

December 2002

Knowledge Generation and Dissemination in Virtual Communities and Virtual Teams

Felix Hampe

University of Koblenz-Landau, Germany

Felix Hampea

University of Koblenz-Landau, Germany

Silke Schönert

University of Koblenz-Landau, Germany

Follow this and additional works at: <http://aisel.aisnet.org/acis2002>

Recommended Citation

Hampe, Felix; Hampea, Felix; and Schönert, Silke, "Knowledge Generation and Dissemination in Virtual Communities and Virtual Teams" (2002). *ACIS 2002 Proceedings*. 51.

<http://aisel.aisnet.org/acis2002/51>

This material is brought to you by the Australasian (ACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ACIS 2002 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Knowledge Generation and Dissemination in Virtual Communities and Virtual Teams

Prof. Dr. J. Felix Hampe

Dr. Silke Schönert

University of Koblenz-Landau
Koblenz, Germany
hampe@uni-koblenz.de

Abstract

In recent years, the creation of Internet-based knowledge has become increasingly significant. However, with regard to the influence and control of knowledge management processes, knowledge communities indicate specific problems for creating and distributing information. People – constantly or temporarily – without Internet access are left out of this knowledge dissemination. The CCIRP project takes problems of this kind into account, creating concepts how information generation in knowledge communities (e.g. CC-Expert) or in virtual teams, and how this knowledge can be distributed based on traditional media. The paper describes two approaches (within the context of the project CCIRP) that deal with knowledge generation and dissemination. CC-Expert is a tool for virtual communities (open user group) and VITEA for virtual teams (closed user groups), which were realised at the university of Koblenz, Germany. The approach VITEA shows how the knowledge generation and dissemination in virtual teams can be improved. It offers an environment to disseminate knowledge to team members without Internet access or with temporarily no access or even where Internet access is more inconvenient than using other media. In the VITEA-System the technologies of a reference lab and a virtual community are combined. One focus are the common aspects and differences and another the methods of knowledge generation and how to distribute knowledge by using heterogeneous media.

Keywords

Knowledge-Based Systems, Organization of work, Project Management Methods and Tools, Knowledge engineer, Sociology of computing

INTRODUCTION

Recent years have seen a dramatic increase in the amount of information that are stored in electronic formats and/ or are available on the Internet. It has been estimated that the amount of information generated in the world doubles every 20 months. So-called (corporate or global) knowledge communities play a decisive role in the generation and distribution of knowledge. Although many people are able to access this knowledge dissemination, some are still left out.

The goal of the CCIRP project is to analyse how to integrate people without Internet access into the process of knowledge dissemination by using traditional communication media like telephone or fax. This paper describes two approaches, focused on the one hand on virtual teams and on the other hand on virtual teams; how to generate information and how to distribute these information by heterogeneous media.

The “Communication Centre Initiative Rhineland-Palatinate (CCIRP)” is a co-operative project between the ministry of work, social, family and health, the ministry of economy, traffic, agriculture and viticulture and the university of Koblenz-Landau. Communication centres are call centres with high media integration (Hampe and Schönert, 1997). The purpose of CCIRP is to increase the attractiveness of Rhineland-Palatinate for potential investors and to create new jobs. To achieve this goal the project concentrates on the conception and implementation of a reference lab and a virtual community – CC-Expert.

The CCIRP reference lab was built at the University of Koblenz-Landau with the goal to analyse how different types of communication media can disseminate information. To satisfy the needs of communication the CCIRP reference lab uses different technologies, like

Internet, phone and fax (Figure 1). There are different possible fields of application for the reference lab. In particular its function is to distribute knowledge by several combinations of heterogeneous communication media.

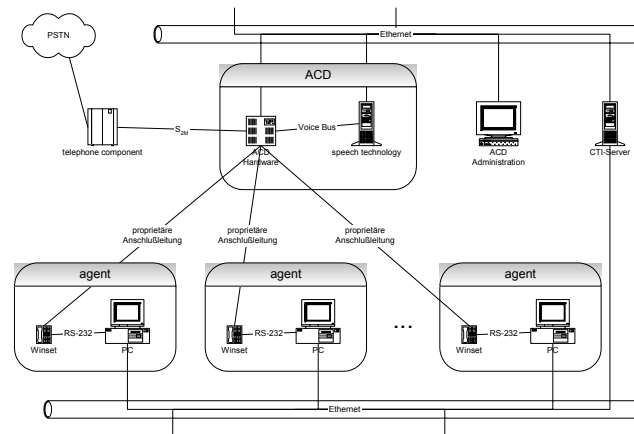


Figure 1: Structure of the reference lab

One possible scenario: A potential investor calls the communication centre (via agent or voice system) to get information about call centre locations in the area, which might be generated by a knowledge community. The investor is especially interested in financial support and in contacting communication centre experts. Via a speech technology-based voice system the investor can choose between different options:

- To get the web address of an Internet page which contains the required information.
- To get the information immediately via voice system.
- To receive a fax message immediately.
- To receive a letter by mail.
- To get a callback from a live agent.

After making his choice, the investor has the option to ask for further information. The system offers related information objects and the caller is able to navigate through the knowledge network.

By using the system the user can choose between various knowledge objects that are distributed by various media. The structure and comprehensiveness depend on the chosen communication media. For example knowledge objects that are distributed by telephone (voice system) are shorter and formulated in a more easily and intuitive way.

KNOWLEDGE GENERATION AND KNOWLEDGE DISSEMINATION

Knowledge presents a state that can be attained through processes of knowledge acquisition. The acquisition of knowledge is normally demarcated as learning, which can be divided into three fundamental phases in each individual: (1) understanding, (2) storing of knowledge, (3) recollection of knowledge [St92].

Individuals, artificially created media such as books, information systems, communication systems, groups, elites or whole organisations are seen as carriers of knowledge (Probst and Büchel, 1994). Nonaka and Takeuchi (1995) created the spiral of knowledge generation, which describes the process of knowledge transfer from individuals to teams and the whole enterprise (see Figure 3). According to this model, knowledge is created through repeated conversion activities of implicit and explicit knowledge. Implicit knowledge like shared mental models or imitating or watching experts acquire technical know-how nonverbally. Explicit knowledge is available in form of metaphors, analogies and models that are often presented verbally. The main forms of knowledge conversion are: socialisation, internalisation, externalisation and combination (Nonaka and Takeuchi, 1995).

On the ontological level the knowledge shared between all members of an organisation is frequently described as organisational culture.

CC-Expert

CC-Expert is an approach within the CCIRP-Context. It is a virtual community in the area of communication center. Its goal is to offer knowledge and to generate knowledge by analysing communication and by aggregating knowledge fragments of different participants. It is a great challenge to create a goal-oriented structure for this community knowledge. The less complex way is to make an overview which is known as a FAQ (frequently asked questions). Besides the approach to make knowledge persistent by building FAQ boards and theme-specific structured documents another possibility is to generate a knowledge network by making associations. Its goal is the creation of knowledge networks consisting of knowledge objects and the relationships or links existing between them. The addition of new relationships can be regarded as the creation of new knowledge. The central idea is to organise information according to the concept of mind maps (see Figure 2). They provide a means to illustrate all relevant information for a specific topic in a graphical manner that mirrors theories about the way our mind works.

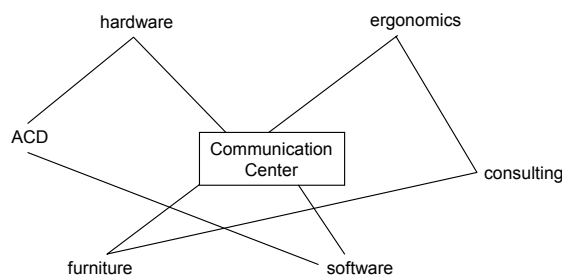


Figure 2: Example of networked knowledge

The knowledge stored in CC-Expert is organised as a knowledge network that consists of objects and the relationships between them. The knowledge can be easily retrieved, either by actively searching through stored documents or by using certain filtering mechanisms. One possible filtering mechanism is based on profiling. As a consequence, certain types of information are automatically sent to the user (push-mechanism) while others need to be actively sought by the user (pull mechanism). The push mechanism can be realised with different communication media, for example new information objects, which fit to the users profile will be sent automatically to the user (by phone or fax).

Knowledge Generation in Communities

On the Internet, different types of communities exist (Schmidt, 2000). One important type is the knowledge community. In this case knowledge is regarded as a product of communication between people. Knowledge communities are Internet communities with the common goal of sharing knowledge (*ibid*). All participants can offer and search for information. It is important to create transparency about the existing knowledge in the community. Knowledge communities improve virtual knowledge exchange and enable the creation of so-called knowledge markets, where users can participate by offering information, by searching for information or as an information organiser (knowledge manager). The intention of a knowledge community is to generate group knowledge. On the one hand this is achieved by contributions of the members; on the other hand it is possible to stimulate community members into action by posing specific questions and discussion themes. The aggregation of a couple of contributions to a specific theme may be helpful to give a general idea of a topic.

Besides the participation of interested people, it is intended that known experts participate in knowledge communities. This can be achieved by creating expert's consulting hours, expert discussion boards and expert contributions.

Usually interested people can freely attend knowledge communities. One special type of knowledge communities takes only members of a (virtual) team into account.

The main characteristics of a virtual team, according to Duarte and Snyder (1999) and Haywood (1998) are:

- Many geographically distributed locations.
- Members belong to different organisations.
- High fluctuation, team members participate only for short periods and thus loss of knowledge is one consequence.
- Heterogeneous teams according to affiliation, competencies and education.
- Communication mainly by using electronic media.
- Team members live in different time zones.
- Usage of different languages.

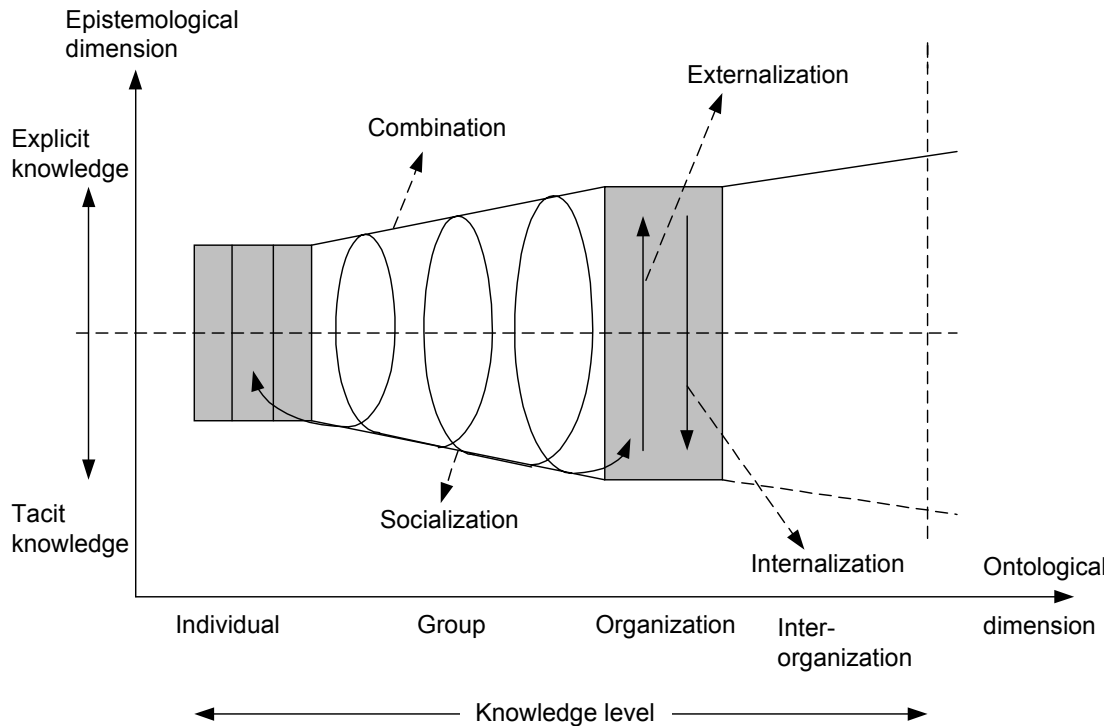


Figure 3: The spiral of knowledge creation (Nonaka and Takeuchi, 1995)

Knowledge distribution depending on communication media

There is a vast amount of information available on the Internet. The challenge is to offer access to this information by using different traditional communication media. Experts can be involved in using different media, too. This creates an advanced circle of knowledge distribution that is shown in Figure 4.

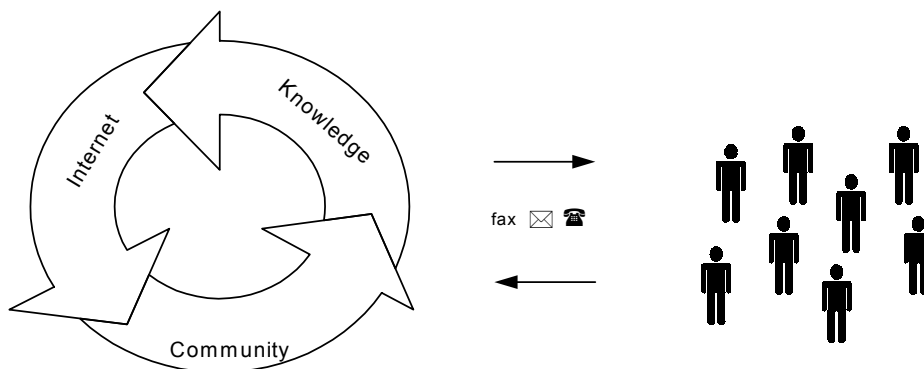


Figure 4: Extended circle of knowledge distribution in knowledge communities

Two aspects determine the extended circle of knowledge distribution:

1. By which means of communication media can user groups be integrated?
2. How can this integration be achieved with high availability (24/7) and with low costs?

There are two traditional communication media appropriate in the main for the integration of user groups that are therefore focused on in this context: telephone and fax. Telephone is still a favourite media tool for communication. The idea is to realise access to information from any telephone, anywhere, at anytime. To fulfil the low cost criteria it is not appropriate to disseminate this information using individual people, but rather by using speech technologies (Harbusch *et al.*, 2001). Fax is a favourite medium too. It is easy to handle, widely available and causes low (investment and variable) costs.

VITEA-System

This application scenario describes the functionality of VITEA. VITEA is an approach intended to organise knowledge generation and to co-ordinate knowledge dissemination in virtual teams. The experiences were gained during the construction of CC-Expert and the reference lab for the "Communication Center Initiative Rhineland-Palatine" could be re-used for the conception of the VITEA-System.

VITEA includes a virtual community to generate knowledge for virtual projects and to generate knowledge about the members of virtual teams. It also uses a reference lab as a knowledge office to distribute information required by virtual team members and managers. Virtual teams can use VITEA to realise and co-ordinate international projects. VITEA supports the essential flexibility, mobility, independency and dynamics required by virtual members and managers. Figure 5 illustrates the functionality of VITEA.

Virtual team members can work together on international projects although they are located at different places all over the world. All project participants can use the VITEA-Community to update and to retrieve the project status and progress. It includes a knowledge database that consists of an employee and a project database. For each employee a profile with detailed information is stored in the employee database that is shown in Figure 5. For each VITEA-Project the project database stores information about the project status, project resources, project staff, project goals and timing constraints. The project information can be shared and interchanged by all project participants through the community. The information stored in the VITEA-System is organised as a knowledge network that consists of objects and the relationships between them. The VITEA-Community acts as an expert system and offers FAQ boards, a chat system and a discussion forum to support the data interchange and social relationships between VITEA-Members.

The employees in the knowledge office act as knowledge brokers. They are responsible for the maintenance and the further development of the VITEA-Community. The information stored in the VITEA-Community has also to be accessible for virtual team members without Internet access. Therefore the knowledge brokers in the knowledge office have to provide information through other media, like telephone or fax. Furthermore, knowledge brokers have to handle requests from virtual team members, for example the creation and the updating of employee profiles. The knowledge brokers work is sophisticated, because of the complex scope of duties in the knowledge office.

Each VITEA-Member has the possibility to retrieve knowledge and to provide information and reports into the VITEA-Community. The interactive elements of the community can be used to compose or to reply contributions for project discussions.

The virtual project manager can inform the knowledge office about his project requirements. The knowledge broker elaborates these information in order to publish them in the VITEA-Community. Furthermore the knowledge broker retrieves project specific information that will be provided to the virtual project manager. In the meantime the project manager can concentrate on other tasks. The knowledge office acts as a virtual secretary for the project manager. It improves the coordination and the flexibility of the project workflow. The VITEA-System supports the project manager to filter information, to economise the project workflow and to improve the communication within the project.

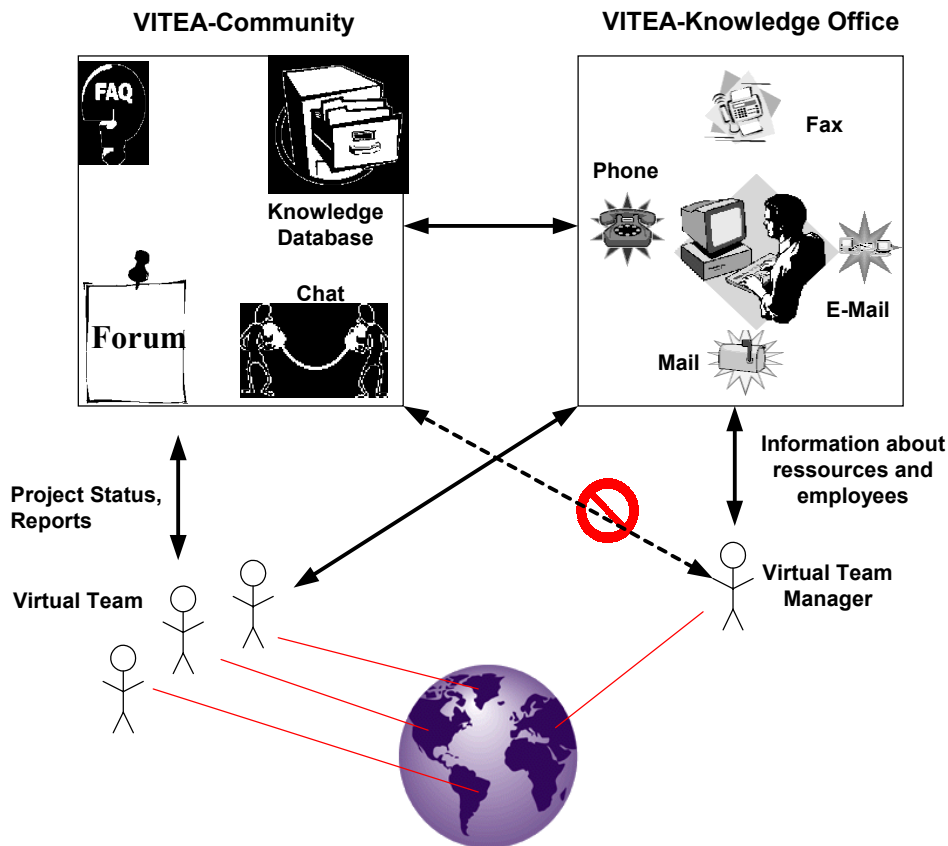


Figure 5: Functionality of VITEA

CONCLUSION

The outline of a technology to generate and to distribute knowledge media independent has been presented in this paper. Its approach is intended to analyse how user groups without Internet access can be integrated into knowledge communities. On the one hand, the information must be stored in an appropriate way, so that different media can easily retrieve it. On the other hand, a comfortable platform offers different media interfaces. The first experimental use offers various insights into the potential benefits. However, it remains to be seen how the system will be accepted by people without Internet

REFERENCES

- Duarte, D. L.; Snyder, N. T.: Mastering Virtual Teams, Jossey-Bass Publishers, 1999.
- Haywood, M.: Managing Virtual Teams, Artech House, 1998.
- Harbusch, K; Knapp, M.; Laumann, C.: Modeling User-Initiative in an automatic help desk system, published in: Proceedings of 2. Workshop on Natural Language Processing and Neural Networks (NLPNN2001); 6. Natural Language Processing Pacific Rim Symposium, Tokyo, Japan, 2001.
- Hampe, J. F.; Schönert, S.: Call Center in: Wirtschaftsinformatik 39, 2 / 1997, S. 173-176.
- Nonaka, I. & Takeuchi, H.: The knowledge-Creating Company, New York, Oxford: Oxford University Press, 1995.
- Probst, G. J. B. & Büchel, B. S. T.: Organisationales Lernen – Wettbewerbsvorteil der Zukunft. Wiesbaden: Gabler, 1994.
- Schmidt, M. P.: Knowledge Communities, Addison-Wesley, 2000.

COPYRIGHT

Hampe, J. F. and Schönert, S © 2002. The authors assign to ACIS and educational and non-profit institutions a non-exclusive licence to use this document for personal use and in courses of instruction provided that the article is used in full and this copyright statement is reproduced. The authors also grant a non-exclusive licence to ACIS to publish this document in full in the Conference Papers and Proceedings. Those documents may be published on the World Wide Web, CD-ROM, in printed form, and on mirror sites on the World Wide Web. Any other usage is prohibited without the express permission of the authors.