

The Medical Library of the Future: Be prepared for the invisible

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Introduction

In this paper I will present some of the past, current and coming steps of an academic medical library towards customer satisfaction in the digital age. The following transitions will be addressed:

- From printed to electronic journals
- From printed to electronic books (the results of the first German study of e-books will be discussed and usage of printed vs. electronic books compared)
- From traditional to mobile library services

Transition to electronic journals

Building and managing a journal collection is one of the greatest challenges in library practice in these days. Journal prices had tripled in the last 10 years and library budgets remained almost flat. There are three goals a library should achieve regarding access to research publications:

1) Optimise the journal collection. 2) Enhance access to information, and 3) Using the benefits of Open Access. The way to attain these goals will be discussed in detail. Not only profound managing skills are needed to address these problems but also a sound reputation in the faculty.

How to optimise the journal collection?

There is nothing so easy and so difficult as to optimise the journal collection of the library. The crucial question is not the optimisation itself but if your clients will honour it.

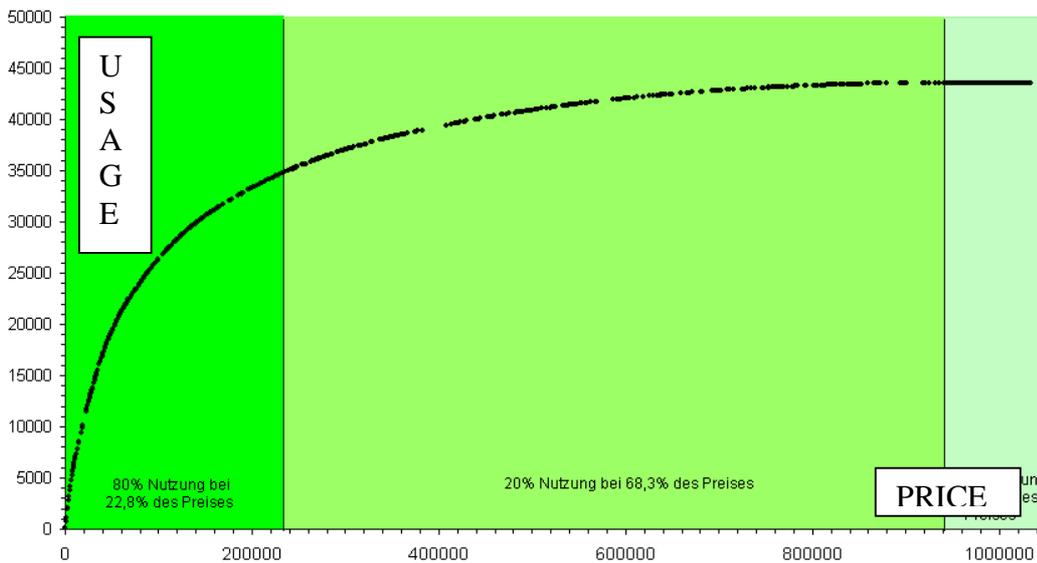
- Calculate the cost effectiveness of journals
- Estimate the value of the complete collection
- Calculate the cost effectiveness of big deals

The first step is to calculate the cost effectiveness, e.g. subscription price divided by usage, of each single journal. This could be done with either printed or electronic journals, but you should stay to the respective format.

	New England Journal of Medicine	American Journal of Medical Genetics
Price	480	10.906
Usage	650	27
Price / Usage	0,74	404

1. Cost effectiveness of journals

The cost/usage ratio of printed titles at the library of medicine in Münster ranged from 0,74 € to 1.200 € per single use. On average, electronic journals are much more cheaper with often (e.g. Nature, Circulation, JBC) only cents per use. This is mainly because of the large number of downloads, which exceeded the print use on average by a factor of 25. (The NEJM decided to be a quite expensive title in the electronic age with electronic costs much higher than before.) Overall, the cost/usage ratio of eJournals ranged from 0,06 € to 1.918 €.



2. Value of the complete collection

The value of the complete collection is estimated by enter the price and usage of the most cost effective journal, e.g. NEJM, into a coordinate system, and continue with the respective values of the next most cost effective journal cumulatively. As you can see, a saturation curve results. The climax of this curve indicates the overall usage of all journals at the overall journal budget. Typically, 20-30% of the budget (and less than 50% of the journals) accounted for 80% of the usage (dark). The remaining part of the budget (middle, 60-70%) was spend for very low use journals. The last part of the journal collection accounted for no usage at all (light, 10%). These titles and some of the middle area could be offered far more economically by document delivery services "just in time". 180 titles were not used a single time.

This curve prompts you to get a view of the overall economy of the collection. It shows clearly how many usage you get for how many money. It was used successfully to promote necessary changes of the journal collection to administration and faculty. (The breaks in the line were not mistakes but major jumps in the collection because of heavy increases in usage or in price. The Journal of biological chemistry is responsible for a major jump in usage, the other journal of major jumps in costs.) Now you can define any point of this coordinate system as your desired "point of operation". This decision will be most likely driven by the money available.

3. Cost effectiveness of big deals

This evaluation holds true for printed serials and single purchased electronic ones. But most likely your electronic journals will be bundled by publisher. This prevents you from cancelling single titles. Therefore evaluation no longer makes sense on a per title basis, but should accelerate to a per publisher basis.

In that regard, three major groups of publishers could be recognized: The first group consisted of Nature, Highwire, and Cell Press, which were the most cost-efficient publisher when it comes to e-

only publications: Every download costs only 44 to 84 Cent with Highwire on the top, Cell Press shortly behind and Nature on the third place. The next group were providing more expensive journal articles. These are price worthy contracts for a number of good used journals. In this group we found Springer, Wiley, Harcourt, Lippincott, and Blackwell. The downloads for articles of the third group was most expensive. These were publishers, which offer quite a number of low-used but high priced journals, like Elsevier, Karger, Ingenta, and Kluwer.

E-Journals

e-Journals come with 2 major benefits:

1. They could be accessed instantly at each ones desktop.
2. In combination with journal article databases like PubMed they offer convenient one-stop shopping. There is no barrier between finding articles and reading them.

Through the top medical database PubMed, 2.5 Mio. articles can be accessed as full-text. To increase the visibility of the library we seized the opportunity to put our logo in this database. Now every user will see the disclaimer "This fulltext article is brought to you by your medical library".



Express Document Delivery

However e-journals have also one pitfall: They are no solutions to the journal price crisis! As a consequence and add-on, we offered our users a highly reliable and fast document delivery option for free. We chose subito as the document delivery option of choice because only subito could guarantee quick delivery within 24 hours - a rarely needed but most welcomed option especially in the field of medicine. This is a premium service, so not every user is entitled to. If, they had to register in advance and request the library's permission. The personal information like name, working department, e-Mail, frequency of use, etc pp were stored in a user database. This database plays an important role in our services, as it enables us to know more about our users and to address them personally.

Open access

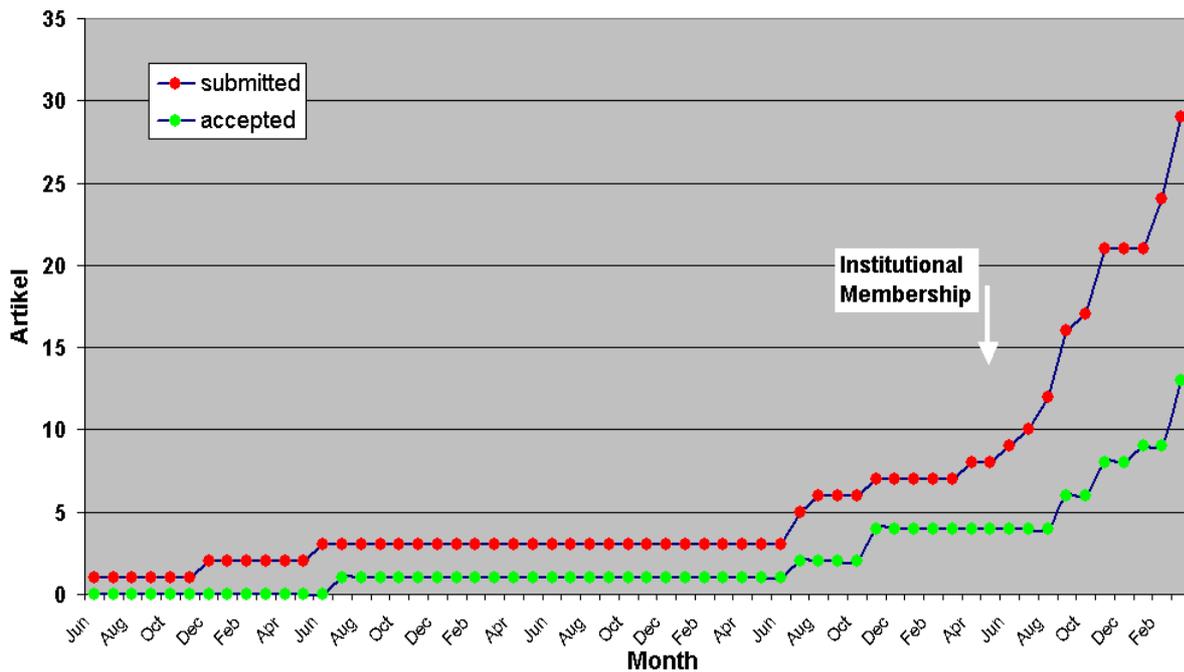
Regarding to recent studies, Open Access may be a possibility to save or to waste money - depending on how many paper the university publishes per year.¹ It's beneficial for the university to support the open access publications of their faculty - for example by becoming institutional member of BioMed Central -, because this is a viable way to publish, earn reputation, impact factors, compete with publishers – without giving away the copyright. In a nutshell it's about to leverage the library budget to put an end to ever increasing journal prices.² But the dean had to be aware too, that there is and will not be a open access only publication chain - commercial publisher will always be present, will be needed and will make their profit. As a consequence, libraries have to spend their money twice: First for toll access subscriptions and second for open access publication charges.

In the diagram you see the sudden and pronounced rise in submissions to BioMed Central after the library waives publication charges through institutional membership. This points to the power of libraries to change the publication habits of their faculty.

¹ Report of the CUL Task Force on Open Access Publishing Presented to the Cornell University Library Management Team August 9, 2004. <http://hdl.handle.net/1813/193>

² University of California: Resolution I: The University's Role in Fostering Positive Change in Scholarly Communication. http://www.slp.ucop.edu/consultation/slasiac/SLASIAC_Resolution_I.html

Papers of the Medical Faculty Münster in BiomedCentral



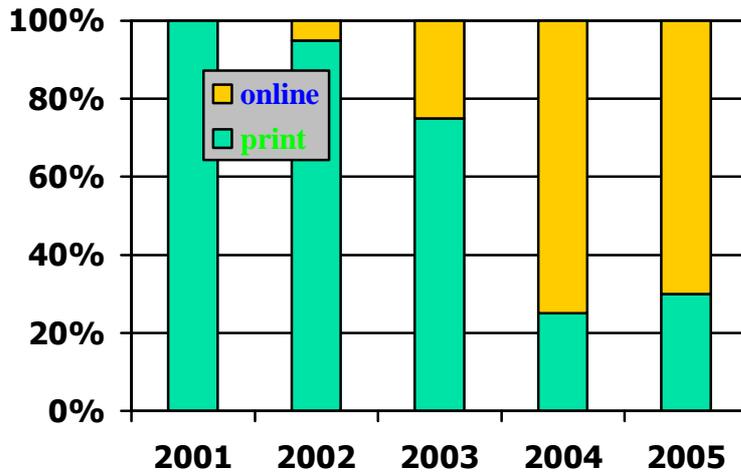
E-Books

The library evaluated the medical eBooks which were available at the market. Most important of course were the German eBooks of the publisher Thieme. The English books of the publisher Wiley, Nature Publ. Group, McGraw Hill, Oxford University Press, Urban & Fischer, and Lippincott, Williams & Wilkins were tested too.

In January 2003 we started a test with the major online book vendors. Fortunately we could persuade the German Publisher Thieme to participate in this study, because he was the only major provider of German medical eBooks at this time. Surprisingly, English language books - for instance these of Wiley and Lippincott (incl. such important books as de Vita's Principles and Practices of Oncology, Oxford Textbook of Medicine or Encyclopaedia of Molecular Medicine) - were used only a few times - on average not more than once every month, whereas with 70-times a month the use of German books were much higher. Interestingly, with almost 500 uses per month, the only student book (Thieme's Internal Medicine) was the top used book.

As well as with journals, there is also a transition on the monographs side of the acquisitions. Electronic books proved their value to our users. Since three years we offer electronic encyclopaedias and textbooks special for students needs and the students love them, according to statistics and enquiries. For example, within a few years, the library budget for English Literature has shifted dramatically to online only monographs (see below). But in contrary to the transition to eJournals, which amounted to 95% within 7 years and is almost finished today, the transition to eBooks will be a much slower process and maybe never be complete.

Library Budget for English Books



We expect that only about 30% of all acquired books will be digital ones at the end of the first decade of the new millennium.

The second difference in the transition process is: Electronic books will never supplement the printed collection. There a fundamental difference in the way electronic books are used by the students: Whereas printed books are still and will still - for the foreseeable future - be best suited for their learning needs, with their superior search and print facilities, electronic books will be excellent tools for quick reference, which is needed in problem based learning for example.

There are four steps in the development of the library:

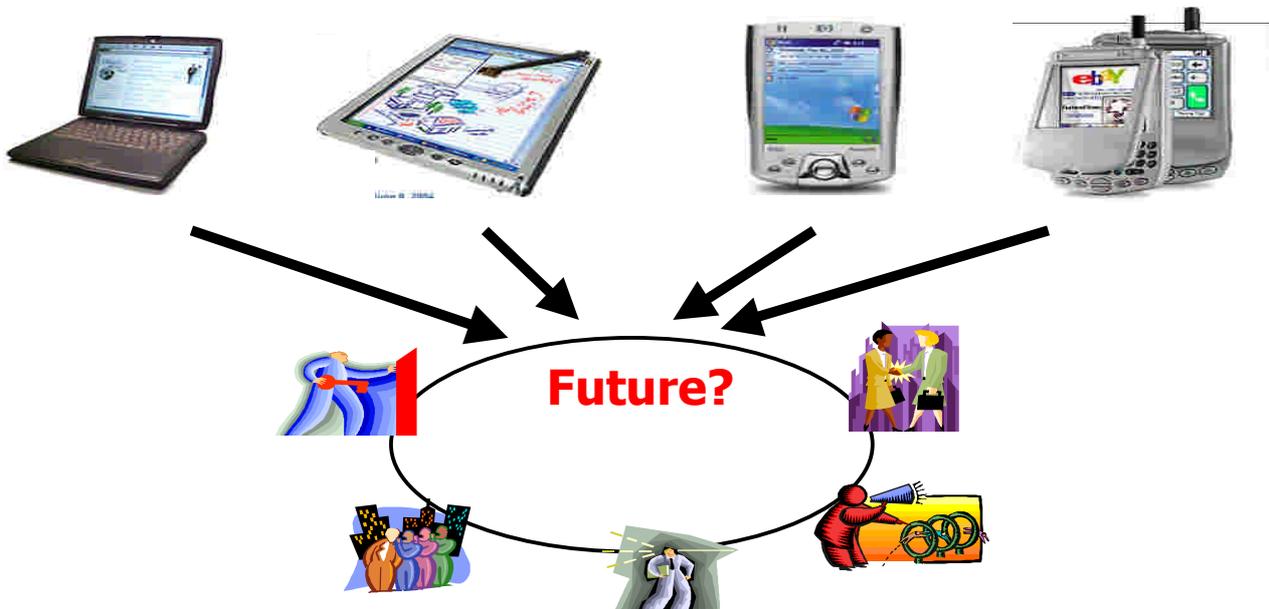
1. The first stage is the well-known, traditional library, which offers it's services only in the building. There is a single point of access, every user has to come physically to the library for using it's resources.
2. The next phase is called the digital library or "library without walls". More and more resources are digitalized and offered via the campus network or even the Internet. The user don't has to come to the physical library anymore, but could use any desktop computer world-wide to access the library's resources.
3. The 3rd step, the "Mobile Library" will make its services not only available at a physical place, let it be the library itself or the library homepage at the user's desktop computer, but to everyone everywhere with a handheld computer. As such, the library is mobile, e.g. is always at the point of need. The mobile library offers offline and online (WiFi) applications for tablet PCs, smart phones, personal digital assistants (PDA), and whatever device which may probably emerge.
4. The 4th (and last?) step will be addressed below.

Most medical libraries are already hybrids in the continuum between traditional / paper-oriented and digital / online-oriented libraries. The Medical Library Münster started a project to implement the Mobile Library as the next evolutionary step by lending out PDAs.

Why PDAs in the hospital?

- Questions arose at every time and place
- All information resources in need can be offered via the PDA
- Mobilisation of information increases quality of patient care
- PDAs are high-end devices (1GB-Memory, Wireless-LAN, VGA-Display)
- PDAs are an increasingly interesting market for vendors

The hospital is one of the "best" workplaces for handheld computer. Questions arose at every time and place, and all information sources in need can easily be offered via a handheld computer at the point of care: As the mobilisation of information increases, the quality of patient care increases too. US-American studies³ showed that patient care gets better and medication errors decreased, if the doctors used PDA-based pharmacopoeias.



Why PDAs in the library?

We lend out books on paper, why not books on PDA? The modern library uses the very kind of communication the customer chooses⁴. If the customer likes to read in bed the library offers a printed book. If he likes to search content, the library offers a digital book. If the customer likes to have a pharmacopoeia in his pocket the library offers an PDA. And maybe in the future the customer likes to have it all without carrying always a special device with him – and the library offers this too. Will the PDA be that special gadget? The library don't knows which futuristic devices the entertainment/computer/phone industries will invent, but for sure the library will offer content for it.

Since 2003, the Medical Branch Library of the University Münster successfully implemented a rental service for handheld computers. The library lend out seven PDAs, i.e. Pocket PCs (iPAQ 1930, 3870) and Palms (Tungsten E), for 4 weeks each. A total of 21 Resources were offered via these devices: E-books, Pharmacopoeias, Coding Schemes, Medline, Journal TOCs and abstracts, Evidence-based Medicine resources, Clinical & Laboratory Medicine Tables, etc. Some hundred researchers and clinicians are using the devices as well as the applications, which the library licensed campus-wide. The overall usage as well as the satisfaction rate and users needs were

³ Rothschild J. M. et. al.: Survey of Physicians' Experience Using a Handheld Drug Reference Guide. Proc AMIA Sump 2000:S.1125 <http://cim.usuhs.mil/pda/why.html> Rothschild and co-workers found that physicians and medical students are able to successfully incorporate PDAs into their patient care workflow. With the use of a drug information database (qRx, ePocrates), clinicians save time, improve knowledge for themselves and their patients, and possibly decrease preventable adverse drug effects.

⁴ Obst O: Mittwoch ist medinfo-freier Tag! <http://medinfo.netbib.de/archives/2005/04/20/460/>

evaluated. The library concluded the project by establishing three service areas for the handheld user community:

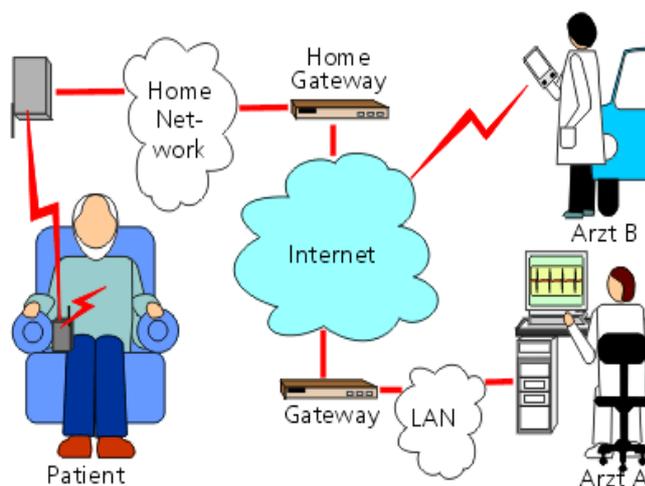
1. Lending of PDAs: The library as a storehouse
2. Providing applications and software: The library as a filling station
3. Technical Support: The library as a knowledgeable institution

The ubiquitous library

The next step beyond the mobile library will be the "ubiquitous library". What is the meaning of the term "ubiquitous"? Ubiquitous computing is defined as "computing without computer" or - more understandable - computing everywhere: Computing devices, which have become so tiny and omnipresent that nobody recognizes them anymore as devices or waste any thought on them. These devices will therefore be not only ubiquitous but invisible.

Ubiquitous Computing
Information Technology will be distributed
in the human environment,
instead of bundling them on the desktop.⁵

This 4th stage (or better: appearance, as these stages are not superseding but coexisting entities) of the library – the so-called "ubiquitous library" - will be in fact invisible, e.g. fully integrated into the continuous flow of information within and around us. There is no device to be switched on, it's always present – never mind.



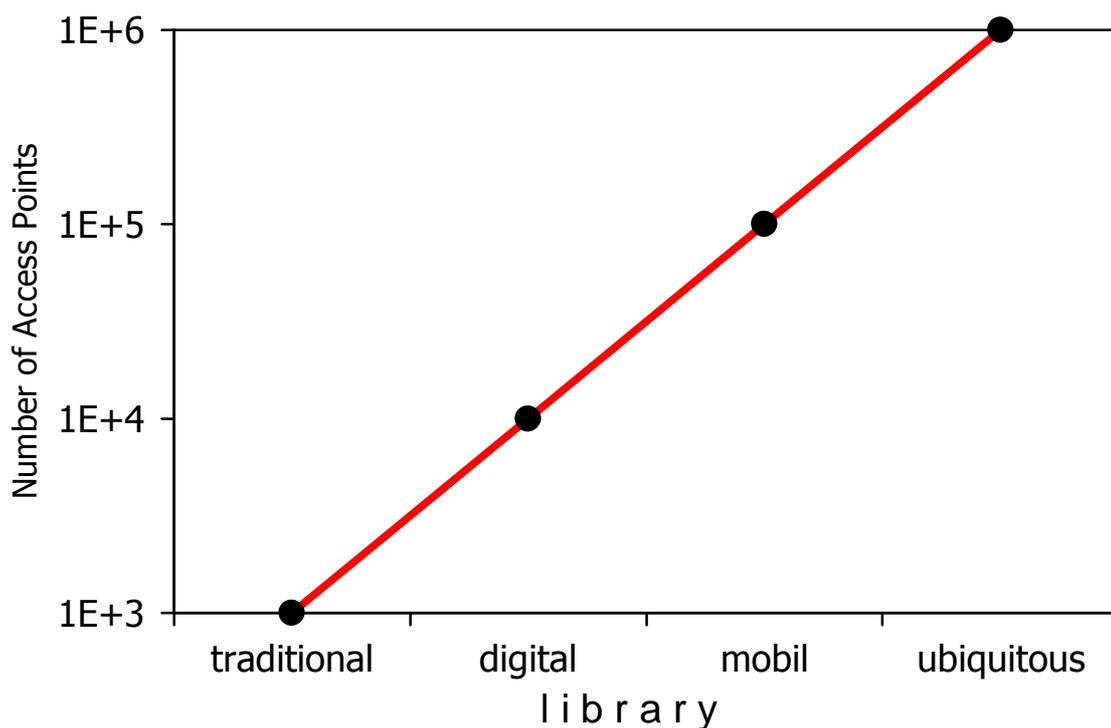
Many people and institutes are working on the idea of the Body Area Network. "The basic concept of BAN is [...] a set of mobile, compact units which enable transfer of vital parameters between the patient's location and the clinic or the doctor in charge. The vital signs data flow passes a chain of BAN modules from each sensor to a main body station, which consolidates the data streams of all sensor modules attached. It transmits the data to a home base station, from where they can be forwarded via telephone line or internet."⁶ BANs can be used for monitoring of vital signs to control individual health. On the patient care level, Body Area Networks (BAN) build of tiny

⁵ Winterer V-H: In omnibus rebus rete http://omnibus.uni-freiburg.de/~vowi/winterer_vt/inetbib/

⁶ http://www.ban.fraunhofer.de/index_e.html

gadgets such as speech-driven phones, virtual monitors, intelligent plaster and diagnostic tools (made of smart computing dust) will provide the physical infrastructure for interconnecting the human being with the surrounding infosphere.

In some years our daily life will be determined increasingly by "electronic assistants". In order to plan a cash transaction or to get necessary information, for many humans the grasp to the handheld computer (PDA) or to the laptop with attached cell phone will be routine. But that is only the preliminary stage of a future, in which electronic assistants and micro systems will be pervasive. Soon they will be a more integrated component of everyday life, without as such been noticed. We will find them within our living range or will carry them directly at the body.^{7,8}



With each further "stage", the number of access points to the information resources called "The Library" will increase by an order of magnitude. Thus, in the traditional world, there is a three-figure number of libraries in the university, and in the digital world a four- to five-figure number of Internet PCs. Mobile access points can be laptops, PDAs, smart or cell phones, here the number of entrance-entitled persons may well double to a six-figure number. Ubiquitous points of entrance are sewed in clothes or scattered in the environment - a seven-figure number might be rather still another underestimation.

Don't mind - if six or seven Million access points, if tiny glittering gadgets or injected RFID chips, at the end nobody will shape the future more than the manager of the underlying content. May well be that this person will not be called a librarian anymore but his skills will be needed much more than before.

⁷ http://www.elektroniknet.de/topics/kommunikation/fachthemen/2004/0005/index_b.htm#3

⁸ Reichl H, Wolf J: Intelligente Gegenstände - Vom Body Area Network zum Smart Home - Things that think. In: Forschung Aktuell 10/2001 <http://www.tu-berlin.de/forschung-aktuell/mensch-maschine/reichl.htm>