Hypertext 'papers' on the Web: Students confront the linear tradition?

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.01. Introduction (return to Index)

A few years ago the WorldWideWeb (WWW) was unknown for most history students, nine or ten years ago the WWW did not exist. Today, the Internet and the World Wide Web are increasingly becoming a part of history courses or the students find their way around the Web themselves. There are certainly many types of use of the Internet, and perhaps the most 'natural' link between History and the World Wide Web WWW is to view the latter as a library and an archive containing electronic texts. However, the WWW can also be seen as a hypertext or hypermedia system[1] and that opens some other possibilities; at the History Department at the University of Bergen one class of undergraduate students are now being trained to explore these aspects of the WWW. We have introduced the Internet also as a tool for historical research and for dissemination of knowledge, As a part of this project students must publish their papers (assignments) or projects as Web-pages. The content of these Web-pages must be historical, just like ordinary papers as part of an assignment or a thesis in a history program.

Although the WWW is new, the underlying concept, hypertext,
Although the WWW is new, the underlying concept, hypertext, has been around for about six decades among a relatively small group of enthusiasts. And these enthusiasts have been focusing on the advantages and disadvantages of hypertext and an electronic hypertext system in comparison to the text and the book. This article will focus on some of the problems going from a book-based text to an electronic text on the WWW or, more precisely, a hypertext. I will try to discuss the following questions: Behind the hype - what are the differences between a historical text and a historical hypertext? How did the students meet the problems confronted by a different environment and what were their solutions? These questions are important and they challenge our views on academic texts in general - whether they are student essays, research reports, master's theses, or professional monographs.

.02. The Main Challenges

Why should history students learn how to write hypertext on the World Wide Web (WWW) in a history curriculum? In Norway it has been a common belief that the hard sciences should be responsible for both developing and teaching new technology. Social sciences were allowed to study the impact of new technology on social life and historians were allowed to study technology when it was put into use. Recently this belief has changed a bit, at least under current government administration. In the current four-year-plan for education (IT in Norwegian Education. A Plan for 1996-1999)[2] it is stressed that Information Technology must be integrated in every discipline at literally all levels of education. This is one of the current political and educational challenges to the History discipline in Norway today. [3]

In one view, the Internet and the World Wide Web are just 'hype' technology, partly driven by commercial interests in the computing industry, and by the infotainment- and entertainment industries. However, the Internet can also be viewed as two-way communication between humans through new technology, unlike related technologies like radio, television, and books which are clearly one-way, i.e., broadcasting. The Internet combines the broadcasting aspects of the audio-visual technologies and some aspects of spoken, telephonic and written communications. In this perspective the use of the Internet is therefore not merely a question of how to use the new technology, it is also a question
of using new ways to communicate.

In addition, the number of documents on the World Wide Web is already enormous. Several of these contain historical content, published on the Web by 'innocent' tourist agencies marketing "historical Bergen" or by extreme political organizations such as neo-nazis rejecting the Holocaust. The fact that groups outside the history community are creating the historical content presented on the WWW are, to me, strong motivation to use the WWW actively and to shape its content. This gives historians an opportunity to communicate and to educate a broader audience in scholarly history. And, therefore, exploring the new ways of communication both inside the history community and with a broader public is the media challenge of the History discipline.

The World Wide Web has become central in publishing primary historical material; structured sources like censuses and electronic text archives hold many historical texts and aggregated historical statistics are also available. The World Wide Web is also a primary historical source itself, for instance, Net-newspapers with no paper counterpart. In Norway Netavisen is a 'newspaper' of this kind. This also create a methodological challenge.

These challenges, the political, educational, methodological and that from the media, strongly affect us as historians and as history teachers. We will have to teach new students how to use the Internet in their history programs for gathering relevant information and train them in source-criticism as well as on the WWW as we have done, for example, with original medieval documents. As well we must teach them how to use the Internet actively and to develop the content of the WWW, how to develop resources that can be read by other historians and by a broader public and to create materials that can be used by teachers at all levels of history education. In a sense, it is old traditional historical skills in a different media.

Migrating from one media such as published papers ones to a hypertext system like the WWW is not straight forward. Writing hypertext is not necessarily like writing a paper text, whether it is a student paper, research paper or a monograph. Hypertext can be a fairly different way of structuring text and can have impact on both writing and reading. Problems related to writing hypertext will be discussed later in this paper. How does a web-paper differ from a paper-paper? What problems does this
create and how did our students meet these problems? The
differences and the problems created by the change in media
and textual structure inflect both the way we read and the way
we write. How can we ensure that what we as scholars try to
communicate gets through to our readers, presumably scholars
themselves? Is scholarly communication different through non-
linear text? This paper will show that this migration from the book
to the Internet has three important impacts:

1. On research - The Internet is/becomes a research tool for
Historians.
2. On publishing - The WWW is/becomes central in
publishing historical knowledge, both academic and
popular.
3. On teaching - History teachers will be using the Internet at
different levels of the educational system, to find both texts
and sources.

It is of crucial importance that we try to discover and discuss
these challenges, else non-historians will set the course and
make the paths. I do not think we as a community and a
discipline want that to happen.

.03. Background: The Curriculum - History and Computing.
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History students have traditionally followed two career paths,
either one becomes a professional historian or once becomes a
history teacher in primary and secondary schools. And in order
to meet the challenges in the new educational reforms in
Norway, we at the History Department of the University of
Bergen created a new course or curriculum, History and
Computing.

The length of this curriculum is one term and it constitutes the
third and last term of the undergraduate level. The regular third-
term curriculum has two parts, one subject common and
mandatory for all students, like "Urbanization and Urban Society
in Europe in the 19th century". The other part is a subject chosen
by the student, that he or she specializes in - an assignment.
The subjects can be chosen from different ones offered by the
teachers, and is the basis for a paper or essay (traditionally 15 pages text + appendix). The paper can be a discussion, based solely on historical literature or can analyze relevant sources and present the results of this research. The students are encouraged to use original source material for their paper and often the teachers prepare materials to be analyzed. In the new History and Computing curriculum the common part is replaced by a computer course. The reading list for the computer part is 1200 pages long and is divided into four main subjects:

1. Computers and History
2. Databases in Historical Research
3. Analyzing Computerized Sources
4. Internet Communication and Publishing

The second part of the reading list, the historical part, is the students' own responsibility and must be related to the subject of the paper. This part must be approved by the teacher/advisor. The 'paper' can only be written as a hypertext on the World Wide Web. And the 'paper' must have a historical topic, just like an ordinary paper in the parallel curriculum of the third term.

The student of the History and Computing courses must write his or her 'paper' as a WWW document, a hypertext; this text must be a 'true' hypertext, and the student can not just convert or 'dump' any ordinary word-processor document on the Web. That is just replacing the Web with 15 sheets of paper, and that is not our intention. The degree of 'hypertextuality' will vary of course, but so far this has not become a problem.

The students are also encouraged to use computerized sources. Digitalarkivet - The Digital Archive [4] - is one of the main collection of computerized sources in Norway. The Digital Archive is a collaboration between the National Archives of Norway and the Department of History in Bergen. The Archives provide the data, while the Department of History provide the tools for presenting and analyzing the sources. The Digital Archive contains mostly list based or structured individually based sources like censuses, church-records, births, deaths, marriages, emigration lists from Norway and immigration lists from across the Atlantic. Many of the students combine these
computerized sources with other types of sources, like tax rolls, fire insurance, or property registers which can be found either in the regional archive or the city archive. There are also several other institutions in Norway providing historical sources on the Web: Dokumentasjonsprosjektet at the University of Oslo has published 20,000 diplomas connected to Norway in the period 1050 to 1590 and a number of Court Proceedings and Protocols, court records from the 1600s and 1700s. And the National Library has placed a large collection of 19th century photos, Galleri Nor, in their Web-archive.

In toto, this gives the students a variety of different sources computerized and non-computerized, and opens many different subjects for study. The student can combine different databases with information from non-computerized sources or he or she can record part of these into a database. However, so far the bias have been on sources of a 'quantitative' or statistical nature, with an add-on of maps, drawings and pictures.

**04. Methods and Analytical Tools** *(return to Index)*

Most of the digitized data used in teaching is stored in dbase III format. This may seem a bit out of date, but the advantage is straight forward: Almost every database, spreadsheet or statistical package can import dbase-files. We have chosen to use as few programs as possible and accordingly students have courses in two different programs for analyzing the source-material. Microsoft Access is used as DBMS (Database Management System) and most of the basic combination and manipulation of data, querying and aggregating functions can be dealt with very neatly in this powerful database package. And the tables resulting from a database query can easily be transferred to Microsoft Excel for making diagrams. Microsoft Excel is also used to make simple statistic computing (descriptive statistics). All our students need to know these two software programs and also how to use the Digital Archive. Some students have needs for more specialized analysis and these are given separate training, e.g. students who wants to do household analyses can use a special software program called CENSSYS, developed by Professor Jan Oldervoll of the Department. CENSSYS is particularly well suited for household and demographic analysis.
.05. Hardware and Software for Internet Publication (return to
Index)

The area defined for study (topics), the source-material, the
methods, and the analytical tools comprise the basis for the
student’s paper. The next step is how to create the ‘paper’ and
make it public on the WWW. What software and hardware are
needed to make a student ‘paper’ on the WWW?

Hardware: We have a computer lab with Pentium PCs running
Windows95, and all are connected to the Internet. Two Internet-
servers both running Windows NT 4.0, one "production"-server
where all the source material (The Digital Archive) and one
"student"-server, both a file-server and a web-server for the
students. There are needs for some extra hardware: A4 color
scanners and a digital camera. The scanners are used to make
digital images of maps, pictures, and copies of sources. The
camera is used both for making images of sources and pictures
of houses and artifacts, in order to avoid copyright problems.

Software: On the servers the web-server program is central.
This is the program that publishes the documents on the WWW
and makes it accessible to everyone on the Internet throughout
the world. The computers connected to the scanners have two
programs installed - Paint shop Pro and PhotoShop. Both these
programs are first used for scanning or acquiring the pictures or
maps, then for basic manipulation such as adjusting the contrast
or zooming the scanned image. In the lab each student machine
has Microsoft Access and Microsoft Excel for analyzing the
source data files. Netscape Navigator is used both for surfing on
the World Wide Web and for creating web-pages (Netscape
Composer). But the students also have to understand the
structure of the HTML [5] and therefore we also teach them to
make HTML-documents by doing the HTML tagging 'by hand'.
Therefore we have used non-WYSIWYG HTML-editors to make
the students able to do the HTML-tagging manually or 'by hand'.
We think this is important for the understanding of the basic
structure of hypertext documents.

At this point the students have defined the topic of their paper,
identified and read existing books on their subject, and hopefully
defined some questions that need to be answered. They have
found some source-material to answer the questions, learned
how to use software to analyze the computerized sources, know
how to use software and hardware to scan additional sources
like maps or pictures, and to manipulate images of maps and learned to use software to write the paper as a web-document or hypertext. The tool used for writing the paper, Netscape Composer, very much resembles an ordinary word-processor. This final skill, how to write a text for the Web, could therefore be viewed as the most trivial one since it is just simple word-processing. This is not true, because there are problems arising from the structural differences between ordinary paper-based text and a hypertext (The World Wide Web is a hypertext system). What are these problems and what solutions have we found?

.06. Student papers: Written Text versus Hypertext "Papers" (return to Index)

Academic texts like student papers have a very simple structure or outline. First, an introduction presenting the issue or discussion is required, followed by some questions to be answered or a hypothesis, some historiographical references, one part of source-criticism, then a pro-et-contra discussion based on textbooks or interpretation of the sources where the aforementioned questions are answered and, finally, a conclusion. The most striking feature is the linearity, a well defined start and well defined end--the conclusion. If the paper is not read sequentially the reader can miss the line of arguments and therefore also not fully understand the author's conclusion.

Hypertext, or true hypertext, is said to be non-sequential. By using the feature of links the reader can navigate through or to different parts of the text. There can be many sequences, there need not to be one beginning point of the text, there can be several, and there need not be but one ending, there can be several links out of the current block of text and into other hypertexts. The non-linearity and the use of electronic links to navigate to other parts of the text or other hypertexts are the defining attributes of a hypertext.

The difference between a traditional academic text and a hypertext are striking, a) traditional text is closed, hypertext is open or dynamic, and b) academic texts are sequential, while hypertexts are non-sequential. Also as one common term for academic texts, a paper, suggests, it is very much bound to a technology or medium. A hypertext also is bound to a certain
technology: it must reside on a computer (though, theoretically, this is not necessary).

On the other hand all types of academic texts, a paper, a thesis, or a monograph share some hypertextual attributes like: [6]

1. Footnotes. In the footnotes there are references to other articles or books and to printed or non-printed sources. One feature that is strongly discouraged but you will still find is discussions in the footnotes. Discussions that did not "fit" in the text above.
2. References to other part of the same text, like "As mentioned in chapter 4" or "this will be discussed later in chapter 7"
3. References to other texts within the same physical object, i.e. an appendix, like: "See also source excerpt in appendix A.1", or "can be found in table 6 in appendix B.4"
4. Some publications also have a list of content, list of figures, list of tables and different indexes, like "Index of persons and places", "Index of subjects". Page-numbers are important
5. These four classes of attributes in a paper based text are hypertextual because they are links to other parts of the text or to other texts (books), but the process of realizing them or executing a link will often involve going to the library and borrowing a book. In a sense, we can say that most academic texts are filled with hypertextual links, but they are not exactly a mouse-click away.

Can these two structures converge? Is it reasonable to say that we want to write academic papers that both are linear and non-linear, like a true hypertext? Or must academic texts on the WWW just be a 'paper-based' text, i.e. replacing the sheet of papers with a computer screen? Academic texts with the line of arguments of one interpretation, or a pro-et-contra discussion of interpretations are fundamental to the academic tradition in the history discipline and to all academic disciplines. The linearity of an academic argument is independent of the media, whether it is spoken, written on sheets of paper or the WWW. But is it possible to imagine a construction which combines the attributes of both forms? And would such a construction make academic
papers better?

I think our students have found some answers to these problems and created 'papers' that do not break with the academic tradition, but that also use the flexibility of the WWW. Some of these problems that arise can be translated into some quite simple questions:

1. How can I as an author ensure that the reader does not get lost in the paper? How can I ensure that the reader knows what is my paper, and what is a hypertext written by somebody else?
2. How can I ensure that the reader can see the structure and the composition of the text? In what sequence(s) can this text be read but still be understood? It is of crucial importance that the reader understand the structure(s) of the text--both its main-structures, and any sub-structures.
3. How many and what type of links should be in the paper? How should different types of links be indicated? For instance, the reader should be encouraged to follow a link to a table if the reader wants to have more detailed information on an argument, but he need not to follow a link to other hypertexts. How can the reader return after following external links (problem of backtracking)?

Figure 1 Main structure of the hypertext 'paper'.

<table>
<thead>
<tr>
<th>Constant column</th>
<th>Variable column</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Introduction</td>
<td>Content dependent on actions in the current frame</td>
</tr>
<tr>
<td>• Discussion</td>
<td>links in this frame</td>
</tr>
<tr>
<td>• Sources</td>
<td></td>
</tr>
<tr>
<td>• Question 1</td>
<td></td>
</tr>
</tbody>
</table>
These questions indicate the main issues: How to indicate my (as author) structure of the text and how the text could be read to understand the content (arguments). I will briefly mention some results of the never-ending discussions we have had of these questions. The main idea is to divide the computer screen into two columns, see Figure 1, using the HTML-tag called `<FRAME>`. In the left column the text is held constant and the right and widest column of the screen, the dependent part, the content will vary according to the reading process i.e. actions in the right column. The outline of the paper (headings) will reside in the constant column to the left of the screen (Figure 1). The order from top to bottom indicates the sequence between different parts of the hyperpaper. This indicates the main-structure of the text as the author sees it. In Figure 1 the main structure is put in the left frame. This is just one way of several possibilities left, right, top, bottom. My point is that one needs a constant column or window to indicate both the structure and where in the hypertext-structure the reader currently is. The outline at the left should also give some picture of the size and composition of the text. What I have referred here to as the "constant column" is also known as the "Scan Column" - see the "Yale Style Manual" Analyzing Page Grids: [http://info.med.yale.edu/caim/manual/pages/design_grids.html](http://info.med.yale.edu/caim/manual/pages/design_grids.html).

One way to indicate what text is included in one particular paper is to use a unique color for all the different blocks of text of one student. The constant column with the outline reduces the danger losing the reader in cyberspace. Clicking on Introduction-link in the constant column will always bring the reader back to the Introduction in the variable part of the screen.

The other main problem is the use of links in the different blocks of text. One possible solution is to not allow other links than those for navigation between the main part of the text (e.g. between chapters). This can be too rigid a requirement, because it can be useful to make links to tables with more detailed
information, links to "footnotes", links to illustrations and links to sources. Common to these links is that they need not to be followed unless the reader want to get some extra information and one method of solving this problem is to put the linked text into a third frame or rather in a secondary pop-up window using an extension to HTML called Javascript. This method is especially useful for the "footnote"-links to printed books and links to tables and to excerpts of sources and when the reader wants to continue reading the main part, he/she just closes the secondary window (example here).

The structure of the student texts--let us call it a hyperpaper--seems like quite a simple one, yet flexible enough to handle different hypertextual aspects, like linking of block of texts, jumping to different parts of the text is simple, additional information, illustrations, sources, brought forward and hidden with simple mouse-clicks. The reader can choose different ways of reading the paper by following the links. It is important that the structure of the hyperpaper is simple or at least explicit, otherwise the content of the text-- the history, the discussion, the findings, the argument -- would not be easily understood.

Figure 2 Structure of reading process, a reading in levels

<table>
<thead>
<tr>
<th>Level</th>
<th>Introduction</th>
<th>Discussion Part 1</th>
<th>Discussion Part 2</th>
<th>Co</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended summary,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 1:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full text,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>diagrams,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>illustrations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 2:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Datafiles,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tables,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sources</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(text, pictures)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
.07. Reading a Hypertext - an Example

Reading a hypertext can be quite different from reading an ordinary text. In Figure 2 there is a sample of how a hypertext with several levels can be read. In Figure 2 reading the hypertext at level 0 will be like reading any text and the hypertext system will allow you to read the text sequentially from the introduction, through the discussion, and then to the conclusion. In the text at level 0 there could also be some excerpts from sources, diagrams, illustrations and simple tables. Level 0 could also be viewed as a kind of an extended summary, and then level 1 could be the full text.

We could also think of a more thorough reading process, where the reader also chooses to investigate part of the text in more detail, read excerpts from sources, definition of terms, references, additional tables or tables of data that are sources of diagrams used at level 0. This is shown in figure 2 by an arrow into level 1. The reader can, by investigating level 1, check the arguments or find other interpretations.

In level 2 there could be tables of data, more sources or different transcriptions of sources, data files for download, and also software tools for analyzing the data files. At level 2 the reader will be partly able to redo the analysis that supports a conclusion at level 0. In a hypertext system (e.g. WWW) these levels can be linked and integrated and the reader can adjust how the text is read according to his/her ambitions and wishes. Research publications structured and linked like this example could be termed a "virtual laboratory". [7]

.08. Hypertext: A three-dimensional example--Time, space and Actors

The previous example is oversimplified because many historical problems have at least three dimensions: time, space, and actors (or social processes, or institutions). The analytical
structure of historical research can therefore become quite complicated. An example: In studying the modernization process, it could be of interest to compare two or more regions over the same period of time, and to analyze different social groups or classes. To present the results of this research in a book, one has to choose one single sequence. And what should be presented first, in what sequence should regional differences, the social differences or the time variations be discussed? Would a chronological outline be best? The problem is to project or simplify the multidimensional analytical structure into a presentation that traditionally is one-dimensional and with a fixed sequence. In a hypertext it is possible to link each of these dimensions. The reader can choose to follow one path, e.g. by following the links read about the changes over time in one social group in one region. If this seems complicated it is close to what one of our students did. In a paper called Handverkarar på Nordnes 1800-1875 ("Master craftsmen and apprentices at Nordnes 1800-1875") it is possible to read this hypertext 'paper' through different paths.

As a reader you can choose to investigate changes over time in the households of the master craftsmen by following one set on links, or one can chose to read about both apprentices and masters at one point of time. The two different groups of apprentices (Svein and Dreng)[8] can be followed accordingly. By following some links the reader will go back in time, contrary to the main structure or outline of the paper, which is chronological. And in each block of text you can go into other blocks of the text where central terms or institutions are explained (e.g. modernization, the guilds) or additional tables to support the argumentation or as 'source' for diagrams. The structure of this Hyperpaper can be described as a three-dimensional text: time as the first dimension, actor-groups as the second, and the sources/tables as the third.

A structure like this makes both the writing and the reading process more complex, but the process of reading resembles the research process in the respect that the reader goes back and forth, or the reader can examine the sources or the data, i.e. follow the traditional footnotes with a mouse-click. The reader is free to choose his own paths through the text according to his interests. A text can have complex structure consisting of different layers (depth or levels) and dimensions (time, space, actors, institutions/phenomena). Because of this possibility of going easily into the depths of a project/study, one might ask
whether hypertext perhaps supports a more critical reading.

Is the structure offered by the hypertext system something new and is it necessarily an advantage? In a book the reader is also free to choose his own paths through the text; however it is not always specifically structured for making your own way through the text. You, as a reader, can of course stop to read here, and then jump to the next paragraph, so there is nothing 'new' in that. So there is no simple answer to this question, but it is a new way of both presenting and structuring historical knowledge. By exploring the possibilities of hypertext or hypermedia on the WWW we may be able to give an answer to this question.

In our class we have experienced two types of problems related to presentation and structure: The students become very preoccupied with layout or 'look-and-feel' -- their paper must have a personal 'look' or 'image'. And by surfing on the Internet they find 'cool' sites, and want to copy different ideas into their own pages. The second problem is one of structure; i.e., to make the structure of the hypertext too complex. If the student uses too many hyperlinks the reading process can become quite complicated -- too complicated. To visualize the problem of structural complexity, just add two extra dimensions in Figure 2. The result could be the lack of an evident sequence of reading and the reader would very easily get lost and ask: Where am I now? What am I reading? Why? These two problems, exaggerated layout and overly complex structures, should be taken very seriously. As historians we cannot accept a project with a nice appearance or a flexible structure, if the historical content is below our standards.

.09. Conclusion (return to Index)

In this paper I have tried to show how we have tried to combine 'traditional' and fundamental elements in the education of Historians with the exploration of a new media.

The main elements are:

- To view the WWW as an archive of sources and resources (The Digital Archive).
- To combine computerized sources and commercial software packages for analytical purposes.
- To extend the traditional student paper by making it into a
These three elements allow us to focus on:

- The crucial methodological questions of formalization when using computer technology in history. The ability to formalize and represent both sources and historical methods (e.g. quantitative methods) is an important skill that is transferable into less computerized history or subjects, because the student learn to make abstractions.
- Using computer technology to explore new ways to communicate, both in order to learn scholarly discourse, and to disseminate historical knowledge.

In this article I have discussed how we at the History Department at the University of Bergen have tried to meet a variety of contemporary challenges. The Internet has created new ways of communicating, and challenges how we communicate, how we read and write. By letting students create their 'papers' as hypertext in a history curriculum we have tried to respond to this challenge actively and without raising too many critical questions at this juncture. At this moment there are still many questions to be answered, and we have tried to find some answers by using the technology itself. We do not yet know whether hypertext 'papers' will improve the education of historians and history teachers or whether the students will learn more, or faster. But in any event we want to use the media actively and to develop its content, not let other groups, whether they are academic or not, get far ahead of us. This is necessary since the new technology of media primarily deals with communication. As historians, it is necessary to explore and develop our way of using the Internet both in research, and as a tool for communication and collaboration inside the community of historians, and lastly, to make historical knowledge available to a wider audience.

.10. Appendix (return to Index)

.11. Footnotes (return to Index)

- Nota bene: note numbers below are a hyperlink back to the note in the text above.

[1] In this paper hypertext will also include the term hypermedia. Instead of hypertext-papers the term hypermedia-papers would be more appropriate. Hypertext is non-linear electronic text structured by using linking mechanisms. The linking mechanisms can also be seen as footnotes in a book.
An English translation of the IT-plan has the URL http://odin.dep.no/kuf/publ/it-plan/eng/

The IT plan is a part of several reforms in the educational system issued in the last three years. The most important is the Reform94 for secondary schools and Læreplan97 for primary schools--the Compulsory School Reform. An English translation of the reforms can be found at http://odin.dep.no/kuf/eng/index.html, (Ministry of Education, Research and Church Affairs.

These sources can be found at URL: http://www.hist.uib.no/arkivverket/index-en.htm

HTML Hyper Text Markup Language. The language to describe a webpage.

These attributes are called Internal hypertextual functions in contrast to External hypertextual functions like bibliographies and library registers. See George P Landow and Paul Delany, Hypermedia and Literary Studies , p. 4, MIT Press, 1994.

The term Virtual laboratory is suggested by Jakob Nielsen, in Multimedia and Hypertext , 1996.

The Norwegian term Svein could be translated as apprentice and the term Dreng, which literally means boy could be translated as journeyman.

Homepage URLs:

Department of History, University of Bergen (English): http://www.uib.no/hi/Welcome.html

The 1801-census (English): http://www.uib.no/hi/1801page.html

The Digital Archive: http://www.hist.uib.no/arkivverket/index-en.htm

The WWW-'papers' (Norwegian/English): http://www.hist.uib.no/hit/studentarbeid.htm and http://www.hist.uib.no/dokkeveien/prosjekt.htm

Master thesis, semi-hypertext (Norwegian/English) http://www.uib.no/hi/hfag.html

The History&Computing curriculum (Norwegian): http://www.hist.uib.no/hit/

The Ministry of Education, Research and Church Affairs http://odin.dep.no/kuf/eng/index.html

Books on hypertext and hypermedia

Philip Barker, Exploring Hypermedia, Kogan Page Ltd. 1993


Hypertext 'papers' on the Web:

Ray McAleese and Catherine Green, Hypertext state of the art, Oxford 1993.
Jakob Nielsen, Multimedia and Hypertext. The Internet and Beyond, AP Professional 1996.

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