To Arrange the Window - the Creation of an Integrated Local View on Information Diversity

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Abstract

The way our patrons search and use information resources has already changed substantially, but the shift to new technologies is not yet completed. Currently new information is mostly coming via "the screen", at least in the STM disciplines (science, technology, medicine). The challenge for libraries nowadays is, to arrange the window towards the bulk of available information according to the needs of different users. Several measures of integration are needed to achieve this aim:

- Instead of supplying the information physically, we now have to provide quick access to different information systems, as far as possible integrated, and to enhance these systems with local enrichments (e.g. availability, local views or filters).

- Beyond journal articles and books we have to integrate other media like photos, videos, or even scientific data. Moreover, the scientific and scholarly information is going to change the media format from paper to electronics, which we should take into consideration in our efforts.

- We have to appreciate that library services are just a small contribution to the whole environment of learning, teaching or research at university. People should be served according to their needs with all resources in an integrated way instead of splitting them up into small partitions based on organisational units.

To arrange the window means to integrate the necessary resources in a way that as much information as possible is included, but guidance and filtering tools avoid information overload. In order to direct our users to relevant information, it could be interesting to offer different views of the window for different target groups or, even more sophisticated, to make offers that can be personalised. At best, the view through the window could be changed from a beginner's or learner's perspective to an expert's or researcher's view. But even within a single search session, the needs can evolve from overview to details.

In the presentation some approaches to arrange the window are shown with examples from German libraries and consequences of the integration measures for the whole library, including services and facilities, are highlighted.

Introduction

Libraries have always been a window to abundant information. However, the technology to deliver information has changed severely during the last decades. More and more, the window to information has got the shape of a computer screen - and, concerning this technology, we have seen a quick development, too. In my personal memory, it began with green letters on black screens and now we arrived at quite comfortable flat screens and notebooks (or even tablet PCs and handhelds) with high resolution displays. But, however, this change is still going on and I suppose that the development of electronic ink[1] and the respective readers[2] will be an essential part of the evolution. This technology has the potential to drive the transition to a widely accepted use of documents in the digital format - omitting the paper.

Of course, these technological changes implicate a substantial challenge to libraries - and to librarians. I will try to give a short overview of the consequences to information searching by our patrons and the adaptation of our offers. The aim of our efforts should be to develop our traditional services of collection, documentation and making accessible the information for our users to a "library window" as a user-centred point of information.

Of course, my own perspective is affected by my job in a medical library. However, medicine is always one of the disciplines, where technological changes are adopted quite early and therefore this might be of interest to other disciplines, too.

On the other side of the window: what to look at

For a long time period, media were dominated by printed journals and printed books. During the last years, however, digital content has gained increasing importance, and in some cases, e.g. for medical journals, the electronic version is now used predominantly. Just recently, the digital available material has been expanded enormously to pre-digital times as most big publishers now offer electronic backfiles to their journals (in many cases back to Volume 1). Therefore, for journals, most of the transition to the digital format is already done. This is at least true for our patrons perspective. Libraries still have to do the last steps, the omission of the print version and measures for long-term preservation of the digital content.

For books, the transition is still more in its beginnings. At present, the use of reference works in digital format is getting increasingly popular. For other scientific books, the offers in digital format are just emerging. However, the development in this sector might be quite speedy - and technology-driven. The occurrence of e-ink and the respective readers are good preconditions for a fast acceptance of e-books. With this technology, most of the usability barrier for e-books will disappear. Instead, the advantages of the digital media as e.g. search functions, hyperlinks and, among others, simply weight and portability will force the transfer.

However, with the digital format, there will be much more opportunities than just a transformation of the same content to another format and its enrichment with some additional features like hyperlinks. The boundaries between different media formats like text, pictures, audio files, videos or even original data will shrink. They can be incorporated into one another and we already see an increasing impact of visual media. More interaction between

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[1] See: http://en.wikipedia.org/wiki/Electronic_ink or the manufacturer's page: http://www.eink.com (all links checked last time on 15.5.06).

[2] See e.g. the ILiad from iRex (http://www.irextechnologies.com/shop/products/iliad.htm) or the Sony Reader (http://products.sel.sony.com/pa/prs/index.html?DCMP=reader&HQS=showcase_reader).

author and audience or between different authors will be possible and version control might be necessary. Probably first in teaching materials, mixed e-media with a combination of different media types that support e-learning will get increasingly popular. In science, original data will get more accessible and incorporated in published material - or even gain importance for themselves like this is already the case e.g. in genetics or climate research.

Integration of the different media to a single window

Although the diversity of media is increasing, as described above, our users want to get access to the relevant information just in one search box - you know it from Google. This is the challenge we have to face and so we have to try to integrate the search for the different media into one window.

Even considering the singularities of metadata for different media, there seems to be no fundamental obstruction to merge most of them into a single catalogue. For example, the catalogue of the Wellcome Library[3] opens up a great deal of different media, including bibliographic information on books and journals, but also pictures and "moving image and sound". However, often it is preferred to separate different media into different catalogues and to combine the search possibilities within a meta-search. Of course, meta-search engines get increasingly popular and allow to integrate not only different media, but also collections from different origins. There are lots of examples, some relevant in the medical sector are e.g. Metafind[4], again from the Wellcome Library or "Entrez - the Life Sciences Search Engine" [5] from the NCBI, which combines a vast amount of bibliographic and genetic data in one box. A German solution for the parallel search in various databases is MedPilot[6].

Integration of library catalogues

In a connected world, there are arguments not only for the integration of different media, but also for the integration of the catalogues themselves. Some years ago, we had local card catalogues for local collections, although there were some regional or even national collections of the cards. Today, many of the catalogues are local, but they include digital material, which is often physically not located in the library but is licensed and hosted on distant servers. The next step that has already been reached in many cases, is the hosting and integration of the catalogues and detaching them from physical location - with the correspondent benefits.

The first, very obvious advantage for an integration of catalogues is, of course, that the processing of the bibliographic data has just to be done once and not separately in each library. With web-resources even the "location" is mostly the same for different libraries and this indication has changed from a location mark to a web address. For licensed material the only remaining local information is a kind of holding flag, which has to be added for each library. Not even this is necessary for free resources on the web. With the increasing importance of open access, the borders of local collections become heavily perforated. Of

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[3] http://catalogue.wellcome.ac.uk/

[4] http://library.wellcome.ac.uk/metafind/

[5] http://www.ncbi.nlm.nih.gov/gquery/gquery.fcgi

[6] http://www.medpilot.de/

course, for free material it becomes increasingly attractive to collaborate in the collection and maintenance of bibliographic data.

For adding local information to integrated catalogues, there are different approaches (that usually do not exclude one another):

- A simple listing of the different holdings as e.g. in the German Union Catalogue for Serials (ZDB)[7].

- The selective extraction of data to a local catalogue. This is also realised with the ZDB, which offers selective data transfer to local systems.

- Showing the local availability with a linking tool. For example, the LinkOut service of PubMed[8] is widely appreciated in the medical community. For other databases linking services[9] are often used to direct to local information.

- The most distinguished integration might be a local view on an integrated database. A good example is the Electronic Journals Library (EZB).[10] This is a collaborative catalogue for e-journals of predominantly German libraries. Such an integration works also for books. Our own catalogue is hosted by the Freie Universität Berlin as a separate admin area with our own sight of the data.

In the case of journal articles, the trend of searching by our users is generally shifting from the level of journal titles (and browsing within the journal) towards the article level. Of course, at this level, there are no local solutions. We basically have to rely on the various bibliographic databases and add local availability information where necessary. For the integration of the different databases a meta-search engine is necessary and within this frame, the enrichment with information on local availability is also possible. For example, the German meta-search engine MedPilot is able to show local availability. This is done very elegantly with a localisation of a user via check of the IP address on the one hand and taking the holdings for the respective institution given in the EZB or in a link resolver on the other hand. The offer is very helpful to German medical libraries, as most of them participate at the EZB at journal level and in this way they get local holding information at article level without additional expenditure.

Beyond: Integration of information in the professional environment

The web is not only dominating as a window to information, but the majority of our professional working processes become increasingly web-based. For example, teaching and learning get into learning management systems (LMSs), administration tasks are often handled in enterprise resource planning systems (ERMs), in health care there are increasingly systems of telemedicine and so on. Often, these different systems have to interact and the user interfaces are, hopefully, tailored to the needs of the users and their workflows.

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[7] http://dispatch.opac.ddb.de/

[8] http://www.ncbi.nlm.nih.gov/entrez/linkout/

[9] as e.g. eg. SFX from ExLibris (http://www.exlibrisgroup.com/sfx.htm) or LinkSolver from Ovid (http://www.linksolver.com)

[10] See our view on the EZB: http://rzblx1.uni-regensburg.de/ezeit/search.phtml?bibid=MBCB&lang=en; however it is not very useful that there are two separate databases for print and electronic journals in Germany (ZDB and EZB).

Of course, we cannot separate our information offers from such user interfaces. Gathering information is an essential part of many professional tasks - and that is the point, where we have to serve our patrons.

The basic principle might be illustrated best with clinical information systems. Ideally, they should not only be located at a prominent place on the medical library's web page, but they should also be integrated into clinical working environments like digital patient files or provided to handhelds. This would represent the transformation of bedside reference from the small pocket books to the digital era.

Information Overload?

So far, this paper was about collecting information from various media and combining them with even more content from professional workflows. However, this might cause a problem: If too much information details cover our window, we might not see the basic outline of the picture anymore. Generally, the problem to find any information on a certain detail has diminished tremendously during the last years, but instead it is an increasing challenge to filter the abundance of information in an efficient way to get the most relevant information within a reasonable time span.

For example, if you look for *Helicobacter pylori* [11], you get more than 6 Mio hits in Google. Even PubMed returns > 20.000 hits and if you limit the search in this database to reviews on therapy, there are still more than 2.000 hits left. This means lots of material, which might be quite complex, if the aim would be, for example, just consumer health information or bedside consultation - and there are many other sources that could be added to an integrated search.

To avoid information overload, we have to organise the window so that the user can perceive the outline of the picture, that is the relevant information. However, what is relevant is depending certainly on the given situation. Depending on the category of information required and the profundity of it, the window has to be arranged differently. Therefore, we have to look first to the information itself.

All information is equal?

As I see it, today information might be arranged in several categories according to media format as e.g. pictures, text media or data, although these categories might change in the future for example to learning media and science media. In each of the categories, there might be a kind of information pyramid with very comprehensive information at the top and a broad basis of detailed information at the bottom (see Fig. 1). A separation of such an information pyramid into several layers of profundity might best be tried for text media, where the range is from reference works at the top to grey literature at the bottom (see Fig. 1). Of course, for this huge category, such a separation might also be most useful to guide our patrons. As a first step, it is quite easy to emphasize reference works and to single them out from other resources. This is done by categorizing the sources - as subject librarians do since a long time.

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[11] *H. pylori* is a bacterium that has been associated with certain gastrointestinal diseases. See also: Nobel Prize in Physiology or Medicine 2005: http://nobelprize.org/medicine/laureates/2005/index.html. All searches done on 21.4.06.

comprehensiveness / profundity

ad hoc **reference** works
(eg. bedside, dictionary)

reference works
(textbooks,
clinical information systems)

metadata
of **monographs**
or **review articles**

(visible
web)

fulltext
of **monographs**
or **review articles**

pictures

audio files
video files

metadata of
journal **articles**

mixed e-media

journal **articles**
(fulltext)

grey literature
(proceedings,
thesis, …)
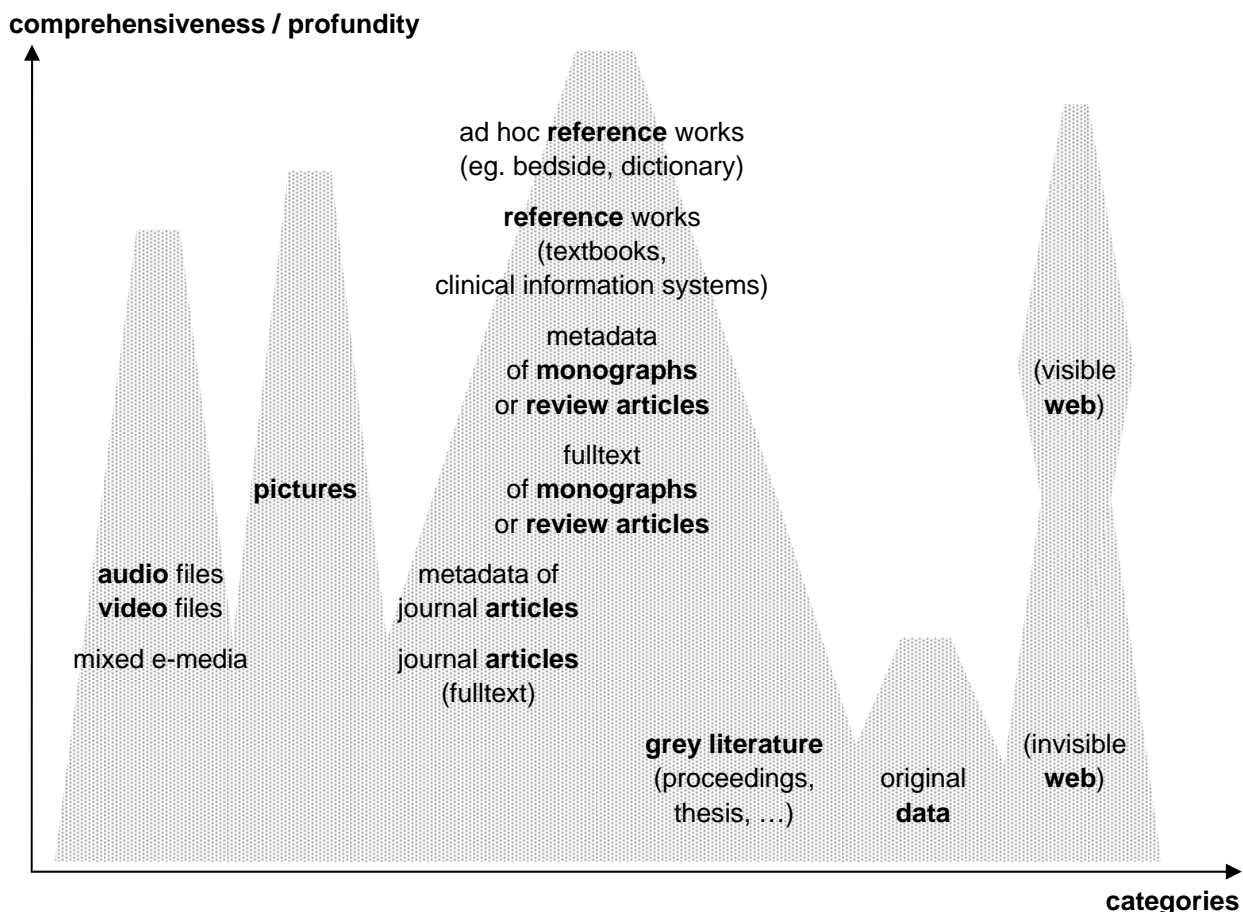
original
data

(invisible
web)

categories

Fig. 1: A tentative attempt to sort information from different resources according to comprehensiveness and category. (Note: The category "web" should be correctly named "Other information on the web" as all other categories are nowadays web-based, too.)

A hierarchical approach with limited technology

A very basic attempt to point out reference works as a comprehensive source of information is shown in Fig. 2. The most fundamental and interdisciplinary reference works[12] are placed directly on the homepage of our library. To follow up the example from above on *Helicobacter*, the user can find basic information with a few clicks in these resources. For digging deeper, we have compiled our "Virtuelle Handbibliothek", a digital reference shelf. Here the user can find sections the different subject categories as e.g. on "WC Infectious Diseases" or "WI Gastroenterology". At this step further down in the hierarchy, some special reference books are offered as digital content. As an ideal, in this virtual reference shelf the most comprehensive and important e-books for each subject category should be available.[13] As a

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[12] In our case: Roche-Lexikon Medizin Version 4.0, 1999: http://gripsdb.dimdi.de/rochelexikon/; UpToDate: http://www.uptodateonline.com; "Harrison's online": Kasper DL et al. (eds.), 2005: Harrison's Principles of Internal Medicine. - New York: McGraw-Hill: http://www.accessmedicine.com/.

[13] Actually, this is not achieved yet. The selection of reference books is still limited to a few providers and some less relevant e-books are still in the list.

last point in the listing for each category, we always refer to the respective offer of free e-books in the web for further information.[14]

on Library homepage:

• **Virtuelle Handbibliothek**
  oder direkt zu:
  Rote Liste | Roche Lexikon   ⇒
  UpToDate   ⇒ **basic information**
  Harrison's online   ⇒
  Sprachwörterbücher

TOC for the disciplines in the "Virtuelle Handbibliothek":

• QZ Pathologie, Onkologie
• W   **Medizin allgemein**
• WA Öffentliches Gesundheitswesen
• WB **Medizinische Praxis, Innere Med**
• WC Infektionskrankheiten
• WD Krankheiten mit systemischen, met
      umweltbedingen Ursachen
• WE Skelett, Muskulatur

List for a discipline in the "Virtuelle Handbibliothek":

WC INFEKTIONSKRANKHEITEN

• Brogden KA [eds.] (2002): Polymicrobial Diseases. - Washington (D
• Dressler S, Wienold M (2003): AIDS Taschenwörterbuch. - 7., neu b
• Gorbach SL (2001): 5-Minute Infectious Diseases Consult. -
• Hoffmann C et al.: HIV.NET 2005. - Steinhäuser   **further**
• Hoffmann C, Kamps BS [eds.] (2003): HIV Medicine. - Flying Publish   **relevant**
• Kamps BS, Hoffmann C [eds.] (2003): SARS Reference. - Flying Pub   **online**
• Knipe DM (2001): Fields Virology. - 4th ed. Lippincott Williams & Wil   **reference**
• Lang W et al. (2000): Tropenmedizin in Klinik und Praxis. - 3. völlig
• (2003): Red Book: report of the Committee on Infectious Diseases.
• weitere e-books dazu in KELDAmed und in FreeBooks4Doctors
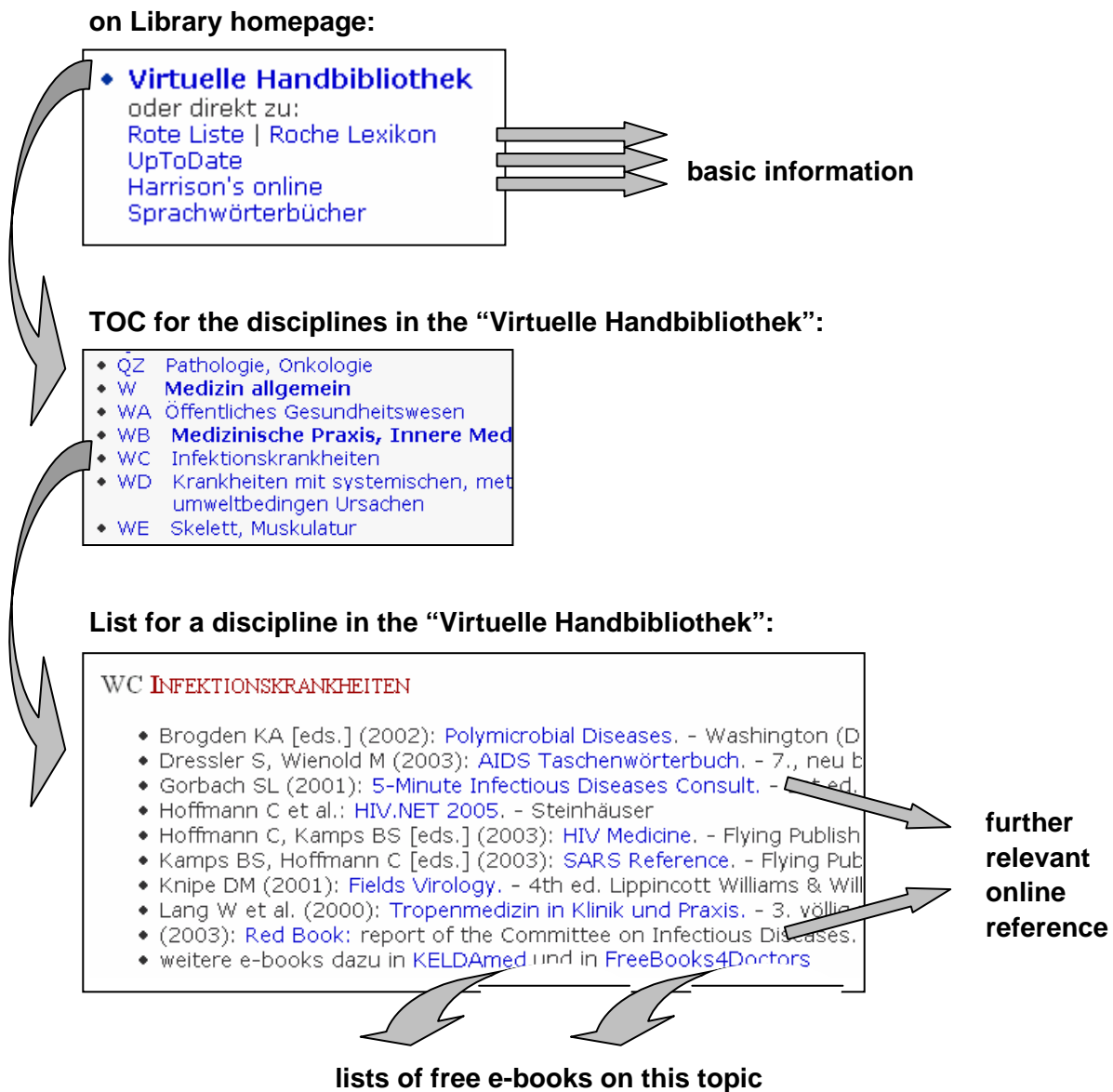
lists of free e-books on this topic

Fig. 2: Basic attempt of guidance of our patrons to comprehensive literature (in this case to infectious diseases) in the Medical Library of the Charité (http://www.charite.de/ch/bib/, soon: http://www.charite.de/bibliothek/).

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[14] These are FreeBooks4Doctors: http://www.freebooks4doctors.com/ and Kommentierte E-Learning Datenbank: Medizin (KELDAmed): http://www.ma.uni-heidelberg.de/apps/bibl/KELDAmed/. Another link to guide for further reading to our online catalogue for each discipline is planned.

Draft for an integrated "Search Centre"

Of course, the guidance in Fig. 2 is restricted to a hierarchical approach to reference works. To integrate it on a broader basis, more sophisticated technology like meta-search engines are needed. As in the basic approach described above, a hierarchical approach over several levels is suggested as a framework, where to aim at (Fig. 3 and 4).

The first component of such an integrated approach would be a concise "Search Centre" box with a limited number of categories and options (Fig. 3). Radio buttons could even restrict the selection to one category. Online and print resources are not separated - deliberately, as users usually are interested primarily in the content and not in the media format. The database(s) searched could be modified by the selection of a specific target group, which is indicated in Fig. 3 as a drop down menu for disciplines (this could also be other criteria, e.g. student or staff). The settings would also determine, whether a search or a meta-search would be performed. For example, for "journal title" there would always be a simple search, whereas for "journal article", there might be a meta-search for most disciplines.

The "Search Centre" itself should give a quick access to the most relevant search possibilities and link to results as direct as possible. The next hierarchical step for less important options could be a page for "Expanded search options" (Fig. 4). On this page, more resources, meta-search across categories and search limits could be offered. Note, however, that it is not tried to put all the resources and possible options within the expanded search, but there is a third hierarchical level, indicated with the "more" tags.

The hierarchical approach already guides the user to a certain extent to the most relevant resources, which means that information literacy is given implicitly, esp. for beginners. Additionally, help features could be incorporated in this system using again an hierarchical approach and arranging them cascading from short information to tutorials.

The integration of the "Search Centre" into the institution as a whole is done in two directions. First, the small "Search Centre" box would allow a placement into different windows, which means to various professional environments.[15] In the opposite direction, the box aims for an integrated search far beyond library offers, as indicated with the local phone book in the "Search Centre" and the Charité column in the expanded options.

The arrangement of the results window might differ, dependent on the searched categories. For meta-searches it might be useful to group the results into different tabs as this is done also e.g. in PubMed. In this database even a certain level of hierarchical guidance is given as reviews are shown in a separate tab as a default setting. The sorting within some result sets might be easy. For example, for a search on journal titles an alphabetical listing would be most self-evident. However, in other cases, a ranking according to relevance would be desirable. Although it might be difficult to distinguish between more or less relevant books, reviews or articles, search engines or book sellers have found their algorithms, that might also be useful for libraries. An additional local parameter for this purpose in libraries could be the local usage data.

Of course, a given result set is often not the final outcome of a search, but has to be modified or is even a stepping stone for a better search. Therefore resorting or merging of result sets and especially refinement functions are important features that users do not get trapped in a dead end, but can continue the process of searching at every point.

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[15] The "Search Centre" could also have other technical realisations. See e.g. the Search Toolbar from the ZBMed in Münster, which has resembling functions: http://zbmed.ourtoolbar.com/
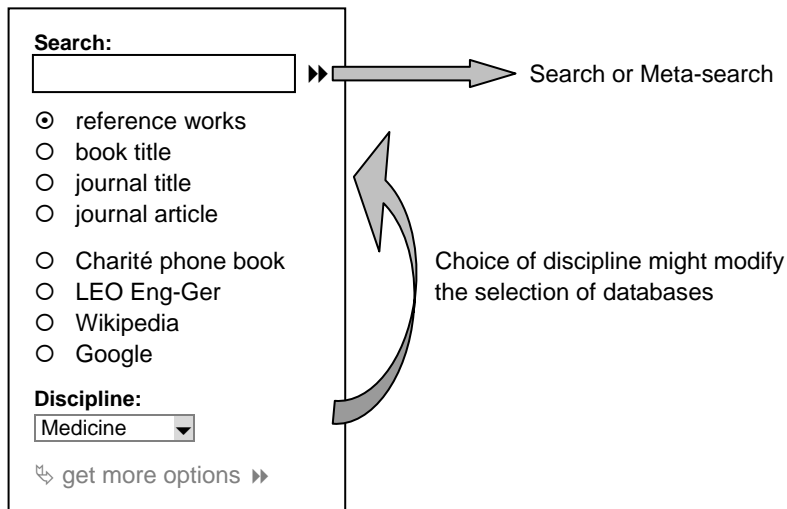
Search:

◉ reference works
○ book title
○ journal title
○ journal article

○ Charité phone book
○ LEO Eng-Ger
○ Wikipedia
○ Google

Discipline:
Medicine ▾

↳ get more options ▸▸

→ Search or Meta-search

Choice of discipline might modify
the selection of databases

Fig. 3: Draft for a local "Search Centre", that can be located on the library's webpage, but also anywhere else.

↳ get more options ▸▸

Search:

▸▸

☐ **titles / metadata of**	☐ **full text of**	☐ **AV media**	☐ **Charité**	▪ **other**
☐ reference works	☐ reference works	☐ pictures	☐ phone book	▪ fact databases ▸▸
☐ books	☐ books	☐ videos	☐ web	☐ impact factor
☐ journals	☐ journals	☐ audio	☐ forms	☐ Google
☐ articles [all database▾]	☐ articles	☐ mixed e-media	☐ supplies	☐ Wikipedia
☐ guidelines	☐ guidelines	↳ more ▸▸	☐ publications	☐ LEO Eng-Ger
☐ thesis	☐ thesis		☐ pat. handouts	☐ phone book (D)
☐ inst. repositories	☐ inst. repositories		☐ data server	▪ public traffic ▸▸
↳ more ▸▸	↳ more ▸▸		↳ more ▸▸	↳ more ▸▸

… and limit to:

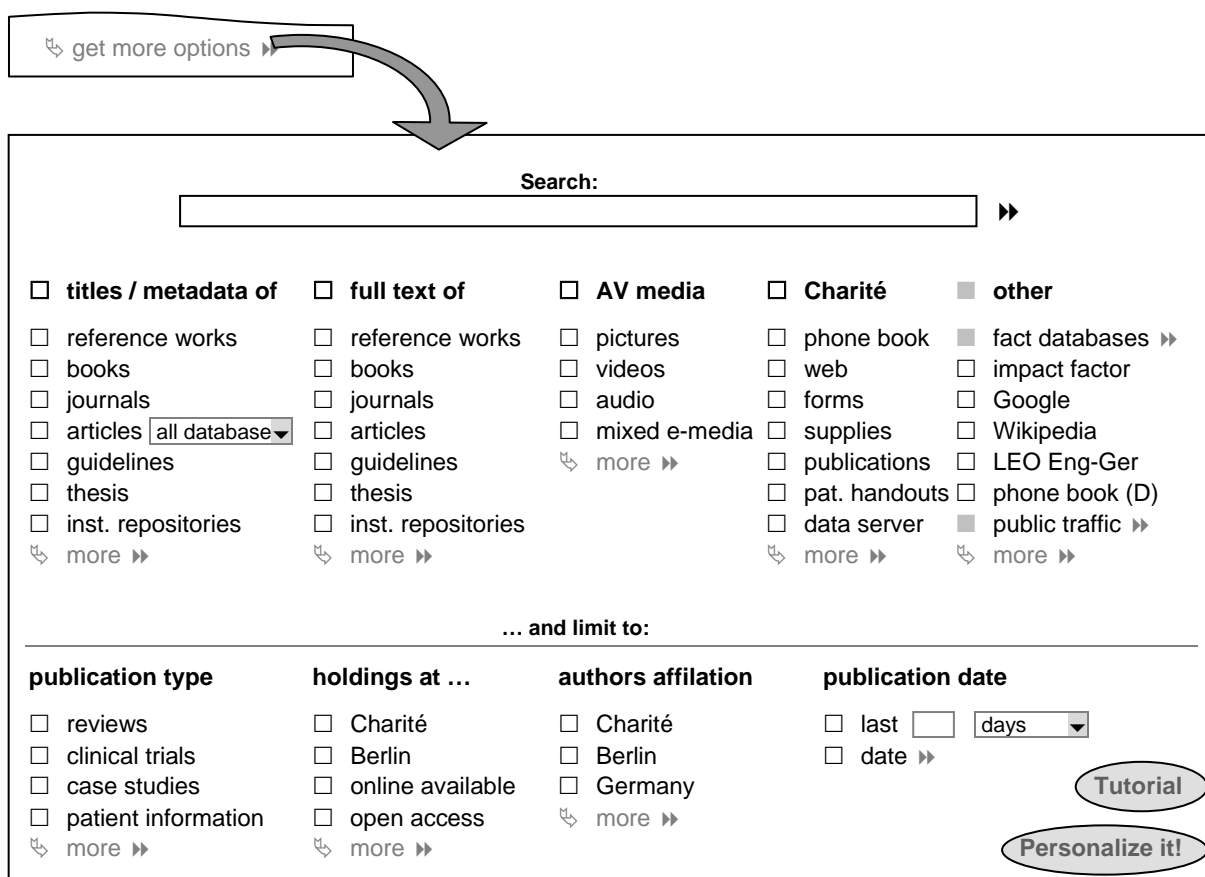| **publication type**	**holdings at …**	**authors affilation**	**publication date**
☐ reviews	☐ Charité	☐ Charité	☐ last [ ] days ▾
☐ clinical trials	☐ Berlin	☐ Berlin	☐ date ▸▸
☐ case studies	☐ online available	☐ Germany	
☐ patient information	☐ open access	↳ more ▸▸	
↳ more ▸▸	↳ more ▸▸		

⬭ Tutorial

⬭ Personalize it!

Fig. 4: A framework for the expanded options of the "Search Centre". Of course, the design could be improved with the features provided commonly by meta-search engines like tree structures, drop down menus (as indicated for the article databases) or additional buttons.

Prospects: personalisation and socialisation

The evolution of searching and ranking technology is not at an end, yet. For many tasks, we see a move from desktop-based to web-based systems, which opens completely new possibilities. With this technologies it is not only possible to save the searching interests and patterns of individual users, but even to get input from other users, who have resembling patterns.

Probably, there will be also a shift from searching ("pull") to push technologies. TOC alerts and explicitly stated search alerts are quite common in the meantime. However, with software, that interprets social patterns, it might be possible that a user gets served with new, for him quite relevant information, he never asked for himself.