META

WORKING PAPER

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META: Enhancing Presence by means of the social affordances

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OUNL — Ruud de Moor Centrum

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Het RdMC geeft, naast andere publicaties, working papers uit, met voorlopige onderzoeksresultaten (bijvoorbeeld van pilots), interessante best practices, beschrijvingen van innovaties, beschrijvingen van implementaties, evaluatiegegevens, exploitatiebevindingen, weergaven van discussies en overwegingen, voorlopige stellingnames, rapportages van voorstudies, prototypen en voorlopige ontwerpen, haalbaarheidsstudies, analyses, praktische documenten en dergelijke. Deze working papers zijn gericht op zij-instromers en hun school, opleiders en begeleiders (in lerarenopleidingen en in scholen) en beleidsmakers, media en alle anderen die op basis van belangstelling en/of professionele activiteiten betrokken zijn bij de innovatie van trajecten die bijdragen aan de professionalisering van onderwijsgevenden.

TU/e — User-System Interaction Programme

The User-System Interaction Design Programme (or USI for short) of the Technische Universiteit Eindhoven (TU/e) supports graduates with a Master's Degree in the engineering or behavioral sciences (MSc's and MA's) to develop themselves into professional designers who realize user-friendly user-system interactions. These user-system interaction professionals are trained in scientific methods and techniques for the design and evaluation of user interfaces of products, services, and systems. Candidates complete their program with the professional degree "Professional Doctorate in Engineering"(PDEng).

Samenvatting

Mensen zijn volop sociale wezens en hun behoefte aan communicatie is nog sterker als we het hebben over leden van een community. De moderne tijd bracht een scala aan nieuwe elektronische communicatiemedia zodat onze communicatie meer en meer vertechnologiseerde.

Tegenwoordig wordt communicatie niet langer beperkt tot een fysieke plaats, maar meer als een verzameling relaties waar mensen sociaal interacteren met wederzijds voordeel. Virtuele sociale netwerken kunnen gebruikt worden voor empathische ondersteuning, maar dienen vaker voor het delen van algemene interesse informatie en probleem oplossen. Het doel van het META-project was een community of practice te ondersteunen door uitwisseling van alledaagse informele communicatie tussen de groepsleden. Het onderzoeksperspectief was gericht op de effecten binnen computer begeleide communicatiesytemen van aanwezigheid en het bevorderen van sociale contacten in de META elektronische omgeving. Gezien het praktische doel zou de project implementatie van het prototype geëvalueerd moeten worden in termen van de toekomstige onderzoeksrichting in dit veld.

Onze doelgroep, community of practice leden, zijn zowel mannen als vrouwen, met een diverse professionele achtergrond, 23-45 jaar oud, die hebben besloten leraar te worden. Ze werken door het hele land verspreid in verschillende onderwijssoorten. Behoeftenonderzoek toonde aan dat de deelnemers een gemiddeld niveau van computervaardigheid hebben, ze internet als communicatiemiddel gebruiken en grote behoefte hebben aan het delen van kennis en ervaringen. Alle respondenten verbinden gesprekken met een of andere vorm van een kamer.

De META-omgeving zou communicatie tussen CoP leden moeten verrijken door hen in staat te stellen kennis, ervaringen, vaardigheden en ontdekkingen te delen in een aangename en prettige elektronische omgeving. Het meer gedetailleerde conceptuele ontwerp werd uitgevoerd op basis van deze behoeften. Een functioneel prototype werd ontwikkeld en geëvalueerd met als doel vast te stellen hoe bruikbaar het META systeem is en of het de sociale aanwezigheidscomponent bevorderd. Mensen van drie universiteiten namen deel aan dit onderzoek. Als instrument werd IPO-SPQ (een enquête die sociale aanwezigheid meet) en aan de systeembruikbaarheids schaal (SUS) kan worden afgelezen dat de geselecteerde uitspraken inderdaad de spreiding van aspecten van systeembruikbaarheid dekken, zoals behoefte aan steun, training en moeilijkheidsgraad etc.

Het resultaat geeft aan dat het META systeem een tamelijk hoog bruikbaarheids niveau heeft en sociale aanwezigheid bevordert. Deze resultaten bieden ons de mogelijkheid te concluderen dat het theoretisch model in dit begin stadium correct was. Dus waren we ook in staat aanbevelingen te doen voor toekomstig onderzoek op dit terrein. Het accent ligt daarbij op het maken van 3D visualisaties en meervoudige verbindingsmogelijkheden.

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General Summary

Humans are fundamentally social creatures and their need for communication is especially strong when we are talking about members of a community. Modern life brought a variety of new electronic communication media thus our communications became technology mediated.

Nowadays community is no longer defined as a physical place, but as a set of relationships where people interact socially for their mutual benefit. Virtual social networks may be used for empathetic support, but are more often used for common interest information sharing and problem solving.

The purpose of the META project was to support community of practice by facilitating casual informal communication between community members.

Through the research perspective the project focuses on the effects of computer mediated communication systems by investigating influence of presence and social affordances in the META electronic environment. Based on practical aim the project implementation of the prototype should be evaluated in terms of identifying the future research directions in this field.

Our target audience, community of practice members are males and females, with different professional backgrounds, 23-45 years old, who decided to become teachers. Located throughout the Netherlands, currently they work in different industrial fields. Requirements study which was done by the questionnaire showed that subjects have a medium level of computer literacy, use internet messaging applications, and have a strong need in sharing their experiences and knowledge. All of the respondents associate talking with some kind of a room.

The META system should enrich communication between CoP members by giving them an opportunity to share knowledge, experiences, skills, discoveries etc. in very pleasant and nice electronic environment. Conceptual and detailed design was based on these requirements.

A functional prototype was developed and evaluated aiming to identify how usable the META system is and whether it enhances social presence. People from three different universities took part in the assessment. As an instrument we used the IPO-SPQ (a questionnaire measuring social presence) and the system usability scale (SUS) can be seen that the selected statements actually cover a variety of aspects of system usability, such as the need for support, training, and complexity etc.

The results showed that the META system has pretty high usability level and does enhance social presence. These results gave us possibility to conclude that

theoretical framework identified at the early stage of the project was correct. And thus we were able to make recommendations for the future research in that area.

Management Summary

The present research focuses on designing social browsing system with respect to the social presence and affordances theories. On the broad meaning the META project project investigates the process of social interaction for developing and maintaining social relationships within community of practice.

Based on the requirements study we developed the META system prototype that allows synchronous and asynchronous communications within the virtual environment between community members.

The META system's 2D prototype focuses on the chat and instant messaging functionality. Server and the client applications were developed using Java SDK 1.4.3.

The assessment study addressed two main issues: usability of the META system and social presence. We employed 45 subjects from three universities thus our participants were located throughout the Netherlands. In order to answer the research question the IPO-SPQ (a questionnaire measuring social presence) and the System Usability Scale (SUS) were used.

The results of the experiment confirm that the META system addresses usability issues and enhances social presence.

Apart from the results gathered from the questionnaires we found some additional comments that helped us to make recommendations for the future research. Main accent is on making 3D visualization and multi-modal interface in the system.

1. Assignment

The social browsing project investigates the process of social interaction for developing and maintaining social relationships within community of practice.
This project has practical and research aims.
The practical aim of this project is to design the social browser which should be integrated in a “Community of practice” electronic environment.
From a research side, the project aims to evaluate social presence and social affordances in terms of supporting collaboration and social interaction which end up in the improvement of socio-emotional processes within community of practice.

1.1. Purpose

Humans are fundamentally social creatures. From birth we orient to other people, and as we develop we acquire abilities for interacting with one another ranging from expression and gesture through spoken and written language. As adults, we are exquisitely sensitive to the actions and interactions of those around us.

However, modern life dictates new forms of communication. When we move from face-to-face interaction to digitally-mediated interaction, everything changes. In our daily life we more often use emails, instant massaging application, mobile phones etc. Thus our communications became technology mediated.

Nowadays community is no longer defined as a physical place, but as a set of relationships where people interact socially for their mutual benefit. Online community is a social network that uses computer support as the basis of communication among members instead of face-to-face interaction. These virtual social networks may be used for empathetic support, but are more often used for common interest information sharing and problem solving. These networks are characteristically easy to enter and leave, nonexclusive, and have heterogeneous membership.
It may be a mistake, however, to assume that people will automatically participate in online communities. In an existing off-line community, members share common interests and the intent to interact with each other for mutual benefit. Members of an audience may have common interests or needs, but have little or no intention of establishing a social network around those needs or interests.

The purpose of the project is to support community of practice by facilitating casual informal communication between community members. For this purpose we set methodological research on developing the social browser for the community of practice in dependence on presence and social affordances.

1.2. Focus of the project

This project focuses on designing social browser for the community of practice electronic environment.

We have used the term 'Social browsing' to describe the search for and match of potential partners in a digital 'seek and sample' process to consolidate relationships in different contexts.

Through the research perspective the project focuses on the effects of CMC (computer mediated communication) systems by investigating influence of presence and social affordances in the community of practice electronic environment.

Based on practical aim the project implementation of the prototype should be evaluated in terms of identifying the future research directions in this field.

That determined the following:

- Identification of the theoretical framework on which the social browser design for community of practice can be based.
- Designing and implementing the social browser prototype for the community of practice.

1.3. Project Owner

1.3.1. The Open University of the Netherlands, Ruud de Moor Centrum

The Open Universiteit Nederland is a distance education institution for higher education. Its mission is three folded: innovation, education, and finding a solution for the shortage of teachers in primary and secondary education. The Ruud de Moor Centrum is focused on that latter task. One of the many projects is the project Community of Practice. Because the community is mediated by an electronic environment, it is very important to emphasize the human aspects of it when designing these electronic environments. Consequently, the electronic environments should incorporate social software which is based on principles as social affordances.

2. Theoretical framework

The starting point of the project is the literature overview to get an understanding of the problem domain and establish practical context to do the project. This section will emphasize main issues and related fields.

2.1 Communication needs

Communication is the process of exchanging information, usually via common system of symbols. It takes a wide variety of forms, from two people having a face-to-face conversation, to hand signals, to messages sent over global telecommunication networks. The process of communication is what allows us to interact with other people; without it, we would be unable to share knowledge or experiences with anything outside of ourselves.

Interpersonal communication is important because of the functions it achieves. Whenever we engage in communication with other persons, we seek to gain information about them.

2.1.1. Gaining the knowledge

One reason we engage in interpersonal communication is so that we can gain knowledge about another individual. Social Penetration Theory [1] says that we attempt to gain information about others so that we can interact with them more effectively. We can better predict how they will think, feel, and act if we know who they are. We gain this information passively, by observing them; actively, by having others engage them; or interactively, by engaging them ourselves.

2.1.2. Building a Context of Understanding

We also engage in interpersonal communication to help us better understand what someone says in a given context. The words we say can mean very different things depending on how they are said or in what context. Content Messages [1] refer to the surface level meaning of a message. Relationship Messages [1] refer to how a message is said. The two are sent simultaneously, but each affects the meaning assigned to the communication. Interpersonal communication helps us understand each other better.

2.1.3. Establishing Identity

Another reason we engage in interpersonal communication is to establish an identity. The roles we play in our relationships help us establish identity. So does the face, the public self-image we present to others. Both roles and face are constructed based on how we interact with others.

2.1.4. Interpersonal Needs

Finally, we engage in interpersonal communication because we need to express and receive interpersonal needs. William Schutz [2] has identified three such needs: inclusion, control, and affection.

- Inclusion is the need to establish identity with others.
- Control is the need to exercise leadership and prove one's abilities. Groups provide outlets for this need. Some individuals do not want to be a leader. For them, groups provide the necessary control over aspects of their lives.
- Affection is the need to develop relationships with people. Groups are an excellent way to make friends and establish relationships.

2.2. Computer mediated communication

The increased diffusion of the Internet has made computer-mediated communication (CMC) very popular. CMC is enjoying steady growth in western society. Dropping costs of requisite hardware and the availability of simplified, intuitively controlled system interfaces have made CMC technology accessible and feasible for popular use. The CMC technologies are influencing society from private life to education, business, politics, and culture. The famous examples of how CMC tools were used for supporting the communications are: Computer Supported Cooperative Work (workplace environment) and Computer Supported Collaborative Learning (distant learning educational environment).

Although data networking technology was not initially built for the purpose of connecting people, electronic mail (email) was an early innovation in these networks; the first messages were sent over the precursor to the Internet in 1969 [3], and Email as a communication medium has undergone only minor changes since its inception. Communication through Email is personalized, spontaneous, and interactive; Senders can specify who they want their recipients to be and tailor their messages to them, taking into account their prior interactions and the nature of the relationship. Historical accounts of the telephone suggest that demand for interpersonal communication is highly elastic. Whenever inter-personal communication becomes easier or cheaper, people communicate more.

Despite the overall popularity of CMC technologies and their near ubiquitous use in the workplaces, relatively little work has been done to understand how they influence existing patterns of conversation or facilitate new patterns.

2.3. Social presence

Researchers and Human Computer Interaction (HCI) designers have begun to realize that the feeling of presence is at the heart of all mediated vicarious experiences, from reading a novel to riding an immersive virtual reality (VR) simulator, because presence is at the heart of humans' desire to use media to move beyond the limits of body and the sensory channels. As a result, the concept of presence has become central to theorizing about advanced human-computer interface such as VR systems, as well as traditional media such as television, film, and books.

After an extensive review of presence-related concepts and their explications, Lombard and his colleagues define presence as "the perceptional illusion of nonmediation". The term "perceptual" means that presence "… involves continuous (real time) responses of the human sensory, cognitive, and affective processing systems to objects and entities in a person's environment" [4].

HCI researchers and VR designers have tended to focus on *physical* presence, the extent to which people feel that they are in a virtual world. However, an equally important dimension of presence is *social presence*, the sense that other intelligent beings co-exist and interact with you, even if those beings are non-human and only seem intelligent.

Short et al. [5] define 'social presence' as the "degree of salience of the other person in a mediated communication and the consequent salience of their interpersonal interactions" (p. 65). They relate 'social presence' to the concepts of 'immediacy'[6] and 'intimacy'[7] . 'Immediacy' is a measure of psychological distance; immediacy behaviors, such as nodding and smiling, "enhance closeness to and nonverbal interaction with another", (p. 213). Argyle and Dean [7] used the concept of 'intimacy' in the interpretation of interpersonal interactions; the level of intimacy is expressed by verbal and non-verbal behavior (e.g. eye contact) and is subconsciously maintained in equilibrium at an appropriate level by the interactions. Short et al. suggest that social presence contributes to intimacy. The concepts of 'social presence', 'immediacy' and 'intimacy' are clearly related: immediacy behaviors are used to create and maintain intimacy; immediacy behaviors also enhance social presence [8].

Classical social presence theory was developed within the confined context of synchronous communications involving face-to-face, audio or close-circuit video telecommunication media. Therefore, from this perspective, social presence can only be perceived while participating in a real-time communication episode. Social presence theory neither was proposed for asynchronous communication nor for text-

based communication media (i.e., computer mediated communication (CMC). Despite the fact that asynchronous, text-based communication is the inherent characteristic of CMC, social psychologists, communication researchers, and (distance) educational researchers have applied social presence theory to it. Indeed, Benschop [9] notices that communication scientist consider e-mail as a communication media that also may provoke social presence but he objects that e-mail just lacks the media richness and the directness of interaction that is needed to create a feeling of social presence. Individuals, however, may experience the presence of the other in asynchronous communication. This psychological experience of the other can be designated as psychological presence, a substitute for the missing social presence in asynchronous communication. Psychological presence is evoked through the activation of a mental model of the other, for example, when an e-mail message written by the other is read. This mental model is defined as the internal representation of the other that individuals construct in their minds, and its construction is affected by the individuating impressions an individual has made of the other. This mental model not only affects the perceived degree of psychological presence, but also affects the social presence in a real-time communication episode. It makes a difference if individuals already know the other in the conversation. If this is the case, then this may increase the degree of social presence [9]

2.4. Affordances

Technology researchers argue that CMC adoption fails when it interferes with subtle and complex social dynamics of groups. Yet, empirical studies of CMC use which explicitly associate social behavior with design features are largely absent from the literature. Also absent are conceptual tools for detecting and describing such behavior.

Ecological psychologists offer the concept of object affordances to describe the relationship between human perception and usability.

2.4.1. Social Affordances

E. Bradner [11] defined social affordance (SA) as the relationship between the properties of an object and the social characteristics of a given group that enable particular kinds of interaction among members of that group.

Defining social affordances, Gaver [12] used the term ‘affordances for interaction’ to indicate the special functionality of the affordances, i.e. to stimulate all possible interaction between humans.

As properties of CMC environment, social affordances are defined as social facilitators that are relevant for the person’s social interaction. That means that person starts to act (interact or communicate) according with perceived affordances.

Though there is no one official definition of social affordances, this term was used by many researchers. Procter [13] gave definition of SA as "(…) making the potential for social (inter)action visible" (p.90). Using the same term, different researchers set different objectives for it. Thus for Kreijns, Kirschner, and Jochems [14] it was awareness of others in their activities, Bradner, Kellogg, and Ericson [11] - visibility, awareness, and accountability.

2.4.2. Technological Affordances

The concept of affordances can also be applied to usability as many books on HCI suggest (e.g., Preece et al. [15] pp. 80– 82, 277–281). These books propose using affordances in the spirit of Gaver [16] and Norman [17],[18]. Gaver suggests the use of technology affordances to increase the usability of graphical user interfaces (GUIs) and Norman [17],[18] appropriates the term technical affordances as a conceptual tool for discussing the design of everyday artifacts in relation to their usability. They respectively speak about perceptible and perceived affordances.

Perceptible affordances are those affordances in which there is perceptual information available that match the actual affordances of an object; if the perceptual information suggest a non-existent affordance or do not match the actual affordances, the affordances are designated by Gaver [16] as false affordances.

2.5. Awareness

Group awareness has been defined as "an understanding of the activities of others, which provides a context for your own activity" [19]. The value of providing awareness to teams is suggested in the literature, which indicates that members of workgroups will be more successful if they maintain awareness of the state of the team, task, and environment [20]. It is also suggested that simple awareness of one's colleagues is a strong predictor of success in collaborations, thus highlighting the importance of awareness for team performance [16].

People maintain an ongoing awareness of others in physical workspaces like whiteboards and tabletops, and they do this using everyday perceptual ability. For example, we can glance over at another person to see where they are working, or we might hear the sound of a particular tool that indicates what they are doing. In the virtual workspaces provided by real-time distributed groupware, these abilities are greatly reduced. Groupware systems reduce a person's visual field to the limited area of a computer screen, remove characteristic motions and sounds from actions, and complicate verbal and visual communication. The situation is made worse by groupware techniques that let people work in different areas of the workspace, thus hiding their actions from one another. As a result of these changes, people receive

only a fraction of the information about others that they would in a face- to-face setting, and it becomes much more difficult to maintain awareness.

One kind of awareness that is often compromised in the move to a groupware system is workspace awareness*:* the up-to-the minute knowledge a person holds about another's interaction with the workspace [21]. This includes knowledge about who is in the workspace, where they are working, what they are doing, and what they intend to do next. Workspace awareness reduces the effort needed to coordinate tasks and resources, helps people move between individual and shared activities, provides a context in which to interpret utterances, and allows anticipation of others' actions.

2.6. The sociability of CMC environments

In order to understand the typical characteristics of sociable environments, studies of the urbanist Whyte [22] about human behavior in urban settings are important to consider. Whyte wondered how newly planned spaces were actually working out. His research question was why some spaces, notably parks, plazas and streets, have become places that are attractive for people to gather and to socialize while other spaces did not. He labeled those attractive spaces as sociable places.

A few researchers in the area of computer-supported cooperative work have adopted the ideas of Whyte [22] and Gehl [23] in their research (e.g., Busher & Hughes [24]; Donath, [25]). The present research's interpretation of sociability perfectly matches the ideas and thoughts of Whyte and Gehl, namely the design of sociable places through physical conditions that enable to bring people together and permit to them to socially interact with each other.

Like public spaces, CMC environments differ in their degree of sociability. Sociability is defined here as the extent to which the CMC environment is able to facilitate the emergence of a social space. The *social space* is the human network of social relationships amongst the group members embedded in group structures of norms and values, rules and roles, beliefs and ideals. The hypothesis is that the higher the sociability, the more likely it is that social interaction will take place or, if present, will increase, and the more likely that it is that this will result in a sound social space and the establishment of a community of learning. A social space is *sound* if it is characterized by affective work relationships, strong group cohesiveness, trust, respect and belonging, satisfaction, and a strong sense of community. A sound social space determines, reinforces and sustains the social interaction taking place amongst group members. Systems with low sociability may experience problems with the emergence of a social space [35].

2.7. Community of practice

Although the term "Community of Practice" is new, communities of practice are not. Such groups have been around ever since people in organizations realized they could benefit from sharing their knowledge, insights, and experiences with others who have similar interests or goals.

Community of practice is an affinity group, an informal network or forum where tips are exchanged and ideas generated. A group of professionals informally bound to one another through exposure to a common class of problems, common pursuit of solutions, and thereby themselves embodying a store of knowledge. Communities of practice are groups of people in organizations that form to share what they know, to learn from one another regarding some aspects of their work and to provide a social context for that work.

One of the best-known examples of a community of practice was formed by the copy machine repair technicians at Xerox Corporation. Through networking and sharing their experiences, particularly the problems they encountered and the solutions they devised, a core group of these technicians proved extremely effective in improving the efficiency and effectiveness of efforts to diagnose and repair Xerox customers' copy machines. The impact on customer satisfaction and the business value to Xerox was invaluable. Yet, for the most part, this was a voluntary, informal gathering and sharing of expertise, not a "corporate program" (however, once the company realized the value of the knowledge being created by this community of practice, steps were taken to support and enhance the efforts of the group).

Fred Nickols [26] set two main indicators of communities of practice:

- People have a strong sense of identity tied to the community (e.g., as technicians, salespeople, researchers and so on).
- The practice itself is not fully captured in formal procedures; people learn how to do what they do and become seen as competent (or not) in the course of doing it in concert with others.

3. Related work

While there are a variety of systems available for making contact, most fall under the categories of social browsing, and whereabouts and availability systems. This section examines a few of these systems.

Casual meetings and chance encounters are essential for spontaneous interaction. Because distance decreases the likelihood of these events, several systems have been developed to support "social browsing" over a network. Most other systems use video for social browsing [27]. Spontaneous "drop-in" interactions between people at distance sites can be encouraged by placing large video screens in common areas (such as coffee rooms).

Xerox Parc's Video Wall. It is the first example, where a slow-scan video connection was placed between two research laboratories located in California and Oregon [28]. In general, Video Wall worked. Goodman and Abel reported that Video Wall was used for both spontaneous (70%) and planned (30%) interactions, and that people used it for both social and technical communications. Because people can see what others are doing, they also know if they can be interrupted.

Bellcore's Cruiser. Bellcore's Cruiser was designed on two premises: 1) users can browse a virtual world seeking social encounters; and 2) users can construct, organize and populate the virtual world independent (within reason) of the physical world [29]. Users can also set privacy levels on how others can peek into their offices.

The CaveCat media space project [30] pays particular attention to the opening phases of making contact, and several metaphors have been designed to facilitate each phase. In particular, they have developed person, time, and space centred views and metaphors for finding people in the pre-communication phase, and they list a variety of methods commonly employed in media spaces to attract attention of others.

The REALITY project [31] aimed to test the feasibility of using integrated IP based videoconferencing and application sharing to create real time, distributed classrooms, providing high quality support for non traditional learners. REALITY uses CU-SeeMe Pro as client-end software to provide real-time interaction.

Point to Point (Microsoft, see http://research.microsoft.com/scg/**).** Any knowledge or resource transfer across groups in an organization depends on people's awareness of who's doing what, which is a challenge given the dynamic, informal nature of many groups and projects. The goal of MS Connect is to help people figure out who they should talk to learn more about a particular person or project by showing connections

between people throughout the company. MS Connect uses active directory information to show both formal relationships between people and informal, dynamic relationships between people. MS Connect has a Point to Point feature, which allows users to see how they are connected to any other person or group

Bridge (Microsoft, see http://research.microsoft.com/scg/**).** Bridge is collaboration between the MIT Architecture Schools iCampus project, the Social Computing Group and the Systems and Networking Group. Using technology developed by researcher Victor Bahl, we can determine the user's physical location on the wireless network. University students are mobile, social, and have dynamic work and social groups. The Bridge project studies the increased awareness of members in a study group (location, presence, etc.) and the effects on learning.

Loops (IBM). This is the system that supports communication among small to medium-sized groups. The main idea of this project is that it is possible to support coherent behaviour by making participants and their activities visible to one another; this allows people to draw on their social knowledge. As web-based "persistent chat" system, Loops allows members of a distributed workgroup or task force to collaborate synchronously and asynchronously, with participants being able to see who is (or was) present and what has happened recently. Loops make use of social proxies, minimalist graphical visualizations of the presence and activities of people participating in a Loop.

The Babble (IBM). The Babble prototype is the first in a series of steps to transform the way in which conversations are supported online. Babble a chat-like communication tool that allows its users to engage in synchronous or asynchronous textual conversations, and provides visual feedback regarding who has recently participated in a conversation.

WebWho [32] is a web based awareness system that visualizes where people are located in a large university computer lab. It allows students to virtually locate one another and, among other functions, to communicate via an instant messaging system. Typically, instant messages are signed with the sender's name, but messages can also be sent anonymously.

4. Requirements elicitation

An integral part of an effective user-cantered design (UCD) process is the gathering of requirements and the identification of common user tasks. The design of a social browser application that is created to bring people into community might vary dramatically based upon the audience's age characteristics as well as their attitudes, beliefs and behavior toward the Internet. User profiling is the identification of the type of users that an application is designed for. It distinguishes those user characteristics that are important factors affecting the design.

4.1. Method

4.1.1. Participants

Participants of our study were existing community of practice members (a total of 20 participants). Community of practice members are males and females, with different professional backgrounds, 23-45 years old, who decided to become teachers. . They have different educational and professional backgrounds and are geographically dispersed.

4.1.2. Procedure

Because of the fact that all participants are located throughout the country a web based questionnaire was administered. From the 20 participants 12 (60%) responded.

4.1.3. Instruments

The questionnaire was used to address the issues concerned the CMC application usage habits as well as knowledge/experience sharing experiences of the target audience.

The questionnaire covers the following aspects:

- Computer literacy of target audience. How well are they acquainted with computers and modern technology.
- Internet use of messaging applications by target audience. Do they use it, for what purposes, how often etc.
- Target audience knowledge/professional expertise sharing. Do they participate in informal meetings to share their knowledge? What communication media do they use for this purpose?

For the full version of the questionnaire see Appendix A**.**

4.2. Results

The questionnaire results showed that the average computer literacy level of the users is medium. 66% of the target audience use computer at work most. All of the subjects find learning new technologies not too difficult.

Among the internet messaging applications most popular are discussion forums and email. Those two are used for work by most of the respondents (89 and 100% respectively). Approximately half of the questioned subjects use instant messaging software. However, none of them use it for work, but only for leisure and/or communication with a family. Mostly, IM applications are used after work.

Despite the fact the discussion forums are mostly used for work, most of the respondents (77%) use them in non-working time.

On average, people use email during the day with different purposes. It seems that email is the most popular communication mean.

All respondents would like to know some additional information about their communication partners, besides the address and name. Most interesting properties are current work, education and, surprisingly, hobbies and interests. Somewhat less interest (about 55% of subjects) was shown to age and professional background of the interlocutor.

Important aspect of communication is knowledge sharing. All of the respondents showed that they have a need in it. Most (88%) of the respondents participate in such knowledge sharing sessions at least once per week. The most popular communication tools for such exchange are discussion forums (100% of subjects), email (88% of subjects) and personal meeting (66%). Most of the questioned subjects (66%) do not have any preferences with respect to the number of participants in the knowledge exchange sessions.

All of the respondents associate talking with some kind of a room (teachers' room, smokers' room, canteen, office).

The user study showed that sharing of knowledge and experience is very important for our participants. What is more important, that they prefer to do it while having informal social conversations. All our participants indicated that for that kind of conversations they are using different kinds of communication means. All of them use IM applications (synchronous) as well as forums and emails (asynchronous). Therefore we want our system to support those two types of communications.

The system requirements in respect to mentioned above, and taking into account concepts of awareness, affordances and social presence are presented below.

General	
GEN1	**Affordances**
GEN1.1	The system indicates what users are doing

GEN1.2	The system ascertains users availability for contact
GEN1.3	The system gives to its users control their own level of availability
GEN1.4	The system allows the users to control the information about them
GEN1.5	System should give sense of community: members help each other engaging in joint activities and share information.
GEN1.6	System should be able to change through feedback from its user community.
GEN1.7	The system should provide basic search functionality
GEN2.2	**Interaction**
GEN2.2.1	The user has to understand as a whole what the system is capable of accomplishing before having to learn how to do it.
GEN2.2.2	The user has to be provided with clear information of what he/she is being asked to do in terms of operations
GEN2.2.3	The user has to be able to feel in control of the system while making sure he/she understands what he/she is doing and where he/she is in interaction.
GEN2.2.4	The user has to be able to execute any operations with a minimal interface effort.
GEN3	**Social Presence**
GEN3.1	System has to be able to create and maintain social presence in order to enhance intimacy.
GEN4	**User Information**
GEN4.1	The system should contain following user information: current work, education, hobbies/interests, age, photo, professional background.
GEN4.2	The user can deny access to his personal information.
Instant Messaging	
INS1	The system should allow real-time message exchange between the on-line users.
INS1.1	The system should allow 1-to-1 real-time message exchange between on-line users.
INS1.2	The system should allow 1-to-many real-time message exchange between on-line users.
INS2	The user can simultaneously participate in several independent IM conversations.
INS3	The system should be able to track the history of conversations
Discussion Forum	
FRM1	Forum should support tree-like structure of topic threads
FRM2	Forum should allow 1-to-many user communication

FRM3	Notifications
FRM3.1.	The system should notify the user about new messages in the topics, where he/she actively participates
FRM3.2.	The user should be able to subscribe to notifications about new messages in the topics where he/she does not participate
FRM3.3.	The system should indicate where the new messages had appeared since last visit of the user
Email	
EML1	The system should have a link to the users email client.

4.3. Scenario

A scenario has been developed to show the main functions of the "Community of practice" system. Scenario emphasize on such aspect as need of knowledge/experience sharing for community of practice members and thus communication means, to ensure that participants are able to communicate all possible ways.

Joss has a problem. Next week he is going to give his first laboratory class, but he does not know how to arrange the things in the classroom correctly. One of his colleagues, Jordi already has a lot of experience in that. But he is currently following a course in Australia. Joss **logs in to the "Community of Practice**". Luckily, Jordi is on-line as well. Joss **sends a message** to Jordi. But the system **sends notification** to Joss that his friend is currently away from his computer. However, it will let Jordi know that Joss wanted to talk to him. Joss is feeling under pressure, and decides to search for his problem in the forums. He **goes to the forum** and presses Search button. The subject of his laboratory work is quite new – it was adopted only two months ago. So, Joss decides to **search the messages** that are not older that that. Luckily, the system finds something. Joss goes to that thread. Someone had that question before, but there were no replies to it in the forum. He looks up the user information about the person who started the thread. Her name is Judith. She is a teacher in the university of the neighbouring city. Joss decides to contact her – she should know the answer to the question by now. But she is **offline**. So, Joss **writes her an email**. He also **subscribes for notifications** about new replies in Judith's topic. In the meantime, his friend Elbekai enters his office and invites him for a cup of coffee. Joss **changes his online** status to "Offline" and joins Elbekai. When Joss comes back to his office he has several new emails. Jordi replied that he will be able to talk to Joss at 14:00. He **received notification** about a new reply in the topic on the forum. He immediately **opens the topic**. Unfortunately, someone else just

repeated the question. Joss changes his IM status to online, and sees that someone added him to his/her contact list. It was Judith! And she is **online** now. Joss **starts conversation** with her. Joss remembered that someone else just asked the question in the forum, and **invites** him to join his **IM conversation** with Judith. The invitation was accepted. Marijke was desperately looking for the answer – she has that laboratory work tomorrow. Judith has a document she received from someone else which has answers to all the questions Joss has about his laboratory work. She **sends this file** to both of her interlocutors. Problem is solved successfully! Joss sends a message to Jordi that everything is settled.

Further in analysis phase we explored possible use cases for the system based on scenario that was described above. Appendix B presents a selection of the use cases we identified.

5. Concept Design - the Room

Based on the requirements and user study, a design concept was originated. This section will describe a chosen design concept.

The questionnaire indicated that all subject associate the conversations (discussions) with some kind of room. That is why the room concept was chosen to represent "Community of practice" application.

The concept is used to explore the relation between form and function in design – a well designed artifact or interface affords it intended use to the user. This means that the design of the artifact supports the user in understanding what it is meant to do and how it is meant to be used. In the same way the functionality of a software system can be more or less clearly expressed through the interface of the system. We believe that a software system implementing a "Community of practice" application using the room concept may benefit both from the Gibson's perspective of affordances (utility) and Norman's perspective of affordances (usability).

The specific kinds of affordances explored in the "Community of Practice" are social affordances. These affordances implement social functionality and, as such, deal with utility. Social affordances are those properties of the electronic environment that provoke social interaction. Choosing the room concept, inherently, creates a number of social affordances, which will be explained below.

In the "Community of Practice" electronic environment, social affordances must have two relationships. First, there must be mutual relationships between group-members and environment. The environment must fulfill the social intensions of members as soon as these intentions crop up while the social affordances must be meaningful and support those social intensions. Second, there must be perception-action coupling.

From a cognitive perspective, space plays a fundamental role in human reasoning, thought, language, and action. Our comprehension of abstract domains is often shaped through spatial metaphors, a property which can be and has been directly exploited for a wide variety of successful user interface designs. Space as we experience it daily, from our desktops through the rooms and buildings we live in, to the cities and landscapes of our environment, has essential properties required from source domains of general-purpose interface metaphors:

- Living and acting in space is a common experience for all users;
- Spatial structures and artifacts offer familiar affordances and operations;
- Human memory relies on spatial arrangements and layouts of items;
- Human spatial experience is tightly linked to visual and auditory perception, the primary channels of human-computer interaction.

Proximity and action are also considered as important aspects of a space. Virtual proximity, which is more related to our environment, than physical, cannot be

measured in meters, but rather in terms of visibility of the other; the degree to which someone can sense the presence of the other.

The kind of an office room, where people can meet and to discuss some issues was used as the organizing metaphor for our prototype because it was indicated by our users, is very familiar to them and provides the elements necessary to support group work as well as social casual informal conversations. We tried to model the facilities of a real office in a realistic way.

Making a decision of developing the room concept we were concentrating our attention on look and feel aspects of the interface that will correspond later with its functionality. One of the main points was to make use of existing user skills.

In order to make an interface simple, we decided to visualize only those elements that are necessary in real life offices: the doors, a hallway, people, tables and some minor things as cups of coffee, folders, and papers in order to give more social sense to the environment.

Rooms are “containers” for people. Just as people located in the same real room are able to see and hear one another, so can too people in the “ Community of practice” room “hear” and “see” each other. Small light button next to the door serves to indicate whether there is a real-time conversation going on. People move through the hallway, from room to room, by opening the doors of the room they want to enter. As soon as a new topic of the discussion appears – a new door appears in a hallway.

In the room, people sit around the table. Every participant of the conversation is represented by an avatar. A person can “ask” (click on the avatar) anyone participating in the conversation about him/her. On the table, in front of everyone there is a cup of warm coffee and a pile of papers. The pile of papers represents the history on the conversation. Every participant can look in this pile in order to find out what was said before. Coffee makes the environment look more natural.

Table 1 Active objects - summary of design decisions

ID	Object	Location	Actions	Explanations
DD1	Hallway	-	Walk around	Hallway represents the center of the community environment; it provides basic information about the current conversation
DD2	Doors	Hallway	Open, look at	Door is related to a chat-room, gives basic information about it (active/passive, subject)
DD3	Glass window	Door	Look at	Shows whether there is any conversation behind the related door
DD4	Room	Hallway	Enter, leave	Represents a chat-room – the place where the conversation takes place
DD5	Table, sofa, place in a room	Room	Sit/stand	Represents the conversation
DD6	Avatar	Table, sofa, place in a room	Talk to	Represents a participant of a conversation
DD7	Pile of papers	Table	Read	Represents history of the conversation
DD8	Coffee	Table		Makes room environment more natural

6. Detailed design

This section represents detailed design description of “Community of practice” system. This description is based on requirements and design decisions that are presented in previous sections.

6.1. Application constituents

The first idea about application interface layout was to divide the application window into three panes. The upper – for notifications, the right pane – user’s contact list and the left pane – list of tabs. First tab is a chat, second – forum webpage. But since that kind of layout allows usage either of chat or forum only, decision was taken to divide the application window into four panes.

The upper pane is for the notifications – when the user is online the notifications about new posts in the forums are displayed there.

The right pane displays the user’s contact list – a sort of the address book with presence awareness information – showing who of the user’s contacts are currently online, and what is their status (busy, away, etc.). It also can be used to initiate instant messaging conversations.

The middle pane – chat. The chat is visualized as the corridor with a number of rooms in it. In the room there is a round table with people sitting around it, every person corresponds to the participant of the conversation. It is possible to click on a person – the window with context menu will appear. In front of everyone there is a cup of coffee and a pile pf papers. When a user clicks on the pile of papers, he/she can read the history of the conversation.

The left part displays the forum webpage.

Generally the application window will be presented as shown on Figure 1.

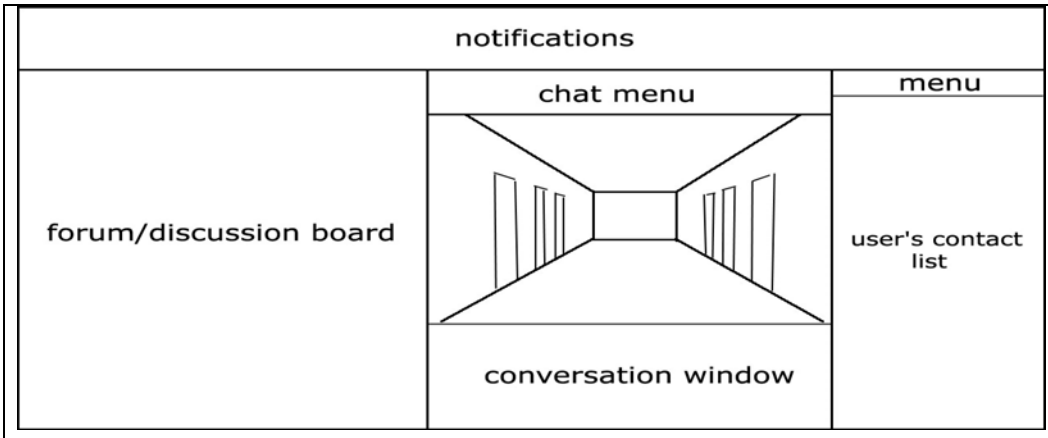

Figure 1 Schematic View of the Application Window

6.1.1. Entering the system

When the user starts the application an image of the door appears. On the door the user can see the titles of available chat rooms. Next to the each title there is a small light bulb The on/off status of the light indicates whether there is someone in the room or not. The user “knocks” at the door, and the login window pops up. If the typed username and password appears, the user enters the main hallway.

[DD.9] The entrance to the system is visualized by a door. After a user clicks on it he has to provide the correct username and password in order to enter the system.

6.1.2. Choosing the conversation

The main hallway has lots of doors in it. By default, the system will have a few doors. Each door represents a separate conversation. The user can walk through the hallway. The subject of the conversation is written on a small tab on the door. We decided to put glass window in the door. As avatars approach the door they can see whether there is someone on the other side. Behind the idea of glass window in the door stay two reasons [33]:

- People are *perceptually attuned* to movement and humans faces and figures, and notice and react to them more rapidly than notice and interpret a signs.
- The glass window supports a perceptually based awareness.

The user can either walk by to the door to read the subject of the related conversation or move the mouse pointer to the door – then the tip window with the short summary of a conversation will appear.

[DD.10] Positions of the doors in the hallway are the same for every user. If some users have entered the system and apparently are looking for the “room”, they can be seen in the hallway. As in a real life situation, users can have a small chat while they are in the hallway.

Figure 2 shows the hallway view that will appear after user enters the system.

Figure 2 Hallway view

6.1.3. Entering the room

After finding a needed **door**, the user walks to it and “knocks” at the door (clicks on the door image). After the door opens user enters the room.

[DD.11] The “search” functionality is presented in a chat menu. This function results is lightening up the doors and positioning them at the beginning of the hallway.

6.1.4. Joining the conversation

In the centre of the room there is a round table. Also the room will have a sofa and some pictures on walls. The participants of the conversations are represented by the avatars sitting around the table, sitting on a sofa or just standing. In order to join the conversation, the user has to walk to the table, and click on the place he/she wants to “sit”. After that a conversation window appears. User can participate either in chat talk or chose the conversation between some members only.

[DD.12] Users might want to listen to the conversation first, before joining it. User just opens a door and conversation window appears. In that case, the name of particular user will not be indicated in conversation window. At the same time, those that already participate in the conversation will get the notification, that there is someone listening to their conversation.

Generally, the room will look as shown on Figure 3.

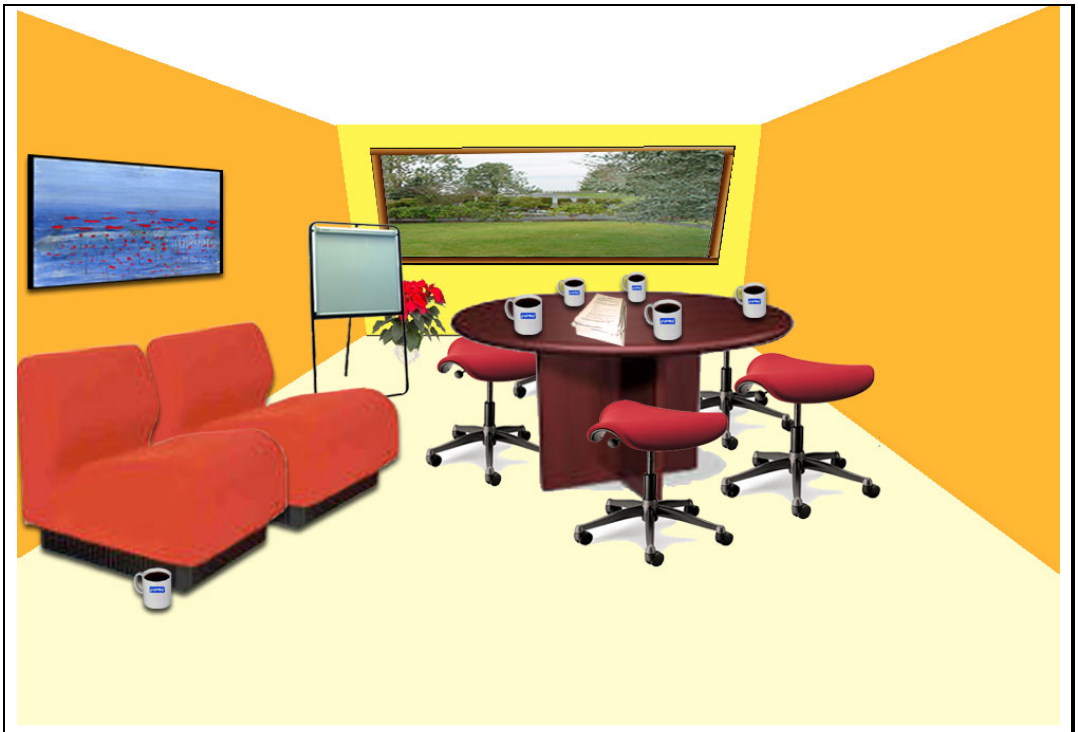

Figure 3 Room view

6.1.5. Reading conversation history

On the table, in front of every participant, there is a pile of papers representing the history of the conversation. The user has to click on the pile in order to read the history.

[DD.13] The history is represented in hypertext in following format:

<time><username (avatar)><text>

Clicking on the username (avatar) in the history would have the same effect as clicking on the avatar sitting around the table. However, in the history you can find users who are not currently in the conversation, or even not online.

6.1.6. Acquiring information about the participants

[DD.14] After clicking on the participant's avatar, the context menu pops up with following menu items "User Information", "Send IM message", "Send email", "Send file".

6.1.7. Conversation

[DD.15] During the conversation some users can be more or less enthusiastic. If user is very active, colour of his/her avatar becomes more saturated. If less avatar becomes grey.

Also, users can change their online status to busy, away, on a phone and offline.

Each avatar will have the status indication. Also status is indicated in the contact list.

[DD.16] By clicking on his/her own avatar, user will have an opportunity to change mood mode. For example, if some one feels bored, he/she presses on avatar, chooses "bored" mode. A small card that indicates "mood" will appear in avatar's "hands".

[DD.17] Users also are given an opportunity to write a short notes or even a motto of current discussion on a flip chart. By pressing on a it a small window appears where user can type a limited amount of words that eventually will be shown on a flip chart.

Table 2 represents the correspondence of made design decisions with requirements.

Table 2 Correspondence of design decisions with requirements

№	Design Decision	Correspondent Requrement(s)
1	DD1	GEN3.1, GEN1.5
2	DD2	GEN3.1, GEN1.5
3	DD3	GEN3.1, GEN1.5
4	DD4	GEN3.1, GEN1.5
5	DD5	GEN3.1, GEN1.5
6	DD6	GEN3.1, GEN1.5, GEN1.1, GEN1.2
7	DD7	GEN3.1, GEN1.5
8	DD8	GEN3.1, GEN1.5
9	DD9	GEN1.5, GEN.2.2.4
10	DD10	GEN1.5
11	DD11	GEN1.7
12	DD12	GEN1.3, GEN1.5
13	DD13	INS3
14	DD14	GEN4.1, EML1, INS1.1, INS2
15	DD15	GEN3.1, GEN1.5,GEN1.3,GEN1.4
16	DD16	GEN3.1
17	DD17	GEN 1.1,GEN1.5,GEN2.2.1,GEN2.2.3, GEN3.1

6.1.8. Menu

The application will have two menus: main menu (chat menu) and user's contact list menu.

The main menu will have the following functions:

Create **new room** (if user wants to start a new topic for chat)

Search for room (if in the hallway there is too many doors and user doesn't want to go through all of them one by one in order to find the one he/she needs)

Exit room (if user wants to leave one chat and join another)

In order to visualize those icons the decision was taken, that all of them should be presented as a door with small tips that will help users to recognize the meaning of the icon.

Figure 4 represents these icons respectively.

Figure 4 Chat menu icons

The user's contact list menu is presented by words and has the following functionalities:

Contacts (for managing user's contacts): add, delete contact, view profile

Personal (for managing user's personal info): nick name, display picture, my profile, my status

6.2. Interaction scenario

In order to show a complete overview of the chosen concept and to get an idea of interaction with the interface two interaction scenarios are presented: 1. functional; 2. non-functional.

6.2.1. Functional scenario

Pascal is very happy today. He successfully finished his first lesson and decided to share this wonderful news within community of practice. For this purpose he logs in to the "**Community of practice**".

Pascal clicks on the **door** and **log in window** pops-up. By typing in his **user name** and **password** he enters the system.

After entering he sees long **hallway** with **doors**. He sees some "people" in the hallway, so Pascal decides to have a small chat with them. Pascal presses on someone avatar and sends to him a **short message** with an introduction of himself. Wouter, the person that Pascal just contacted replies that gladly will talk to him. After having a short conversation, Wouter advised Pascal to go to "New experience" room.

He walks through the **hallway** and looks for the theme "New Experience". In the glass window he sees some people in it. Pascal enters the **room**. He sees five **avatars** that sit around the table. Before joining the discussion Pascal takes a **paper pile** from the **table** and looks up the conversation history. Pascal clicks on a sofa and sits on it. Finally he joins the conversation by sending the **message** to all

participants.

Meanwhile Hans, another member of the community of practice, gets some free time. He walks in the **system** and through glass windows sees that rooms are busy with discussions. But he has only a few minutes so he decides just to send a **small massage** to all people that sit in "New experience" room. He explains his interests and asks whether he can add participants to his user list. He gets an answer, that he can do that. Now, in his **user list** Hans clicks on each avatar. In the **conversation window** that appears, he chooses "**send email**" option. Hans sends an **email** to everyone again, giving more elaborate statement of who he is and **logs off** the system by closing the "Community of Practice" application window.

Carsten is a new member of the community of practice. He rarely uses the "**Community of practice**" system, but he overheard that he might find there a lot of useful information. He has a problem with handling his class and decided to **log in** to the system, hoping that he can get a good advice from his colleagues.

After logging in he sees a long **hallway**. He walks through it by looking the appropriate discussion theme. Carsten feels a bit lost, so he looks up the **menu** and selects the **search function**. In a small **window** that appeared, he types **key words**, and the system gives the answer by **lightening up** all **doors** in the **hallway** that are related to his request and **situates** them at the beginning of the **hallway.** Carsten points a **cursor** to the first door and in a small **tip window** that appeared, reads the topic current discussion, which seems like what he was looking for. Carsten enters the **room** and sees one **person** there. By clicking on the **avatar** Carsten gets a **window** with **user information** in it. "Person's" name is Tineke and apparently, she also is a new teacher. Carsten is very happy that he might found a new friend, so he sends a **message** to Tineke, where he introduced himself and shortly explained his problem. Tineke answers, that she had the same problem, but her friend Eva send her a very good paper that gives explanations how to manage it. Tineke chooses from the **menu** in her **conversation window** "**send file**" option and sends this paper to Carsten. He sees in his **window** a short notice that he should **accept** or **deny** receiving a **file**. Carsten presses accept and in a few seconds the document is successfully received. Also she sends a **message**, that she would love to talk to him, but she has an appointment and should leave. But before **logging off,** she asked Carsten of permittion to add him to her **user list**. Carsten agrees and also adds Tineke to his **user list**. Tineke **logs off** and Carsten proceed with looking for some more information in **forum**.

6.2.2. Non -functional scenario

Elmo just got the email from his friend Karianne that she is waiting for him in "**Community of practice**" and wants to talk with him. So Elmo logs into the system.

In the hallway he **sees** some **avatars.** Among them he **recognises** those that are in his **contact list**. Elmo **decides** to have a **small chat** with them. Gerrit is very **happy** to see Elmo. It was a while since they **talked** to each other. Elmo and Gerrit **exchanged** their **latest news** and Elmo **proposed to find** Karianne, and to **have conversation** with her. He clicks on her name in the contact list and **gets notification** that currently she is in the "New experience" room. Elmo and Gerrit **walk through** the hallway. They are very **curious** about the discussion that is going on in that room. They **opened** the door and before joining it that have decided to **listen to** this discussion first.

The discussion seems very **interesting,** so they **joined** it. But Gerrit **notices** that Karianne's avatar is **grey**. He knows, that this means she is passive. He **exchanges** his thoughts with Elmo and together they **decided** to contact Karianne apart from discussion. She **complained** that she **felt** like no one has listen to what she said and that is why she is so **silent**. Elmo clicks on his avatar and chooses "**need attention**" mood mode. Everyone **became quiet** for a moment. Elmo says that he wants everybody to listen to Karianne now. So Karianne's **got a chance** to speak up. She was **touched** by Elmo's gesture and become a bit **nervous.** Patricia (one of the participated in the discussion) sends her a **supportive message**. When Karianne has finished, the discussion got a new turn.

7. Implementation

In this chapter we describe the implementation phase of the project.

The idea was to implement the environment using one of the available 3D graphics APIs, such as OpenGL, Direct3D or JAVA3D. However, due to the time constraints, the implementation of the 3D prototype was considered to be unfeasible, therefore 2D prototype was implemented. The main focus of the prototype was on the chat and instant messaging functionality. Server and the client applications were developed using Java SDK 1.4.3.

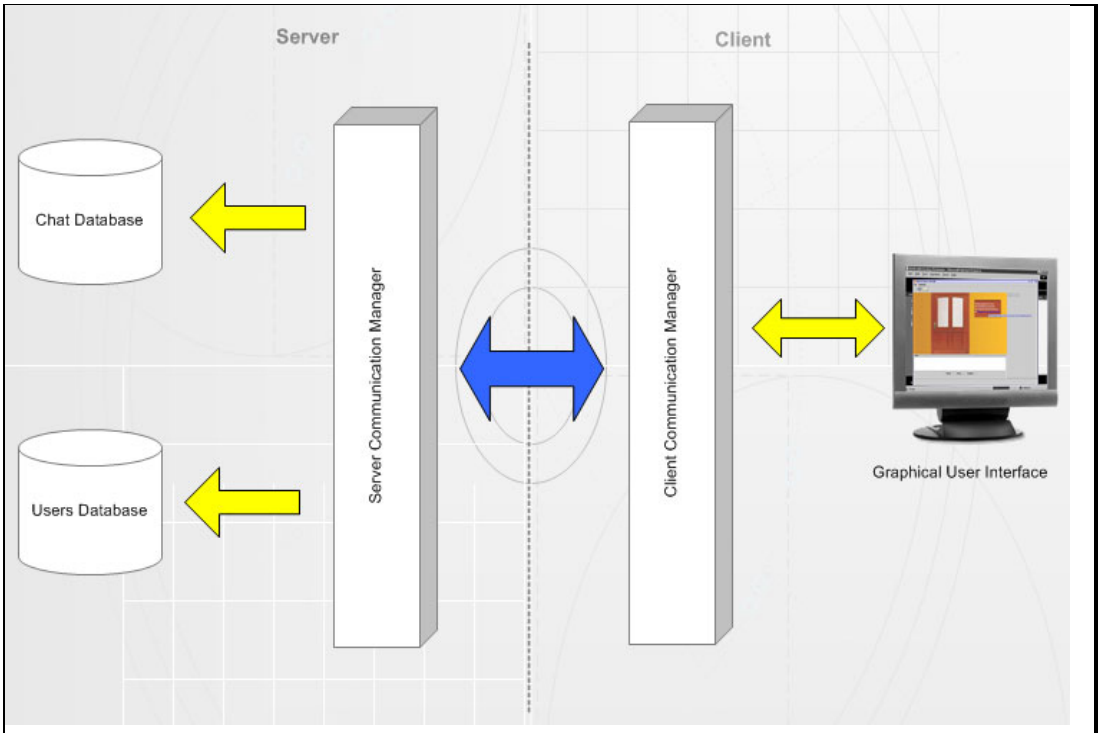

Figure 5 META Architecture

7.1. Server

The functions of the server application were following:

- registering new user of the system;
- monitoring status changes and informing relevant users about status changes of their friends;
- maintenance of the users' contact lists;

- storage and delivery of the so–called “offline” messages (addressed to the users, who are currently unavailable)
- initiating negotiations for the file transfer;
- enabling chat conversations;
- maintenance of chat database;
- Providing additional information upon the request (such as conversation history of the chat room, user information, description of the chat room, etc.)

7.2. Client

The client software was mainly focused on the visualization of the designed concept. However, to validate the concept, certain functionality had to be implemented, such as:

- changing user online status;
- registering new user in the users’ database;
- sending and receiving instant messages;
- sending and receiving binary files (using direct connection to the conversation partner, rather then doing it via the server);
- sending and receiving chat messages;
- amending users’ friends list (adding and removing friends);

Concept visualization included following locations:

- Entrance door, where information about the available chat rooms is displayed;
- Main hallways, displaying the avatars of the user, currently at this location, and doors to the chat rooms.
- Chat room door, where additional information about the selected chat room is displayed;
- Chat room, where, actually, the conversation between the participants takes place;

The client window consists of three parts – contact list (right part of the screen), concept visualization view (left upper part of the window) and chat message editor (left bottom part of the window).

7.3. Contact List

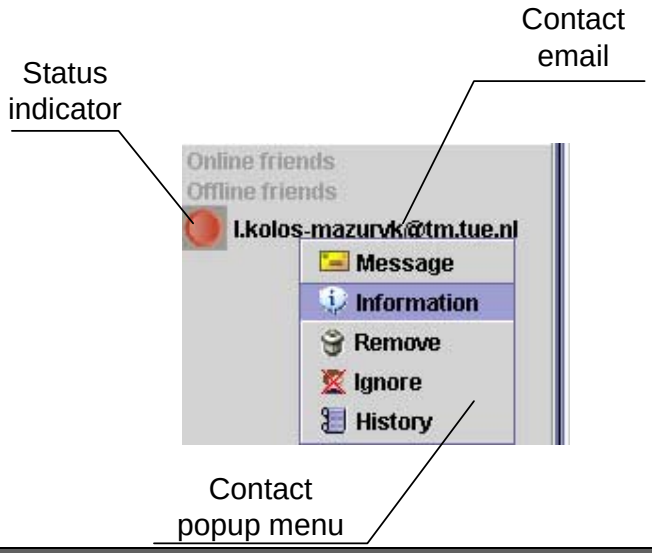

Figure 6 Contact list structure

By right-clicking on the contact email or status indicator contact popup menu appears, which allows to send a message to the contact, look up information about the person, see conversation history, send a file (if contact is not offline) etc. (see Figure 6).

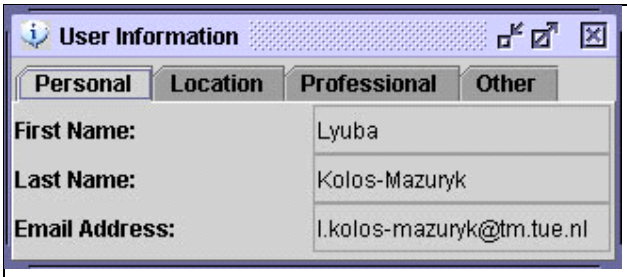

Figure 7 User Information window

The user information window shows information about the correspondent user, which he/she entered during the registration. The content is according to the user study performed on the earlier stages of the project.

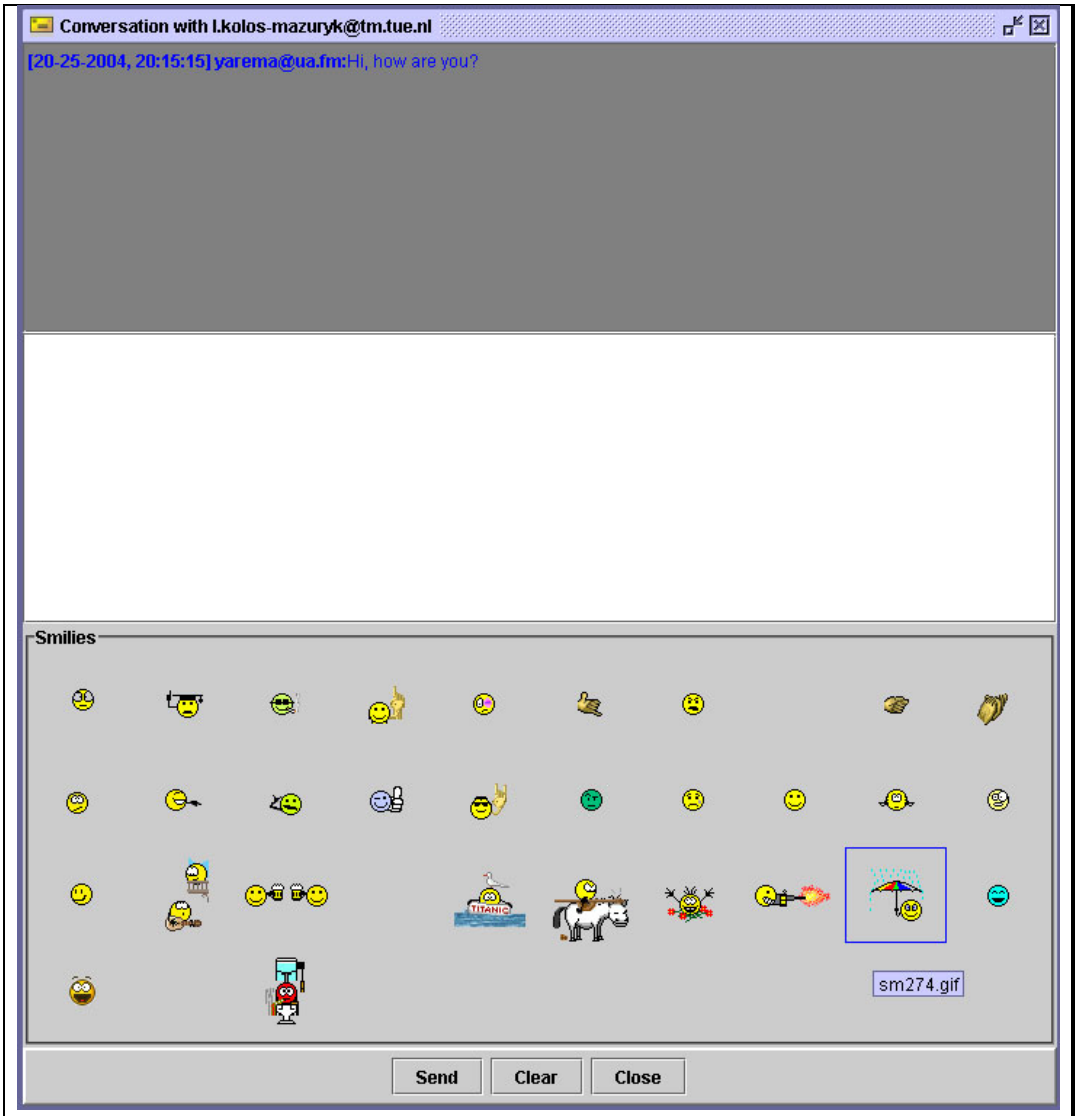

Figure 8 Conversation window

The conversation window consists of three parts – the upper part shows the messages which were send and received during the current conversation with the user. The middle part is a message editor, chat messages can have embedded emoticons, which are displayed below the editor window. Emoticons list can be enhanced by adding correspondent .gif files into the "smiles" folder of META installation directory. However, the second party has to have these icons in order to be able to see the smiles.

For sending a file user has to select "Send File" item from the contact popup menu. Then standard file selection dialog appears, and the file is being send to the recipient. If she/he refuses to accept the file, alert window will be displayed on the sender side.

7.4. Status information

Displaying status information of the participants is essential part of the system. In the chat rooms and the hallway, a correspondent avatar is displayed (Figure 9).
In the contact list, a circle of the same color as the avatar on (Figure 9) is displayed. Form some states (away, on the phone, busy) a correspondent icon is displayed along with the colour circle.

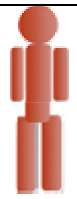	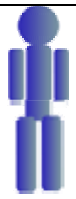			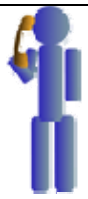	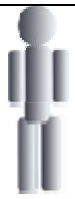
a. offline	**b. online**	**c. away**	**d. busy**	**e. on the phone**	**f. silent**

Figure 9 Avatar icons

7.5. Visualization

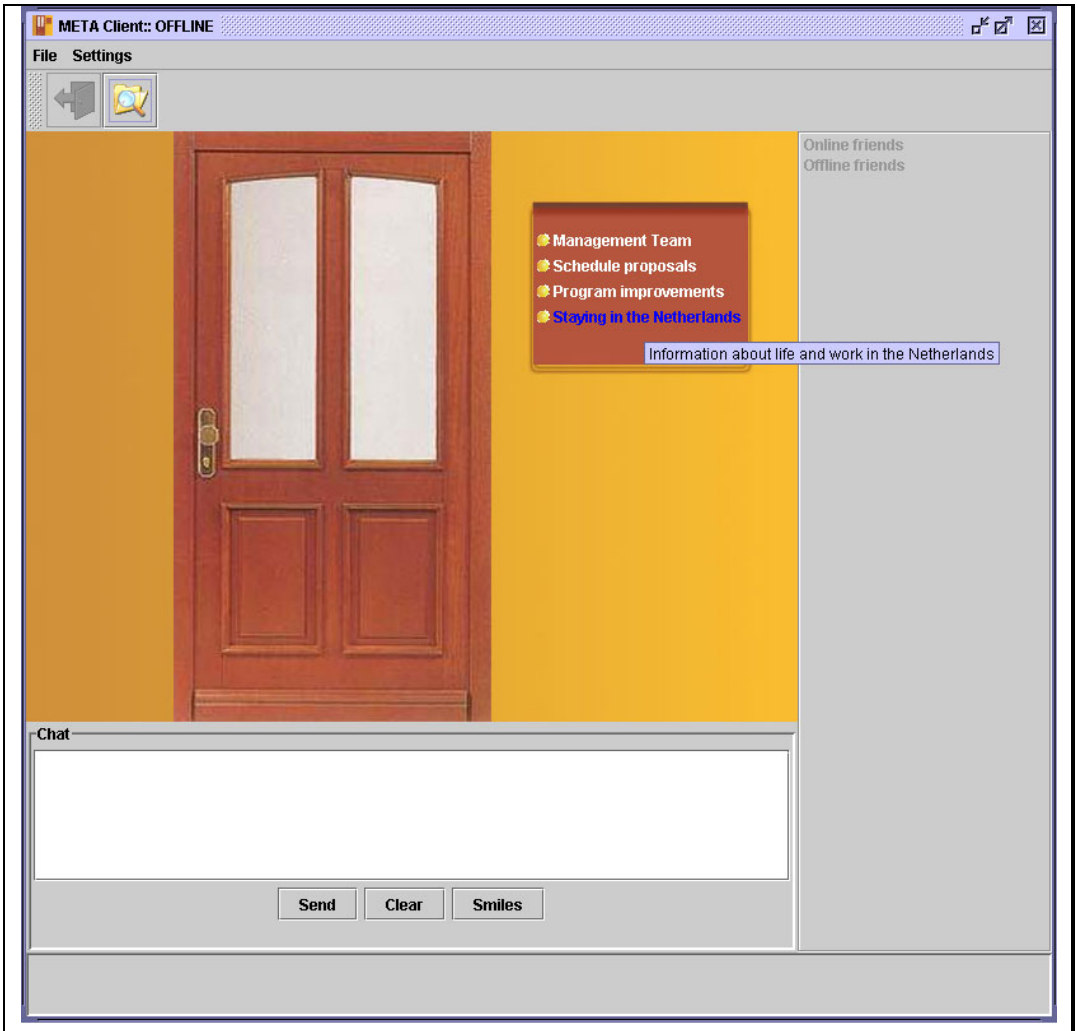

Figure 10 Main entrance

The main entrance, as described in the **[DESIGN]** is a door, with a board next to it. On the board additional information about the chat rooms, which are currently available in the system is displayed. Actually, the room name is written on the board. Shining bulb on the left side means, that someone currently is in the room. If you position a mouse cursor over the name of the room on the board, the tool-tip will display the description text of the selected chat room. By clicking on the room name on the board the user will be immediately transported to the selected chat room. By clicking on the door, the user will enter the main hallway (see Figure 11).

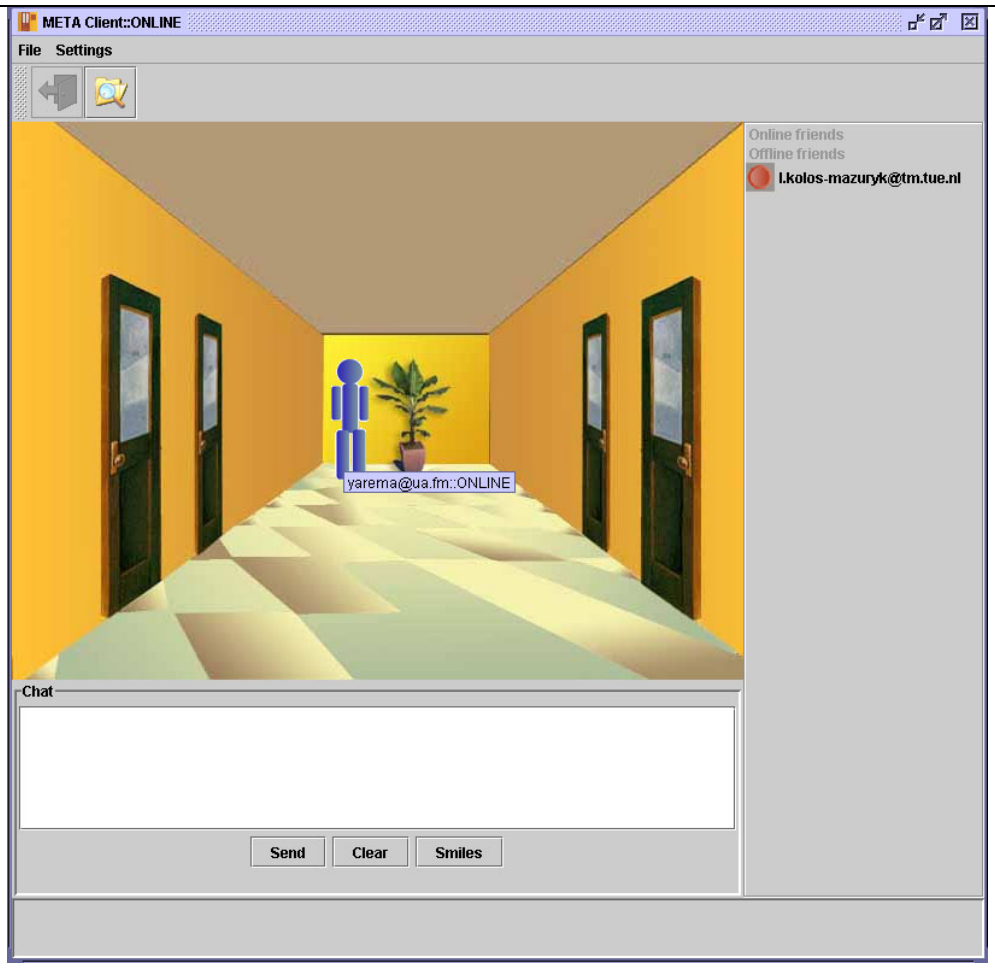

Figure 11 Main hallway

The main hallway is a hall with doors to the chat rooms, on the left and right sides. Usually users move from the entrance to the main hallway. The avatars of the users, which are currently in the hallway, are displayed. By clicking on the avatar, the popup menu with options is displayed. The user can lookup additional information about the selected person, see their conversation history, send a message, etc. By positioning the mouse cursor over the chat room door, the user can see the name of the correspondent chat room. By clicking on the door, the user moves on to the next location, which is the entrance of the chat room (see Figure 12).

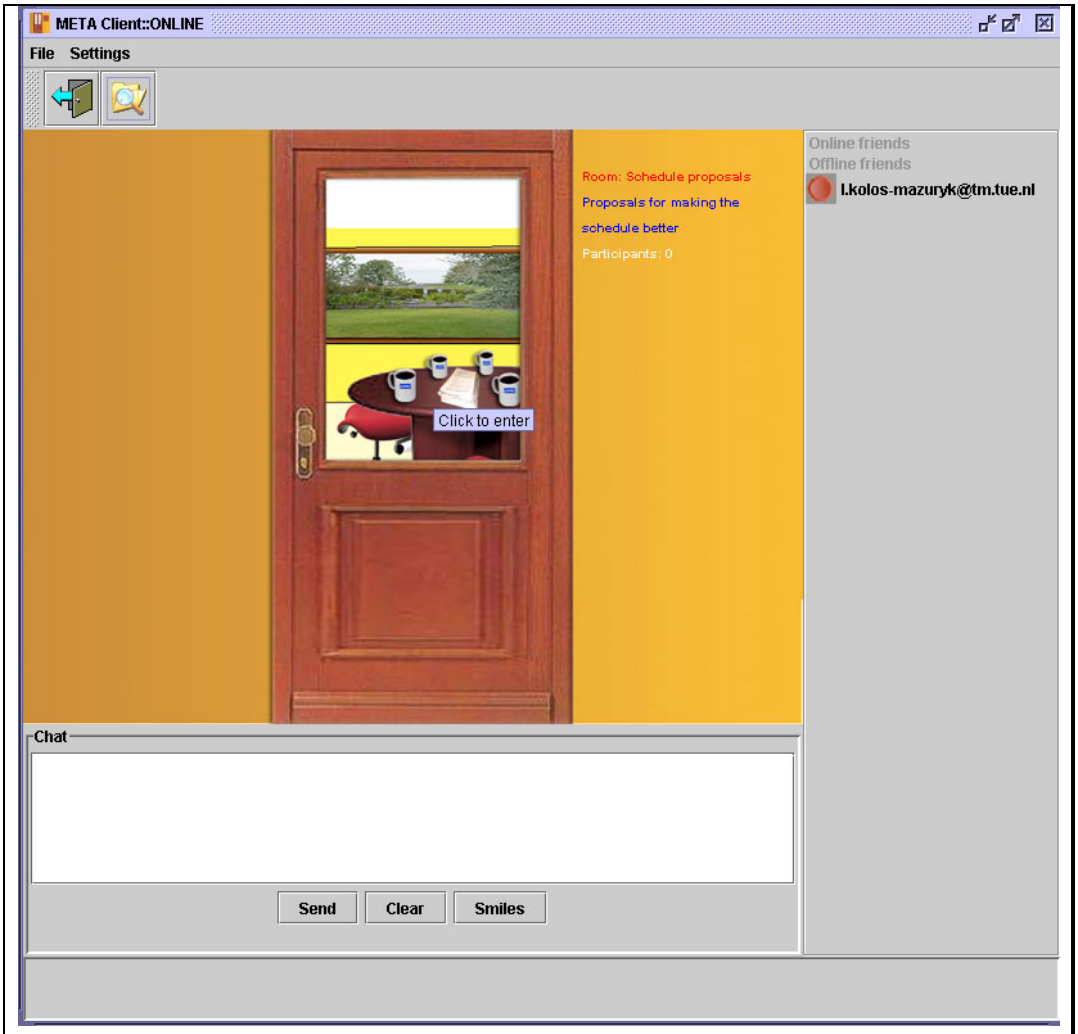

Figure 12 Room door

The introduction of this location was caused by the necessity to reduce information load in the main hallway. But it it does also enhance the imitation of the movement process in reality – before entering the door you actually come close to it – and if it is a glass door, you can see what is going on in the room. The same here – you walk up to the door to see what's happening in the room, and then you can decide whether to go inside the room or to move further along the hallway (This principle is called social translucence, see [36]). Extra information you can get at the room door consists of room name, room description and the number of participants. However, it can be easily enhanced. By clicking on the door, the user enters the correspondent chat room.

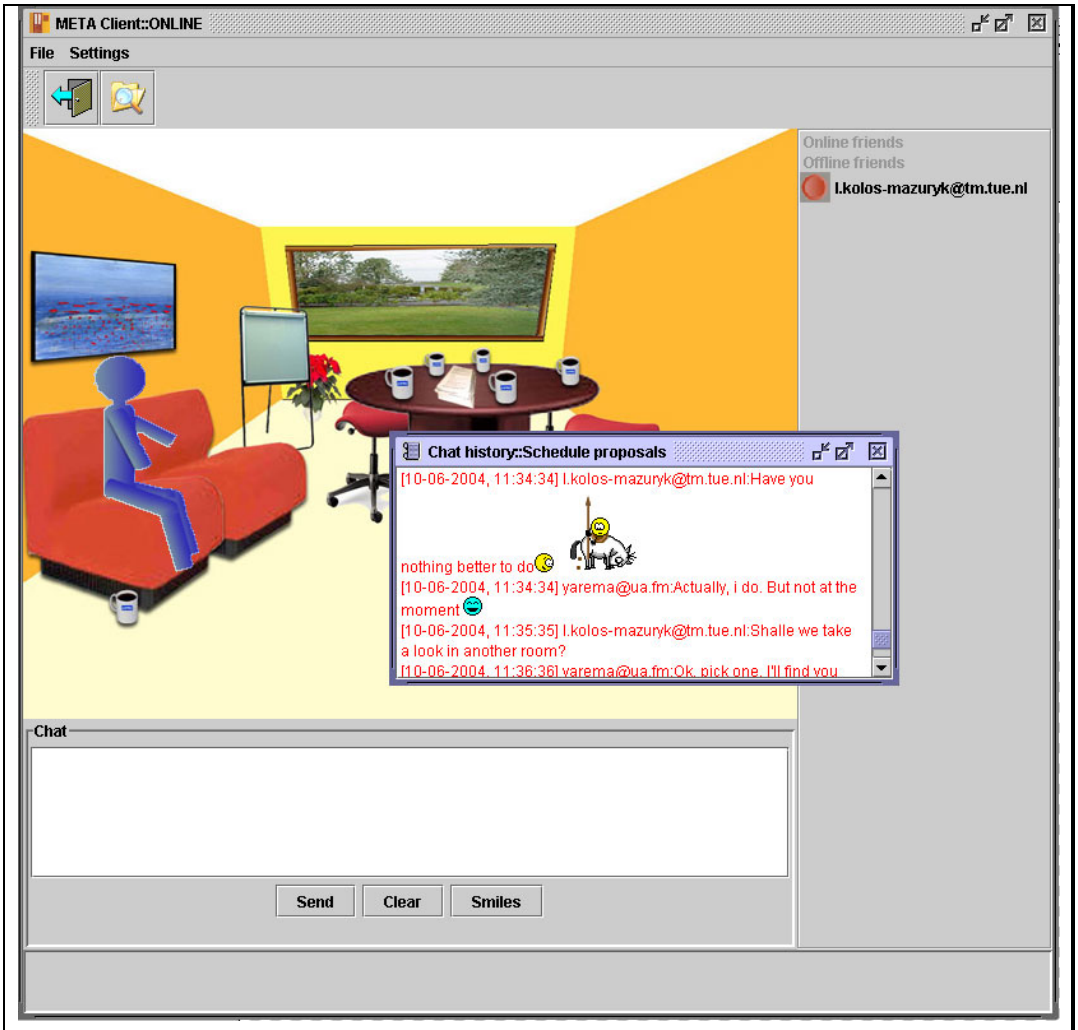

Figure 13 Chat room

A chat room is represented by a model of a meeting room. It has a table with sitting places around it.

A pile of paper on the table represents the chat history, by clicking on it user can retrieve the log of the conversations in the correspondent chat room. The avatars of the participants act exactly the same way as in the hallway.

The flip chart is another active element. By clicking on it, the user is able to enter a short text message, which will be displayed on the flip chart. The length of the message is limited by the size of the flip chart.

8. Assessment

We decided to conduct the study of the "META" system by answering two main questions:

1. Does the "META" system enhance social presence?
2. How usable the "META" system is?

For that purpose we set up experiment.

8.1. Test Objectives

We decided to conduct the assessment in order to determine how main aspects of theoretical framework, indicated in one of previous chapters enhance social presence within "Community of practice" members. Our hypotheses are:

H1: The META and regular chat systems do not differ from usability point of view

H2: The META system contributes to the degree of perceived social presence

8.2. Method

To test our hypothesis the following independent variables were chosen: 1. regular chat (a part of the META system) and 2. META system.

8.2.1. Participants

Fifteen groups of three participants took part in the evaluation of the "META" system. A small promotional ad was sent by email to students of three universities: TU/e, Twente and Groningen. Those who responded were grouped in three by criteria that members of one group should be from different universities. This criterion was chosen because it assures unfamiliarity of group members with each other and supports the fact that members of the "Community of practice" are located through out the Netherlands

8.2.2. Instruments

In order to answer the first question we decided to use the IPO-SPQ (a questionnaire measuring social presence) [34] .The questionnaire combines semantic differential items, namely an evaluative or emotional response with subjective statements about attitude towards media experience media in which subjects can agree or disagree on a 7-point scale.

Answering the second question participants completed the SUS (the system usability scale). See http://www.usability.serco.com/trump/documents/Suschapt.doc

The System Usability Scale can be seen that the selected statements actually cover a variety of aspects of system usability, such as the need for support, training, and complexity, and thus have a high level of face validity for measuring usability of a system.

8.2.3. Design

In the experiment we used two trials. Each group of participants took part in two trials. These trials were counterbalanced. Figure 14 shows order of trials and assigned variables.

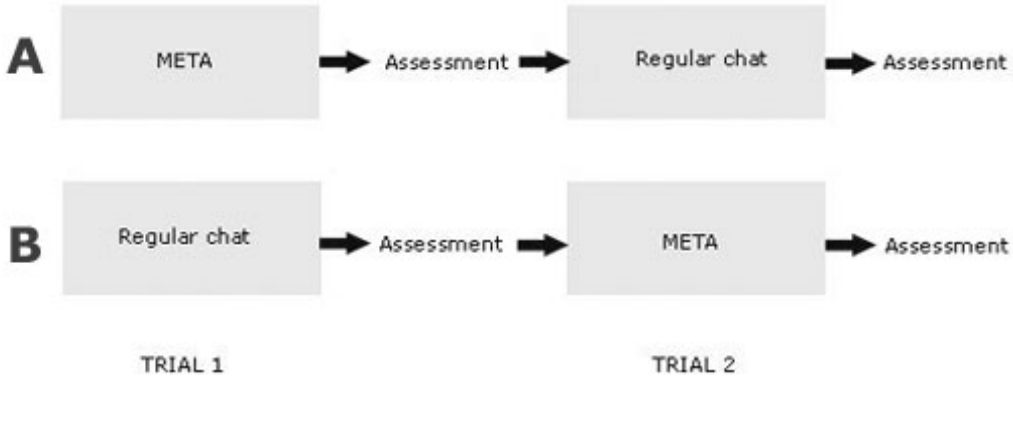

Figure 14 Testing Approach

8.2.4. Testing and procedure

The experiment was conducted online. Through email all participants were given short instructions about the system installation, assignments and the assessment (see Appendix C).

Testing lasted for five days. 45 participants took part in the study.

Three groups of participants were tested per day:

- 7 groups (21 subjects) were following A order (META-CHAT);

- 8 groups (24 subjects) were following B order (CHAT-META).

Each session lasted for 50 minutes (15 minutes for trials and 10 minutes for assessment after each trial).

Participants were given small assignments for a discussion: 1. How to improve management and 2. How to find an accommodation in the Netherlands.

Those assignments were counterbalanced (presented in reverse order) accordingly to the group number:

CHAT (accommodation) – META (management)

META (management) – CHAT (accommodation)

CHAT (management) – META (accommodation)

META (accommodation) – CHAT (management)

After the respondents have had an opportunity to use the system they were asked to close it and record their immediate response to each item in the questionnaires. Later they were asked to write some comments about their experience and the system.

8.3. General results

All participants successfully installed both systems the META system and the regular chat. No one from initial number of the participants left the experiment.

8.3.1. Usability

The results showed that there is no big difference between the scores for the usability assessment of both systems: META and regular chat.

Table 3 and

Table 4 represent means and standard deviation of SUS scores (order “A” and “B”).

Table 3 Means and standard deviation (A)

	META	CH[1]
Mean	**78.69048**	**75.9524**
STDEV	**4.718252**	**4.21872**

Table 4 Means and standard deviation (B)

	CH[1]	META
Mean	**73.75**	**78.333**
STDEV	**5.9436**	**5.8823**

There is no significant difference in the results, since the systems are rather alike from usability point of view. The mean evaluations for both META and regular chat are almost the same, and the standard deviations from the mean values are small. Mean values for META are somewhat higher, and that can be explained by extra functionalities incorporated in META system.

8.3.2. Presence

Results for presence assessment differ from usability evaluation. All scores for META system are significantly higher than ones for the regular chat. Tables below present the results of assessment on per-criterion basis for both systems: Table 5 presents order A and Table 6 presents order B.

Table 5 Order A: results of assessment

	MEAN	Standard Deviation	MEAN	Standard Deviation
	META (A)		CHAT(A)	
Not personal_Personal	**6.285714**	**0.46291**	**3.428571**	**0.676123**
Insensitive_ Sensitive	**5.857143**	**0.478091**	**3.190476**	**0.511766**
Not social_Social	**6.285714**	**0.46291**	**3.52381**	**0.601585**
Cold_Warm	**5.904762**	**0.300793**	**3.095238**	**0.624881**
Dead_Lively	**6.047619**	**0.384212**	**3.190476**	**0.601585**
Boring_Interesting	**6.238095**	**0.538958**	**3.285714**	**0.46291**
Distant_Close	**5.857143**	**0.358569**	**3.238095**	**0.436436**
Not emotional_Emotinal	**6.238095**	**0.436436**	**3.428571**	**0.597614**
Unfriendly_Friendly	**6.142857**	**0.358569**	**3.428571**	**0.597614**
Not accessible_ Accessible	**5.857143**	**0.358569**	**3.380952**	**0.497613**
Non reactive_ Reactive	**6.142857**	**0.358569**	**3.47619**	**0.601585**

[1] CH stands for regular chat

Unnatural_Natural	6.142857	0.358569	3.333333	0.483046
MEAN SCORE	6.1		3.3	

Table 6 Order B: results of assessment

	MEAN	Standard Deviation	MEAN	Standard Deviation
	CHAT (B)		META(B)	
Not personal_Personal	3.458333	0.508977	6.75	0.442326
Insensitive_ Sensitive	3.291667	0.550033	6.25	0.53161
Not social_Social	3.416667	0.50361	6.791667	0.414851
Cold_Warm	3.25	0.675664	6.25	0.442326
Dead_Lively	3.458333	0.58823	6.25	0.442326
Boring_Interesting	3.458333	0.508977	6.291667	0.550033
Distant_Close	3.5	0.589768	6.541667	0.58823
Not emotional_Emotinal	3.458333	0.658005	6.416667	0.653863
Unfriendly_Friendly	3.583333	0.653863	6.333333	0.481543
Not accessible_ Accessible	3.333333	0.56466	6.166667	0.56466
Non reactive_ Reactive	3.666667	0.56466	6.375	0.575779
Unnatural_Natural	3.375	0.494535	6.666667	0.481543
MEAN SCORE	3.4		6.4	

Figure below shows comparison between mean scores for both systems in both trials.

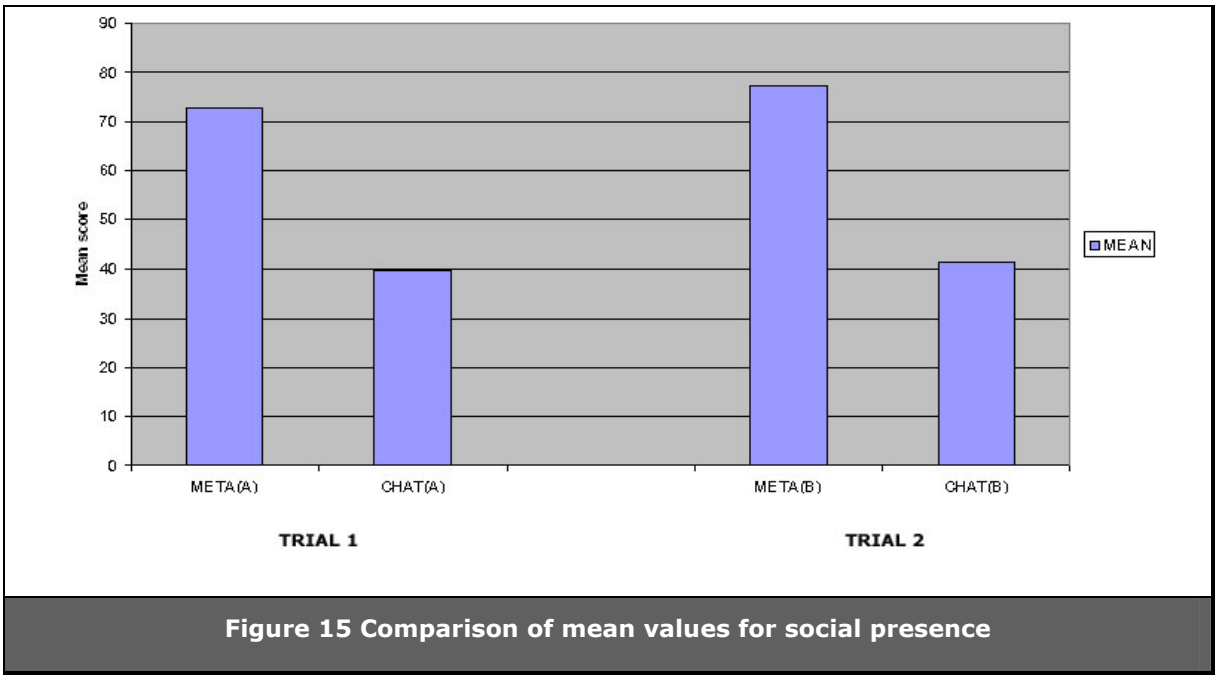

Figure 15 Comparison of mean values for social presence

8.3.3. Additional findings

There are some interesting remarks made by users about the META system:

- Having a 3D visualisation instead of 2D, as it is now, would improve presence even more, and will help to get rid of several minor inconsistencies;
- Changing of the avatars' colour when someone is not speaking for a while, is very helpful, and adds feeling of reality;
- It is desirable to add more short-cut keys for some of the functions. Most of the systems use "enter" key for submitting the messages, but in META "Alt+Enter" is used – that was destructing some of the users;
- Idea of presenting short messages on the flip chart is nice and helpful;
- Add some extra elements to chat rooms in order to differentiate them
- Most of the user would like to see multi-modal interface in the system, so the voice chat could be possible (see Skype: http://www.skype.com);

8.4. Statistical analysis

In order to analyse the results of the experiment we used paired samples t-test, which compares means of two variables for a single group.

The coding of the item value in the row data was total scores of subject's responses in both questionnaires.

8.4.1. Usability

The results of the test show that the difference between the variables is significant (t=-3.429, p=0.001) although there is no big difference in mean values (-3.7222) and standard deviation is small.

Paired Samples Test

t	df	Sig. (2-tailed)
-3.429	44	.001

8.4.2. Presence

The presence assessment results for paired samples t-test are presented below.

Paired Samples Test

t	df	Sig. (2-tailed)
-49.156	44	.000

There is a substantial difference between mean scores for both variables (- 34.5333). Standard deviation is small.

The hypothesis that META system contributes to the degree of social presence is accepted, since the difference between two values is significant (t=-49.156, p= 0.000)

8.5. Conclusions

Based on results mentioned above we can conclude the following:

8.5.1. Usability

The usability study of the META system resulted in the following: SUS scores have range from 0 to 100. The META system scored on 78.5 in average, which is taken as pretty good result.

Although statistically, there is a significant difference in usability between META system and regular chat, the main conclusion is that both systems are alike from the usability point of view. And fact, that the META has a higher SUS score can be explained only by having some extra functionalities, which were absent in the regular chat system.

8.5.2. Presence

The results for social presence assessment are more interesting. Accordingly to the subjective attitude score of the IPO-SPQ the META system has higher level of social presence comparing to the regular chat system. Average mean score for the META system is around 6.3 whereas the chat system averagely scored in 3.3. Hypothesis that the META system enhances social presence was accepted due to the results of paired sampled t-test, which showed significant difference between mean scores for single group of subjects.

Interesting is also that fact that it seems that there is no relations between usability level and feeling of presence, however that should be tested and this issue was out of the scope of this project.

9. Discussion

In this chapter we discuss more elaborately on the results achieved and give our recommendation for the future research.

9.1. Communication needs

Knowledge of people, who they are, what they look like, how they behave supports the development of both professional and personal relationships with new peers. Also, the development of a group sense emerged from interaction about more general topics. The META system, which was developed in the first place to satisfy communication needs, allows people (members of community of practice) to meet in the unified environment, and to speak not only about work and business, but to conduct primarily informal conversations.

9.2. Computer mediated communications

Due to the fact, that members of community of practice are spread across the whole Netherlands and have only rare opportunities to meet face to face, and taking into account, that communication nowadays becomes more and more computerized, naturally, the META system comprises several means of computer mediated communication. These include instant messaging, emailing, chatting and file exchange. However, taking into account fast development of the technology, and wishes of the users concerning multimodality of such a system, possible direction of future development would be inclusion of such communication means, as mobile telephony, paging, etc. Due to the fact, that META system was developed in Java, it can be deployed to PDA with minimal effort.

9.3. Social presence

In current project, main accent form the research point of view whether META system enhances presence feeling of the users. In order to answer research question, we designed experiments, which allowed comparing two systems, practically equivalent from the functional point of view. The difference was in “META window”. According to the results IPO-SP questionnaire, we obtained a positive answer to our question. Interestingly, usability which was approximately at the same level for both systems does not correlate with presence. This fact should be investigated in future.

9.4. Affordances

Affordances theory is relatively new. While developing the META system, we attempted to employ recent developments in this area. Nevertheless, according to the theory, affordances are present independent of the fact whether they were perceived or not. However, in current project we did not test whether our choice of affordances influences social presence, or success of the system as a whole. But this direction is interesting, and should be researched in the future.

9.5. Awareness

Awareness is fundamental to social and collaborative activities. If one observes people in real life situations, the ability to sense or become aware of others is the first step towards any kind of interaction. Awareness of others enables communication with others, which in turn enables collaboration with others. Once we become aware of others, we can engage in a variety of social and collaborative activities.

9.6. Sociability

Accordingly to PPS (The project for Public Spaces: http://www.pps.org) there are some requirements for public places. They should be:

1. *Accessible and* well connected to its surroundings. System primarily was to be developed in 3D. In 3D virtual universe a users feels objects “physically”. System would allow a close simulation of a real world. However, due to the time and resource constraints initial plans were changed.
2. People need to be engaged in *activities*. System has to allow not only informal and casual conversations, but also contain a place for collaborative work, which often comprises a number of activities (such as document reviews, writing on a white board, etc.). A small example of it in the system is a flip chart, but enhancements of such tools in the system definitely are interesting.
3. The space must be *comfortable*. System has a number of objects, which are meant to enhance feeling of comfort, such as sofa, a tree in the corridor, cups of coffee, a picture on the wall, etc. However, it would be interesting how to differentiate rooms – starting from different colors of standard objects, or changing the set of available objects.
4. It should be a *sociable* place. According to the user profile, we decided to make a system as a corridor with rooms. The systems should have reflected the real-life situation. However, as mentioned above, in order to make a system truly sociable some improvements have to be made.

10. Bibliography

[1] Altman, I., & Taylor, D. (1987). Communication in interpersonal relationships: Social Penetration Theory. In M. E. Roloff and G. R. Miller (Eds.), Interpersonal processes: New directions in communication research, 257-277. Newbury Park, CA: Sage

[2] William Schutz: JOY: EXPANDING HUMAN AWARENESS, Grove Press, 1968

[3] Leiner et al. The Past and Future History of the Internet.In: Communications of the ACM, 40(2):102--108. Feb 1997

[4] Lombard, M., & Ditton, T., 1997. At the heart of it all: The concept of presence. *JCMC* 3 (2), http://www.ascusc.org/jcmc/vol3/issue2/lombard.html

[5] Short, J., Williams, E., & Christie, B. (1976). The social psychology of telecommunications. London: John Wiley & Sons.

[6] Weiner and Mehrabian, 1968. Language within Language: Immediacy, a Channel in Verbal Communication, Appleton, New York

[7] Argyle, M. & Dean, J., 1965. Eye contact, distance and affiliation. *Sociometry*, 28, 289-304.

[8] Gunawardena, C. N., 1995. Social presence theory and implications for interaction and collaborative learning in computer conferences. International Journal of Educational Telecommunications, 1, 147-166

[9] Benschop, A. (2001). Virtuele gemeenschappen: Bouwstenen voor een sociologie van het Internet [Virtual communities: Building blocks for an internet sociology]. Retrieved January 31, 2004, from http://www2.fmg.uva.nl/sociosite/websoc/index.html

[10] Tu, C. H. (2002b). The measurement of social presence in an online learning environment. International Journal of Educational Telecommunications, 1(2), 34–45.

[11] Bradner, E., Kellogg, W., & Erickson, T. (1999). The adoption and use of 'Babble': A field study of chat in the workplace. In S. Bødker, M. Kyng, & K. Schmidt (Eds.), Proceedings of the sixth European conference on computer supported cooperative work (pp. 139–158). Dordrecht:: Kluwer.

[12] Gaver, W. W. (1996). Situating action II: Affordances for interaction: The social is material for design. Ecological Psychology, 8(2), 111–129.

[13] Procter, R., & McKinlay, A. (1997). Social Affordances and Implicit Ratings for Social Filtering on the Web. In Proceedings of the Fifth DELOS

Workshop on Filtering and Collaborative Filtering (pp. 89 – 96). ERCIM Press.

[14] Kreijns, K., Kirschner, P. A., & Jochems, W. (2002). The sociability of computer-supported collaborative learning environments. Journal of Education Technology & Society, 5(1), 8–22. Retrieved September 2, 2003, from http://ifets.ieee.org/periodical/vol_1_2002/v_1_2002.htm .

[15] Preece, Rogers, Sharp, Benyon, Holland, & Carey, 1994 Human Computer Interaction, Addison Wesley, 1994.

[16] Gaver, W. W. (1991). Technology affordances. . In S. P. Robertson, G. M. Olson, & J. S. Ohlson (Eds.), Proceedings of the SIGCHI conference on Human factors in computing systems: Reaching through technology (pp. 79-84). New York: ACM Press.

[17] Norman, D. A. (1990). The design of everyday things. New York, NY: Doubleday. (Original work published 1988).

[18] Norman, D. A. (1992). Turn signals are the facial expressions of automobiles. Cambridge, MA: Perseus Books.

[19] Dourish, P., & Bly, S. (1992). Portholes: Supporting awareness in a distributed work group. In P. Bauersfeld, J. Benett, & G. Lynch (Eds.), Proceedings of the SIGCHI conference on Human factors in computing systems (pp. 541–547). New York: ACM Press.

[20] Cannon-Bowers, J. 1993- 'Team performance and training in complex systems', in collected papers of the Fourth Offshore Installation Management Conference, Robert Gordon University, Aberdeen, April.

[21] Gutwin, C. (1996). Workspace awareness research (1996). Retrieved December 31, 2003, from http://www.cpsc.ucalgary.ca/Research/grouplab/people/carl/research/awareness.html .

[22] Whyte, W. H. (1980). The Social Life of Small Urban Spaces. Washington, DC: Conservation Foundation.

[23] Gehl, J. (2001). Life between buildings: Using public space (4th ed.). Denmark: The Danish Architectural Press.

[24] Busher, M. & Hughes, J. (1999). Screen scenery: Transposing aesthetic principles from real to electronic environments. In Munro, A. J., Höök, K., & Benyon, D. (Eds.), Social navigation of information space (pp. 90 – 111). London: Springer-Verlag.

[25] Donath, J. S. (1997). Inhabiting the virtual city: The design of social environments for electronic communities. Unpublished PhD thesis,

Cambridge, MA: MIT. Retrieved February 2, 2003, from http://ftp.media.mit.edu/pub/donath/VirtualCity.ps .

[26] Fred Nickols (2000) - http://home.att.net/~discon/KM/CoPs.htm .

[27] Bly, S. A., Harrison, S. R., & Irwin, S. (1993). Media spaces: Bringing people together in a video, audio, and computing environment. Communications of the ACM, 36(3), 28–47.

[28] Goodman, G., Abel, M. (1987) - Collaboration Research in SCL, In Proc. Conference Computer-Supported Cooperative Work (CSCW'86), pp 246-251.

[29] Fish, R.S., Kraut, R.E, Root, R.W. and Rice, R.E. (1993), Video as a Technology for Informal Communication, Communications of the ACM, January 1993, Volume 36, number 1, pp. 48-61.

[30] Marilyn M. Mantei , Ronald M. Baecker , Abigail J. Sellen , William A. S. Buxton , Thomas Milligan , Barry Wellman, Experiences in the use of a media space, Proceedings of the SIGCHI conference on Human factors in computing systems: Reaching through technology, p.203-208, April 27-May 02, 1991, New Orleans, Louisiana, USA.

[31] Brown, S., Ross R. (2002) 'The evolving classroom: Real time support for distance learners in the community and industry.' 3 rd International Conference on Information Communication Technologies in Education, INEAG Research and Training Institute of the Agean, July 17-19 2002, Samos, Greece . pp 83-90. ISBN 960-8313-03-1.

[32] Ljungstrand, P. (2000): Context Awareness in Mobile Telephony. In Proceedings of Wireless World Workshop, Digital World Research Centre, Guildford, United Kingdom.

[33] Erickson, T. (1997) Social Interaction on the Net: Virtual Community as Participatory Genre. In Proceedings of the Thirtieth Hawai'i International Conference on Systems Science. (ed. J. F. Nunamaker, Jr. R. H. Sprague, Jr.) Vol 6. IEEE Computer Society Press: Los Alamitos, CA, 1997, pp. 23-30.

[34] de Greef, H.P. & IJsselsteijn, W.A. (2000). Social Presence in the PhotoShare Tele-Application. Proceedings of PRESENCE 2000, Delft, The Netherlands, 27-28 March 2000.

[35] Kreijns, K. (2004). Sociable CSCL environments, social affordances, sociability, and social presence. Unpublished doctoral dissertation. Open Universiteit Nederland. Heerlen, The Netherlands.

[36] Erickson, T. & Kelllogg, W. A. (2000). Social Translucence: An approach to designing systems that mesh with social processes. ACM Transactions on Human Computer Interaction, 7(1).

Appendix A – Questionnaire

Geachte heer/mevrouw,

Ik ben een onderzoeker in een project aan de Open Universiteit in Heerlen genaamd "Social Browsing" . In dit project wordt onderzoek gedaan naar de sociale interactie tussen mensen met dezelfde professionele achtergrond met als doel het verder ontwikkelen en behouden van sociale relaties binnen een professionele gemeenschap. Het bevorderen van informele communicatie tussen mensen met dezelfde professionele achtergrond is hierbij het belangrijkste onderwerp.
In dit onderzoek bent u een van de geselecteerde mensen die wat professionele achtergrond betreft in aanmerking zou komen voor mijn onderzoek.
Ik hoop dat u zo vriendelijk wilt zijn te participeren in mijn onderzoek en een vragenlijst voor mij wil in vullen.

Door de onderstaande link aan te klikken hebt u toegang tot de vragenlijst. Kunt u toepasselijke antwoorden alstublieft markeren. Let op, sommige vragen hebben de mogelijkheid meerdere antwoorden te geven.

http://www.ipo.tue.nl/homepages/lkolos/quest/

Alle informatie zal strikt vertrouwelijk worden behandeld. Niemand van buitenaf zal toegang verkrijgen tot de door u gegeven antwoorden of uw persoonlijke gegevens zonder uw instemming.
Resultaten zullen alleen worden weergeven gebruikmakende van statistieken. Indien u nog vragen heeft of op/aanmerkingen na het lezen van de bovenstaande informatie. Kunt u mij bereiken per e-mail: l.kolos-mazuryk@tm.tue.nl

Alvast bedankt voor uw medewerking aan mijn onderzoek.

Met vriendelijke groet,

MSc. Lyubov Kolos-Mazuryk

A. Algemene Informatie

A.1. Naam: _____ Datum: _____

A.2. Leeftijd: _____

B. Computer Gebruik

B.1. Ik zou mijn niveau van computergebruik schatten als:
Beginneling☐gemiddeld☐ Ervaren☐

B.2. Waar gebruikt u uw computer het meest?
Thuis☐ Op het werk☐ Anders ☐
Indien ergens anders: _____

B.3. Hoe makkelijk/moeilijk is het voor u om gebruik te maken van moderne technologie?
Makkelijk ☐ redelijk makkelijk☐ redelijk moeilijk☐ Moeilijk☐

C. Instant Messaging

C.1. Maakt u gebruik van instant messenger software? Zo ja, kunt u aangeven van welke software u gebruik maakt. **Zo nee, gaat u dan alstublieft verder bij sectie D.**

ICQ☐ MSN Messenger☐ Yahoo! Messenger☐ AOL Instant Messenger ☐
Anders, _____

C.2. Hoe frequent gebruikt u instant messaging?
Minder dan 1 uur per dag☐ 1 tot 2 uur per dag☐

Meer dan 2 uur per dag☐

Anders, licht toe _____

C.3. Waarvoor maakt u gebruik van Instant messaging?

Werk☐ Ontspanning☐ Communicatie met familie☐

Anders, _____

C.4. Wanneer gedurende dag maakt u gebruik van instant messaging?

Tijdens het werk☐ In de pauzes☐ 's avonds☐

C.5. Welke informatie over uw MSN gesprekspartner is belangrijk voor u?

Leeftijd☐ Opleiding☐ Werk☐ Hobby's/Interesses☐

Foto☐ Professionele achtergrond☐ Locatie☐ Contact adres ☐

Anders _____

D. Uitwisseling van Kennis

D.1. Vindt u het nuttig om informeel kennis uit te kunnen wisselen met betrekking op professionele ervaringen uit uw werkomgeving?

Ja☐ Nee☐

D.1. Hoe vaak participeert u in informele ontmoetingen voor het uitwisselen van professionele ervaringen?

Meer dan 1 keer per week☐ 1 keer per week☐ 1 keer per maand☐

Minder ☐

D.2. Van welke communicatie middelen maakt u gebruik tijdens de uitwisseling van de informatie?

Ontmoeting in persoon☐ E-mail☐ Telefoon☐

Videoconference☐

Internet chat-rooms☐ instant messaging☐

Anders, _____

D.3. Geeft u de voorkeur aan een ontmoeting tussen 2 personen of een open discussie met meer personen?

1 op 1☐ open discussie☐ Beide ☐

D.4. Welk object of plaats uit het dagelijkse leven zou u associëren met praten/ontmoeten (b.v. vergaderruimte, Kantine, koffie machine)?

Appendix B – Use Cases

The main use case shows all possible means of CMC that are used in the "Community of practice" system.

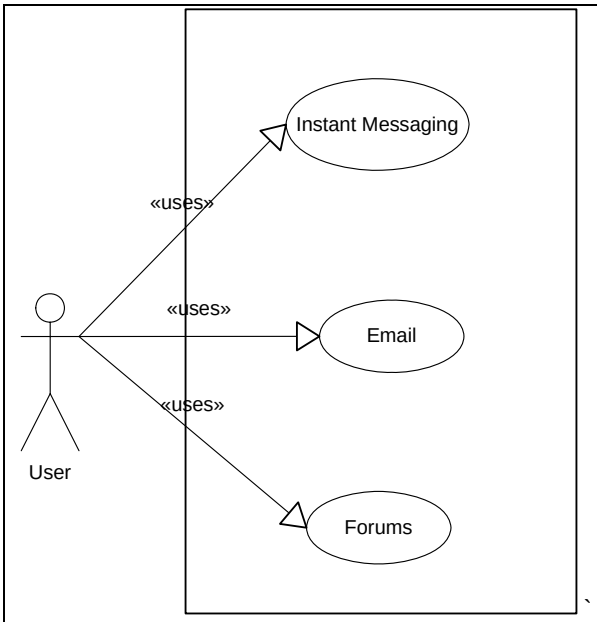

Figure 16 Main use case

More detailed use cases of IM and forums usage are presented on figures 2 and 3 respectively.

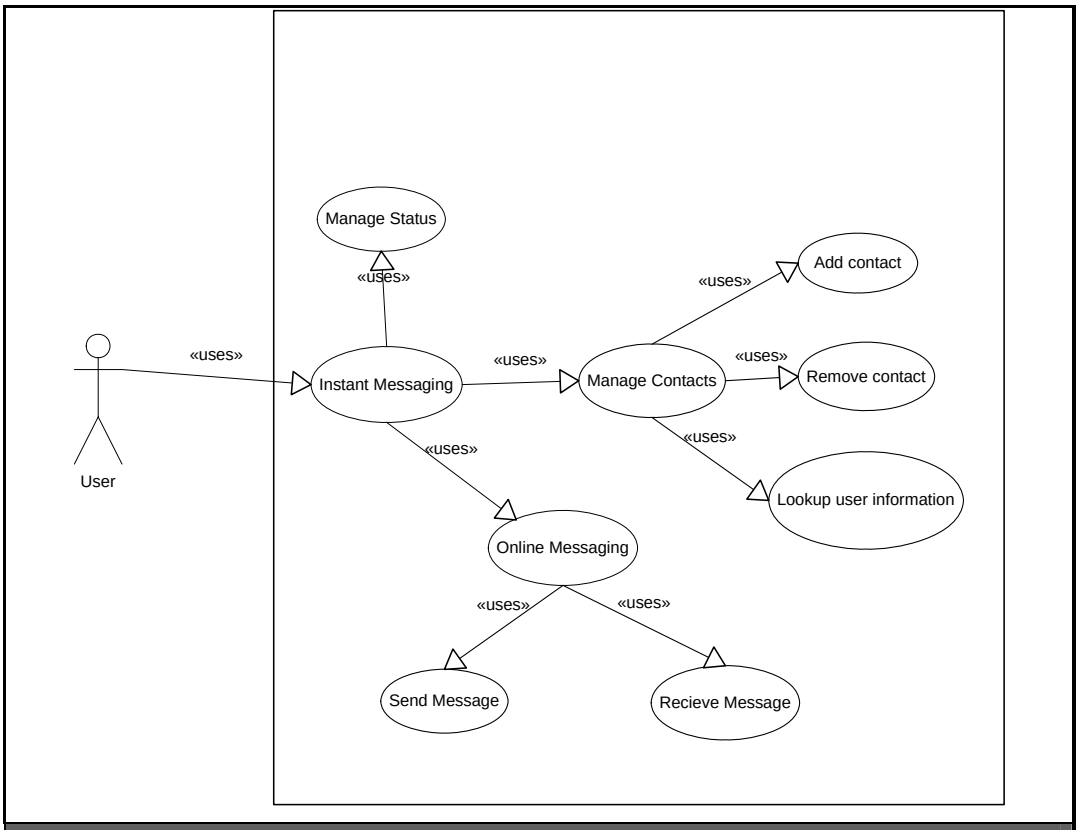

Figure 17 Instant Messaging use case

Goal	To use IM
Actions	Manage status Manage contacts(add contacts, remove contacts, look up user information) Send/receive message
Results	A contact list is managed, user indicated his/her online status and had conversation through IM application

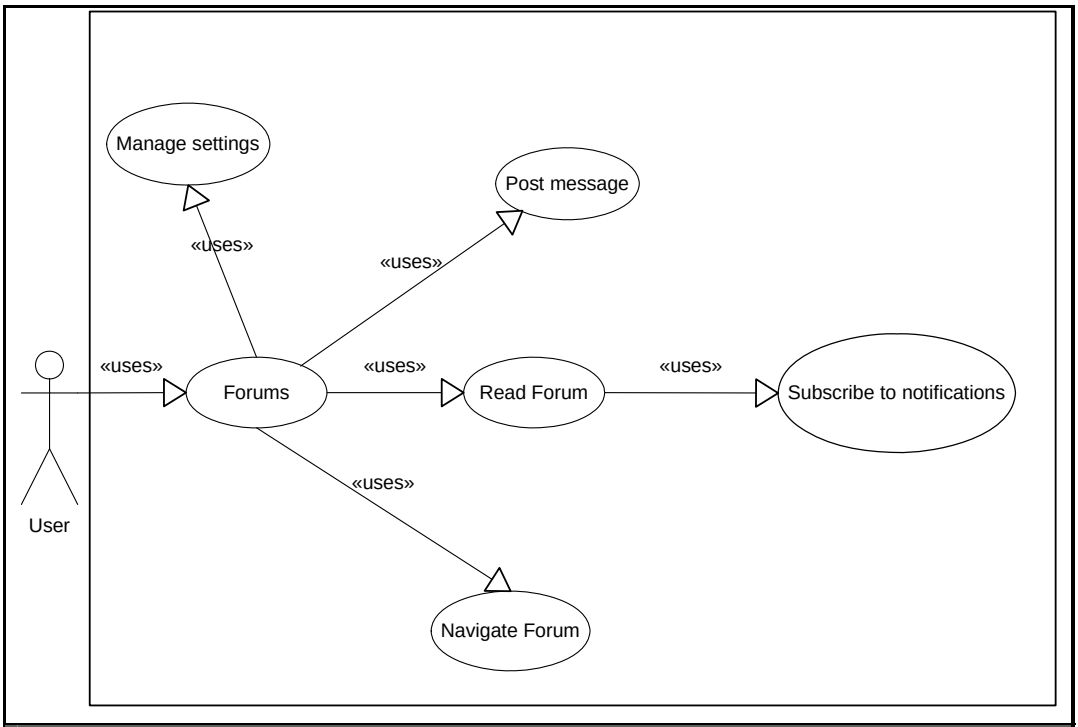

Figure 18 Forums use case

Goal	To use discussion forum
Actions	Manage settings Post message Read forum Navigate Forum Subscribe to notifications
Results	A user manages his/her settings, uses all possible interactions within forum

Appendix C – META Installation & Test Instructions

1. Downloading META Client

Download METAClient.zip from the website. Extract the content of the archive to a folder on your hard-disk. Copy systray4j.dll to your Windows/System32 directory.

2. Downloading and Installing Java Runtime Environment

META Client requires java virtual machine to be able to run. Please download the lates version of Java Runtime Environment (JRE) from the SUN Java website. After downloading it run the installation. You will be guided through all the additional steps.

3. Running META Client

After installing Java Runtime Environment you are ready to start META Client. Execute "run.bat" file, which is located in the folder, where you've extracted METAClient.zip.

4. Testing Instructions

Please, enter the META system and log in.
The topic of your discussion is “how to improve management team”.
You will have to discuss this theme with two more colleagues of yours. Try to contact them first. You have to use all existing functions.
For this short discussion you have 15 minutes.
After you finish, please, close the system and fill in the questionnaires below.

Please, enter the META system and log in.
The topic of your discussion is “how to find accommodation in the Netherlands”.
You will have to discuss this theme with two more colleagues of yours. Try to contact them first. You have to use all existing functions.
For this short discussion you have 15 minutes.
After you finish, please, close the system and fill in the questionnaires below.
In the window below, please, give your comments about the systems you’ve tried.

Colofon

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Ook de volgende site kan geraadpleegd worden:

www.ou.nl/rdmc