

Moving from the digital to the virtual library

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DRAFT

Moving from the Digital to the Virtual Library. The Tilburg Experience.

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Introduction

In this paper I shall give an overview of the current situation in the development of the Digital Library at Tilburg University and how we are gradually moving from the implementation of the local Digital Library towards the concept of the Virtual Library. I shall go into our experiences with the online provision of primary information to our end-users, both of journal articles and of papers produced by the researchers of our own institution. Positive experiences as well as problems with the use will be discussed. New projects and prospects will provide a direction for the position of the library in the years to come. The university library will focus on the provision of added value to the information process in a global environment and on integration with teaching, learning and research.

The development of the digital library at Tilburg University

Tilburg University in the Netherlands is a medium-sized university focusing on the humanities and the social sciences. Currently, some 9000 students are enrolled and the total staff number is about 1600. The university has a compact campus. The faculties of economics and law have an excellent reputation both in teaching and in research.

In 1989, this university initiated a programme to build a new library and the initiated the development of the digital library. The Digital Library Programme at Tilburg University (1,2) aimed to provide staff and students with excellent support facilities for teaching, learning and research. Key elements in the programme, which initially was supported by Digital Equipment Corp., were:

1. The provision of electronic information to the desktop, of both our faculty and our students, on campus and at home.

2. A campus-wide implementation of the "integrated desktop": one single computer, connected to the campus network, which provides seamless access to all important information resources, software packages and communication facilities.
3. The development of tools for knowledge navigation in order to support the user in locating and retrieving relevant information in the global information environment.

The programme was managed by a partnership of the university library and the computer centre with the wholehearted support of the Executive Board.

The concept of the integrated desktop is a cornerstone in our activities. Recognition of the power of electronic communication, the increasing importance of electronic information and the changing opportunities for end-users, who have access to information through their desktop computer, was the starting point for Tilburg University to develop and implement this concept. Working on a single computer, the user should have easy and direct access to secondary and primary information, to various software packages and to communication facilities. In a university environment, the user is a consumer of information, but at the same time he or she is often also the producer of new information by making full use of the present body of knowledge and by enhancing this with new ideas and research results. This process should be supported by the library in close cooperation with the computer centre.

Tilburg University's network connects more than 2400 PCs, each of them providing access to locally and remotely stored information. For the students 450 PCs are available in the library and an additional 400 PCs in seminar rooms. All 1600 staff have networked PCs on their desktop. The power of the concept of Tilburg University is that all of these 2450 PCs offer the same basic facilities:

1. *Access to information*
 - *local OPAC* and other Dutch Opacs through the national open library system;
 - local Reference databases, such as the Online Contents database on journal articles and the Excerpta Informatica database on applied computer science. These are seamlessly linked to full text information and coloured images;
 - networked CDROMs;
 - the National Catalogue and the National Online Contents database with electronic request and accounting facilities for end-users;
 - other central databases hosted by Pica, the Dutch organisation for library automation;
 - Internet resources and networked CD Roms;
 - management information both for students (including results of examinations, reservation system) and for staff (financial and other administrative information);
 - electronic helpdesk;
2. *Software packages*, such as word processing, graphical and statistical software, which are licensed campuswide and can also be used from the home.
3. *Communication facilities*, such as E-mail, FTP and the Trumpet Newsreader.

The concept of the Integrated Desktop is an example of a user-oriented client/server implementation. In 1991, the executive board and the faculties agreed on standardization. We considered that a campus-wide implementation would be enabled by a homogeneous infrastructure. Standardization was introduced with respect to:

- the network infrastructure within the departments (the standard is the Novell Netware);
- the desktop computers in the offices and for the students: PCs running Windows are prevalent;
- one preferred PC vendor;
- software that would be supported by the computer centre.

This policy enabled the university to achieve cost-effective solutions.

Although currently some minor variations in this approach are introduced, as a result of the differences between departments and differences in the level of use of various facilities, basic models for standardization are still accepted and recently reconfirmed campus-wide.

From secondary to primary information

Until 1994, the library focused on the electronic provision of secondary (bibliographic) information. In 1991, Tilburg University started its own local Online Contents database with references

to the articles of the 1600 most important journals the library subscribed to. Contents pages were scanned and OCRed and the information was locally stored in a database. This local project formed the basis of a national service, which has been running for four years now and which is hosted by Pica.

In 1995, we closed our scanning department. We now rely on the subset of the national Online Contents database maintained by Pica, from which we can download the data that match our own holding and which we store locally. The data of this Online Contents database are currently being produced by Swets and Zeitlinger. At Tilburg University this information is partly enriched with abstracts delivered by Elsevier Science and other publishers and with abstracts that are produced in-house by library staff members.

The provision of the full text of the journal articles to the end-users was a logical next step. In 1994, Tilburg University was the first institution in Europe to enter into a licence agreement with Elsevier Science with respect to their electronic subscriptions [3,4]. In 1995, electronic access could be provided to the Tiff images of the 120 Elsevier journals on economics and social sciences that the university subscribed to. In order to work efficiently with bibliographic data and full text images, Tilburg University developed the KWIK software in cooperation with Digital Equipment. This "KWIK" software is based on the Mercury software, originally developed for Unix workstations at Carnegie Mellon University. At our university it runs on PCs equipped with MS-Windows software.

It is clear that the Netscape and Internet development made us move from a customized and sophisticated approach to open WWW solutions, although this means losing some functionality and performance. Access to bibliographic and full text information is now being provided via WWW, based on the implementation of the results of the project Decomate (Delivery of Copyright Material to End-Users) which was funded by the European Commission. This project was coordinated by Tilburg University, with the London School of Economics and the Universitat Autònoma de Barcelona as partners [5,6].

The Decomate software is applicable to various local environments and can deal with materials from various publishers in various formats. The Z39.50 protocol is used for the transactions with database servers.

The full text database of Tilburg University was extended with the PDF files provided by Kluwer Academic and Academic Press. The access

to the current 200 full text journals will be extended by a new licence agreement with Elsevier Science that will provide access to 160 journals the library does not subscribe to but which are relevant for the subjects that are being taught at the university. Access to this copyright material will be provided on a pay-per-view basis.

Experiences with publishers and licences

The Decomate project focused on copyright material. From the very start of the project it was obvious that licence agreements with publishers were necessary in order to store electronic files locally, to deliver requested files to end-users and to allow the users to make print-outs and to download the material. For libraries, licence agreements on electronic files were new, but the same was (and in most cases, is) true for publishers. Some general conclusions that can be drawn from these experiences are:

1. The big publishers are taking the lead in electronic subscriptions. They have a strategy and the capability to test and innovate.
2. In general, most medium-sized and small publishers in Europe are reluctant to "go electronic". This is a handicap for libraries that want to achieve sufficient critical mass. The future of these publishers might not be very promising if this situation is continued.
3. Electronic files are currently not cheaper than printed journals. In most cases libraries have to pay an additional percentage on top of the subscription price.
4. In the Decomate project, all partners stored the electronic files on a local server. Essentially, the place of storage of the full text could be or should be trivial in a networked environment. Performance and the level of use could be indicators for a proper decision on storage.
5. Experiences with electronic subscriptions provide important information to the publisher. They also provide essential management information to the library.

We can identify which journals are of importance and we might also find out that some of the journals are not being used at all. In this way, we now have a powerful new management tool. We can - with full confidence - ask the publishers to deliver value for money. We shall certainly find that some high-priced journals are hardly read at all and are only of importance only to a very limited number of users. This management information will be an important input for decisions to take only licenses which will be cost-effective and to rely on use based on pay-per-view or

document delivery at low cost for other journal articles.

Tilburg University and electronic publishing by researchers

It would be unwise for a university library to only focus on digital material delivered by a publisher. Actually, many libraries are discussing whether there is a new role for libraries in the electronic publishing of documents produced by the parent institution. The library and the computer centre at Tilburg University currently support the **electronic storage and access of research papers** produced by university researchers, particularly of the Department of Economics and of CentER, the top institute for economic research in the Netherlands. Faculty members produce their papers in hard copy but also supply their electronic files in Postscript to the library. The library takes care of cataloguing in the National Catalogue and in the local reference database. Conversion of Postscript files to PDF is carried out by the computer centre. Library staff provide the papers with keywords and make these papers accessible through the World Wide Web and through the local reference database Attent.

This initiative has been expanded to a nationwide project. All universities with Economics departments cooperate, and produce most of the economic research papers produced in the Netherlands available through the network. The National Funding Council regards this initiative in the field of economics as an example for other subject areas.

Another project deals with the creation of a brand-new **electronic journal: The Electronic Review of Comparative Law**. The goal of this project is to develop an editorial, technical and organisational concept for an electronic journal which publishes articles of high quality in the English language with an international editorial board. Quality will be ensured by both high editorial standards and a strict electronic peer review system.

We would like to see that full use being made of the advantages of the electronic format:

- to link articles with legal sources like legislation and judicial texts;
- to link discussion and comments to published articles, creating an open - but controlled - platform for discussion among peers.

The university library will manage the project in close cooperation with our Faculty of Law, which appointed the editor-in-chief, the Faculty of Law of

the University of Utrecht and our Computer Center.

Experiences on the Use of the Digital Library Services

We have now had five years experience with the campus wide use of the services provided on the integrated desktop. On the whole, positive experiences are prevailing:

1. The library is overcrowded. Students make extensive use of the library resources. Ninety percent of our students regularly use the integrated desktop computers. The library is a meeting point and working place for university students.
2. Most electronic services which have been implemented since 1992 are heavily used both by students and by staff.
3. Currently, the "integrated desktop" is not only a cornerstone of the Digital Library programme, but it is also widely accepted as a key element in the strategy of the university. It is the basis for IT innovation projects in teaching, learning and administration.
4. The library of Tilburg University is drawing more and more national and international visitors. Over the last 5 years, the library was visited by more than 7000 professionals, librarians, computer centre officers and researchers from more than 24 countries.

We have also identified some important problems:

1. The most important problem is that it takes more time to integrate new information services into the educational process of the university than we expected. Individual use by students is excellent, but more faculty could make full use of the opportunities provided by the electronic information environment. An important number of teachers have so far been reluctant to invest time in new technologies and in an innovative approach to the educational process.
2. New services demand more instruction, more training and more user support. The library can play a significant role in these activities.
3. The open environment in the library requires more regulations with respect to the use of the computers by students (for that reason, a reservation system and a time-out system have been developed), security measures and clear policies in order to maintain a proper and correct use of the electronic facilities.

Some data on the use of electronic services

One of the advantages of electronic services is that we can log events in our database and generate more detailed information on the use. Some data on entries to important databases can be provided:

	1994	1995	1996
<i>OPAC</i>	105.521	127.168	190.159
<i>Online contents</i>	29.000	52.864	73.828
<i>CD Roms</i>	83.291	89.771	105.463

The Online Contents database is a good example of an excellent new service (started in 1991) that needed some time before it could begin to play a prominent role in the digital library services. We expect that the same will be the case with the electronic subscriptions. It is interesting to see how the use of the full text articles is developing:

	1995	1996
<i>Number of views of articles</i>	11.624	15.784
<i>Number of prints</i>	690	1.237

The numbers for the use of the reference database are good, the numbers for viewing reasonable and for printing are as yet very limited. It should be stressed, however, that there are some implicit and explicit limitations to the full use of the journals provided by Elsevier Science and Kluwer Academic:

1. There is still a time-span of four to six weeks between the arrival of the printed version of the journal in the library and the arrival of the electronic files. Of course this lag will disappear in the near future, but actually it is an impediment to the full use. Researchers, who are used to immediately browsing the new issues of their favourite journals, frequently complain about it.
2. The critical mass of the electronic information that is provided is still limited. The Elsevier journals account for less than 5% of the journals covered in our local reference database. This conclusion was also made in the TULIP project in the US some years ago. In addition, it should be stressed that the delivery of Academic Press files and Kluwer files is still not running smoothly.

Although it is too early to make a balanced evaluation of this electronic service, I would like to make some initial remarks:

1. It is clear that a good reference database is of vital importance. For most users of the library this is their entrance to the full text. They first

scan the abstracts and then decide whether or not they want to look at the full text. Some researchers, however, are focused on 9 or 10 journals, that they have an interest in, and they just want to have direct access to the most recent issues, bypassing the reference database which is supported too. This situation might be different for the sciences and for the bio-medical collections.

2. There is a significant gap between the number of viewing operations of the articles and the number of print-outs. It becomes apparent from additional interviews with some of the users that they use the printing facilities in a very selective fashion. But still, many questions with respect to these figures remain. Further research is necessary.

User demands

It will take some time for these new facilities to completely mature and to be adopted by all users. It is also clear that the development towards the provision of full text articles to the desk-top will soon result in a completely normal service. Top researchers who currently are heavy users of our database are very enthusiastic about it and want us to proceed in this direction. This indicates that in a couple of years the digital library or rather the networked library with ample access to digitized or digital material will be an accepted and standard phenomenon.

The initial phase in the development of the digital library too frequently confronted the users with changes. Stability in systems and services is required for users to feel comfortable. It would be a good thing if we could manage to maintain the "look and feel" for the end-users and to make improvements and new versions "behind the screens"

Another strong demand from the user community is that we should provide one interface to heterogeneous databases and make everything much simpler. One way to access our OPAC, our reference databases, our CD Roms, with full possibilities for simultaneous searching across these databases and with a guarantee for document retrieval and fast document delivery.

The most important issue that is mentioned by users is that they expect the library to support users and provide tools and tailor-made facilities to deal with the information overload. This offers important opportunities for libraries to redefine old and traditional roles and functions: selection, services and support. The skills and know-how of

library staff members can play a significant role in meeting these challenges.

The role of library staff was confirmed in a user study that was carried out in 1996 on the services provided by the computer centre and the library of Tilburg University. One of the interesting results of this study was that students very much appreciate the computing facilities and electronic services, but regard the staff of the library and their performance as the most important category. The support, skills and attitude of staff is the most important factor determining the performance and appreciation of the library from the students' point of view.

Library Strategy Contributing to the virtual library

Libraries will identify their own strengths and weaknesses and decide on their strategy for the future according to their own specific situation. One of the important aspects for most libraries deals with the strategy on access and ownership of documents. There is an increasing focus on **information management** and on selection of relevant information, irrespective of the place where and how the information is stored. This is particularly true for libraries that have limited resources. These libraries have to make firm decisions and choices based on the strengths and scope of their parent institution. The opportunities for cooperation, partnership and creation of consortia will be carefully considered.

All university libraries in the Netherlands are currently involved in the development of the "local digital library". At the same time, all libraries cooperate in the maintenance and enhancement of the national library catalogue (currently more than 10,000,000 records stored in 400 Dutch libraries) and the national Online Contents database with 12,000 frequently used journals creating an excellent national library infrastructure. These central databases provide end-user facilities for electronic document request and delivery. Libraries understand that their work is part of a global environment, of networked and interconnected libraries and databases, which can act for the user as a **virtual library**.

In addition to these national facilities new levels of cooperation between libraries are being developed. In 1996, Tilburg University started a project with two other Dutch university libraries - the University of Maastricht and the Erasmus University of Rotterdam - to develop the virtual serials collection on economics. The three libraries

have a comprehensive serials collection on economics.

The first phase of this project aims at the improvement of the services to the end-users with respect to access to and retrieval and delivery of all journals the three libraries subscribe to. The three libraries regard extension of services as a practical starting point for cooperation with respect to collection management and collection development. It is envisaged that a user from the University of Maastricht can have seamless access from his or her desktop computer to bibliographic information and abstracts of journal articles that are stored in electronic or printed form in Tilburg or Rotterdam. It should be guaranteed that the user can have the full document within a reasonable time span (preferably within one hour). Once these facilities are in place, they can offer a tool and a good basis for decisions whether or not to have subscriptions of journals on all three sites. We regard this to be a bottom-up approach for a nation-wide policy with respect to cooperation in collection development. It will be obvious that heavily used journals of outstanding quality will be needed locally for the time being, but far reaching agreements can be made on hundreds of more specialized journals and journals of the second and third categories. This project will be funded by the National Science Council as an important initiative to enhance the development of the Dutch virtual library.

Basic elements will also be addressed in a European project that has now been submitted as a proposal to the European Commission. This project aims at creating a starting point and a working model for a digital library on economics distributed throughout Europe. The project deals not only with copyrighted material supplied by the publishers, but also with information on CD-Roms, library catalogues, research papers and Internet resources. All this primary and secondary information is part of the virtual collection on economics. In this project, Tilburg University will cooperate with the London School of Economics, the Universitat Autònoma de Barcelona and.....
This project will be supported by

Knowledge navigation

In addition to a seamless access to heterogeneous databases which are distributed and located at various sites, we would like to implement **personalized information services** for the end-users, current awareness services based on defined **user profiles**.

It is clear that for many researchers the key issue is how to deal with the information overload.

Most of them do not want to read more; they want to read less. The selection process of information is a critical issue. For that reason it is important to provide and refine tools for tailor-made selection of information. Supporting the discovery of knowledge might become the most important activity by which the library can prove that it can add value to the information process making use of traditional library skills which are completely upgraded and adapted to the electronic environment.

These initiatives indicate that we are gradually shifting from activities with respect to the development of the local digital library to activities that go beyond this and focus on interconnection with other rich information sources, gradually creating user access to the virtual library. Additional tools to find the way in this virtual environment are imperative.

Integration with teaching and research

The second cornerstone of the strategic goals of the library of Tilburg University for the next three or four years emphasizes local dissemination and stimulation of a structural **integration of the digital/virtual library services with teaching, learning and research**.

The availability of full text information and capabilities to do full text searching and to cut and paste relevant pieces of information will improve the possibilities of making full use of the concept of the integrated desktop. Scientific work will be supported in a better way. There are also important opportunities for redesigning the educational process. It will be clear that the key to change can only come from the faculties. Libraries can only support this change in interaction with the users.

From our perspective we can and will focus on:

1. clear information on services and systems;
2. more continuity and stability in the "look and feel" of the end user environment;
3. tailor-made training facilities for faculty staff;
4. instruction for students as an integral part of the curriculum;
5. Both personal and electronic support;
6. tailor-made current awareness service;
7. collaborative research projects with faculty staff.

For the future of a university library it will be vital to enter into new partnerships with the faculty staff and to support their work in a new fashion. Although the information is available in a virtual environment and users do not necessarily have to

go to the library to access its content, the library will still be a real organisation based on the skills and activities of its staff members.

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