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Mobile Digital Library in the National Library of Norway

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Abstract:

The purpose of this ongoing work is to investigate and improve access to digital assets at the Norwegian National Library using mobile phones. The project is thus part of a growing effort towards transliteracy which is the ability to read, to write and otherwise communicate and interact across a range of platforms, tools and media. The National Library's website at www.nb.no plays an essential role in Norway's online library services. For development purposes an alternative mobile access point is created. This site provides tests of variant push and pulls modes, present "elite editions" and test polyvalent organization of selected materials. A National Library Mobile User Network is described as are two practical case studies.

Purpose

Digital curation means to select, preserve, maintain and make available digital assets. But professional curation in the digital age goes beyond the mechanics of ordering, meta descriptions and delivery.

As digital expression and digitized representations are available as "full text" in rich and multimodal formats and as they might be embedded in similarly rich contexts through mashups and remixes, the curator is confronted with new challenges.

The specialized patron and the general public demand several access mechanisms like filters and search profiles, browsing, traversals of interesting predefined paths as well as contextual and dramaturgical support for the process of impartment.

The purpose of the work that I report on here is to investigate and improve access to digital assets at the Norwegian National Library based on one particular requirement: It should be achieved using a mobile phone.

The project is thus part of a growing effort towards transliteracy, namely to develop the abilities to read, to write and otherwise communicate and interact across a range of platforms, tools and media.

Background: Digital Assets at National Library of Norway

The National Library has a varied and extensive collection of Norway's documentary heritage dating back to the 14th century.

Since it is technology independent, Norway has one of the world's most modern legal deposit acts. All textual materials that are produced for public consumption are supposed to be deposited there by order of law. Based on this Act relating to the Legal Deposit, the library is building a collection that includes manuscripts, books, music, radio and TV programmes, film, theatre, maps, posters, pictures, photographs, internet documents and newspapers.

As Norway's "memory bank" the National Library is now digitizing all its collections, including material that is still under copyright protection. Some European countries have also started digitizing parts of their national cultural treasures, but so far no other national library has plans to digitize their entire holdings. We are thus the first National Library in Europe to take on this huge challenge, not only for the preservation of materials for posterity, but also to make as much content as possible available on the web.

We also preserve original broadcasts and other digital communication forms that are publicly available. All broadcasters with a public licence in Norway deliver copies of their programmes for preservation. Up to now there has been extensive collaboration between national broadcaster, NRK and the Library. The programmes of four radio channels are transferred every night.

The National Library's policy is to reach users wherever they are. With 18 million page views on the web per year, the Library covers all different kinds of users, not only in Norway but all around the world as well.

We have rich and valuable digital collections. But one limiting factor is that our website at http://nb.no is less than optimal for others than those who are positioned in front of their personal computers. The growing number of mobile users should be taken better care of.

Mobile access

The use of mobile phones as multimedia devices and for Internet access is on the rise. With a global average of more than 60 cell phones for every 100 individuals, some countries like Taiwan and Netherlands have more mobile phones than they have inhabitants. In poor areas of the world, there is a growing trend that several individuals share access to one phone. This has economic repercussions as the phone system becomes a vehicle for monetary transfers in addition to traditional and new forms of information exchange. In 2009, for the first time ever, mobile phones were used more for accessing data than to make calls. [1]

Increasingly users will want to access information services wherever they are, - while on the road, in airports and cafés, on their way to work, school and university. The traditional way of delivering information to the user is insufficient, people need to access information anytime and anywhere.

How does the National Library position itself within this context?

The Library's goal is to be a core player for the entire Norwegian Digital Library. The Library positions itself as a multimedia centre of knowledge and strives to be among Europe's most exciting and modern library institutions. This implies that the Library must extend its services to the emerging mobile platforms.

This situation is also what motives the current project work. In the following I give a more technical background.

Mobile platforms

There are several platforms competing for dominance in today's mobile market. Among the more important we find the Palm system, Nokia with Symbian-oriented platforms, Apple's iPhone, Microsoft Window's Mobile and Google's Android.

For this project we have chosen Google's Android as the main development and test platform. Kindle, iPhone and other popular types will be tested and partly covered as well.

The Android platform

Android is the first truly open platform for the modern mobile devices. It includes a Linux-based operating system, a comprehensive library of pre-programmed software modules and an extensive API (Application Programmers Interface) for developers, - all of the software needed to develop and run applications on a mobile phone.

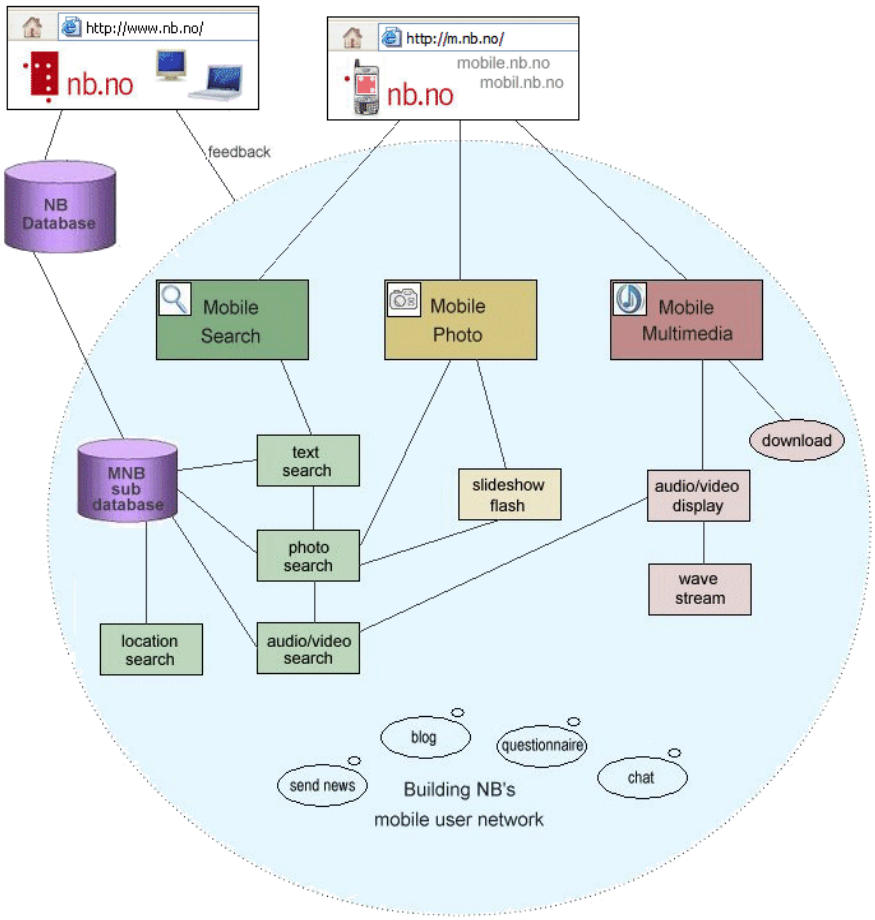
Since the software is open-source and freely available, there are no proprietary obstacles that hinders mobile innovation. It allows developers to write managed code in the Java language and also with support for declarational XML, and controlling the device via Google-developed Java libraries. In a few years, Android is expected to be a major platform for application developers.

Towards a mobile National Library – A prototype m.nb.no

The National Library's website at http://www.nb.no plays an essential role in Norway's online library services. Based on FAST technology the library supplies users a cross-collection search within its database systems.

This project aims to develop a visual website prototype -- **m.nb.no**. It will be accessible and designed for mobile phone and PDA users and will be based on the www.nb.no website.

Fig 1 shows the structure of the project:



We will design and implement a visual website prototype that provides services like mobile written search, text/voice input to the database, mobile photo display (single and sequencing display), etc.

Examples are:

- Picture slide show on mobile devices with multi-touch manipulation and location data exchange
- User/patron-provided pictures and voice-over/comment into the library's database via mobile phone
- Location based information search
- Interface to mobile multimedia presentation from library collections
- Building National Library's mobile user network/community with investigation of usage modes, particularly in educational contexts

User feedback

To enhance the explorational and curational character of this work, a mobile user community network will be developed based on voluntary user registration under the m.nb.no tree. This will give the framework for targeted tests and investigations of usage modes, particularly in educational contexts.

Ad hoc feedback from the user network in Norway, inputs from national and international partners and the analysis of targeted user surveys and interviews will be used to improve the prototype content and interaction models.

Mobile Web Content

What is the important and necessary content for mobile users?

- **Elite Edition:** A mobile web site should not only be a portable edition of the ordinary desktop version, but also an elite e*dition,* - a well curated, selected and organized version.

- **Sampling:** A mobile web *version* should provide samples and illustrations of the capabilities of the full websites that are not (yet) optimized or amenable for mobile access.

- **Interface:** A mobile front-end may act as an interface, guide and reference to the general repositories. Standard web pages may carry huge information loads and some contents may not interest or are unsuitable for mobile users.

- **Polyvalence:** Eventually, the same web page should be accessible, informative and enjoyable using different screen formats for the palm, the lap, the desk and entire walls. One approach may be to divide the page into several blocks by subject for example, and execute reorganizing mechanisms that recreate a wide display into hierarchical structures. Unnecessary blocks should then be removed in a mobile version.

Fig.2 and Fig.3 show the relationship between the National library's web index page, sub-index page and one of the categories' index page on the mobile version.

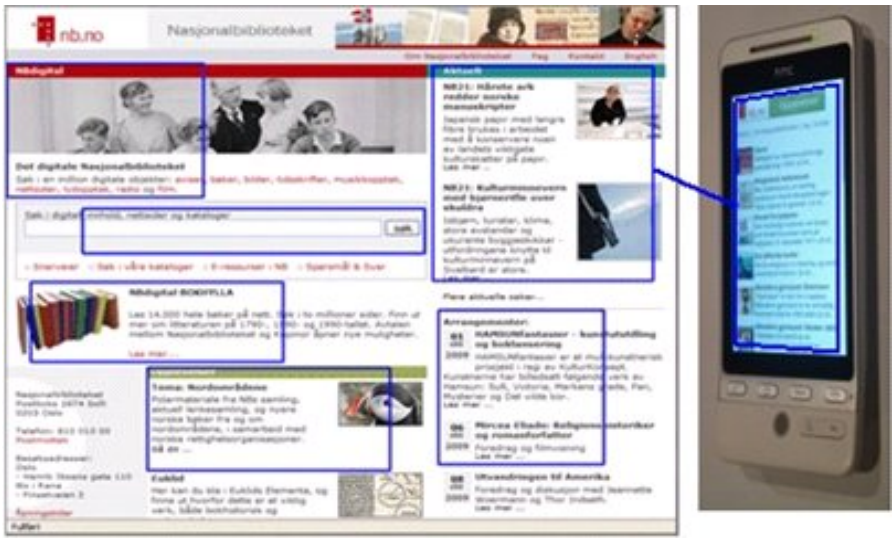


Fig.2

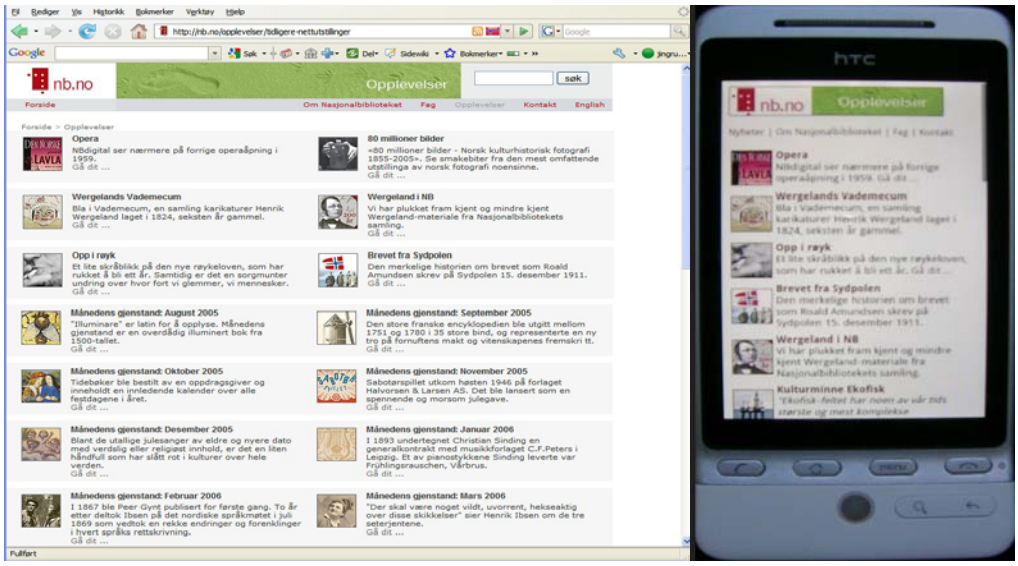
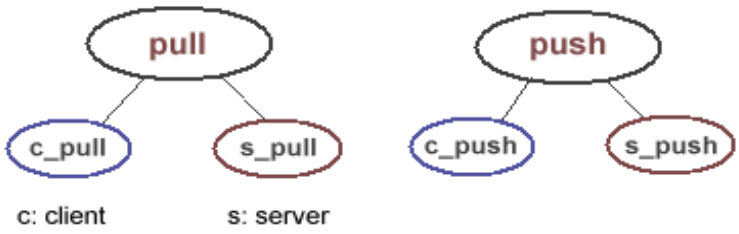


Fig.3

Mobile Web Display

There are basically two types of content delivery modes for mobile access: pull and push.



1. Client pull (c_pull)
   The client sends a query to the server which returns the relevant info/content page back. As a user provides an URL or type in search words, the server sends back the relevant information.
2. Server Pull (s_pull)
   We can send online questionnaires to mobile users via a server. Mobile users may give their answers at anytime and anywhere.
3. Server Push (s_push)
   The s_push model is normally used for multicasting information to user groups, such as mass mailing, news/newsletters, announcement of new books, and software updates, etc.
4. Client Push (c_push)

A mobile user may push relevant content (back) to a server's database, for example images, comments, etc.

Composite modules

As one example consider the combination c_pull + c_push + c_pull:

This is an online puzzle game solution for the first printed Northern map in 1482 (National library's collection). When an m-user enters this page, he may try to place the puzzle pieces to the correct position. If he passes the game, he will get more information about this old map and discover that Sweden was called "Suecia" and Norway "Norbegia" at that time.

In more detail: m.nb.no

When users visit our main website www.nb.no, a JavaScript will work on the sever side. According to relative data analysis, device type, operating system, etc. automatically identify devices. If it is a mobile device, it will be sent directly to the mobile site -- m.nb.no.

As a user enters the website m.nb.no, he or she will be automatically transferred to one out of two different entry points:

- PC users will be transferred to a page with a layout as rendered in Fig 3a on the left below. On this page the PC users can experience how the page looks inside a mobile screen.

- And mobile device users will be transferred to a page specially designed for the smaller screen and common usage contexts of mobile users. The page layout is sketched in fig 3b on the right below.

The application server will recognize which functions should be carried out by a JavaScript. A flash video will be made to guide users how to use the mobile site m.nb.no.

Fig 3a

Fig 3b

For these development and testing purposes an SQL database prototype has been created as a subset, - a database *projection* -, of NBs main database.

Fig.4 shows a search test screen.

The Android system itself comprises a SQLite client. SQLite is popular choice for the database engine in cell phones, PDAs, MP3 players, set-top boxes, and other electronic gadgets. SQLite has a small code footprint, makes efficient use of memory, disk space and implements a self-contained, serverless, zero-configuration, transactional SQL database engine. Android uses this to maintain an embedded repository for local data like phone numbers, pictures etc.

Server-side data and functions are presented to the Android client as a DOM (Document Object Model) instantiation that are enhanced by run-time scripts (Javascript). A separate JAVA process on the Android device communicates with these scripts and may thus integrate the underlying SQLite repositories with DOM content. In this project, the SQLite mechanism will here be used to develop and test intermediate storage features in conjunction with the m.nb.no services. One example might be that users may need short term storage of lower-resolution pictures and sound bites etc. for offline rendition.
Fig.4

Google's Voice Search application, which is pre-installed on many Android devices, provides powerful features like "search by voice". Android 2.1 introduces a voice-enabled keyboard, which makes it even easier to stay connected. This project is in an attempt to find a solution so that m-users can speak to their phone to give comments in which they would normally type.

Photo/image display on m.nb.no

The mobile search function is based on standard conventions for text-based searches using free format or structured searches, but adjusted for the smaller screen. M-users can reach the NB photo collections in two ways - as predefined slide shows or as discrete photo search. A flash photo presentation has been developed that fetches an image list in XML format and will give visual and tactile support for finger sweeping functions. Discrete photo searches will bring up a group of images which matched with the search word that user has typed in, and display small image icons with titles. Each icon will point to its relative large-size image. M-users could sweep their finger up and down to watch large-size image. Similar functions will be available for multimedia searches.

Fig. 5a

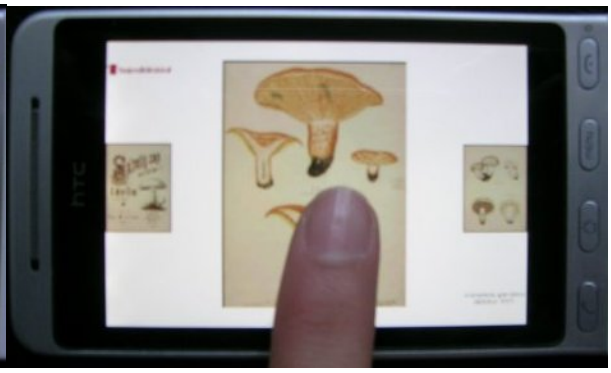


Fig. 5b

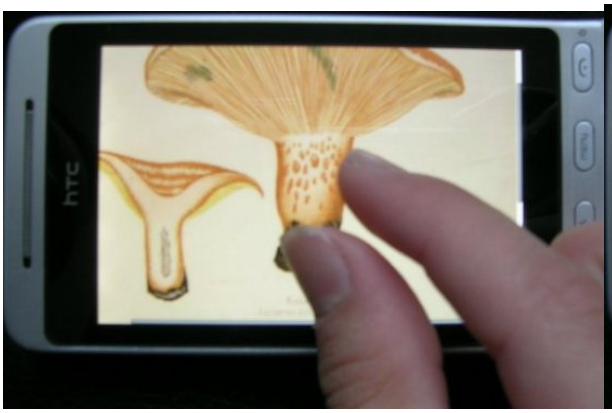


Fig.5c

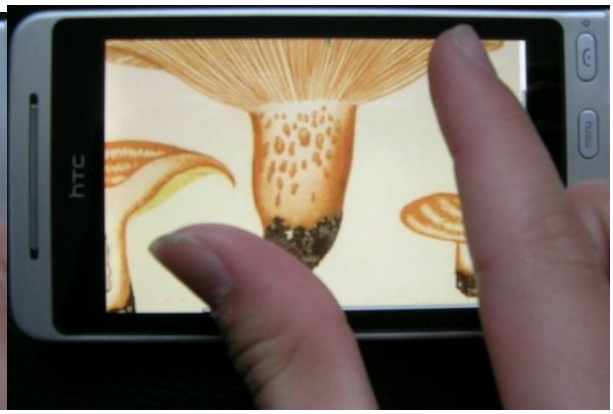


Fig.5d

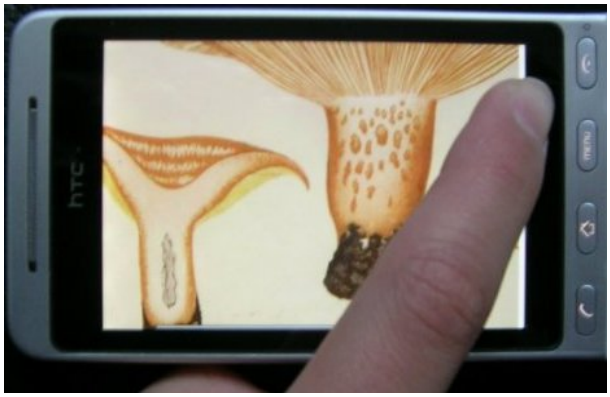


Fig.5e

A group pictures Fig 5a-5e shows an example on a flash photo presentation based on a mushroom hand drawing book. We can browse pictures by click small icon pictures on left or right, and choose one (5a,5b), use finger sweeping functions to zoom in and out, and moving from side to side. (5c)

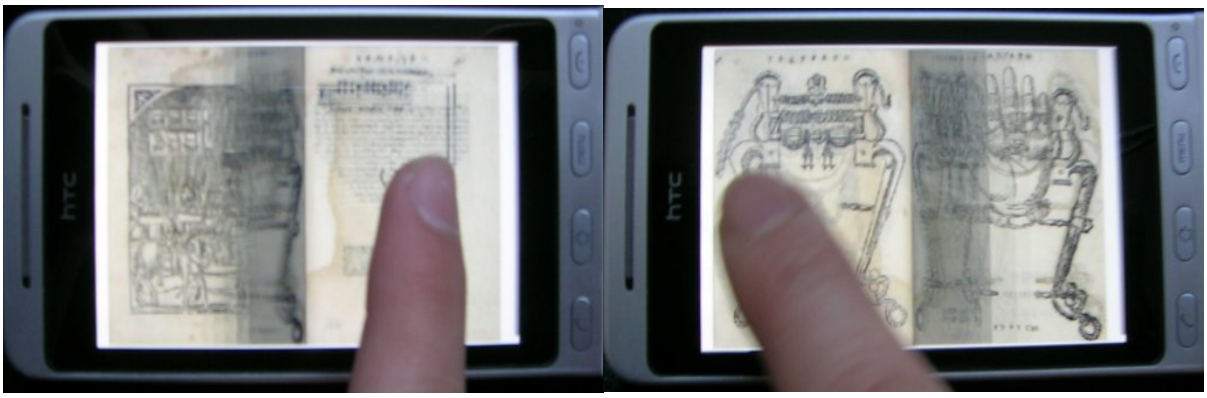


Fig.6a Fig.6b

Fig.6a-6b shows “turn the page” functionality by a finger swipe on an Android mobile phone.

Case studies.

The following two cases illustrate two relevant and leisurely usage modes that will be made possible by this project. They supplement professional use like preparations for a school or university lecture, on-line access to classical texts on a long train-ride etc.:

Case 1: Location-based information.

Based on the location services provide from the Norwegian telecom company Telenor or Android location system, for instance within the nearest 2 to 5 km of the user’s position, a mobile phone may combine localization data with other search parameters and retrieve material that carries geographical information or metadata.

In return, the user receives materials as a *location collection package*. Visitors to the Ekeberg hill at the perimeter of downtown Oslo with its popular restaurant overlooking the city may for instance turn their attention from the view of the new opera building to the town’s history. Through localized search, the mobile phone may display a slideshow of pictures taken from this hill by the early photographers Axel Lindal and Anders Beer Wilse dating to the town’s rapid expansion in the 1880-1905period.

Users may also retrieve relevant information about the opera building they admire or other architectural achievements by *the Snøhetta* architects like *Bibliotheca Alexandrina* in Egypt. They might even use the phone to take pictures of themselves and annotate the original material or their own contribution and send it back to the library’s photo database “Galleri NOR”.

Case 2 – Individualised history.

The National Library’s rich collection of historical material may be put to relevant use in individual biographies. To celebrate an important birthday, a farewell-party at the workplace or other moments of remembrance, a user may search and download a collection of historically relevant items like a batch of Christmas postcards, a few newspaper clippings, a radio talk show, newsreels or the early televised news – all from a particular year in the past. The material is sequenced on the phone and then displayed for all those present using the phones built-in or accompanying pocket-size projector. To round off, the entire presentation is wirelessly transferred not only to the guest of honour, but to all of them.

Mobile user network

Michael Wesch, a professor of anthropology at Kansas State University, says in his hugely popular presentation to the Library of Congress (available as a YouTube video):

> *The web is no longer just linking information. Web 2.0 is **linking people**, in the way we have never linked before. We'll need to rethink a lot of things…*

From a systemic point of view, we focus here on some basic elements of the traditional and emerging elements of the library system as a whole (see Fig.7).

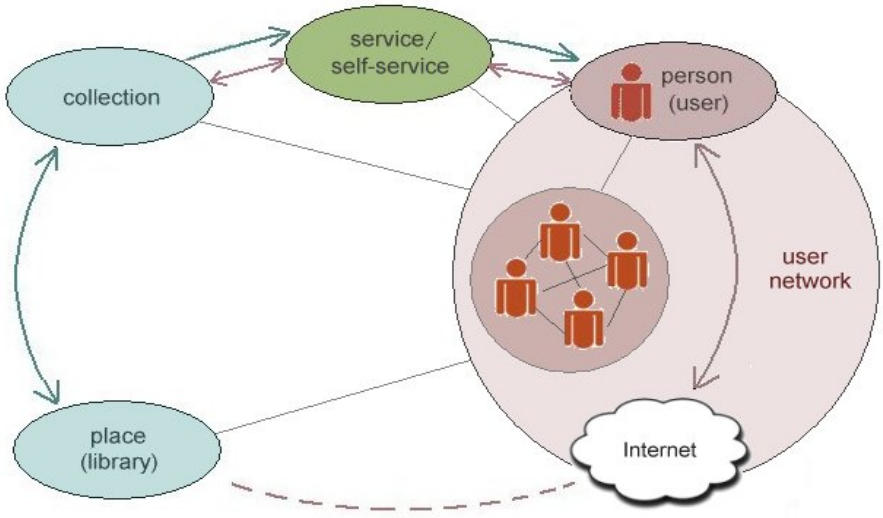


Fig.7

The traditional libraries concentrate mainly on the elements to the left, i.e. the physical library with its stacks and open-shelves collections and facilities for reading and listening are used as the base to provide one-way services to the patrons.

Libraries in the digital age, on the other hand, have to pay more attention to the elements on the right in this illustration as well as their role within the larger cycle. They must take into account users in their individual roles but also as members of a wide variety of networks, the interactivity of services that also encompass active and concurrent feedback from patrons, the library as both a physical and a virtual "place" and, finally, a strategy and a design that integrates all these elements. One emergent feature with consequences for the latter design and development work is precisely the *mobile* dimension of on-line access.

As initial and supplemental steps to developing the retrieval and display mechanisms, the current project will also be used to gain experience in building user networks and feedback loops. The mobile network patrons may here share comments and blogs with each other, chat with librarians and give systematic feedback on usage patterns in informal contexts (as illustrated earlier) and formal settings (like school work, university studies etc.) The library can use such networks to distribute news, journal and book information regularly to their registered mobile users, carry out appropriate surveys and evaluations. Such feedback is not of value for the mobile services only, but also for a much wider range of National Library services including the main www.nb.no portal.

In this way an m-user network may become an important asset for the library institution as a whole.

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