

Selling Science Online

The self-projection of scientific institutions
and conveyance of scientific contents
on the World Wide Web

Workshop report

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INTRODUCTORY REMARKS

The interactive media, and especially the internet, confront science and research with new challenges. The virtual space of online communication forms a completely new public, a globe-spanning communication space with its own structures, themes, communication procedures and attention-getters. How prepared are universities and research institutions for these challenges? What opportunities do the multimedia communication forms offer them, taking into account also the ever sharper competition and the demand not only to increase their performance but also to communicate it outwards? What PR strategies do they develop and how well does the online content meet the wishes of the target groups?

There will be presentations here of empirical studies, an inventory of German universities and scientific institutions in the net and surveys of offerers and users of scientific online inputs. The aim of the research project now running at the Freie Universität Berlin is to develop, on the basis of empirical findings, practical concepts for scientific communication in and with open data networks.

This workshop report will present the concept and methodological design of empirical studies currently running. It is a stock-taking of German tertiary schools and science institutions on the net and survey of the providers and users of scientific online services. The objective of the research project running at the Free University of Berlin is to produce practical concepts for scientific communication¹ in and with open data networks, on the basis of empirical findings.

INTRODUCTION

The Internet is not a new medium to science. Already in 1969 the "Advanced Research Projects Agency Network" (ARPANET) came into being in the United States of America at the behest of the Department of Defense. Whereas the US government was primarily interested in the structure of this net, i.e. in its lowest possible vulnerability to disturbances and breakdowns, the actual communication potential of the multiple networking was used from the outset for the computer driven communication of scientists.

The boom in this new form of communication in the 90s started when scientific usage began to decline compared with the mass usage in the non-academic sector, i.e. mainly in the business and private domains. Now the Internet is growing like a snowball according to its structure and with exponential growth rates. The² development and marketing of user friendly transmission protocols, formatting standards and reception

¹ The term 'science communication' is to be understood interpreted as the initialization and realization of publicly accessible information and communication processes on the science/research and society/government intersections by means of various - eg. journalistic - means and aimed at various target groups.

² See <http://www.nic.de/Netcount/netStatOverview.html>

software has strongly driven this development. Thematisation of the medium by the 'conventional' media in this context contributes to its popularity even among the non-involved and non-users.

Through the further development of the 'Hyper Text Marker Language' (HTML) as one communication form among the various services offered on the Internet, the World Wide Web is increasingly assuming the character of an interactive mass medium. That adds to the computer driven communication within the scientific community new possibilities of transporting scientific contents and the self-projection of scientific institutions.

The German tertiary schools and scientific institutions are in a new situation at the start of the 21st century. The restructuring of our society into a "media society" is also impacting on communication. New and further reaching communication demands on tertiary schools and scientific institutions are colliding with negatively changing financial parameters. These are enforcing changes in communication services and structures. New forms are required in external and internal communication.³

New instruments like the Internet presentation promise individual contacting, personal involvement, a synchronous and global presence and a communication expanded by a dialogue and new interaction forms. New communication options make understanding easier but also make accessibility harder. The success of reaching understanding depends more and more on how much attention is paid in shaping information and communication systems to technical requirements and typical behaviours in handling information and individual needs and reception structures. The increasing importance of knowledge and information in society also changes the communication expectations placed in universities and research organisations. University and societal structures are beginning to internet in the virtual university.⁴

RESEARCH DEFINITION

We know from our own experience that the practical implementation of interactive information offerings in the academic sector still tends to depend on the engagement and abilities of scientists who as a rule work in completely different fields, and is not part of the standard repertoire of those responsible for publicity work and knowledge transfer. This has led to there being sometimes crass differences in the views over what online offers should do and contain.

The study, being done as a three-semester project seminar at the Institute of Media and Communication Studies (Institut für Publizistik und Kommunikationswissenschaft) at the Freie Universität Berlin, is to put special focus on the mass media aspect of scientific online communication and in that context integrate the three essential perspectives for evaluation of scientific offerings on the World Wide Web:

³ Bentele 1997

⁴ Gesamthochschule Kassel: Abschied von der Öffentlichkeitsarbeit? Präsentation der ersten Ergebnisse einer bundesweiten Erhebung zum Hochschulmarketing. Kassel 1997.

(1) The providers: What purpose do they pursue with their online presence, what target groups are they trying to reach and how is the practical implementation of the Internet offering worked into the institutional organisation?

(2) The contents: What contents are offered and how is the offer structured and formatted?

(3) The users: Who uses the contents of scientific facilities, which contents are more strongly, which less strongly, called upon and what does the search strategy of the 'online user' in this thematic context on the World Wide Web look like?

From the communication science perspective one can describe the World Wide Web as a recipient oriented medium. Contents are not broadcast, as by conventional mass media, but made available for calling up. Especially because of that the linkage between the supplier and user perspective is of decisive importance.

This approach goes beyond the pure 'selling' of science. At the centre of the questions to be examined here is not the self-projection of scientific institutions,⁵ but the conveyance of scientific contents on the World Wide Web; and here particularly the question whether the providers of scientific information are offering precisely information and content users are looking for and expect. Building on these findings and interpretations, recommendations should be derived for the publicity work of the tertiary schools and research institutions. These will not be restricted to design and organisational aspects but also point up the application possibilities and perspectives of this technology.

THE RESEARCH STATUS

(1) The providers

By their own online presence the tertiary schools and scientific institutions want to position themselves in Cyberspace, increase the global knowledge about them, pursue image policy, influence opinion formation in regard to critical themes, promote direct dialogue with the target groups and above all increase the efficiency and speed of conventional communication processes.

The pretest of the content analysis of the project presented here showed that structural and visual design differ greatly and appear to correlate with the time taken to make it, the date it was made, the number of people responsible for it and the budget available. At any rate, 97% of the German universities report a more or less comprehensive information offering on the net;⁶ but differences show in content. The offers in many cases do not aim at elementary target groups like potential students, journalists, scientists, entrepreneurs and politicians. Interaction and transaction possibilities are

⁵ Nolte, Carsten/Schütt, Dirk: Deutsche Universitäten im Internet. Göttingen 1997, p. 11.

⁶ Nolte, Carsten/Schütt, Dirk: Deutsche Universitäten im Internet. Göttingen 1997, p. 11.

limited. Only few universities offer the possibility of exchange through blackboards or newsgroups through the classical contact possibility of e-mail.

Although many tertiary schools and scientific organisations have recognised the potential of online PR, in many cases there is still no effective and efficient implementation. Online platforms differ so much from conventional media that using them has first to be learned, not just in their technical but also their communication-practical respects. For example, the procedure and result of interactive communication are driven to a great extent by the communicator and the recipient. The information flood and lack of structure in Cyberspace make the ability to separate the substantial from the trivial and to rely on competent signposting the critical success factor⁷. In practice one often misses clear definitions of objectives and controlling standards for the online engagement of the tertiary schools and scientific organisations.⁸ Moreover, there is a lack of a joint presence of German tertiary schools and scientific organisations on the net.

In contrast to marketing research, which has recently intensively addressed issues of online communication,⁹ German-language PR literature so far is limited to depicting a few individual cases¹⁰. The media-theoretical addressing of the Internet is also still at the beginning.¹¹

The "importance of the computer medium for the scientific communication system" is proved in research literature.¹² In the study presented here the first attempt is made to subject the conveyance of scientific contents on the World Wide Web to a critical analysis and to develop quality criteria for scientific online presences, PR instruments, so to speak, for online scientific communication.

(2) The contents

Studies addressing the online presence of German universities and scientific organisations primarily looked at the "service on the net" and the "technical capability"¹³.

⁷ See Zerfaß 1996

⁸ Positive examples are the Forschungszentrum Informationstechnik GMD (see www.gmd.de) and the Max-Planck-Gesellschaft (see www.mpg.de)
See inter alia Oenicke, J: Online-Marketing. Kommerzielle Kommunikation im interaktiven Zeitalter. Stuttgart 1996.

See inter alia Krzeminski, Michael/Zerfaß, Ansgar (ed.): Internative Unternehmenskommunikation. Frankfurt 1998 and Schulz, Holger: Public Relations im Internet. Wie präsentieren sich deutsche Unternehmen im World Wide Web. Hannover 1997 (unpublished diploma thesis at the Hochschule für Musik und Theater, Hannover. On the operative implementation of online PR measures see also Marlow, Eugene: Electronic Public relations. Belmont 1996.

¹¹ See comprehensively on this Vesper, Sebastian: Das Internet als Medium. Bardowick 1998, p. 16f.

¹² Rutenfranz, Uwe: Wissenschaft im Informationszeitalter. Zur Bedeutung des Mediums Computer für das Kommunikationssystem Wissenschaft. Opladen 1997; see also Scholl, Wolfgang: Computervermittelte Kommunikation in der Wissenschaft. Münster 1996 and the same/Pelz, J: Computervermittelte Kommunikation in der deutschen Wissenschaft. In: Batinic, B. (ed.): Internet für Psychologen. Göttingen 1997.

¹³ See Kurth, Jürgen: Die Internet-Liga. Welche Hochschule in Deutschland hat den besten Auftritt im World Wide Web? In: Start (no year), issue 1/98, p. 88-90. The description is of an examination

Probably the most comprehensive investigative approach has so far been delivered by SCHUTT¹⁴, who examined the Internet presences of 3,638 chairs at German universities. Whereas "general information" is increasingly offered on the Internet, higher-input services from research are only rarely in the offering (17%). Left out of this study were the exterior presentations of the universities through the administration (presidential office, research transfer office, press office, etc.).

No comparing study of the online presentations of extra-university scientific institutions is known.

(3) The users

In the spring of 1998 more than 6.6 million people in Germany (10.4% of the population over the age of 14) had occupational or private access to online services and/or the Internet. The figure had increased by more than half over a year. The increase was registered within the framework of the just published ARD/ZDF online study . The¹⁵ findings were obtained in telephone interviews with 1,006 online users aged from 14. The authors say it provides a reliable representative basis. Other studies have not yet been able to meet this criterion, especially the purely online based surveys (W3B study, Web-Monitor of wp research). In other studies (ACTA, Typology of Wishes) the research of special online data is done only as a sideline. The Gfk Online-Monitor carried out the first time in 1997 is to supply basic data on online usage twice a year in future.¹⁶

A fundamental problem in online research is that because of the small sample hardly valid data can be obtained on details , let¹⁷ alone provider-specific user profiles for scientific communication.

METHODOLOGICAL CONSIDERATIONS

Conventional methods of empirical communication and media research are only partly usable for the scientific examination of the contents of online media. Basic wholes and samples on the sides of both the media contents and the online users are almost impossible to define and fix. The dynamic structure of the offerings on the World Wide

carried out by Westerwelle & Partner from November 1987 to January 1998 at 250 universities and technical colleges. The main investigative criteria: loading time of the homepage, overview, topicality, links to other pages, etc.

¹⁴ See Nolte, Carsten/Schütt, Dirk: Deutsche Universitäten im Internet. Göttingen 1997.

¹⁵ See Eimeren, Birgit van/Gerhard, Heinz/Oehmichen, Ekkehardt/Schröter, Christian: ARD/ZDF-Online-Studie. In: Media Perspektiven 8/98, p. 423. ARD/ZDF are the German public broadcasting corporation.

¹⁶ See Damaschke, Giebert: Neue Daten für das Internet. In: media & marketing 7/98, p. 36-40.

¹⁷ See Eimeren, Birgit van/Gerhard, Heinz/Oehmichen, Ekkehardt/Schröter, Christian: ARD/ZDF-Online-Studie. In: Media Perspektiven 8/98, p. 423.

Web and the constant changes through reworking and updating cause great problems in selecting and archiving the material to be examined.¹⁸

That means that in terms of empirical research both the validity and representativeness as well as the reliability of the findings of content analyses and online surveys are negatively influenced. For, the chosen browser already influences the depiction of the HTML documents on the researcher side just as the concrete appearance of the survey instruments does on the side of the respondents.¹⁹

From the perspective of the usability of the findings of a study, which is focused on both the value of the WWW offering to the conveyance of scientific contents and the self-projection of scientific institutions as well as the concrete design of the contents and their usage, the scientific institution is a good starting point for all three partial studies.

Proceeding from a 'finite' German list of scientific facilities and institutions, all possible and necessary limitations and restrictions of the examination material and examination objects can be applied.

CONCEPT AND INVESTIGATIVE APPROACH

To arrive at a comprehensive statement on the status and development potential of scientific online offerings in Germany the essential examination steps and examination dimensions are harmonised with each other. In the following the conceptual considerations for provider questioning, the content analysis of the offers and the user survey are briefly outlined.

(I) Written questioning of the suppliers of scientific communication

Selection of examination objects

Based on the listing of the German scientific facilities 'VADEMECUM', a²⁰ complete, finite list of all institutions present with an offering of their own on the World Wide Web is drawn up.²¹ The list is divided into six 'types' of science communicators, enabling a successive working through the institutions included:

- Tertiary schools (e.g. universities, technical colleges, art schools);
- self-administering scientific organisations (e.g. Max Planck-Gesellschaft, „Blaue Liste“ institutes, largescale research facilities);

¹⁸ See Rössler, Patrick: Standardisierte Inhaltsanalyse im World Wide Web. Überlegungen zur Anwendung der Methode am Beispiel einer Studie zu Online-Shopping-Angeboten. In: Beck, Klaus, Gerhard Vowe (ed.): Computernetze - ein Medium öffentlicher Kommunikation. Berlin 1997, p. 245-268.

¹⁹ See Werner, Andreas: Medien und Kommunikationsforschung in digitalen Online-Umwelten. In: Beck/Vowe 1997, p. 227-244.

²⁰ VADEMECUM – Stätten der Forschung. Bonn 1997.

²¹ Scientific journals and other services professionally active in the conveyance of (popular) scientific contents were excluded.

- Industrial research facilities;
- Federal facilities with research tasks;

- Specialised information facilities (e.g. libraries, insofar as they are not part of universities) and
- Museums.

With the aid of this meanwhile completed list it is possible to draw a representative random sample of all facilities present on the World Wide Web as well as to subject individual institutions to detailed case study examination.²² This possibility will be especially important in the harmonisation with the content analysis design.

Examination dimensions and examination instrument

This survey is to address primarily the following partial areas:

- The importance attached to the Internet presence within the institution (in respect of personnel and PR strategy);
- the reasons and aims of its implementation (benefit, purpose: status/target);
- the content offered;
- the target group addressed and the actual usage of the offer.

On this basis a working group of the project seminar drew up a comprehensive, fully standardised questionnaire comprising 25 questions. In the development phase this questionnaire, comprising about five pages, was sent by post or e-mail to 10 selected institutions and reworked in line with their responses.

Implementation and pretest

The tests in the development phase showed on the one hand that dissemination of the questionnaire in the present form is difficult. The technical platforms available to the interlocutors in the scientific institutions are too different for distribution of a standardised questionnaire. On the other hand, postal questioning - not least due to the bureaucratic structure of especially the universities - seems to be a secure method of reaching the desired interlocutor.

In the next phase of the project it is planned to write to all the scientific institutions on the list and to request their cooperation in the census survey. Still in September the first questioning of university press offices is to begin.

²² For example, in the coming semester the first Master of Arts thesis is to be written that addresses the Internet presence of the Max-Planck-Gesellschaft in detail.

(2) Quantitative content analyses of selected WWW offers by German scientific institutions

The two most important perspectives are addressed by questioning the scientific institutions as providers of online communication and the users of these offers. The concept of quantitative analyses of the providers of scientific WWW offers serves the structured identification and intersubjective description of the offers to enable systematic comparison of the responses of both the providers and the users.

Selection of examination objects

One of the major problems in content analysing examination of WWW offers is the dynamic structure of the documents. The application of conventional procedures from print and broadcast media research is not readily possible for this reason.

Before we address this problem, a few more remarks on the organisational structures in which the WWW offers of scientific institutions are anchored. German universities are a good example to highlight these problems. As a rule, on the scientific side (teaching and research) they are structured into faculties, fields and institutes. In addition, all universities and technical colleges have an administrative structure responsible inter alia for representing them externally (presidential office, chancellor, etc.), usually with their own press and research transfer office.

From the point of view of the analysis the least favourable case is that each of these levels has its own online presence, covering partly differing and even overlapping information and theme areas. This gives rise to the immediate question as to how to put these divergent offers into a sequence relevant to the examination.

A look through the WWW offers has shown that original scientific contents, i.e. concrete research plans and findings, tend to be found at the level of the institutes or individual scientists, and that the self-projection of the institution as a whole happens at the level of the central powers of the universities. In most cases there are no uniform design standards for all organisational units. There is very little harmonisation of contents.

Now to the problems of sample and population. Fundamentally the examination material is limited by the institutional approach chosen here. Only those WWW offers are to be included in the examination for which corresponding scientific institutions are responsible. But no overview of the entire material is possible. For example, the Freie Universität Berlin (*.fu-berlin.de) alone runs about 98,000 HTML pages (status: August 1998).

With view to these problems the following selection concept was developed:

- Full registration of all homepages (index pages) of all scientific institutions from the provider list;
- inventory of all central authorities explicitly responsible for external communication (press and transfer offices) and
- a conscious, thematic selection of individual offers at institutional level.

This prestructuring of the examination material on the organisational level of the scientific institutions significantly alleviates the problem of sample design referred to above. The selection of HTML documents to be examined needs to be automated only on the last, thematic level of the institutes (i.e. below the top level domain) with the aid of a search engine or a retrieval programme. The examination material remains overviewable.

Examination dimensions and examination instrument

The indicators to be encoded on the WWW pages thus identified depend on the level of analysis.

On the homepages of the whole institution (e.g. university), the press office and possibly the selected institute, field of work or research facility, in addition to formal (technical) variables, primarily indicators for establishing contact, self-projection and user service of the organisational levels will be registered:

- Contact making: postal address, telephone, fax, e-mail address, etc.
- Self-projection: uniformity and central information authority
- Services: guest book, FAQ, search engine
- User addressing: target group specifics, foreign language offering

The identification of the individual offers of selected institutes (e.g. the offer of the Meteorology Institute of the Freie Universität Berlin) will then be differentiated further. The analysis unit is always one retrievable page, accessible by a standard browser with fixed settings. Context unit of this analysis is the entire Website as the sum of the encoded HTML documents with the already addressed homepage. Centrepiece of this analysis step are the variables in content, i.e. the forms (report, interactive documents), scientific contents (essays, dissertations, etc.) offered on the individual pages:

- Contact making (see above), invitation to respond
- Design characteristics, navigation aids, links, interactive services
- Subject area, content type and form, language, text origin, formulation

This partial study delivers both data on the total projection of the provider examined and detailed descriptions of individual offers differentiated organisationally and thematically.

Selection of the examination objects

The examination instrument was developed and tested during the last semester. In the next semester it is planned to carry out the survey with a student working group.

(3) Online survey of users of scientific offers in the WWW

What profiles exist of the users of online offers in the scientific sector? What contents do they seek in the World Wide Web and how is their acceptance of and satisfaction with these offers? Against the background of the other two partial studies, this examination phase attempts to obtain information about users that is both general and provider-specific.²³

Selection of respondents

Various partial populations of the users of scientific offers will be addressed by this survey. The aim is (1) to obtain the largest possible number of scientific institutions for a link on the online questionnaire.²⁴ In addition (2) postings in scientific newsgroups will call for participation in the survey. In the context of this survey representativeness is not the issue. This quality criterion is probably not attainable by online surveying. Even in the cases of the providers we examine, the questionnaire returns will always tend to have the character of a 'TED survey' on television rather than a representative sample. Despite this, there should be provision for respondents to give pointers as to acceptance and grading of the offers.

Examination dimensions

In a brief questioning of socio-demographic data, the questionnaire relates in the later provider-specific form primarily to

- evaluation of the provider side (design, contents, technical capabilities),
- the information search behaviour, respectively usage of service on the Internet,
- generally valid quality criteria for scientific web offers and
- usage of conventional media for scientific research.

Execution and pretest

²³ The technical implementation of online questionings is an established method. It is not discussed here (see e.g. Batinic, Bernard: Die Durchführung von Fragebogenuntersuchungen im Internet – ein erster Überblick, <http://www.psychol.uni-giessen.de/~batinic/survey7faq.htm>)

²⁴ A similar technique is currently being used at the Gerhard Mercator University in Duisburg by Marcinowski et al. (see <http://pro-online.uni-duisburg.de>).

The questionnaire developed by us will be distributed to participants of the PCST conference. It is positioned on the net under the WWW address <http://winnie.kommwiss.fu-berlin.de/wk/fragebogen.html> for responding to.

Concluding remarks

Unfortunately we cannot yet present any empirical data on the self-projection of scientific institutions and conveyance of scientific contents on the World Wide Web. Despite the boom that has made the Internet a general talking point in the past five years, scientific research into it is entering virgin territory. In addition to the 'normal' time consuming development work that conventional empirical studies already involve, in the case of the World Wide Web one has the least possibilities to access existing findings and methods. But we are optimistic that the approach outlined here will take us a little closer to the goal of acquiring knowledge about science on the net and with that an improvement of scientific communication through this new channel.

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