Quality Evaluation of Electronic Communication Fora with evalYOUate

Marc Rittberger

Information Science, University of Konstanz

marc@rittberger.de

Abstract

Communication is an essential and necessary aspect of professional work in science and business. Besides the traditional face to face communication more and more face-file-face communication is used in newsgroups, email, or communication fora. We introduce a index number system to evaluate the benefit of communication fora. We distinguish the overall quality of communication fora into five areas: information, interaction and communication, presentation, organizational and social, and technique and method. With evalYOUate, an internet-based tool to support the evaluation, we studied 29 communication fora in the German speaking countries. Results show big differences between the fora and that especially the middle range is often weak in the information level.

Introduction

While in the first generation of Internet applications different services met the various requirements for navigation, searching, informing and communicating, these activities are increasingly being performed by a single service, the World Wide Web. For example, it is no longer appropriate to limit electronic marketplaces for technical information to the organization and distribution of knowledge and information. Such market places should provide not only the exchange of knowledge and information along the well-known procedures with journals but also encourage personal conversation and discussions. As science consists not only in the transmission of printed knowledge, but also and especially in the communication between experts which furthers the insights and increases understanding.

Communication is an essential aspect of successful knowledge management in the enterprise [North 1998]. The knowledge workers differ among other things in their information competence and ability to work with the necessary information and communication techniques [Köhler et al. 1999]. Communication is thus also to be regarded as a basis of knowledge management: "Without communication between individual knowledge carriers, no agreement can be reached on one's own and others' ideas and experiences. Organizations in which high communication barriers exist between individual departments can thus arrive at jointly developed solutions only with difficulty, and all too often form inefficient knowledge islands"[1] [Probst et al. 1999]. Communication is thus a means and aim of knowledge management which does not merely emphasize the functional aspect of communicative processes in the preparation and generation of knowledge,

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[1] Author translation

for the development and improvement of effective enterprise communication itself is the declared aim of efforts in knowledge management [Heger 1999].

Communication as a success factor in the organization of knowledge, whether in science or in the enterprise, can be organized and supported with the aid of communication fora, news, email or online conferencing systems. The utility and suitability of such systems can thus play an important role in communication in the enterprise or in the electronic market places of the technical public.

Communication fora can fulfill this function. They can be a part of the quality evaluation of electronic information services like knowledge management systems in companies and electronic market places for technical information which we will examine more closely in this contribution. We will present an index number system for the evaluation of communication fora. We will thereby show that the approach for the evaluation of electronic market places developed in Konstanz [Rittberger 1999] is also suitable for evaluating other information services. For evaluation a tool was developed which simplifies the administrative work in calculating index numbers. We will present this tool and its utility for developers and for customers of information services using the example of communication fora.

Communication fora

Fora are places for information, communication and entertainment and also transactions. The concept of forum *per se* was developed in the eighteenth century and derived from Latin. It had various meanings such as 'marketplace', 'court' or 'public place, place for public life|. The fora of Roman cities were not merely places where goods were exchanged, trials were held and politics pursued, but also places for meeting in public, exchanging experiences and opinions, for entertainment and seeing and being seen. This also applies to the marketplaces of villages and cities at later points in time, and also up to the present day. The concept used today has been affected by globalization and the information society. Thus the community which meets in a forum, that is an electronic, virtual discussion space, is no longer limited to a region, but can in principle participate from every point of the Internet in the communication and information exchange in the forum. A forum can thus be characterized as a public meeting place which contributes to the general exchange, independently of whether or not the objects are of merely a physical nature [Kuhlen 1998a]. Communication fora as new media for interaction create new realities and thus also new communication behavior. Through the use of these media new rules and reference systems arise which organize themselves but are also often in need of coordinating assistance [Frindte & Köhler 1999]. A comprehensive presentation of the significance of the Internet for communication processes is offered by [Döring 1999].

A further characteristic which is necessarily part of a communicative act is interaction. In the communication possibilities and other interactive branches [Neuberger & Tonnemacher 1999] we find the essential attributes which differentiate the new media from traditional mass media such as radio, television, newspapers and magazines, whose chief task is the one-dimensional distribution of information. The classical media hardly offer any interactive components which can permit the exchange of information by means of communicative acts between various groups or individuals.

Besides the communication fora, there is a range of further offerings in the Internet for interaction and exchange of information, for example newsgroups, chats, MUDs, guest lists, and mailing lists. Communication fora are typically more asynchronous and often moderated, which can help increase the quality of the individual contributions and avoid non-objective, incompetent or

illegal contributions. There is no limitation on linkages and thereby the linkage of communication fora in the WWW, so that the whole range of information can be tied into discussions.

evalYOUate

The purpose of an index number system is, by systematic comparisons of the data summarized in the index numbers, to make statements on the phenomena of the dimensions represented by the index numbers. Thereby individual index numbers are described by a splitting into more detailed index numbers until one arrives at the lowest level of an index number system at which no differences can be detected. The individual index number has the advantage of providing information of a quantitative nature about a specific subject matter. The index number system uses in principle the same form of representation for every subject matter and thereby the same index number type. With this prerequisite the individual index numbers can be placed in a calculation context which enables the index numbers of higher levels to be calculated using the index numbers of the lower levels. Index number systems thereby build on a peak index number and the main index numbers below it. Thereby the next higher level is calculated from the sum of the products of their lower index numbers with the corresponding weighting factors. With unbalanced trees and unequal branch sizes division through a standardizing factor is possible in order to prevent the weight of individual index number hierarchies from becoming unsuitably large.

To evaluate information service performance the index number approach developed in Konstanz was first installed with the aid of a spreadsheet software, thus with a proprietary software solution.[2] The limitations of this approach quickly became apparent:

- No individual interactive adaptation of the index number system by the user can be done, i.e., weighting of individual criteria corresponding to the specific user interests is not possible, or possible only with considerable effort.

- There is no possibility of influencing the criteria or structure of the index number system or changing it in a simple manner.

- Weighting and standardizing factors can hardly be changed.

- The application is only locally applicable, i.e., the proprietary software solution must be installed on the target computer.

- Index number systems generated with great effort cannot be presented to the World Wide Web in an acceptable, thus readable form.

Even if the first critical points could have been solved using MS-Excel, the platform independence and Web-compatibility requirements would lead to a new implementation. An implementation in Java and Java-Script appeared to be the suitable solution, whereby the data are placed in an ODBC-database [Dreher 1999]. The system thereby was supposed to be as open as possible for the development of index number systems so that two further framework conditions had to be fulfilled:

- It should be possible to generate a firmly pre-given frame for the objective evaluation of information services. Depending on the users viewpoint, individual main index numbers could be differently weighted and adapted to the individual requirements.
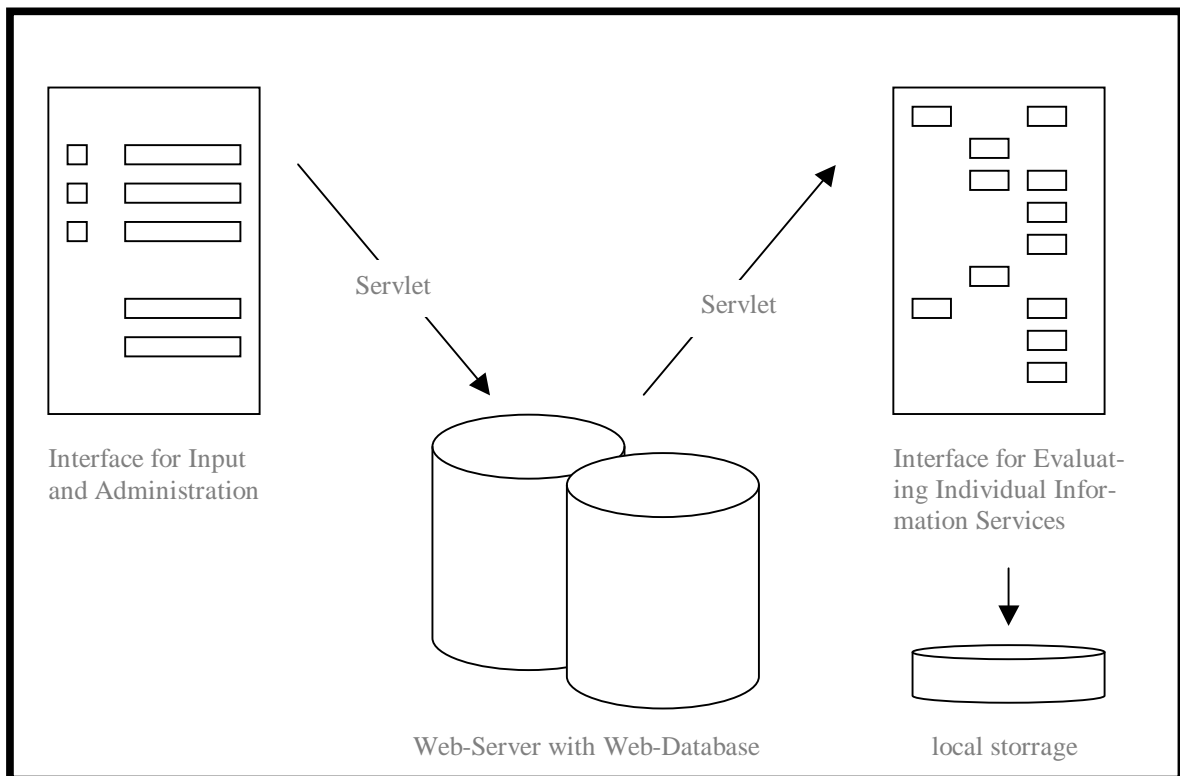
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[2] We employed Microsoft Excel 97.

- It should be possible to implement the index number system on two levels. The logical structure of an index number system must be set up for each evaluation of a specific type of information service. The logical structure establishes the individual criteria and their relationships with each other. This structure can be stored in the database. Based on this structure for the evaluation of a specific information service, for example, of an electronic marketplace, the weighting of the index numbers can be determined. Each individual evaluation of an instance can also be stored.

The tool evalYOUate makes it easier to calculate index numbers. It permits evaluations oriented to a personal, or an individual view or to a specific user models, which are guided by the different weighting of the index numbers. The intellectual performance of assembling criteria, identifying the relationships between the criteria, setting the weights of the criteria, thus thereby the construction of the logical structure of the index number system, continues to be at the discretion of the user and/or examiner. One can subdivide the structure of an index number system and the evaluation of information services into the following steps:

- determining the type of evaluation
- identifying the criteria
- operationalizing the criteria
- setting up the structure of the index number system
- determining the weighting factors
- performing the evaluations

Figure 1 shows the structure of the evalYOUate software for the evaluation of informa-

Interface for Input and Administration

Servlet

Servlet

Interface for Evaluating Individual Information Services

Web-Server with Web-Database

local storrage

tion service with an index number system.

The tool we developed thus offers support in setting up the structure, determining the weighting and carrying out the evaluation, so that new index number systems can be set up, managed, and stored.

Technically the interaction between server and user was realized using servlets. Figure 1 shows the different components of the application. The interface for setting up an index number system and managing the existing index number systems transfers the data to a database system. These data are used to change the weightings of individual criteria. The calculation of the instances occurs on the client side, so that work with an instance can also be performed offline. The full functionality is available for the calculation of main and peak index numbers.

Quality criteria of communication fora

To collect the criteria for the evaluation of communication fora, existing criteria catalogues were used and their features adapted. Furthermore, criteria were enhanced from the key literature and personal experience. The criteria catalogue thereby created was tested by means of a pre-test and especially the criteria relative to the communicative aspects of fora were intensively improved and the operationalization of these criteria developed. The criteria were divided into five essential evaluation levels, the main index numbers for information services [Rittberger 1999; Kuhlen 1998b]:

- On the **information level** the contents and content aspects of an electronic communication forum are described.

- The **interaction and communication level** clarifies the search and navigation procedures employed and other forms of interaction and describe the communicative possibilities of electronic communication fora.

- The **presentation level** includes the style elements employed. Design principles are employed, for example in setting up screen surfaces.

- The **organizational and social level** covers aspects of trust engineering, security handling and business policy.

- The **technique and method level** refers to criteria which describe the technique employed and their developments, such as the robustness of a communication phase.

The following paragraphs present the index numbers directly subsumed under the five main index numbers for electronic communication fora.[3]

Information

- About 10 *contributions* per day appears to be an ideal number.
- It was decided that ca. 50 active *participants* would be good, assuming that one or two contributions would be written per week.
- The *activity of the participants* corresponds to the number of contributions divided by the number of participants.
- *Responsiveness* refers to the number of reactions to the original contributions. High responsiveness indicates a very active discussion.

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[3] The development of the criteria catalogue and the evaluation of the communication fora was carried out together with a student group (S. Astahna, M. Gröbel, U. Haid, B. Schneider, T. Sindlinger and M. Wagner) in a course in information science.

- The *topic offering* provides information on the variety of a forum, which is differently evaluated depending on the perspective of the user.
- The *topic checklist* evaluates the possibilities of participants to bring in own topics and interests and possibly begin a new discussion.
- Is the *start of a discussion* stimulated by a moderator, motivated and supported with information?
- *Transaction options* contain votes, exchanges and the like which go beyond the discussion *per se*.
- The *virtual library* helps the participants of a discussion to supplement their statements with links, supplementary texts, etc.

Interaction and Communication

- The *notification* of participants on newly received contributions.
- The *editing* of a contribution after its publication in the communication forum.
- Detailed *search* in forum contributions and the supplementary pages.
- The *reply function* in order to be able to directly reply to a contribution in the communication forum.
- *Chatting* as a synchronous supplementation of a-synchronic communication in the forum.
- The *link* list contains a number of references to the topic.
- An *automatic translation* also enables foreign language speaking participants to overcome the language barrier.

Presentation

- In the *overall layout* particularly the share of the contents of the forum is measured in relationship to the other presentations on the page, e.g., banner advertising.
- The structure of the individual forum contributions and their interrelationships are studied in the *forum-specific surfaces*.
- *Status information* provides information about the state of the discussion, for example the number of contributions in the last 12 hours.
- The extent to which *support functions* are available to assist users.
- *Navigation aids* provide orientation in the forum.
- A *preview* provides information on the later appearance of a contribution in the forum.
- Accompanying *animations* are regarded as disturbing textual communication and considerably increase the loading time.
- *Searchability* is a standard of how rapidly the communication forum can be located within a Web site.
- The *arrangement* of contributions indicates their position in the forum and the extent to which users can adapt this ordering to their needs.
- Are the contributions *archived* and how are they archived?

Social and Organization

- The *forum guidelines* give information on the legal framework conditions, data protection and data security, as well as the usual 'netiquette' in the forum.
- The background, motivation and aims of the forum are explained in the *provider information*.
- *Moderation* assists in the coordination and compensation of deficiencies of the face-file-face communication.

- *Access options* determine the authenticity of the participants and thereby the confidence with which individual contributions can be approached.
- A *participant list* creates confidence and contributes to building a virtual community.
- *Participant profiles* create transparency concerning the identity of the other participants.
- *Social-cognitive substitute functions* like smileys and emoticons help to compensate for the conventional communication means.

Technique and Method

- The *loading time* for the forum pages should be as short as possible and *accessibility* must always be ensured, even during peak periods.
- *Error robustness* makes statements about the stability of the system.
- A *browser recommendation* is needed if the pages are optimized for a specific browser.
- *Printing* is not always simple on complexly organized pages. An own function, possibly with a preview can help.
- *URL-recognition* in contributions simplifies the linkage of contributions with external pages on the Web.
- *Word filters* for the reduction of inappropriate expressions in contributions, e.g., vulgar words, are based on stop word lists created by providers.
- *Attachments* such as pictures can enrich the discussion.
- The employment of *cookies* permits a higher level of comfort, for example, in user identification.
- Individual *user configurations* extending up to settings such as, say 'My Personal Forum', help regular users generate their own view of a forum.

Evaluation and results

The individual domains were weighted after intensive discussion of their significance for the success of a forum. The information level was thereby assigned the highest value (30%), the technical/methodical level the lowest value (10%). The communication-, presentation- and social/organizational levels contributed to the overall evaluation with a weight of 20%.

Overall 29 electronic communication fora were tested. Twelve fora were studied in a pretest to examine the criteria and their weight, and the best and worst forum of the chief test were subjected to an additional post-test. The post-test helped determine the evaluation variations between the individual testers.

The fora were selected from a pool of more than 100 fora which could be categorized on the basis of the type of provider, media, politics and society, teaching, research and science as well as economy and private. A subdivision into subject areas which were dealt with in the fora could not be carried out, since often a great variety of different topics were discussed in a forum. The communication fora of the various provider types were selected from those where there was intensive discussion and which were moderated.

Index Number	Level 1	Level 2	Level 3	x-Factor	/-Factor	Level
INFORMATION	61.8			0.3	1	1
Participants		26		0.1	1	2
Contributions		75		0.1		2
Activity of Participants		74		0.15		2
Responsiveness		94		0.15		2
Topic Offering		100		0.15		2
Topic Checklist		100		0.1		2
Start of Discussion		15		0.1		2
Transaction Options		0		0.1		2
Virtual Library		0		0.05		2
INTERACTION & COMMUNICATION	55			0.2		1
...						
PRESENTATION	71			0.2		1
...						
SOCIAL & ORGANISATION	17.5			0.2		1
...						
TECHNIQUE & METHOD	40			0.1		1
...						

Peak Index Number: 51.24

Figure 2 shows a part of the evaluation tool which was modified for the presentation.

Each of the 12 fora in the pre-test and of the 17 fora in the main test[4] were evaluated with the evaluation software evalYOUate, and its importance was calculated. Figure 2 shows a portion of the information function of the evaluation for the communication forum of the Politics Forum. The various index numbers were weighted differently in accordance to their significance. A high weight was placed on the activity and responsiveness of the participants, as well as on the moti-

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[4] The URLs of the fora are given in the Appendix.

vation provided by the moderator. The various columns show, besides the names of the index numbers and the hierarchy level of the index numbers, the weights of the individual index numbers, the standardizing factor and the hierarchical level. Let us look at the calculation of the index numbers on the higher levels:

♦ The index number of the information level is calculated by using the index numbers of level 2 multiplied with their normalized weights, named ×-Factor in figure 2. The weighted level2 index numbers are summed up.

Index number of the information level: $26 \times 0.1 + 75 \times 0.1 + 74 \times 0.15 + 94 \times 0.15 + 100 \times 0.15 + 100 \times 0.1 + 15 \times 0.1 + 0 \times 0.1 + 0 \times 0.05 = 61.8$.

♦ The peak number of a communication fora is calculated by summing up the five weighted main index numbers, the level 1 index numbers in figure 2, as there are the index numbers for the information level, the interaction and communication level, the presentation level, the organizational and social level and the technique and method level.

Peak index number of the Politics Forum: $61.8 \times 0.3 + 55 \times 0.2 + 71 \times 0.2 + 17.5 \times 0.2 + 40 \times 0.1 = 51.24$.
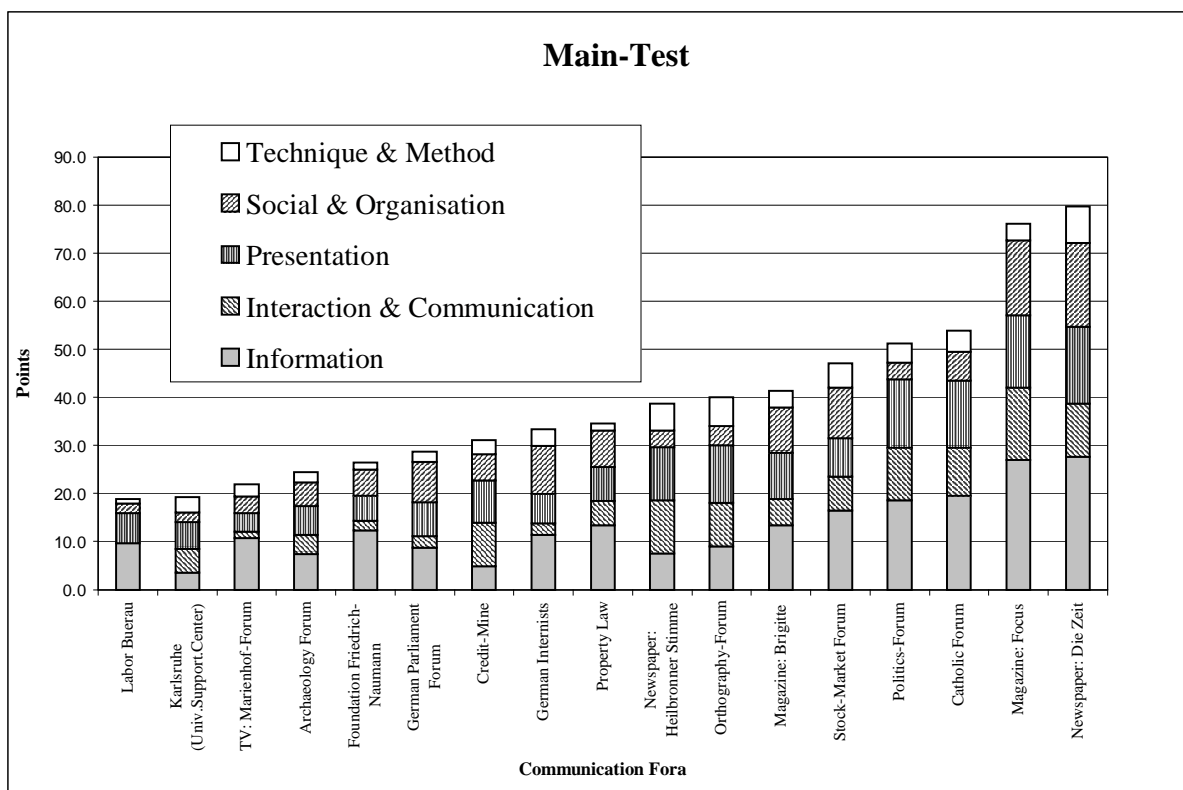

Figure 3: The results of the evaluation of communication fora in Germany. The five different levels are shown for the 17 mentioned communication fora

Figure 3 gives an overview of the results of the quality evaluation of electronic communication fora. The fora from the print media domain received the highest ratings in the evaluation. The weekly magazine *Focus* and the weekly newspaper *Die ZEIT* head the rankings with a clear lead.

Especially noteworthy are the information and presentation function, as well as the offerings of social/organizational aspects, especially outstanding moderation and user profiles. At the end of the list are the fora of the Labor Bureau and the University Support Center of the University of Karlsruhe, which have clear weaknesses on several levels. Occupying a broad middle range are fora which are quite weak in information content, but good in realization, thus on the levels of presentation as well as methods and technique (e.g., fora on property law, German internists). Also in the middle range are fora with good information content, but weaker in other areas (e.g., *Brigitte* (a German women's magazine) and *Politics-Forum*).

Summary

The evaluation of electronic information services can be objectified by multi-attribute procedures. The identification and weighting of the individual criteria or index numbers must be carefully planned for the implementation of an evaluation. The presented procedure using an index number system proves in practice to be a suitable approach, since it provides a transparent and objective procedure for evaluating information services. Besides the objective approach, the index number system is also suitable for a user-related evaluation. After setting up the index number system the user can be permitted to undertake the weighting in accord with his interests. Thus for example a user of communication fora who prefers moderation can weight the particular index numbers higher than in our example.

References

Döring, N. (1999). Sozialpsychologie des Internet: Die Bedeutung des Internet für Kommunikationsprozesse, Identitäten, soziale Beziehungen und Gruppen. Göttingen: Hogrefe, Verlag für Psychologie

Dreher, E. (1999). Entwicklung eines webbasierten Kennzahlensystems zur Evaluierung von Informationsdienstleistungen. Diplomarbeit Informationswissenschaft, Universität Konstanz

Frindte, W. & Köhler, T. (1999). Kommunikation im Internet. Frankfurt am Main: Lang

Heger, A. (1999). Probleme des Wissensmanagements in der Praxis - Theoretische Begründung und methodische Entwicklung eines Analyse- und Design-Tools. Diplomarbeit Informationswissenschaft, Universität Konstanz

Köhler, T., Frindte, W., Neumann, C., und Schreiber, A. (1999). Empirische Suche II: Computervermittelte Kommunikation und Unternehmen - Wirklichkeit oder Virtualität? In: Kommunikation im Internet. Frindte, W. & Köhler, T. (eds.); Frankfurt am Main: Lang, Kap. 5, 115-135

Kuhlen, R. (1998a). Die Mondlandung des Internet. Elektronische Kommunikationsforen im Bundestagswahlkampf'98. Universitätsverlag Konstanz: Konstanz

Kuhlen, R. (1998b). Organisationsformen und Mehrwertleistungen elektronischer Märkte. In: Linguistik und neue Medien. GLDV-Jahrestagung vom 17. - 19. März 1997. Heyer, G. & Wolff, C. (eds.); Wiesbaden: Deutscher Universitäts-Verlag

Neuberger, C. & Tonnemacher, J. (1999). Online - Die Zukunft der Zeitung? Das Engagement deutscher Tageszeitungen im Internet. Opladen: Westdeutscher Verlag

North, K. (1998). Wissensorientierte Unternehmensführung: Wertschöpfung durch Wissen. Wiesbaden: Gabler

Probst, G. J. B., Raub, S. und Romhardt, K. (1999). Wissen managen. Wie Unternehmen ihre wertvollste Ressource optimal nutzen. Frankfurt am Main: Frankfurter Allgemeine Zeitung für Deutschland

Rittberger, M. (1999). Certification of information services. In: IQ 1999. Proceedings of the Conference on Information Quality. Lee, Y. W. & Tayi, G. K. (eds.); Boston: MIT, 17-37

Appendix

The total of 17 fora in the main test are presented, arranged according to type of enterprise:

Media:

- Magazine Brigitte: http://www.brigitte.de/forum/forum.html
- TV: Forum Marienhof: http://www.das-erste.de/interaktiv/
- Newspaper Die ZEIT: http://www.debatte.zeit.de/
- Magazine Focus: http://focus.de/D/DC/DCH/dch.htm
- Newspaper Heilbronner Stimme: http://www.stimme.de/forums/index.cfm?CFApp=2

Politics and society:

- German parliament: http://www.bundestag.de/forum/index.htm
- Foundation Friedrich Naumann: http://www.fnst.de/db/dk1.liste.php3?groupid=1
- Catholic Forum: http://www.kath.de/
- Politics Forum: http://www.forum-hosting.de/cgi-bin/rlist01.pl?f=2&r=1

Teaching, research and science:

- Archeology: http://www.theiss.de/AiD/forum.htm
- German Internists: http://www.multimedica.de/public/html/hosmm/VO/IMFVO000X/35/
- Credit Mine: http://www.credit-mine.iao.fhg.de/credit-mine/forum.html
- University Support Center at Karlsruhe: http://www.usc.uni-karlsruhe.de/USC/
- Property Law: http://www.jura.uni-sb.de/FB/LS/Ruessmann/

Economy:

- Stock Market: http://www.bch.de/
- Orthography: http://www.korrekturen.de/
- German Labor Bureau: http://195.145.119.72/cgi-bin/aoWebCGIForum