Social Information Processing in MUDs - the Development of Friendships in Virtual Worlds

Abstract:

With the rapid growth of the Internet, new communication forms have emerged. People build virtual communities in Newsgroups, Chat-rooms or MOOs. This study examines how friendships are developed in a special form of virtual worlds: multi-user-dungeons (MUDs). According to the Social Information Processing perspective (Walther, 1992) people should learn to verbalize nonverbal contents with increasing time. The use of paralanguage should be an important predictor of the development of impression formation. It was argued, that sociability as a general trait and scepticism towards computer-mediated communication (CMC) as a situation-specific attitude could also influence this process. 103 MUDders completed a questionnaire concerning their online friendships, data of MUD-use, attitude to MUDding, use of paralanguage, sociability and scepticism towards CMC. 76.6% of the MUDders reported relationships with other MUDders. The results confirmed the social information processing perspective. Sociability had only low influence, whereas scepticism towards CMC was an important predictor. Only participants scoring low in scepticism use paralanguage-features provided in MUDs and build up friendships. To examine why the sceptical respondents play MUDs, a cluster analysis was computed. It revealed four types of MUDders, which differ in their attitude to MUD. The consequences of different motivations for playing MUDs on the development of friendships are discussed.

Introduction

Since Rheingolds (1993) book "The virtual community: Homesteading on the electronic frontier", virtual communities have rapidly gained publicity. They can be defined as "social relationships forged in cyberspace through repeated contact within a specific boundary or place (e.g. a conference or a chat line) symbolically delineated by topic of interest" (Fernback & Thompson, 1995). Virtual communities can develop in each of the various forms of computer-

mediated communication (CMC), for example in Newsgroups, in chats, or in multi-user-dungeons (MUDs, described below). Hopes and fears are connected with the development of these new forms of community (Wellman & Gulia, 1999). Enthusiasts consider virtual communities as liberation of traditional constraints and boundaries like time and place. People from all over the world can find others with the same interests. Friends have no longer to be chosen mainly from the persons living in the same city. Similarity in interests and attitudes are the basis of virtual relationships. Sceptics worry that CMC will isolate people in their homes. The full range of in-person contact will be replaced by technically mediated communication (Fox, 1995).

The discussion and the reporting in the media seems to be quite polarized. Compared with the number of enthusiastic reports or skeptical fears, little empirical data exist. Several studies report that people make friends in Cyberspace (Parks & Floyd, 1996; Parks & Roberts, 1998) but little is known about the processes taking place in virtual worlds. People cannot see each other in text-based virtual worlds. Many useful informations like gesture, miming or intonation are missing in CMC. How is it possible to form relationships in such a seemingly cold medium?

The Social Information Processing theory (Walther, 1992) has been developed to explain how people meet and develop online relations. But it is troubled by two concerns. First, there is a lack of evidence for the specific communication processes taking place in these online relations, as researchers have focused on media inputs, and relationship outputs, to the general exclusion of actual processes (see Straus, 1997). While Walther (1992), for instance, proposes that CMC users adapt nonverbally-expressed social information into online behavior both verbal and textual, research supporting his contention has not examined the micro-behaviors specified in this proposition. Second, the theory originally assumed that all communicators are motivated to develop significant relations with CMC partners, while subsequent tests have shown a variety of factors that dampen this motivation and affect (e.g. Walther, 1994, 1997). Other approaches, such as those related to media selection, offer alternative perspectives on how perception of media can influence their usage; these approaches tend to focus at raw usage though and not at the character or content of the usage. This present research addresses both these concerns.

First, the process specified in the Social Information Processing perspective is examined (Walther, 1992). According to Walther (1992), people get used to CMC and learn how to verbalize nonverbal contents. Do people really use more verbalizations with more CMC-experience? Does verbalization lead to friendships? Therefore, is the formation of friendships just a question of familiarity with CMC? No. A second aspect has to be taken into account. People differ in traits, attitudes and motivations. For example, do people who are very sociable in real life build up more friendships in the Internet as well? Does their attitude towards CMC influence their behavior and therefore the formation of friendships? Can different types of users be distinguished which differ in the use of relational strategies?

These questions are answered by examining a specific form of virtual communities: multi-user-dungeons (MUDs). MUDs are adventure role-plays in the Internet. MUDs are chosen as a research site because they are well-established virtual communities. In contrast to new, commercially used and graphical virtual worlds, they have existed for over 20 years. Although most of them are simply text-based, they feature a highly developed social system. It is also known from a study of Parks and Roberts (1998) that people form friendships in MUDs. The purpose of this study is to examine the underlying process.

Multi-user-dungeons

MUDs (for some further information see http://www.godlike.com/muds/ or http://www.mudconnect.com/), multi-user-dungeons or multi-user-domains, are text-based virtual realities, adventure-role-plays in the Internet. [1] How can they be placed into the various forms of CMC? Computer-mediated communication can happen synchronously or asynchronously. In asynchronous CMC the communication partners do not have to be logged in the system at the same time. An e-mail can be read immediately, or hours, or even days later. Asynchronous forms are among others e-mail, mailing-lists or newsgroups. Synchronous CMC requires the participants to be logged into the system simultaneously. The text typed is immediately displayed on the screen of other

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[1] Graphical MUDs exist as well. At the time of the study there was no running graphical MUD in Germany where the study took place, though influences of graphics are not discussed.

participants. Synchronous forms are for example chats and MUDs. Chats offer an opportunity for real-time discussions on specific topics. They are primarily used for small talk and socializing.

MUDs in contrast are competitive role-playing games. The setting is a fantasy world, in which every player has to create their own "character". To join a MUD the player has to log into the server hosting the MUD via the telnet-program (see Screenshot).

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At the beginning, the selection of a name, a gender, and a race (demon, elf, gnome,..) is requested. These attributes describe the character. The character has several skills and abilities like strength, knowledge, dexterity etc.. This skills are rather low at the beginning but develop during the game.

MUDs differ from newsgroups or chats because they use text not only for discussion but also for forming virtual *worlds* (see also Reid, 1995). The characters and all objects are created and described by text. Rooms, shops, pubs, towns, streets, forests, seas, ships and so on are included. A room, for example, is described as follows:

Welcome to Silvarien, home of the half-elves of TappMud!

This is the town's meeting hall, a spacious hall covering the upper floor of the townhall of Silvarien. Tables and benches invite you to sit down and rest, or to enjoy the view through the large windows. A wide staircase leads down to the mayor's office.

There is one obvious exit: down

A bulletin board.

If the player types "d" for down, the description of the next room is displayed. The elements of a room can be examined with "look at <object>". Objects are also described by text and they can be used. For example, a torch can be lighted by typing "light torch" or extinguishedwith "extinguish torch".

MUDs are similar to MOOs (multi-user-dimensions, object-oriented) in these textual descriptions but they differ in their main purpose. MOOs are primarily social, people meet there to communicate, socialize and build houses. This

paper focuses on adventure-style LPMUDs (http://www.imaginery.com/LPMUD/), called after Lars Pensjoe who developed the program-code) whose members mainly take part in role-plays. Aim of the MUDs is to solve quests and kill monsters in order to get points which can be used to improve skills and finally to advance the level of the character. At a certain level it is possible to become a so-called *wizard*. Wizards are responsible for the further development of the MUD, they code new areas and quests. Due to this level-system LPMUDs are characterized by a hierarchical social structure.

Due to the wizards' ability to create new objects and areas, MUDs are permanently changing. They are dynamic worlds developed by the players.

Despite role-playing, solving quests, and programming, MUDs are also used for socializing. Several modes of communication exist. The "say" command reaches all players in the same virtual room, "tell <name>" can be directed to a specific player, "shout" is seen by all players simultaneously.

A special feature of MUDs are the *feelings* and *emotes* (see table 1 for examples). In MOOs they are called Feature Objects and Social Verbs but they function are similarily. Feelings are small pre-programmed scripts to express actions and emotions by simply typing an abbreviation. There are several hundreds of verbs and adverbs which can be combined at pleasure. For example, "smi iro" results in "smile ironically", it is possible to smile sadly, happily, knowingly, innocently and so on. Other feelings are hug, laugh, cry, poke, kick, kiss, or sigh. If the predefined feelings are not sufficient, player can easily create their own emotes by appending text to their name. MUDders also use Smileys, little faces formed by ASCII-signs. Smileys, feelings and emotes are often summarized as *emoticons*. Examples are presented in table 1.

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Due to these features, MUDs can be regarded as a highly developed form of computer-mediated communication (CMC). Compared to mailinglists, newsgroups or chats, they offer more possibilities to overcome the lack of nonverbal cues. Walther (1992) focuses in his Social Information Processing

(SIP) perspective explicitly on the verbalization of nonverbal contents. Before the SIP as the theoretical framework of this study is outlined, a short overview over the prior theories in CMC research is given.

Research on computer-mediated communication

The Social Presence Model developed by Short, Williams & Christie (1976) is the oldest theoretical framework for analyzing mediated communication. Originally intended for comparing communication via telephone, audio and video conferences, it was often used for explaining effects in CMC (Hiltz, Johnson,& Turoff, 1986; DeSanctis,& Gallupe, 1987; Rice & Case, 1983). Social presence was regarded as a "quality of the medium itself" (p. 66), although it was measured as the subjective impression in some studies (Short et al., 1976). Media vary in the number of channels. In audio conferences for example only sound is given, whereas in video conferences additional visual information is provided. According to Short et. al (1976), the less channels a medium has, the less its social presence. Consequently, the perception of the communication partner should be very impersonal in media with low social presence. Communication should be primarily task-oriented, and social influence should be difficult to achieve. Consistent confirmation of these hypotheses was not attainable, though, for example, more attitude change towards the source was found in the sound only condition than in face-to-face (ftf) communication (Short, 1972, 1973).

According to the Social Presence Model, it should be more difficult to build up relationships via CMC than via ftf-communication. Social presence is seen "as a single factor that comprises a number of dimensions relating to degree of interpersonal contact" (Spears & Lea, 1992, p. 32) and is often measured on dimensions of a semantic differential like unsociable-sociable or cold-warm (Short et al., 1976). Because of the low social presence of CMC, this medium should be expected as quite unsuitable for the development of friendships. If the communication situation is perceived as impersonal and cold rather than warm and sociable, the communication partner is also not seen as a person who could be a friend.

Another very influential model is the Reduced Social Cues approach (RSC). It was developed by a group of researches at Carnegie Mellon University (Kiesler, Siegel,& McGuire, 1984; Kiesler, 1986; McGuire, Kiesler,& Siegel, 1987;

Sproull & Kiesler, 1986). The absence of social and contextual cues is the central factor in the RSC approach. The lack of this cues undermines the perception of leaderships, status and power, and leads to reduced impact of social norms and therefore to deregulated, antinormative behavior. Moreover people become depersonalized because the attention focuses on the written text, not the social context. Other consequences are difficulties in co-ordination, deindividuation and equality of participation (Spears & Lea, 1992). Deindividuation means loss of identity, reduced self-regulation, and self-awareness. Social norms and constraints are less present. The resulting disinhibited behavior e.g. flaming causes a hostile impersonal atmosphere and impedes the development of friendships. Depersonalization leads to an attention shift away from the audience towards a greater focus on the task.

Although several studies (Kiesler, Siegel & ;McGuire, 1984; Siegel, Dubrovsky, Kiesler,& McGuire, 1986) describe CMC as impersonal, hostile, and task-oriented, this results should not be generalized to every CMC-situation. Field studies have shown that CMC can be very rich in socio-emotional content (Rice & Love, 1987) and that many users develop friendships in virtual communities (Parks & Floyd, 1996; Parks & Roberts, 1998).

Walther (1992) offers an explanation for these discrepancies between laboratory and field studies. The crucial factor is the time. It takes longer to type than to speak, and people have to get used to the new medium. Thus, there are rather rate differences between the media than fixed differences in impression development (Walther, 1993). The impression development process lasts longer in CMC, therefore the differences between CMC and ftf diminish, once there is enough time. Walther (1992) suggests an alternative perspective: the Social Information Processing model consisting of the following assumptions and processes. Relational motivators stand at the beginning, e.g. the affiliation motive. Other drives are impression management or dominance drives. These drives motivate people to get in contact with others. Next, impression formation takes place by decoding the verbal messages of the communication partner. Despite the assumptions made by RSC, it is possible to get an impression of the other via CMC. Language, for example, is one factor that leads to assumptions about education, social and professional status. In the next step CMC-users develop an interpersonal epistemology, that means, a distinctive

representation of the communication-partner. Therefore, they use "knowledge-generation strategies such as interrogation, self-disclosure, deception detection, environmental structuring, and deviation testing to gather psychological knowledge-level information about other persons" (Walther, 1992, p. 71). Finally, textual relational messages are encoded. People learn how to textualize nonverbal contents. Several relational strategies can be applied in CMC, e.g. smileys. More emphasis is on language-based strategies like using capizalization or acronyms. Capitalization is a symbol of shouting, and acronyms like *rotfl* ("roll on the floor laughing") exist additionally. According to Walther (1992), relationships in CMC are possible but the user has to learn to verbalize nonverbal contents. Time plays an important role, it takes longer to get used to the medium, to get to know each other and to build up trust and friendships via CMC. The SIP has been confirmed in several short-time studies in which geographically dispersed people cooperated in work-groups for several weeks (Walther, 1993, 1997). It has not been tested in more recreational settings like MUDs or in long-term interactions which take place in virtual communities.

The general hypothesis that the development of relationship takes more time in CMC can be specified for the situation in MUDs. As reported above, MUDs offer several features for the encoding of relational cues. Feelings and emotes as well as smileys can be used to express emotions. The first hypothesis of this study is therefore:

H1: Emoticon use (i.e. smileys, feelings, and emotes) increases with time.

Walther later developed the Hyperpersonal Model of CMC which states that CMC is sometimes even more friendly and social than ftf-communication (Walther, 1996). In asynchronous CMC, the sender has the opportunity of selective self-presentation. They have time to think about what to write about themselves and can choose the positive aspects. On the other hand, the reduced social cues in CMC lead to an idealized perception through the perceiver. They have only the positive information and overestimate the person sending. CMC can therefore be more social and intimate, more "hyperpersonal" than ftf-communication. That indicates that the ability to express emotions in text and self-presentation are very important for the social and friendly atmosphere, and consequently for the development of friendships. Because

friendships are characterized by self-disclosure, intimacy and mutual support, they cannot exist without the expression of emotions.

Roberts, Smith,& Pollock (1996) verified the Hyperpersonal Model for MOOs. They showed how MOO-users form relationships by overcoming the lack of nonverbal cues by using feelings, emoticons and paralanguage. MOOs are primarily social-oriented, therefore relationships should be easily formed in a MOO. The purpose of adventure-oriented LPMUDs is playing a game, socializing is only a side-effect. In LPMUDs the ability of expressing emotions via text should be even more important for the developing of relationships. The second hypothesis is therefore:

H2: The more emoticons (i.e. smileys, feelings, and emotes) a person uses, the more friendships are buildt up.

Hypotheses 1 and 2 test the predictions of SIP. As stated in the introduction, some studies show inconsistent results. Not all CMC-users seem to be motivated to form relationships. Which other factors influencing the formation of relationships in MUDs have to be considered as well?

Parks and Roberts (1998) studied several forms of virtual communities and showed how friendships in MOOs, Newsgroups and real-life differ in dimensions such as interdependence, breadth, or depth. MOO friendships were more advanced than Newsgroups relationships but less developed than off-line relationships. Reasons for these differences were not specified. Parks and Roberts (1998) did not find demographic variables differentiating people with online-relationships from those without. If demographic factors like sex or age do not influence the formation of online-relationships, personality factors may play an important part.

Sociability may be such a factor. People differ in the general trait sociability, and it could be argued that individuals with difficulties in making friends in real-life may experience the same difficulties in CMC. Becker and Mark (1998) observed three different virtual environments (text-based, graphical and with audio) and reported that most individuals experienced the same degree of shyness as in real life. Thus, shyness or sociability should be a factor which predicts the development of friendships additionally. From this point of view, it is supposed that sociability has the same influence in CMC as in ftf-communication.

On the other hand, it can be argued that shy and inconspicuous persons profit by the anonymity in the Internet. They cannot be judged primarily by their appearance, they do not have to fear any consequences in real-life and may therefore be encouraged to approach other people. Roberts, Smith, and Pollock (1997) studied MOO- and IRC-users and found that "individuals who self-identified as shy reported that they were less inhibited and less conservative in on-line environments" (p.2). If shyness is compensated by the safe environment provided in virtual communities, different degrees of sociability may also be less relevant for the development of friendships.

Because of these different predictions and the lack of consistent empirical results, an open research question is formulated:

RQ1: Is sociability a predictor of the development of online-friendships?

While sociability is a general trait, situation-specific attitudes may also play an important role. Evidence for the influence of attitudes and perceived attributes derives from research on media selection (Daft & Lengel, 1984; Fulk, Schmitz,& Ryu, 1995). As reported above, CMC was rated as quite impersonal, cold and unsociable in the early studies following the Social Presence Theory (Short et al., 1976). A similar proposal is made by the media richness model (Daft & Lengel, 1984; Trevino, Daft,& Lengel, 1990): media vary in their capability of reducing ambiguity. A medium is regarded as rich if it facilitates feedback, communicates multiple cues, presents individual tailored messages and uses natural language. Daft and Lengel (1984) concluded that media can be ranked according to their richness. Face-to-face communication comes on top of the rank order, formal numeric text at the end and e-mail somewhere in between.

At the beginning, media richness was regarded as an objective characteristic of the medium. Studies on media selection came to inconsistent results, though Markus (1994a), for example, found that managers used electronical mail successfully for tasks requiring higher degrees of media richness.

A more appropriate model seems to be the social influence model of technology use (Fulk, Schmitz,& Steinfield, 1990; Schmitz, Fulk,& Ryu, 1995). It suggests that individuals' media perceptions are, partly, socially constructed. As Schmitz & Fulk state "the perceptions of objective features may differ across individuals" (1991, p. 490). Their results showed that the perceived media richness is a significant predictor of actual media use. Similar effects are found

for the perceived media usefulness. In a more recent study, this measure turned out to be a better predictor of media use than the perceived richness (Fulk, Schmitz,& Ryu, 1995).

Most of the studies on media selection concentrated on the use of electronic mail in organizational contexts. They showed that perceived media richness influences the choice of *which* medium is used. The question of *how* a medium is used, was neglected. This study assumes that perceived media characteristics also influence the actual use of the selected medium. The concept of media richness has to be adapted to the specific context, the development of friendships in MUDs. In the classic studies on media richness (Daft, Lengel,& Trevino, 1987) participants were confronted with various situations or tasks and had to choose a medium. MUDders already have chosen synchronous CMC in virtual worlds. But do they regard CMC and especially MUDs as appropriate for developing friendships? It is assumed that if individuals judge CMC as impersonal and not appropriate for making friends, this attitude will lead their behavior. As a result, communication will be impersonal even if the person is quite sociable in other situations. To distinguish this concept from media richness, it is called *secpticism* towards CMC and towards the features of MUDs. A sceptic person will not believe in the possibility of building up friendships via CMC in general and the specific possibilities provided by MUDs. Scepticism was therefore taken as another determinant of the building up of online-relationships.

H4: Scepticism towards the usefulness of MUDs for developing friendships impedes the development of online-friendships.

Beside scepticism, there may still be other factors influencing the process of making friends. According to Walther (1992), motivational factors should also play a role. Anticipation of future interaction is another important variable. Walther (1994) compared in an experiment ftf groups with two CMC conditions. In one condition the CMC groups expected future interaction, in the other it was told that group members would change with the next task. Only persons who thought that they would work together for several weeks showed high values in scales like immediacy/affection, similarity/depth or receptivity/trust. MUDs imply further interaction as the character is saved at the end of each session. The level structure in LPMUDs is an incentive for further playing. The more points a

player has, the better the skills and abilities of his/her character become. Thus, anticipation of future interaction should be nearly the same for all MUDders. This result implies that expectations and goals influence medium use.

Further evidence for the role of expectations and goals is given in a study by Kayani, Wotring, and Forrest (1996). Participants were confronted with several communication situations differing in content (information exchange, persuasion) and the relational dimension (friend, colleague, stranger) of the communication goals. The dependent variable was media selection. Results showed clearly that the situation specific goals influenced media choice. Markus (1994b) showed also that e-mail use was not only determined by perceived media characteristics but also by users' intentions. She concludes that "the current study implies that future research on the social effects of electronic communication technology should consider not only the technological characteristics of various media, but also those purposes and goals that users atttempt to accomplish through the media" (1994b, p. 145).

These studies show the importance of goals and motivations but again they focus on media selection. It is supposed that goals also influence *how* a medium is used. What does this mean for the development of friendships in MUDs? What goals could be important?

MUDs are role-playing games in the Internet, therefore they are not primarily intended for communication. People may play MUDs just the *game* or for the sake of *role-playing*. The aim of many single-user games consists of killing monsters and solving quests. If a person sees a MUD as an extension of a single-user game, though primarily as a game, this person will not be interested in forming friendships. The other MUDders are considered as part of the game, other characters fighting the same dangers. They are not seen as persons with whom interpersonal bonds could be formed. If the goal is playing a game and not joining the virtual community, less friendships should be developed. The second goal is role-play. This also has implications for the formation of online-relationships. Strict role-players act always in terms of the role. The feelings and emotes these players express are the emotions of their characters. They fit in the story. For example, a thief caught for stealing is angry. To question the relationship between the use of emoticons and the players' affective state is important. The verbalizing of nonverbal context cues is only a successful

strategy for making friends when the actors express their true feelings. The motivation for role-playing is therefore considered as another goal influencing the formation of online-relationships.

H5 is therefore:

H5: The motivation for playing MUDs (i.e. game, role-play) is a determinant for the building up of relationships.

Method

Procedure

The study was announced in the news of three German MUDs (Adamant, First Light, TappMUD) and MUDders interested were called to mail their real life address to receive a questionnaire. The use of hard-copy postal mail avoided problems of script-programming. It also allowed to check for multiple participation and real life gender (German first names are quite unequivocal). 125 questionnaires were sent out and 103 questionnaires returned to the author, resulting in a response rate of 82%. Of course, it would be more important to know the size of the population of the three MUDs. This question remains difficult to answer. It is only possible to get the number of playerfiles. Altogether, there were about 550 active players in the three MUDs at the time of the study. But many players have more than one character in one MUD, and many of them play more than one MUD. In this study, 25% of the players reported to play only one character in only one MUD. Another 25% play more than one character in one MUD, the other half report to play one character in several MUDs or several characters in several MUDs. In a more recent study (Utz, in prep.) even more players reported to have more than one character. So, the number of active players should be seen as limiting value, the actual number of mudders is at best the half. Therefore, the sample covers quite a lot of the porpulation of the three MUDs.

160 items tapped the following aspects: demographic data, data of MUD-use, attitude towards MUD, development of friendships, use of paralanguage, and personality-aspects.

Measures

The following *demographic data* were taken in order to characterize the sample: age, sex and major subject of study/occupation.

Data of MUD-use were collected to get information about the MUD-behavior and to test whether a broad range of MUDders had taken part in the study. This part of the questionnaire included questions about the hours per week spent in the MUD, MUD-time in months, number of characters and MUDs played, and so on. The data were self-reported and therefore subjective. This is not seen as a problem for the validity of the data as another study showed substantial agreement between self-reported mud-time per hour and objective measured data (Zielke, Schildmann,& Wirausky, 1995).

Three scales assessed the attitude towards MUDding. Initially, 14 items were developed. Responses were made on a six-point scale ranging from "not true" to "true", higher means indicating higher level of agreement.

To test whether the newly developed items for *game*, *role-play* and *scepticism* formed three different factors, a principal components analysis using varimax rotation specifying three factors was conducted. The three resulting factors explained 52.8% of the total variance. The first factor, *g*ame, explained 19.0, the second, role-play, 18.3% and the third, scepticism, 15.5% of the total variance. One Item not loading highly (less than .35) on either factor was excluded. Each of the remaining items loaded clearly on its appropriate factor (see Appendix 1). Items were averaged for further analysis.

The scale *scepticism* (Cronbach's alpha = .68) was intended as a situation-specific measure of the attitude towards CMC and MUDs. The items focus on the social potential of MUDs such as the belief on the possibility of making friends or expressing emotions adequate in MUDs. The four items were: "I think there are often misunderstandings in the MUD because I don't see or hear the others.", "I think it is impossible to express feelings adequately in CMC." (-)"I think getting to know each other via CMC is impossible." (-)"I think getting to know each other via CMC is possible only under the condition that people are willing to show their true attitudes and emotions." Items marked with an (-) were inverted, so that higher scores meant higher scepticism.

MUDs are not only a form of computer-mediated *communication,* but also adventure-style *role-playing games*. Therefore different motivational reasons for

playing MUDs are possible. Two scales assessed these possible motivations or goals in order to further characterize the group of the MUDders.

Game (Cronbach's alpha = .70) focused on the game-character of MUDs. People can play MUDs primarily to solve quests, kill monsters, train theirs skills, win points, and to get a position in the High-Score-List. Getting to know the other participants can be less central. Game consisted of the items " MUD is only a game for me" or the reverse, "The Mud is not only a game because relationships to other persons are developed". "MUD is connected with real-life, because I know many MUDders in rl." "The boundary between MUD and rl fades away sometimes.", "When my MUD-character dies, I am also sad in rl.". Items were coded that way that higher scores indicated seeing the MUD more as game than as virtual community.

Role-play (Cronbach's alpha = .78) tapped a different aspect. Especially well developed MUDs offer a number of different races (e.g. human, elf, demon, gnome) and guilds (e.g. fighter, cleric, bard, thief, sorcerer). Role-play is therefore a central component of MUDding, a thief has to behave other than a cleric for example. Role-play therefore differentiates between playing a role in the MUD or behavior as seen in real-life. Roleplay consisted of the four items: "With my characters I try to play different roles which have not much in common with my true personality.", "My behavior in the MUD is different to that in real-life.", (-)"I identify myself with my MUD-character/s.", and (-)"Behavior and character of my MUD-figures are very similar to me". Items marked with an (-) were reversed again, so that higher scores indicated more role-playing.

In order to control the involvement, the *social identification* (Cronbach's alpha = .89) with the group of the MUDders was measured by the modified scale of Simon and Massau (1991). This scale is based on the Social Identity Theory (Tajfel, 1978).

Sociability was assessed by a subscale of the Multidimensional Measurement of Self-Description (Mummendey, Riemann,& Schiebel, 1983). This instrument consists of 56 bipolar pairs of adjectives which assess six different scales of the

feelings and emotes are MUD-specific features for expressing emotions through text. Ratings ranked from 1 (very seldom) to 5 (very often), the scale is called *paralanguage* (Cronbach's alpha = .72).

The scale *friends* (Cronbach's alpha = .72) was intended to measure the development of online friendships. Four items concerned with the quality of online-relationships: "I have friend in the MUD, with whom I can talk about private topics." (-)"The people in the MUD are just casual acquaintances to me.", "Some of my MUD-acquaintances resulted in real life friendships", "Some of my MUD-acquaintances resulted in romantic real life relationships". The categories acquaintance, friend and romantic friend differ in the extent of depth and intimacy of the relationship. Romantic relationships lead this ranking. The exact criteria of judgement for another person as acquaintance, friend or romantic friend was left to the actor.[2]

The questionnaire included some additional scales which are not relevant for this paper; for further information see Utz (in press).

Subjects

103 (85.4% male, 14.6% female) players of adventure-style MUDs took part in this research. The average age was 23.5 years (SD 2.7 years). 101 participants came from Germany, two from France. 83% were students at university level, 1% at high school level, the others were employed outside the home. The high education level of the respondents probably is due to the free Internet access at universities.

Participants were playing MUDs on average for 19.6 months (SD = 14.8), they spent 12.3 hours per week in this virtual worlds (SD = 10.7). The average number of MUDs was 1.85 (SD = 1.0). 76.7% of the MUDders reported that their MUD-friendships developed to offline friendships, 24.5% formed romantic relationships. The mean of the scale friends was 3.85 (SD = 1.17), indicating moderate agreement.

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[2] Remember that the items presented are translated from German to English. In German, the categories are somewhat clearer.

Results

Social Information Processing in MUDs

According to Social Information Processing, people should use more paralanguage with increasing time (H1) and this should increase the development of friendships (H2).

To test this hypotheses, correlational analyses were conducted. The correlation between use of paralanguage and MUD-time in months was weak and marginally significant (r(92)= .17, p = .05, one-tailed). The correlation between hours per week and paralanguage was significant (r(103[3]) = .32, p < .01, one-tailed). H1 is therefore supported: the ability to express nonverbal contents in text increases with time.

Paralanguage correlates at r(98) = .49 (p < .01, one-tailed) with development of friendships confirming H2. The partial correlation between paralanguage and friends controlling for MUD-time and hours per week was r(95) = .38 (p < .01, one-tailed), showing that the substantial link between the use of paralanguage and the making of friends is not only due to time spent in virtual worlds but also the ability to express relational contents in words. These results support the Social Information Processing perspective: People learn how to verbalize nonverbal contents. This ability predicts the development of friendships and explains, without the factor time, still 14% of the variance.

Effect of sociability and scepticism

RQ1 was asked whether the general trait sociability influences the development of relationships via CMC as well. There were significant but only moderate correlations between sociability and friends (r(100) = .23, p < .05, two-tailed) and sociability and paralanguage (r(98) = .24, p < .05, two-tailed). Sociability explains evidently much less variance than the use of paralanguag*e.*

Sociability is not related to hours per week or MUD-time (r(96) = -.02, n.s.; r(89) = -.11, n.s.). A selection effect can therefore be excluded, that only sociable people continue MUDding is not true. As answer to RQ1, it can be formulated that sociability influences the forming of online-relationships to a moderate degree.

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[3] Changing n are due to unsystematic missing data for single items.

H4 suggested that the attitude to MUDding, especially scepticism, would be another important variable. A significant correlation of $r(99) = -.50$ ($p < .01$, one-tailed) between scepticism and friends confirmed this hypothesis. The more sceptical to CMC a person is, the less friendships he/she develops.

Regression analysis

To examine the effects of all variables simultaneously, a regression analysis was calculated (method *enter*). Development of friendships (Friends) was the criterium, the predictors were paralanguage, sociabilit*y*, and scepticism. Results are presented in table 2.

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Insert table 2 around here

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The results confirm the correlational analyses. Scepticism towards CMC and the use of paralanguage are variables which predict the development of relationships in MUDs, Sociability did not reach significance. This result qualifies the result of the correlational analysis: compared to scepticism and paralanguage, sociability is not a significant predictor. H2 and H4 were also supported. The absolute Beta weights of scepticism and paralanguage do not differ. The Social Information Processing perspective therefore should be extended and the scepticism towards CMC taken into account. Individuals who believe it possible to build up relationships in virtual worlds learn how to use smileys, feelings and emotes and thus make friends in MUDs.

Although the reported results make an important contribution to the analysis of relationships in virtual worlds, the question remains why people very sceptical to CMC play MUDs. A possible explanation lies in the assumption that they do not want to socialize primarily but are more interested in role-play, in killing monsters, or in solving quests. The number of players developing friendships speaks for this hypothesis. 76.6% seems relatively high but in the study of Parks and Roberts (1997) 93.6% of the users of the primarily social MOOs reported online-relationships. According to Walther (1992) though, motivational factors are an important assumption for the social processing. Different types of MUD players may be possibly distinguished by their attitude to the game. To test this hypothesis, an additional analysis was conducted.

Typology of MUD-motivations

A hierarchical cluster analysis (Ward, 1963) was computed. The z-standardized values in the attitude scales game, role-play and scepticism were entered in the analysis. The appropriate numbers of clusters was determined by visual examination of the amalgamation coefficient schedule (Aldenderfer & Blashfield, 1984). This procedure is analogous to the scree test in factor analysis. Four types of motivations emerged. 99 participants could be classified, four cases had to be sorted out due to missing data. The fit of the classification was tested by a discriminance analysis. 94.9% of the original classified cases and 91.9% of the cross-validated cases were correctly classified. Therefore, the cluster analysis resulted in an adequate classification. Group-means for the three attitude scales are presented in table 3, multivariate MANOVA confirmed the significance of the differences (see table 3).

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Insert table 3 around here

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The participants in group 1 (N=24) seem to be real role-players. They are low in scepticism, the MUD is a game for them and they are first and foremost playing different roles. Role-play is a central aspect in adventure-style MUDs. The largest group (n=44) consists of persons for who the MUD is primarily a game. They do not play roles, but they want to play, i.e. to kill monsters and to solve quests. They are significantly higher in scepticism, but only just above the midpoint of the scale.

15 players are classified as group 3. They are very low in scepticism, they neither want to play nor to role-play. They seem to be very involved in the virtual world per se. Two possibilities exist: they can be wizards and their main purpose may be to further develop the MUD. Therefore, the MUD is more a software-project than a game. Or they are "chatters" and visit this virtual worlds to meet other people. In this case, MUDs are seen primarily as virtual communities.

16 participants who can be called "the real sceptical ones" are in group 4. They score very high on scepticism, game and role-play. The question remains, why they are MUDding, if they are so sceptical and do not take it serious at all.

To further characterize the groups with regard to involvement, another MANOVA with the variables social identification, hours per week and MUD-time in general was conducted. The last two values were regarded as implicit measures of engagement in the MUD, whereas social identification with the group of the MUDders is an explicit criterion for involvement. The group-means are presented in table 4.

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Insert table 4 around here

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Only the effects for hours per week and social identification are significant. This results are consistent with the descriptions above. Members of group 4 are very sceptical and therefore not very involved in the MUD. They spend clearly less hours per week and they do not identify with the group of the MUDders. The general MUD-time is not significantly lower, therefore it may well be that they were once more engaged in the game. Respondents in group 3 are most identified with the game. They also spend the most time in the MUD, confirming the assumption that these are the respondents most involved. The role-players in group 1 identify to a high degree with other MUDders, too. Low scepticism therefore covaries with high identification with the group. The players in group 2, for whom the MUD is primarily a game, identify only to a moderate degree.

Do these different motivations and attitudes carry consequences for the usage of paralanguage and the development of friendships? Another MANOVA with paralanguage and friends as dependent variables was computed. Both effects were significant. The means are presented in table 5.

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Insert table 5 around here

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The effect on the use of smileys, emotes and feelings follows the same direction. Low sceptical participants in group 1 (role-play) and 3 (involved ones) use the most paralanguage. A correct interpretation of the values has to take into account that ratings for paralanguage were made on a 5-point-scale. The results in group 4 are striking: the scepticals deny the development of

friendships and score only at 3.33 at paralanguage. Value 3 meant "occasionally" and is very low for a MUD, due to the purely text-based communication. A certain minimum of verbalization must be used. It seems that individuals in this group could as well play a single-user game at home. Although group 1 and 3 use paralanguage to almost the same extent, the participants in group 3 managed to build up significantly more friendships. This effect can be explained with greater involvement and motivational factors. People in group 1 are primarily interested in role-play. Behavior in real-life differs from MUD-behavior. Verbalized emotions are not emotions of the actor but pretended emotions of the character played. This dissimulation makes it more difficult to build up relationships.

Discussion

Examination of how people develop friendships in virtual worlds, especially in MUDs, was the purpose of this study. Is it just a question of familiarity with CMC or do other relevant factors exist? The results of the correlational and regression analyses confirmed the Social Information Processing perspective (Walther, 1992). People get used to CMC after a while and learn how to compensate the lack of nonverbal cues by using linguistic cues. The more smileys and MUD-specific feelings and emotes a person used, the more friendships were formed. This relationship between verbalizing nonverbal contents and development of friendships remained substantial even when the data were controlled for MUD-time in months and hours per week spent in MUDs.

These findings contradict Parks and Floyd´s (1996) result that the development of friendships is more a function of simply familiarity and experience with CMC. The time spent in virtual worlds is not a sufficient predictor for the making of friends. It could be argued that time spent in MUDs is not a good measure of experience. People who continously run a window with the MUD in the background of their computer report high numbers of hours per week although their actual experience may be much smaller. Therefore, only if experience is specified as ability to deal with the possibilities of CMC and to verbalize emotional contents, it is a significant predictor of the development of friendships.

Another important finding was that the building up of friendships in MUDs is only low correlated with the general trait sociability. The Internet seems to provide an opportunity for shy and socially inhibited people to overcome their difficulties. This is in line with Parks and Roberts (1998) who suppose that MOOs and MUDs provide users with "the perception of a "safe" environment for social interaction in which individuals can explore all types of relationships without fear of repercussions in their physical lives" (p. 531). Another study of Roberts, Smith, and Pollock (1997) examined shy people and found that they were less inhibited in CMC and formed intimate relationships. Zimmerman (1987) demonstrated the positive effects of CMC on schizophrenic adolescents. The potential of virtual worlds for overcoming shyness has long been neglected and has to be further studied.

The most important result of this research is the influence of scepticism on development of friendships. If individuals have no belif in the possibility of expressing feelings in CMC or becoming acquainted with others in virtual worlds, they refrain from doing so. They also do not use the features offered by MUDs: feelings and emotes. Not trying to verbalize emotions and other nonverbal contents leads to a confirmation of their sceptical attitude. Scepticism towards CMC seems to be the missing link between familiarity with CMC and the development of relationships. This would at least be a plausible explanation. But because the results presented are based on correlational analysis, the direction of causality cannot be proved. Nevertheless, it was shown that time alone is not sufficient to form friendships in virtual worlds. People have to compensate the lack of nonverbal cues and have to learn to replace nonverbal expressions with verbal indicators. Belief in the medium is a presupposition to that. The attitude towards the medium has been neglected in most studies on actual media use. Perceived media richness was only used to predict media selection.

Not every individual communicating online believes in the possibility of making friends in virtual worlds. They do not have to do so as there are other reasons for communication via computer. Motivational factors have to be taken into account. A first clue to their importance is the number of friendships found in different settings: 73.6% of the respondents in this study reported that they had made friends in the MUD. Parks and Floyd (1996) found that 60.7% of the

Newsgroup-users developed relationships, whereas Parks and Roberts (1998) come to the result that 93.6% of the MOOers formed relationships. These figures reflect the expected motivation for making friends. MOOs are built for socializing, MUDs have the additional role-play and game-component whereas Newsgroups are primarily intended for discussing certain topics. Individuals may participate in a Newsgroup to gain information as well as to form relationships.

For a further specification of the motivational aspects, a cluster analysis was computed in order to divide the MUDders into subgroups. The resulting types differed not only in scepticism, but also in their goals, motivations, and the development of friendships. Four types could be distinguished: role-players, players, involved ones and sceptical ones. Sceptical MUDders are low in scepticism as well as in hours per week and identification. Parks and Roberts (1998) found that 46.2% of the MOOers without online friendships spent less than three hours per week in the MUD and interpreted this as low involvement. This assumption is supported by the results in the scale Social Identification in this study. Another finding is that although the role-players and the involved ones have similar values in scepticism and use feelings, emotes and smileys to a similar extent, the involved MUDders report significantly higher values in the scale Friends. This result indicates that in addition to the ability to verbalize nonverbal contents motivation plays an important role also. If the reason for playing MUDs is the interest in role-playing, development of friendships may be a secondary feature.

Although the design of the study does not allow the testing of causal hypotheses, there is evidence for the important role of motivations. First, this finding is in line with Walther's (1992) assumption of underlying motivational factors. If people are not primarily motivated to get to know other individuals, they learn to verbalize nonverbal communication to a lesser intent. Secondly, research on media selection has proven the influence of motives and goals on media *choice* (Kayani, Wotring,& Forrest, 1996; Markus, 1994b). Further studies are needed to replicate and further analyze the connection between motivations, goals, and CMC-*use*. Longitudinal studies are needed to specify temporal developments. An initial motivation could be supplemented by another one which could result in different medium use again. Despite the

methodological limitations, the present study can be seen as a first step in studying the influence of goals and motivations on actual medium use.

A limitation of the study can be seen in the highly selective sample. First, respondents were self-selected. This problem cannot be avoided in research in virtual communities. The MUDders' real identities are not known, participants cannot be "forced" to fill out a questionnaire. More important though is the question whether participants and non-participants differ in important characteristics. The high SDs in MUD-time and hours per week indicate that a broad range of MUDders participated. There were Newbies as well as Wizards, players with only one character and players with more characters in different MUDs. The mean of hours played per week is in the same range as the objective measured time in another study on German MUDs (Zielke, Wirausky,& Schildmann, 1995). The results are therefore assumed to be quite reliable.

The sample is highly selective in another aspect as well. Only players of German LPMUDs were studied. Most of the players are young well educated males. That raises questions about the generalization of the results found. One argument in favour of the generalization is that similar dynamics at the gross level have been found in the original SIP and hyperpersonal experiments which were not based on role-playing. The process specified in SIP should be the same for different kinds of virtual communities: it takes more time to build up online-relationships than ftf-relationships.

Another question remaining is whether the results presented here can be also generalized to asynchronous forms of CMC. Maybe individuals are primarily sceptical in synchronous CMC where only a limited time for choosing the right words is given. Selective self-presentation as described by Walther (1996) is made much more difficult in synchronous CMC. The messages may be less thought about and misunderstandings may therefore be preprogrammed. For a further testing of this hypothesis studies in different settings are needed.

The fact that goals and motivations influence media use should also be true for other environments. Goals will differ, though, in a newsgroup role-play will not be an important goal. Information-seeking should be one of the dominant motivations in this case. The special sample of LP-MUDders determines the percentage of people who built up online-friendships as well. In more social

MOOs the percentage is higher, in more task-oriented newsgroups it is lower as reported above (Parks & Floyd, 1996; Parks & Roberts, 1998). Thus, the attitudes and goals studied do not play the same role in another virtual community. Thereofore, motivations and expectations are important factors that should be taken into account in future studies.

The potential of virtual communities is not yet examined enough. What consequences do friendships have that are formed in virtual worlds and what consequences does the identification with virtual communies have for traditional bonds and communities? Will virtual friendships and communities replace, compensate or complement ftf-relationships? How will society be changed? There is an immense potential for further research. Virtual communities offer an opportunity for testing "old" theories in a new field but also for studying new developments of society.

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Appendix

Rotated components solution (VARIMAX)

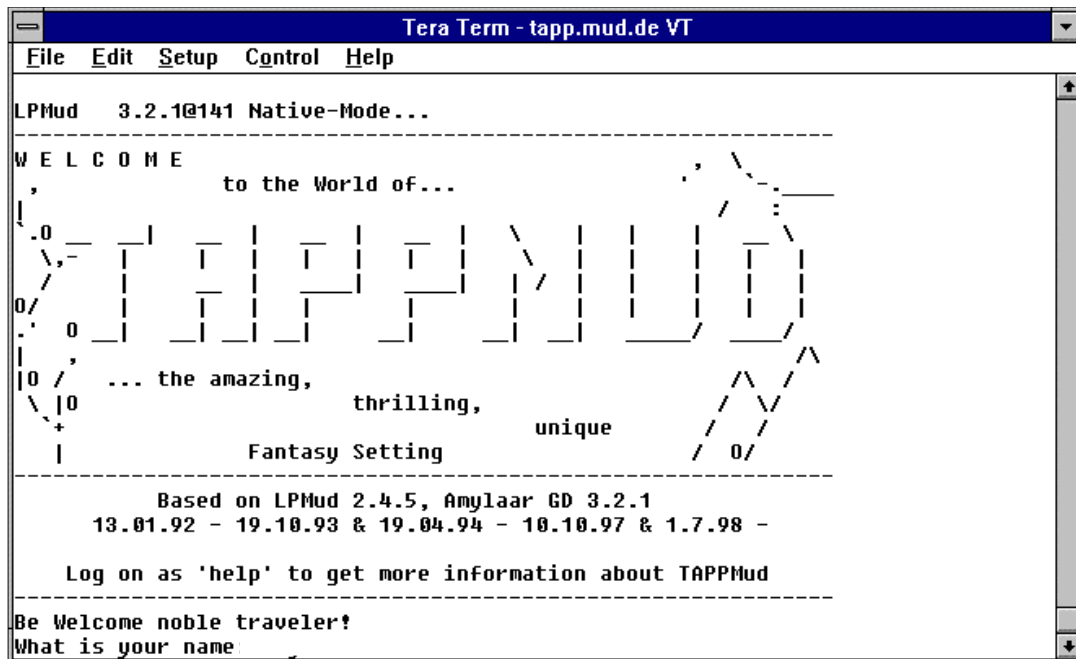| Item	Component		
	1 (Role-Play)	2 (Game)	3 (Scepticism)
MUD is only a game for me.		-.821	
MUD is connected with real-life, because I know many MUDders in rl.	.290	.508	
MUD is not only a game because relationships to other people are developed.		.706	
The boundary between MUD and rl fades away sometimes		.751	
When my MUD-character dies, I am also sad in rl.		.398	
Behavior and character of my MUD-figures are very similar to me.	.842		
with my characters I try to play different roles which have not much in common with my true personality.	-.802		
My behavior in the MUD is different to that in real-life.	-.814		
I identify myself with my MUD-character/s.	.587	.400	
I think there are often misunderstandings in the MUD because I don't see or hear the others.			.511
I think it is impossible to express feelings adequately in CMC.		-.251	.672
I think getting to know each other via CMC is impossible.			.801
I think getting to know each other via CMC is possible only under the condition that people are willing to show their true attitudes and emotions.			-.806
I am never sure whether the other person is acting a role in front of me..		-.313	

Figure 1: Screenshot of TAPPMud

Table 1: Smileys, Feelings and Emotes

	Description	Example
Smileys	Faces formed by ascii-characters	:-) happy smiley :-(sad smiley
Feelings (called social verbs in MOOs)	Preprogrammed scripts, combinations of verbs and adverbs possible, results always in the preprogrammed reaction shortcuts	➢ laugh ↵ ➢ You fall down laughing ➢ cuddle Minna ↵ ➢ You cuddle Minna. ➢ smi Aron und ↵ ➢ You smile understandingly at Aron
Emotes (posing in MOOs)	Self-defined expressions	➢ me is so happy that he could embrace the whole world↵ ➢ <Name> is so happy that he could embrace the whole world.

Table 2

Regression analysis to predict the variable "friends", R^2 = .32 (F(3,88) = 15.1, p < .01)

Variable	Beta	T	Significance
Paralanguage	.322	3.250	p < .01
Sociability	.084	.933	n.s.
Scepticism	-.330	-3.371	p < .01

Table 3

Types of MUDders: Means Scores, and Standard Deviations (in brackets) for Scepticism, Game and Role-play

	Group 1 (n = 24)	Group 2 (n = 44)	Group 3 (n = 15)	Group 4 (n = 16)	F(3,95)	p
Scepticism	2.27 (.57)	3.61 (.86)	2.22 (.56)	4.33 (.96)	34.76	p < .001
Game	3.93 (.82)	4.02 (.77)	2.39 (.53)	5.00 (.62)	33.88	p < .001
Role-play	4.11 (.63)	2.68 (.70)	2.30 (.62)	4.69 (.66)	60.44	p < .001

Table 4

Types of MUDders: Means Scores, and Standard Deviations (in brackets) for implicit and explicit involvement measures

	Group1	Group2	Group3	Group4	F (3,83)	p
MUD-time	20.41 (15.00)	17.92 (13.22)	23.86 (17.91)	17.80 (8.94)	.28	p = .84
Hours per week	14.04 (10.81)	12.74 (8.31)	17.63 (16.87)	4.20 (3.94)	5.34	p < .01
Identification	3.93 (.87)	3.59 (1.02)	4.66 (.78)	2.60 (.94)	13.16	p < .01

Table 5

Types of MUDders: Mean scores and standard deviation (in brackets) in use of *Paralanguage* and friends

	Group 1	Group 2	Group 3	Group 4	F (3,91)	p
Paralanguage	4.21 (.47)	3.70 (.75)	4.19 (.77)	3.33 (.98)	5.44	p < .01
Friends	4.14 (.85)	3.73 (1.10)	4.82 (.89)	2.73 (.98)	11.2	p < .01