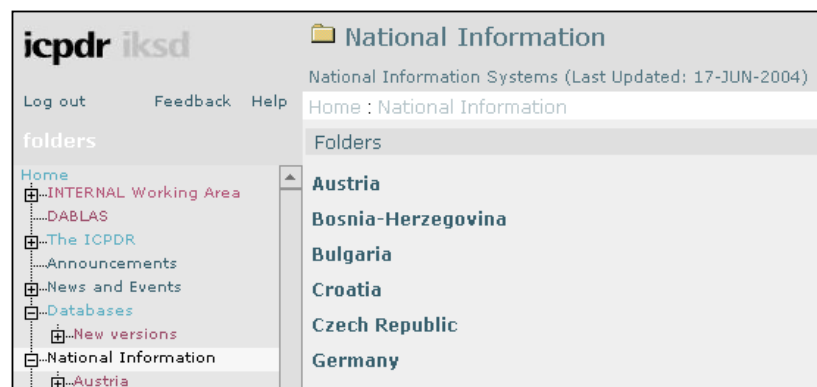


Figure 20: No introduction

shouldn't consume too much space, but should be informative enough so that users who are not so familiar with the system still do understand where they are.

Unfortunately quite a lot of the Danubis sub-sites do not offer this added information. Thus, it is very difficult to understand what these sub-sites are about and what content one has to expect.

6.20 Homepage

The homepage as shown in Figure 7 is light (in terms of kBytes, number of items and colour), which makes it attractive. Some icons and small images with not much of text render it relatively easy to get an overview.

Nevertheless, this page seems to be developed for in-house use mainly, as there are no indications of what the ICPDR and its work is about, who is involved and which region it covers. This is a major issue – the user should be welcomed on the homepage! Not necessary to right two pages of details about ICPDR. But a small introduction, a map as a background image, a photo of a meeting could help to let the user feel the importance of this project.

Furthermore, as already discussed elsewhere, distinct menus for topical and geographical browsing would ensure a better understanding of what the project is about.

6.21 Management structures

A very hypothetical statement could be made by users, when exploring the rigid, hierarchical, clearly separated structure of the EGs within the “Internal Working Area” (Figure 21): Are these EGs in reality (i.e. not only within the IS) as much (i.e. not at all) associated and linked as in the Danubis?

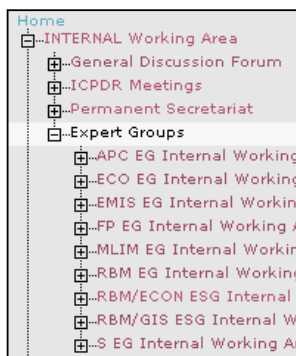


Figure 21: EG structure

It seems that the groups have been separated voluntarily, without trying to install a form of interconnectivity, of “corporate identity” of all people involved. Sure, this is a provocative comment. But because a) there is hardly any additional text on the pages and b) hyperlinks are mainly used to link to documents, the big advantage (and actually one of the main reasons of existence of the WWW) of connecting pieces of information from different pages, sections, sub-sites, and over the whole Internet are not used at all.

As the main use of the IS will in the future be as today the upload/download of textual documents, there is perhaps no real need and surely no simple solution to it. But some users mentioned that they were looking sometimes in other EG folders for documents.

So, one possibility would be the topical arrangement of the content. This would enable a cross-group listing of content, of documents, or at least parts of documents. A stronger collaboration and a higher benefit of the produced information would result.

6.22 Up-to-datedness

The destiny of an IS harbouring a lot of documents is that it turns itself slowly into an archive. Where only small parts of the system are actively used, more and more elements are out-of-date and not anymore consulted. At a certain stage one should ask if this development is accepted or if measures have to be taken, to eliminate this “ageing process”. Does one want to end up with 95% archiving and only 5% actuality? Is the information produced over the years still valued? Is it used? Or could it be a) deleted or at least b) displaced in a special archive? Are there so many documents that it hampers browsing and findability? Is there a rule telling for how long documents shall be provided via the IS? The IS comes with the feature of the expiring date of an item. But all are normally set to never.

One should think about the predicament of “navigationability” (the ease of browsing, searching, finding) and archiving. Be sure to clean up your spaces from time to time. Develop a real archive, which could be just an easy FTP server (which results in almost no software and administration costs). Rethink the use of the “Date of expiration” feature in the properties.

6.23 Searches

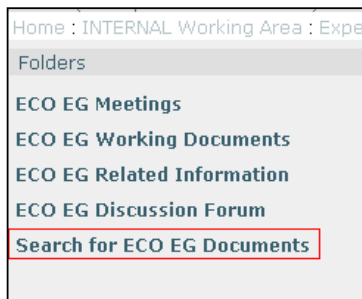


Figure 22: Search within an EG

The searches within some of the Expert Groups don't indicate where they search (Figure 22). Do they query only documents published within the same folder? Or do they take the Danubis as a whole into consideration? The search result page doesn't mention it either. So the user is left in some uncertainty: does this (local) search resemble the main search interface which appears on every page

wherever one is in the IS or if it is a search apart.

6.24 Document sizes

Although covering parts of the European continent, due to different historical and thus financial and infrastructural reasons, some of the countries involved in the ICPDR project do not have the fastest Internet connections. Some even do not have a Flatrate, but have to dial into the Net by modem, which immensely slows down the speed of traffic. Even in Geneva, where the authors of this document are provided with very high connectivity, the access to Danubis has been relatively slow and hesitant.

Now, dealing with simple HTML files for browsing information does not pose a major problem when using modems or other low-speed connections. But as soon as one has to download documents, be it Word or PDF files, data tables or images, one really runs into problems.

So, an effort must be undertaken to assure that these partners do have the possibility to connect to the IS and access the published information, without having too much disadvantages and troubles due to their network connections. But it seems that not much attention has been paid to publish only light documents – many Word files and a lot of the photos for example are over 1 MB in size. This poses a certain risk to loose, due to frustration, these collaborators. Be aware, that trying to (re-)download a couple of times lengthy files, be it as a result of the cut off by transmission errors or the truncation of the telephone line, gets users really frustrated.

Documents shouldn't be solely placed either as whole documents or only chapter-wise. The download of huge files, eventually blown up by photos, screenshots or other place-consuming entities, is sometimes difficult for centres that don't have a viable and fast Internet connection. On the other side, downloading chapter by chapter is an inefficient, displeasing and frustrating procedure. Not only because the user has to download separately 15 files (as is the case with the Annual Report 2002), but concatenating the document at the PC for printing purposes is a rather unsatisfying job.

6.25 Help system

The help file of the ICPDR is nicely done and well documented. The icons used for the different functions, displayed within the normal pages of the IS and, for orientation purposes again within the help, give the user the possibility to quickly browse the help to find and recognise the chapter of interest.

There are only two weak points:

- 1) There is no direct link between a specific problem, from where the user wants to consult the help, and the according chapter within the help. It would be very useful to see directly the paragraph that covers the subject the user has problems with.
- 2) The second point is rather simple: Users don't consult the help. Although this phrase is somewhat exaggerated, it is clear that only a minority of users use this additional resource in order to solve a problem or get help in how to use the system.

6.26 Metadata

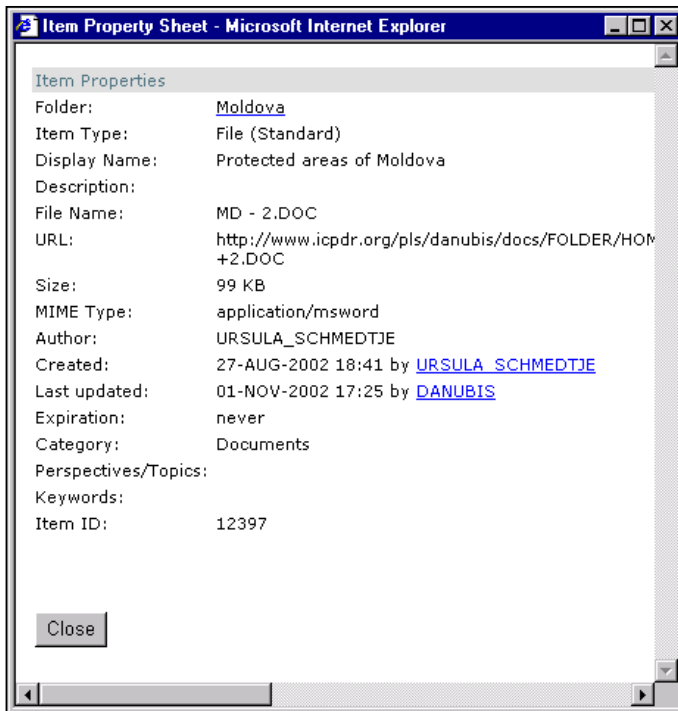


Figure 23: Item property sheet I

The field of metadata is probably one of the most avoided and almost hated domains that exist. Nobody likes it, hardly anybody does it, a few however do it, but many of those not correctly. Nevertheless, the importance of proper metadata-editing can't be underestimated when dealing with major information loads. There are two important aspects to be analysed: Have the proper fields been chosen? And are they correctly filled?

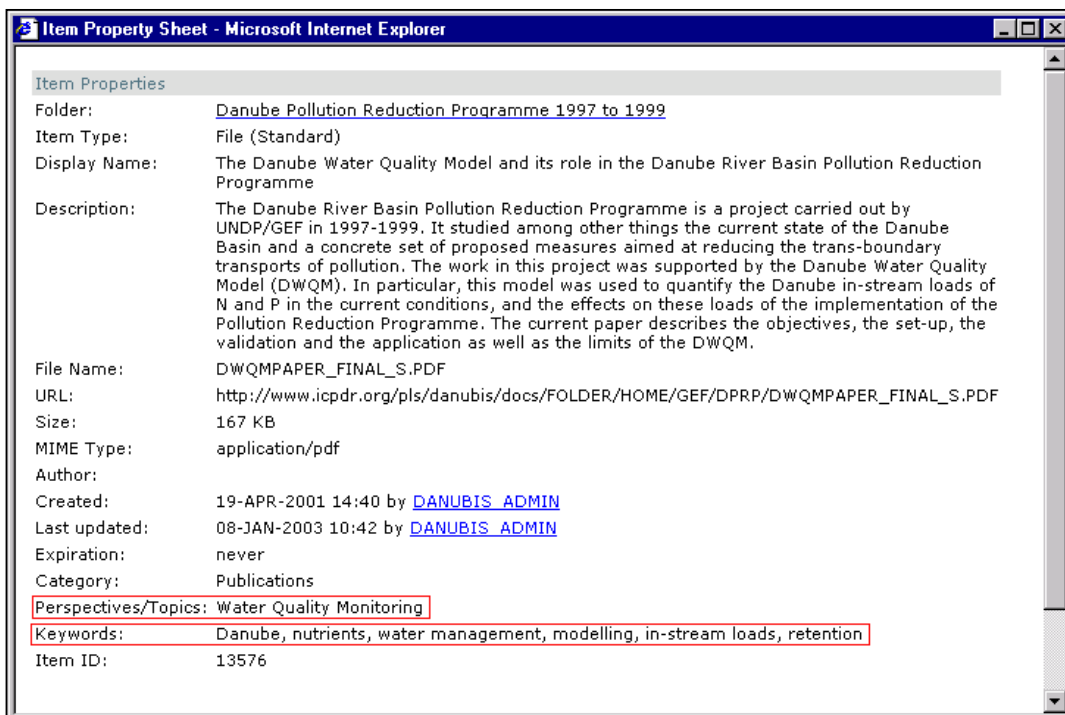


Figure 24: Item property sheet II

But anyway, why should you care about metadata? Simply, because metadata are the powerful tool that link the information with the users. By tagging documents and other information objects with, hopefully, controlled vocabulary metadata, we enable

powerful searching and browsing. The metadata fields enable a quick and very efficient search and result thus in meaningful and quantitative diminished results.

The following three examples show the strengths as well as the weaknesses of metadata as used in ICPDR.

Example 1 (Figure 23) lacks for instance a couple of the most basic metadata information: There is no description of the document, no Perspectives/Topics have been indicated, and not one keyword has been filled in. This is a rather serious problem and concerns heavily the quality assurance of the whole system in the long run.

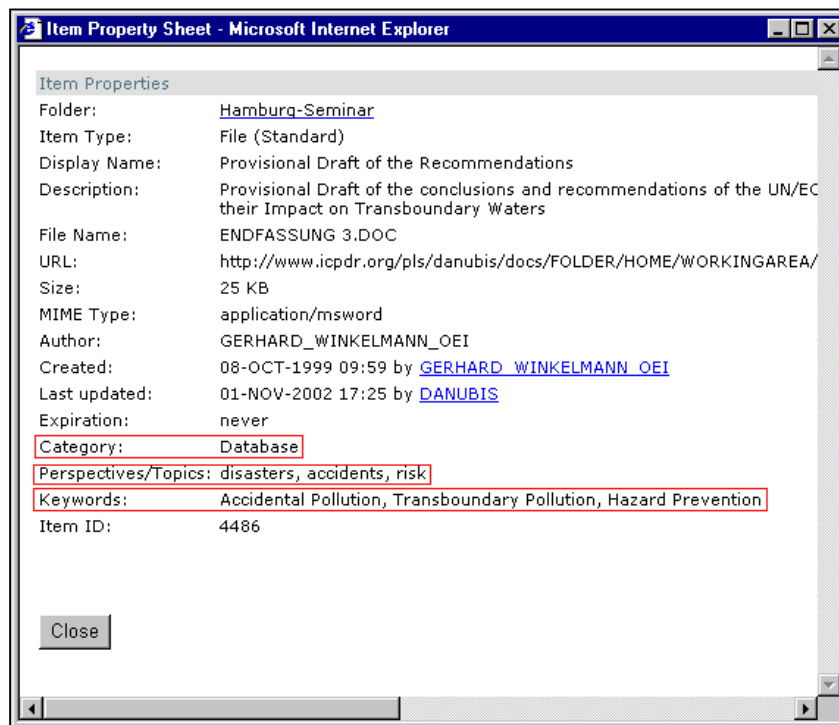


Figure 25: Item property sheet III

Example 2 (Figure 24) shows in contrary nicely how fields are more or less properly entered: a rather extensive description, indications to Perspectives/Topics and Keywords. Unfortunately there has been no author indicated.

Example 3 (Figure 25) finally comes up with two problems: 1) Although the “MIME Type” is indicating a Word document, the “Category” is speaking differently of a “Database”. So, what is it now, this information object? Document or database? Furthermore in comparison to example 2 it seems that the two fields “Perspectives/Topics” and “Keywords” have been switched: the keywords give rather the topics, the other field list keywords.

These three examples show a common problem: Although attention has been paid on the development level to provide a platform for exact and proper documentation, the people who enter these data either don’t do it at all or very differently. The objective must be to obtain the same metadata from five different people when

entering the metadata for a given document. On the level of “Perspectives/Topics” and “Keywords” a controlled vocabulary can easily be deployed to channel the use of a specific, harmonious set of semantic words. In addition, one person should be engaged to control the quality of the entered metadata.

7 Recommendations

Whatever goal one is trying to reach, the development of a simple, easy-and-fast-to-understand user interface (“Keep it simple, stupid!” – the KISS principle) can never be underestimated. Features that are familiar to the developers and core users often provoke the appearance of a big question mark in the eyes of the general user, and may lead in the next step to irritations and eventually frustration.

As already mentioned, the most important “rules” for the development of an successful IS are:

simple interface – clear structure – easy navigation – logical labelling

The user experience honeycomb diagram¹³ shows in a different form the factors involved in user-centred design. It helps to define priorities in web site (re-)design and shows all major priority issues at play.

Much of what has been already discussed in the preceding chapters builds the link to these segments. Finally, the whole report is circling around these elements: Is the site useful? Is it easily accessible? Can one quickly find what one is looking for? Is the information of good quality? Do they matter to my work? etc.

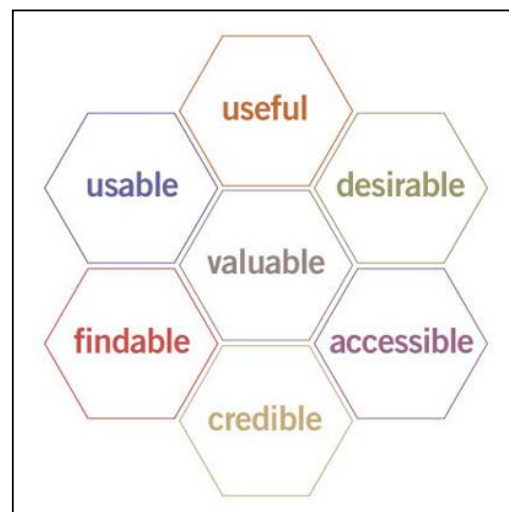


Figure 26: Honeycomb diagram

Thus, having already criticised, discussed and suggested, in this section we will only list the most apparent and urgent, aggregated proposals. Although no direct link has been established between the subjects described below and the honeycomb, the mention of this model should help to connect content & functionality to user needs. For example, “findable” refers to the possibility to use the search engine for accessing specific information pieces by entering keywords. But it refers at the same time to a clear structure of the “folders”, so that the user can “find” documents by browsing through the system. “Usable” can refer to the extent of functionality of the databases – how much does a user really need for a proper display of values. Or are the calendar functions really “usable”? And so on...

The following order of the items is not by random, but tries to follow, say: the construction of a house, beginning by laying a robust fundament, constructing then walls and later the roof, adding doors and windows, and later curtains and furniture.

¹³ Peter Morville, 2004, <http://semanticstudios.com/publications/semantics/000029.php>

So, some items are based on others (no (solid) wall without a (proper) fundament – so no successful search without good labelling). But at the same time, they interact – the construction of the floor in the house can't be separated from the design of stairs and the size of the rooms. There is a strong interaction between all elements. This means, that a “simple”, clearly separated listing does not correctly reflect the fact that we are speaking here about a “system”, i.e. a group of independent but **interrelated** elements comprising a unified whole. To give an example: The user needs influence the goals and visions for the IS. These needs affect the design of the site, which in turn is dependant of the underlying structure and labelling system. All these components influence the search system, which's success on the other side depends deeply on correct metadata and a defined labelling system or thesaurus...

Furthermore, the paragraphs below form a mix of recommendations from our side and questions we pose, but should be answered by ICPDR – including the inputs from headquarters and the experts in the countries. Thus, final recommendations on clear definitions of visions, goals and long-term strategy for the IS can hardly be presented by the authors, as too many questions cannot be answered and will surely take some effort within ICPDR to clarify and define. This said, our advice would go along the following lines: Follow the guidelines mentioned in the above chapters to develop a sound, well-organised and –labelled information system with clear and unambiguous navigation. In order to achieve this, the transition to another CMS is indispensable, but must be undertaken with great care, good research and consideration of the long-term goals. Concentrate on the direct need of the users, which is the access to meeting documents, the databases, the event-calendar (with less priority). By enabling easy access through linking, browsing and searching to these information chunks, users will automatically be attracted and motivated to explore further functionality and content of the IS. A better cooperation and exchange between the managing parties (i.e. system administrators, developers, TEs, and also the users) should be encouraged and ensured.

7.1 Clarify the user needs

After consultations with the TEs and some EG members, we can see a clearly defined and specific use: downloading documents in the context of upcoming meetings. There is only a minor wish to access additional information, either from other workgroups, from the public part of the ICPDR web site or from the databases. Thus, the accessibility, including the ease of browsing, searching, and asking (the three main ways of accessing information) should be made as easy as possible. Once navigation has become easier (through better labelling, clearer structure, more attractive design etc.), users will eventually use the whole range of possibilities of an IS more extensively.

Undertake an in-depth logfile analysis, showing major habits, user behaviours, user preferences. Try to highlight the most important, most-used functions. Figure out if people find what they are looking for; what customising functions they use; how much time they spend on the Personal Homepage; how they try to find specific information;

etc. This normally helps a lot to get a clearer picture of the way people use an existing IS – and as well, how they do not use it.

7.2 Redefine your goals

Redefine your goals. Do this not in broad terms (not as general as in the Information Strategy report), but describe in exact terms what you really want to achieve. For example: Provide a platform where the Expert Group managers can publish documents related to upcoming or past meetings for download for all participating members. Provide databases for access to detailed data in the form of tables for specific expert members. Add (carto-)graphic capabilities to enable as well the use of these databases for non-experienced users, for whom data tables are a numerical puzzle. These decisions help to augment your credibility.

7.3 Develop a conceptual model

Develop a conceptual model of and for the website. Be sure to place the user, rather than the website, at the centre. Figure out the “information clouds” and the “functional chunks” that you want to integrate. How do you label these parts? How do you organise them? How do they relate to each other? How do they play together?

7.4 Reorganise the structure

The entire hierarchical, topical and functional structure of the Danubis should be revised and reorganised. A clear, easy-to-follow and especially logically developed and well-labelled site structure is of utmost importance and would greatly facilitate finding the right content. Enable not only a management-hierarchical (e.g. clear separation between the EGs), but also a topical and geographical entry into the system.

7.5 Simplify the design

Until now, we have placed much emphasis on the more fundamental, structural elements, such as organisation, labelling and navigation systems. Nevertheless, this is only one side of the coin. The other is the development of an attractive and intuitive (web) design of the information system. Our impression is that some of the elements used within the graphical design haven't been correctly or efficiently applied in order to facilitate browsing and finding. Headings are not always intuitively recognisable as such, sometimes used as hyperlinks; titles not separated from content in form or style; colours not applied to indicate certain properties of the object.

The main interface, be it the public site or the Internal Working Area, should be simple. As the main objectives of the principal audience can be relatively well-defined – accessing documents in relation to meetings – there is no real need to add extensive functionality. In addition to the most basic needs, a couple of interesting and useful

features can be included, such as the Email alert, the “What’s new?” section, and a list of Upcoming events. If additional, more complex functionality is of a certain importance for the IS, then these could be de-emphasized by an “Advanced User Functions”-button.

The “Internal Working Area” should be closely linked to the Public Site, as this facilitates the use of both parts by the project members. The transfer of expertise (i.e. in form of documents) from the internal to the external section will rise with the re-design of the new public web site. Thus, the design and the structure of both parts should be consistent and coherent.

7.6 Revise the search

We recommend revising the search. This can be achieved on one side by assuring the correct entering of the metadata fields – especially “title”, “topic” and “keywords”. More specifically, both fields “topics” and “keywords” should be driven by a controlled vocabulary. This enables at least the use of a homogenous set of keywords. Even more sophisticated, a thesaurus could be implemented, using semantic relationships and term rotations.

On the other hand, the search engine should then search in the first step not in all metadata fields and the whole document, but only in a limited number of these fields, especially in “title”, “topic” and “keywords”. Only if the user does not find what he/she is looking for, he/she could be advised to search within all documents.

7.7 Review the databases

The databases are evidently not that much used; nevertheless, they form an important part of Danubis. Mainly used by some experts, the functionality could be enhanced and expanded by adding a (excel-) graphic and cartographic module. Additional functionality should be limited to a minimum; supplementary query features could be hidden from the principal page and made available through an “advanced users”-button. Data must be kept up-to-date for credibility reasons.

7.8 Generate a feature list

Set-up a list of features the IS should offer. Allocate a level of importance or relevance (e.g. “mandatory/critical”, “important”, “desirable”) and an explanation for the reason why this function has to exist. The list can be rather long, easily covering several dozens of features. The list will help you to

- find out more about your needs,
- define your functional requirements,
- serve as a basis for further improvements,
- lay the foundation for the search for an alternative content management system.

Only when you have finished this list of required features – and you stick to your decision to migrate to another CMS – you should engage yourself or somebody from outside to do some research on the CMS market. The probability is high that you can find a CMS that offers a high percentage of the functionality that you need. Perhaps the system offers the option to add modules, which could then be programmed in-house? A lot of the CMS products one can get for free or for a fairly inexpensive price are based on a lot of experience and a wide community of developers. It offers discussion forums and a palette of additional modules contributed by the community.

8 Annex I: Feature list

	Mandatory	Important	Use for
Personal Home Page			
Change password	●		
Account Info	●		
Preferences		●	
Customize - Personal Home Page		●	
Customize about this page	●		
Customize What's new			●
Customize Upcomming Events			●
Customize Internal working aera			●
Customize favorites		●	
Customize current discussion			●
Customize Notification status			●
Customize saved search			●
Customize owned folders			●
Customize items awaiting approval			●
Set language	●		
Left Menu			
Log In Log out	●		
Feedback	●		
Help	●		
folders			●
Expand - Collapse all folders			●
Quick search	●		
More search fonction	●		
Quick links			●
Navigation			
property sheet	●		
Add folder in my interest list			●
Send this fil to your email account	●		
Calendar			
Calendar events	●		
Choice date	●		
Refrech	●		
Search			
Items	●		
folders	●		
Advanced search	●		
More search options	●		
Meta search	●		
ICPDR Topics	●		
ICPDR Documents	●		
Languages	●		
Basic search	●		
Search tips	●		
Search with Google			●

Database			
Customize report	●		
Query options	●		
Run report	●		
Save	●		
Reset	●		
Reset to defaults	●		
Contact			
List of Email Adresses	●		
Contact			●
Send Email		●	
Send Group Email		●	
Personal details	●		
Mailto	●		
Search	●		
Export to	●		
Get Email List		●	
Discussion forum			
General discussion Forum	●		
Group discussion Forum			●
Start new topic	●		
Select Forum			●
Add this forum to your interest list			●
read	●		
Folder*			
Add an item	●		
Create folder			
Folder properties	●		
folder style	●		
Edit Folder	●		
View Folder	●		
Add an item after this item	●		
Edit	●		
Delete	●		
Add a subitem	●		
Copy	●		
Move to another folder	●		
Item bulk Action	●		
Administration	●		

* : Home : GEF Assistance to ICPDR : Danube Regional Project 2001 to 2006 :
Test folder for UNEP-GRID