Mudding: Social Phenomena in Text-Based Virtual Realities

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Abstract

A MUD (Multi-User Dungeon or, sometimes, Multi-User Dimension) is a network-accessible, multi-participant, user-extensible virtual reality whose user interface is entirely textual. Participants (usually called *players*) have the appearance of being situated in an artificially-constructed place that also contains those other players who are connected at the same time. Players can communicate easily with each other in real time. This virtual gathering place has many of the social attributes of other places, and many of the usual social mechanisms operate there. Certain attributes of this virtual place, however, tend to have significant effects on social phenomena, leading to new mechanisms and modes of behavior not usually seen 'IRL' (in real life). In this paper, I relate my experiences and observations from having created and maintained a MUD for over a year.

1 A Brief Introduction to Mudding

> The Machine did not transmit *nuances* of expression. It only gave a general idea of people—an idea that was good enough for all practical purposes.
> *E.M. Forster* (1)

A MUD is a software program that accepts 'connections' from multiple users across some kind of network (e.g., telephone lines or the Internet) and provides to each user access to a shared database of 'rooms', 'exits', and other objects. Each user browses and manipulates this database from 'inside' one of those rooms, seeing only those objects that are in the same room and moving from room to room mostly via the exits that connect them. A MUD, therefore, is a kind of *virtual reality*, an electronically-represented 'place' that users can visit.

MUDs are not, however, like the kinds of virtual realities that one usually hears about, with fancy graphics and special hardware to sense the position and orientation of the user's real-world body. A MUD user's interface to the database is entirely text-based; all commands are typed in by the users and all feedback is

```
>look
Corridor
The corridor from the west continues to the east here,
but the way is blocked by a purple-velvet rope
stretched across the hall. There are doorways leading
to the north and south.
You see a sign hanging from the middle of the rope here.
>read sign
This point marks the end of the currently-occupied
portion of the house. Guests proceed beyond this point
at their own risk.
 -- The residents
>go east
You step disdainfully over the velvet rope and enter
the dusty darkness of the unused portion of the house.
```

Figure 1: A typical MUD database interaction

printed as unformatted text on their terminal. The typical MUD user interface is most reminiscent of old computer games like Adventure and Zork [5]; a typical interaction is shown in Figure 1. Three major factors distinguish a MUD from an Adventure-style computer game, though:

- A MUD is not goal-oriented; it has no beginning or end, no 'score', and no notion of 'winning' or 'success'. In short, even though users of MUDs are commonly called *players*, a MUD isn't really a game at all.
- A MUD is extensible from within; a user can add new objects to the database such as rooms, exits, 'things', and notes. Certain MUDs, including the one I run, even support an embedded programming language in which a user can describe whole new kinds of behavior for the objects they create.
- A MUD generally has more than one user connected at a time. All of the connected users are browsing and manipulating the same database and can encounter the new objects created by others. The multiple users on a MUD can communicate with each other in real time.

This last factor has a profound effect on the ways in which users interact with the system; it transforms the activity from a solitary one into a social one.

Most inter-player communication on MUDs follows rules that fit within the framework of the virtual reality. If a player 'says' something (using the `say` command), then every other player in the same room will 'hear' them. For example, suppose that a player named Munchkin typed the command

```
say Can anyone hear me?
```

Then Munchkin would see the feedback

```
You say, "Can anyone hear me?"
```

and every other player in the same room would see

```
Munchkin says, "Can anyone hear me?"
```

Similarly, the `emote` command allows players to express various forms of 'non-verbal' communication. If Munchkin types

```
emote smiles.
```

then every player in the same room sees

```
Munchkin smiles.
```

Most interplayer communication relies entirely on these two commands.[1]

There are two circumstances in which the realistic limitations of `say` and `emote` have proved sufficiently annoying that new mechanisms were developed. It sometimes happens that one player wishes to speak to another player in the same room, but without anyone else in the room being aware of the communication. If Munchkin uses the `whisper` command

```
whisper "I wish he'd just go away..." to Frebble
```

then only Frebble will see

```
Munchkin whispers, "I wish he'd just go away..."
```

The other players in the room see nothing of this at all.

Finally, if one player wishes to say something to another who is connected to the MUD but currently in a different and perhaps 'remote' room, the `page` command is appropriate. It is invoked with a syntax very like that of the `whisper` command and the recipient sees output like this:

```
You sense that Munchkin is looking for you in The Hall.
He pages, "Come see this clock, it's tres cool!"
```

Aside from conversation, MUD players can most directly express themselves in three ways: by their choice of player name, by their choice of gender, and by their self-description.

When a player first connects to a MUD, they choose a name by which the other players will know them. This choice, like almost all others in MUDs, is not cast in stone; any player can rename themself at any time, though not to a name currently in use by some other player. Typically, MUD names are single words, in contrast to the longer 'full' names used in real life.

Initially, MUD players appear to be neuter; automatically-generated messages that refer to such a player use the family of pronouns including 'it', 'its', etc. Players can choose to appear as a different gender, though, and not only male or

1. In fact, these two commands are so frequently used that single-character abbreviations are provided for them. The two example commands would usually be typed as follows:

```
"Can anyone hear me?
:smiles.
```

female. On many MUDs, players can also choose to be plural (appearing to be a kind of 'colony' creature: "ChupChups leave the room, closing the door behind them"), or to use one of several sets of gender-neutral pronouns (e.g., 's/he', 'him/her' and 'his/her', or 'e', 'em' and 'eir').

Every object in a MUD optionally has a textual *description* which players can view with the `look` command. For example, the description of a room is automatically shown to a player when they enter that room and can be seen again just by typing '`look`'. To see another player's description, one might type '`look Bert`'. Players can set or change their descriptions at any time. The lengths of player descriptions typically vary from short one-liners to dozen-line paragraphs.

Aside from direct communication and responses to player commands, messages are printed to players when other players enter or leave the same room, when others connect or disconnect and are already in the same room, and when objects in the virtual reality have asynchronous behavior (e.g., a cuckoo clock chiming the hours).

MUD players typically spend their connected time socializing with each other, exploring the various rooms and other objects in the database, and adding new such objects of their own design. They vary widely in the amount of time they spend connected on each visit, ranging from only a minute to several hours; some players stay connected (and almost always idle) for days at a time, only occasionally actively participating.

This very brief description of the technical aspects of mudding suffices for the purposes of this paper. It has been my experience, however, that it is quite difficult to properly convey the 'sense' of the experience in words. Readers desiring more detailed information are advised to try mudding themselves, as described in the final section of this paper.

2 Social Phenomena Observed on One MUD

Man is the measure.
Ibid.

In October of 1990, I began running an Internet-accessible MUD server on my personal workstation here at PARC. Since then, it has been running continuously, with interruptions of only a few hours at most. In January of 1991, the existence of the MUD (called LambdaMOO[2]) was announced publicly, via the Usenet newsgroup `rec.games.mud`. As of this writing, well over 3,500 different players have connected to the server from over a dozen countries around the world and, at any given time, over 750 players have connected at least once in the last week. Recent statistics concerning the number of players connected at a given time of day (Pacific Standard Time) appear in Figure 2.

LambdaMOO is clearly a reasonably active place, with new and old players coming and going frequently throughout the day. This popularity has provided

2. The 'MOO' in 'LambdaMOO' stands for 'MUD, Object-Oriented'. The origin of the 'Lambda' part is more obscure, based on my years of experience with the Lisp programming language.

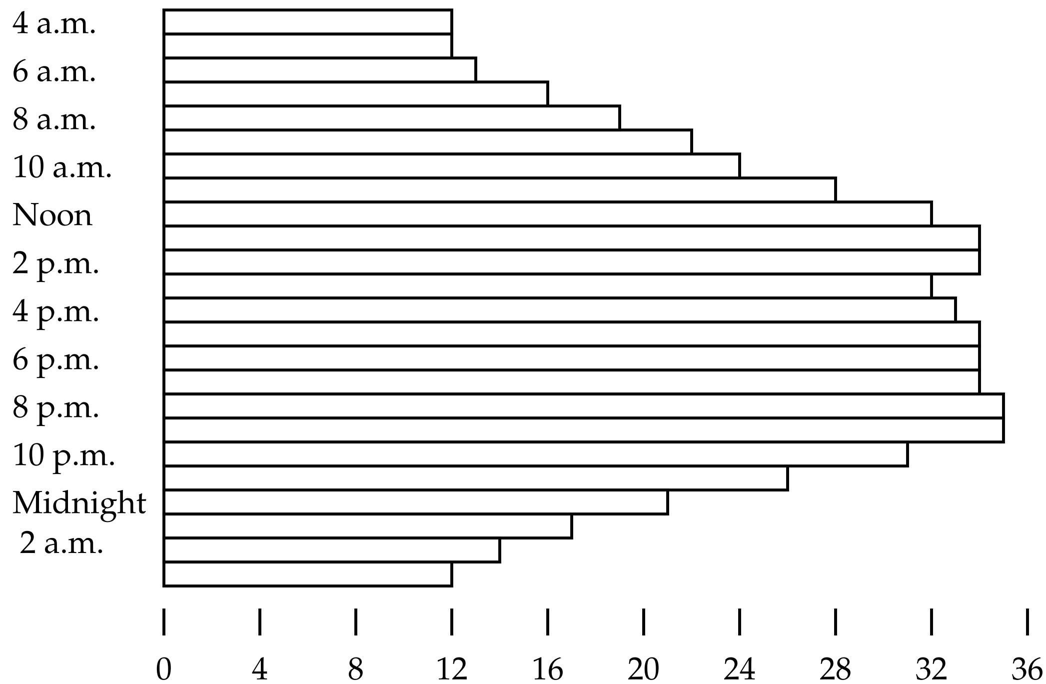

Figure 2: Average number of connected players on LambdaMOO, by time of day

me with a position from which to observe the social patterns of a fairly large and diverse MUD clientele. I want to point out to the reader, however, that I have no formal training in sociology, anthropology, or psychology, so I cannot make any claims about methodology or even my own objectivity. What I relate below is merely my personal observations made over a year of mudding. In most cases, my discussions of the motivations and feelings of individual players is based upon in-MUD conversations with them; I have no means of checking the veracity of their statements concerning their real-life genders, identities, or (obviously) feelings. On the other hand, in most cases, I also have no reason to doubt them.

I have grouped my observations into three categories: phenomena related to the behavior and motivations of individual players, phenomena related to interactions between small groups of players (especially observations concerning MUD conversation), and phenomena related to the behavior of a MUD's community as a whole.

Cutting across all of these categories is a recurring theme to which I would like to draw the reader's attention in advance. Social behavior on MUDs is in some ways a direct mirror of behavior in real life, with mechanisms being drawn nearly unchanged from real-life, and in some ways very new and different, taking root in the new opportunities that MUDs provide over real life.

2.1 Observations about individuals

The mudding population. The people who have an opportunity to connect to

Toon	Gemba	Gary_Severn	Ford	Frand
li'ir	Maya	Rincewind	yduJ	funky
Grump	Foodslave	Arthur	EbbTide	Anathae
yrx	Satan	byte	Booga	tek
chupchups	waffle	Miranda	Gus	Merlin
Moonlight	MrNatural	Winger	Drazz'zt	Kendal
RedJack	Snooze	Shin	lostboy	foobar
Ted_Logan	Xephyr	King_Claudius	Bruce	Puff
Dirque	Coyote	Vastin	Player	Cool
Amy	Thorgeir	Cyberhuman	Gandalf	blip
Jayhirazan	Firefoot	JoeFeedback	ZZZzzz...	Lyssa
Avatar	zipo	Blackwinter	viz	Kilik
Maelstorm	Love	Terryann	Chrystal	arkanoiv

Figure 3: A selection of player names from LambdaMOO

LambdaMOO are not a representative sample of the world population; they all read and write English with at least passable proficiency and they have access to the Internet. Based on the names of their network hosts, I believe that well over 90% of them are affiliated with colleges and universities, mostly as students and, to a lesser extent, mostly undergraduates. Because they have Internet access, it might be supposed that the vast majority of players are involved in the computing field, but I do not believe that this is the case. It appears to me that no more than half (and probably less) of them are so employed; the increasing general availability of computing resources on college campuses and in industry appears to be having an effect, allowing a broader community to participate.

In any case, it appears that the educational background of the mudding community is generally above average and it is likely that the economic background is similarly above the norm. Based on my conversations with people and on the names of those who have asked to join a mailing list about programming in LambdaMOO, I would guess that over 70% of the players are male; it is very difficult to give any firm justification for this number, however.

Player presentation. As described in the introduction to mudding, players have a number of choices about how to present themselves in the MUD; the first such decision is the name they will use. Figure 3 shows some of the names used by players on LambdaMOO. One can pick out a few common styles for names (e.g., names from or inspired by myth, fantasy, or other literature, common names from real life, names of concepts, animals, and everyday objects that have representative connotations, etc.), but it is clear that no such category includes a majority of the names. Note that a significant minority of the names are in lower case; this appears to be a stylistic choice (players with such names describe the practice as 'cool') and not, as might be supposed, an indication of a depressed ego.

Players can be quite possessive about their names, resenting others who choose names that are similarly spelt or pronounced or even that are taken from the same mythology or work of literature. In one case, for example, a player named ‘ZigZag’ complained to me about other players taking the names ‘ZigZag!’ and ‘Zig’.

The choice of a player’s gender is, for some, one of great consequence and forethought; for others (mostly males), it is simple and without any questions. For all that this choice involves the fewest options for the player (unlike their name or description, which are limited only by their imagination), it is also the choice that can generate the greatest concern and interest on the part of other players.

As I’ve said before, it appears that the great majority of players are male and the vast majority of them choose to present themselves as such. Some males, however, taking advantages of the relative rarity of females in MUDs, present themselves as female and thus stand out to some degree. Some use this distinction just for the fun of deceiving others, some of these going so far as to try to entice male-presenting players into sexually-explicit discussions and interactions. This is such a widely-noticed phenomenon, in fact, that one is advised by the common wisdom to assume that any flirtatious female-presenting players are, in real life, males. Such players are often subject to ostracism based on this assumption.

Some MUD players have suggested to me that such transvestite flirts are perhaps acting out their own (latent or otherwise) homosexual urges or fantasies, taking advantage of the perfect safety of the MUD situation to see how it feels to approach other men. While I have had no personal experience talking to such players, let alone the opportunity to delve into their motivations, the idea strikes me as plausible given the other ways in which MUD anonymity seems to free people from their inhibitions. (I say more about anonymity later on.)

Other males present themselves as female more out of curiosity than as an attempt at deception; to some degree, they are interested in seeing ‘how the other half lives’, what it feels like to be perceived as female in a community. From what I can tell, they can be quite successful at this.

Female-presenting players report a number of problems. Many of them have told me that they are frequently subject both to harassment and to special treatment. One reported seeing two newcomers arrive at the same time, one male-presenting and one female-presenting. The other players in the room struck up conversations with the putative female and offered to show her around but completely ignored the putative male, who was left to his own devices.

In addition, probably due mostly to the number of female-presenting males one hears about, many female players report that they are frequently (and sometimes quite aggressively) challenged to ‘prove’ that they are, in fact, female. To the best of my knowledge, male-presenting players are rarely if ever so challenged.

Because of these problems, many players who are female in real life choose to present themselves otherwise, choosing either male, neuter, or gender-neutral pronouns. As one might expect, the neuter and gender-neutral presenters are still subject to demands that they divulge their real gender.

Some players apparently find it quite difficult to interact with those whose true gender has been called into question; since this phenomenon is rarely manifest in real life, they have grown dependent on ‘knowing where they stand’, on

> You see a quiet, unassuming figure, wreathed in an oversized, dull-green Army jacket which is pulled up to nearly conceal his face. His long, unkempt blond hair blows back from his face as he tosses his head to meet your gaze. Small round gold-rimmed glasses, tinted slightly grey, rest on his nose. On a shoulder strap he carries an acoustic guitar and he lugs a backpack stuffed to overflowing with sheet music, sketches, and computer printouts. Under the coat are faded jeans and a T-Shirt reading `Paranoid CyberPunks International'. He meets your gaze and smiles faintly, but does not speak with you. As you surmise him, you notice a glint of red at the rims of his blue eyes, and realize that his canine teeth seem to protrude slightly. He recoils from your look of horror and recedes back into himself.

Figure 4: A moderately long player description

knowing what gender roles are 'appropriate'. Some players (and not only males) also feel that it is dishonest to present oneself as being a different gender than in real life; they report feeling 'mad' and 'used' when they discover the deception.

While I can spare no more space for this topic, I enthusiastically encourage the interested reader to look up Van Gelder's fascinating article [3] for many more examples and insights, as well as the story of a remarkably successful deception via "electronic transvestism".

The final part of a player's self-presentation, and the only part involving prose, is the player's *description*. This is where players can, and often do, establish the details of a persona or role they wish to play in the virtual reality. It is also a significant factor in other players' first impressions, since new players are commonly `look`ed at soon after entering a common room.

Some players use extremely short descriptions, either intending to be cryptic (e.g., 'the possessor of the infinity gems') or straightforward (e.g., 'an average-sized dark elf with lavender eyes') or, often, just insufficiently motivated to create a more complex description for themselves. Other players go to great efforts in writing their descriptions; one moderately long example appears in Figure 4.

A large proportion of player descriptions contain a degree of wish fulfillment; I cannot count the number of 'mysterious but unmistakably powerful' figures I have seen wandering around in LambdaMOO. Many players, it seems, are taking advantage of the MUD to emulate various attractive characters from fiction.

Given the detail and content of so many player descriptions, one might expect to find a significant amount of role-playing, players who adopt a coherent character with features distinct from their real-life personalities. Such is rarely the case, however. Most players appear to tire of such an effort quickly and simply interact with the others more-or-less straightforwardly, at least to the degree one does in normal discourse. One factor might be that the roles chosen by players are usually taken from a particular creative work and are not particularly viable as characters outside of the context of that work; in short, the roles don't make sense in the context of the MUD.

A notable exception to this rule is one particular MUD I've heard of, called 'PernMUSH'. This appears to be a rigidly-maintained simulacrum of the world described in Ann McCaffrey's celebrated 'Dragon' books. All players there have names that fit the style of the books and all places built there are consistent with what is shown in the series and in various fan materials devoted to it. PernMUSH apparently holds frequent 'hatchings' and other social events, also derived in great detail from McCaffrey's works. This exception probably succeeds only because of its single-mindedness; with every player providing the correct context for every other, it is easier for everyone to stay more-or-less 'in character'.

Player anonymity. It seems to me that the most significant social factor in MUDs is the perfect anonymity provided to the players. There are no commands available to the players to discover the real-life identity of each other and, indeed, technical considerations make such commands either very difficult or impossible to implement.

It is this guarantee of privacy that makes players' self-presentation so important and, in a sense, successful. Players can only be known by what they explicitly project and are not 'locked into' any factors beyond their easy control, such as personal appearance, race, etc. In the words of an old military recruiting commercial, MUD players can 'be all that you can be'.[3]

This also contributes to what might be called a 'shipboard syndrome', the feeling that since one will likely never meet anyone from the MUD in real life, there is less social risk involved and inhibitions can safely be lowered.

For example, many players report that they are much more willing to strike up conversations with strangers they encounter in the MUD than in real life. One obvious factor is that MUD visitors are implicitly assumed to be interested in conversing, unlike in most real world contexts. Another deeper reason, though, is that players do not feel that very much is at risk. At worst, if they feel that they've made an utter fool of themself, they can always abandon the character and create a new one, losing only the name and the effort invested in socially establishing the old one. In effect, a 'new lease on life' is always a ready option.

Players on most MUDs are also emboldened somewhat by the fact that they are immune from violence, both physical and virtual. The permissions systems of all MUDs (excepting those whose whole purpose revolves around adventuring and the slaying of monsters and other players) generally prevent any player from having any kind of permanent effect on any other player. Players can certainly annoy each other, but not in any lasting or even moderately long-lived manner.

This protective anonymity also encourages some players to behave irresponsibly, rudely, or even obnoxiously. We have had instances of severe and repeated sexual harassment, crudity, and deliberate offensiveness. In general, such cruelty

3. Kiesler and her colleagues [2] have investigated the effects of this kind of electronic anonymity on the decision-making and problem-solving processes in organizations; some of their observations parallel mine given here.

seems to be supported by two causes: the offenders believe (usually correctly) that they cannot be held accountable for their actions in the real world, and the very same anonymity makes it easier for them to treat other players impersonally, as other than real people.

Wizards. Usually, as I understand it, societies cope with offensive behavior by various group mechanisms, such as ostracism, and I discuss this kind of effect in detail in Section 2.3. In certain severe cases, however, it is left to the 'authorities' or 'police' of a society to take direct action, and MUDs are no different in this respect.

On MUDs, it is a special class of players, usually called *wizards* or (less frequently) *gods*, who fulfill both the 'authority' and 'police' roles. A wizard is a player who has special permissions and commands available, usually for the purpose of maintaining the MUD, much like a 'system administrator' or 'superuser' in real-life computing systems. Players can only be transformed into wizards by other wizards, with the maintainer of the actual MUD server computer program acting as the first such.

On most MUDs, the wizards' first approach to solving serious behavior problems is, as in the best real-life situations, to attempt a calm dialog with the offender. When this fails, as it usually does in the worst cases of irresponsibility, the customary response is to punish the offender with 'toading'. This involves (a) either severely restricting the kinds of actions the player can take or else preventing them from connecting at all, (b) changing the name and description of the player to present an unpleasant appearance (often literally that of a warty toad), and (c) moving the player to some very public place within the virtual reality. This public humiliation is often sufficient to discourage repeat visits by the player, even in a different guise.

On LambdaMOO, the wizards as a group decided on a more low-key approach to the problem; we have, in the handful of cases where such a severe course was dictated, simply 'recycled' the offending player, removing them from the database of the MUD entirely. This is a more permanent solution than toading, but also lacks the public spectacle of toading, a practice none of us were comfortable with.

Wizards, in general, have a very different experience of mudding than other players. Because of their palpable and extensive extra powers over other players, and because of their special role in MUD society, they are frequently treated differently by other players.

Most players on LambdaMOO, for example, upon first encountering my wizard player, treat me with almost exaggerated deference and respect. I am frequently called 'sir' and players often apologize for 'wasting' my time. A significant minority, however, appear to go to great lengths to prove that they are *not* impressed by my office or power, speaking to me quite bluntly and making demands that I assist them with their problems using the system, sometimes to the point of rudeness.

Because of other demands on my time, I am almost always connected to the

MUD but idle, located in a special room I built (my 'den') that players require my permission to enter. This room is useful, for example, as a place in which to hold sensitive conversations without fear of interruption. This constant presence and unapproachability, however, has had significant and unanticipated side-effects. I am told by players who get more circulation than I do that I am widely perceived as a kind of mythic figure, a mysterious wizard in his magical tower. Rumor and hearsay have spread word of my supposed opinions on matters of MUD policy. One effect is that players are often afraid to contact me for fear of capricious retaliation at their presumption.

While I find this situation disturbing and wish that I had more time to spend out walking among the 'mortal' members of the LambdaMOO community, I am told that player fears of wizardly caprice are justified on certain other MUDs. It is certainly easy to believe the stories I hear of MUD wizards who demand deference and severely punish those who transgress; there is a certain ego boost to those who wield even simple administrative power in virtual worlds and it would be remarkable indeed if no one had ever started a MUD for that reason alone.

In fact, one player sent me a copy of an article, written by a former MUD wizard, based on Machiavelli's 'The Prince'; it details a wide variety of more-or-less creative ways for wizards to make ordinary MUD players miserable. If this wizard actually used these techniques, as he claims, then some players' desires to avoid wizards are quite understandable.

2.2 Observations about small groups

MUD conversation. The majority of players spend the majority of their active time on MUDs in conversation with other players. The mechanisms by which those conversations get started generally mirror those that operate in real life, though sometimes in interesting ways.

Chance encounters between players exploring the same parts of the database are common and almost always cause for conversation. As mentioned above, the anonymity of MUDs tends to lower social barriers and to encourage players to be more outgoing than in real life. Strangers on MUDs greet each other with the same kinds of questions as in real life: "Are you new here? I don't think we've met." The very first greetings, however, are usually gestural rather than verbal: "Munchkin waves. Lorelei waves back."

The `@who` (or `WHO`) command on MUDs allows players to see who else is currently connected and, on some MUDs, where those people are. An example of the output of this command appears in Figure 5. This is, in a sense, the MUD analog of scanning the room in a real-life gathering to see who's present.

Players consult the `@who` list to see if their friends are connected and to see which areas, if any, seem to have a concentration of players in them. If more than a couple of players are in the same room, the presumption is that an interesting conversation may be in progress there; players are thus more attracted to more

```
Player name        Connected    Idle time    Location
-----------        ---------    ---------    --------
Haakon (#2)        3 days       a second     Lambda's Den
Lynx (#8910)       a minute     2 seconds    Lynx' Abode
Garin (#23393)     an hour      2 seconds    Carnival Grounds
Gilmore (#19194)   an hour      10 seconds   Heart of Darkness
TamLin (#21864)    an hour      21 seconds   Heart of Darkness
Quimby (#23279)    3 minutes    2 minutes    Quimby's room
koosh (#24639)     50 minutes   5 minutes    Corridor
Nosredna (#2487)   7 hours      36 minutes   Nosredna's Hideaway
yduJ (#68)         7 hours      47 minutes   Hackers' Heaven
Zachary (#4670)    an hour      an hour      Zachary's Workshop
Woodlock (#2520)   2 hours      2 hours      Woodlock's Room

Total: 11 players, 6 of whom have been active recently.
```

Figure 5: Sample output from LambdaMOO's `@who` command

populated areas. I call this phenomenon 'social gravity'; it has a real-world analog in the tendency of people to be attracted to conspicuous crowds, such as two or more people at the door of a colleague's office.

It is sometimes the case on a MUD, as in real life, that one wishes to avoid getting into a conversation, either because of the particular other player involved or because of some other activity one does not wish to interrupt. In the real world, one can refrain from answering the phone, screen calls using an answering machine, or even, in copresent situations, pretend not to have heard the other party. In the latter case, with luck, the person will give up rather than repeat themself more loudly.

The mechanisms are both similar and interestingly different on MUDs. It is often the case that MUD players are connected but idle, perhaps because they have stepped away from their terminal for a while. Thus, it often happens that one receives no response to an utterance in a MUD simply because the other party wasn't really present to see it. This commonly-understood fact of MUD life provides for the MUD equivalent of pretending not to hear. I know of players who take care after such a pretense not to type anything more to the MUD until the would-be conversant has left, thus preserving the apparent validity of their excuse.

Another mechanism for avoiding conversation is available to MUD players but, as far as I can see, not to people in real life situations. Most MUDs provide a mechanism by which each player can designate a set of other players as 'gagged'; the effect is that nothing will be printed to the gagging player if someone they've gagged speaks, moves, emotes, etc. There is generally no mechanism by which the gagged player can tell *a priori* that someone is gagging them; indeed, unless the gagged player attempts to address the gagging player directly, the responses from the other players in the room (who may not be gagging the speaker) may cause the speaker never even to suspect that some are not hearing them.

We provide a gagging facility on LambdaMOO, but it is fairly rarely used; a recent check revealed only 45 players out of almost 3,000 who are gagging other players. The general feeling appears to be that gagging is quite rude and is only appropriate (if ever) when someone persists in annoying you in spite of polite requests to the contrary. It is not clear, though, quite how universal this feeling is. For example, I know of some players who, on being told that some other players were offended by their speech, suggested that gagging was the solution: "If they don't want to hear me, let them gag me; I won't be offended." Also, I am given to understand that gagging is much more commonly employed on some other MUDs.

The course of a MUD conversation is remarkably like and unlike one in the real world. Participants in MUD conversations commonly use the `emote` command to make gestures, such as nodding to urge someone to continue, waving at player arrivals and departures, raising eyebrows, hugging to apologize or soothe, etc. As in electronic mail (though much more frequently), players employ standard 'smiley-face' glyphs (e.g., '`:-)`', '`:-(`', and '`:-|`') to clarify the 'tone' with which they say things. Utterances are also frequently addressed to specific participants, as opposed to the room as a whole (e.g., "Munchkin nods to Frebble. 'You tell 'em!'").

The most obvious difference between MUD conversations and those in real life is that the utterances must be typed rather than simply spoken. This introduces significant delays into the interaction and, like nature, MUD society abhors a vacuum.

Even when there are only two participants in a MUD conversation, it is very rare for there to be only one thread of discussion; during the pause while one player is typing a response, the other player commonly thinks of something else to say and does so, introducing at least another level to the conversation, if not a completely new topic. These multi-topic conversations are a bit disorienting and bewildering to the uninitiated, but it appears that most players quickly become accustomed to them and handle the multiple levels smoothly. Of course, when more than two players are involved, the opportunities for multiple levels are only increased. It has been pointed out that a suitable punishment for truly heinous social offenders might be to strand them in a room with more than a dozen players actively conversing.

This kind of cognitive time-sharing also arises due to the existence of the `page` command. Recall from the introduction that this command allows a player to send a message to another who is not in the same room. It is not uncommon (especially for wizards, whose advice is frequently sought by 'distant' players) to be involved in one conversation 'face-to-face' and one or two more conducted via `page`. Again, while this can be overwhelming at first, one can actually come to appreciate the relief from the tedious long pauses waiting for a fellow conversant to type.

Another effect of the typing delay (and of the low bandwidth of the MUD medium) is a tendency for players to abbreviate their communications, sometimes past the point of ambiguity. For example, some players often greet others with 'hugs' but the 'meanings' of those hugs vary widely from recipient to recipient. In one case the hug might be a simple friendly greeting, in another it might be intended to convey a very special affection. In both cases, the text typed by the hugger is the same (e.g., "Munchkin hugs Frebble."); it is considered too much trouble for the hugger to type a description of the act sufficient to distinguish the 'kind' of hug intended. This leads to some MUD interactions having much more ambiguity than usually encountered in real life, a fact that some mudders consider useful.

The somewhat disjointed nature of MUD conversations, brought on by the typing pauses, tends to rob them of much of the coherence that makes real-life conversants resent interruptions. The addition of a new conversant to a MUD conversation is much less disruptive; the 'flow' being disrupted was never very strong to begin with. Some players go so far as to say the interruptions are simply impossible on MUDs; I think that this is a minority impression, however. Interruptions do exist MUDs; they are simply less significant than in real life.

Other small-group interactions. I would not like to give the impression that conversation is the only social activity on MUDs. Indeed, MUD society appears to have most of the same social activities as real life, albeit often in a modified form.

As mentioned before, PernMUSH holds large-scale, organized social gatherings such as 'hatchings' and they are not alone. Most MUDs have at one time or another organized more or less elaborate parties, often to celebrate notable events in the MUD itself, such as an anniversary of its founding. We have so far had only one or two such parties on LambdaMOO, to celebrate the 'opening' of some new area built by a player; if there were any other major parties, I certainly wasn't invited!

One of the more impressive examples of MUD social activity is the virtual wedding. There have been many of these on many different MUDs; we are in the process of planning our first on LambdaMOO, with me officiating in my role as archwizard.

I have never been present at such a ceremony, but I have read logs of the conversations at them. As I do not know any of the participants in the ceremonies I've read about, I cannot say much for certain about their emotional content. As in real life, they are usually very happy and celebratory occasions with an intriguing undercurrent of serious feelings. I do not know and cannot even speculate about whether or not the main participants in such ceremonies are usually serious or not, whether or not the MUD ceremony usually (or even ever) mirrors another ceremony in the real world, or even whether or not the bride and groom have ever met outside of virtual reality.

In the specific case of the upcoming LambdaMOO wedding, the participants first met on LambdaMOO, became quite friendly, and eventually decided to meet in real life. They have subsequently become romantically involved in the real world and are using the MUD wedding as a celebration of that fact. This phenomenon of couples meeting in virtual reality and then pursuing a real-life relationship, is not uncommon; in one notable case, they did this even though one of them lived in Australia and the other in Pittsburgh!

It is interesting to note that the virtual reality wedding is not specific to the kinds of MUDs I've been discussing; Van Gelder [7] mentions an on-line reception on CompuServe and weddings are quite common on Habitat [4], a half-graphical, half-textual virtual reality popular in Japan.

The very idea, however, brings up interesting and potentially important questions about the legal standing of commitments made only in virtual reality. Suppose, for example, that two people make a contract in virtual reality. Is the contract binding? Under which state's (or country's) laws? Is it a written or verbal contract? What constitutes proof of signature in such a context? I suspect that our real-world society will have to face and resolve these issues in the not-too-distant future.

Those who frequent MUDs tend also to be interested in games and puzzles, so it is no surprise that many real-world examples have been implemented inside MUDs. What may be surprising, however, is the extent to which this is so.

On LambdaMOO alone, we have machine-mediated Scrabble, Monopoly, Mastermind, Backgammon, Ghost, Chess, Go, and Reversi boards. These attract small groups of players on occasion, with the Go players being the most committed; in fact, there are a number of Go players who come to LambdaMOO only for that purpose. I say more about these more specialized uses of social virtual realities later on. In many ways, though, such games so far have little, if anything, to offer over their real-world counterparts except perhaps a better chance of finding an opponent.

Perhaps more interesting are the other kinds of games imported into MUDs from real life, the ones that might be far less feasible in a non-virtual reality. A player on LambdaMOO, for example, implemented a facility for holding food fights. Players throw food items at each other, attempt to duck oncoming items, and, if unsuccessful, are 'splattered' with messes that cannot easily be removed. After a short interval, a semi-animate 'Mr. Clean' arrives and one-by-one removes the messes from the participants, turning them back into the food items from which they came, ready for the next fight. Although the game was rather simple to implement, it has remained enormously popular nearly a year later.

Another player on LambdaMOO created a trainable Frisbee, which any player could teach to do tricks when they threw or caught it. Players who used the Frisbee seemed to take great pleasure in trying to out-do each other's trick descriptions. My catching description, for example, reads "Haakon stops the frisbee dead in the air in front of himself and then daintily plucks it, like a flower." I have also heard of MUD versions of paint-ball combat and fantastical games of Capture the Flag.

2.3 Observations about the MUD community as a whole

MUD communities tend to be very large in comparison to the number of players actually active at any given time. On LambdaMOO, for example, we have between 700 and 800 players connecting in any week but rarely more than 40 simultaneously. A good real-world analog might be a bar with a large number of 'regulars', all of whom are transients without fixed schedules.

The continuity of MUD society is thus somewhat tenuous; many pairs of active players exist who have never met each other. In spite of this, MUDs do become true communities after a time. The participants slowly come to consensus about a common (private) language, about appropriate standards of behavior, and about the social roles of various public areas (e.g., where big discussions usually happen, where certain 'crowds' can be found, etc.).

Some people appear to thrive on the constant turnover of MUD players throughout a day, enjoying the novelty of always having someone new to talk to. In some cases, this enjoyment goes so far as to become a serious kind of addiction, with some players spending as much as 35 hours out of 48 constantly connected and conversing on MUDs. I know of many players who have taken more-or-less drastic steps to curtail their participation on MUDs, feeling that their habits had gotten significantly out of control.

One college-student player related to me his own particularly dramatic case of MUD addiction. It seems that he was supposed to go home for the Christmas holidays but missed the train by no less than five hours because he had been unable to tear himself away from his MUD conversations. After calling his parents to relieve their worrying by lying about the cause of his delay, he eventually boarded a train for home. However, on arrival there at 12:30 a.m. the next morning, he did not go directly to his parents' house but instead went to an open terminal room in the local university, where he spent another two and a half hours connected before finally going home. His parents, meanwhile, had called the police in fear for their son's safety in traveling.

It should not be supposed that this kind of problem is now commonly-understand phenomenon of 'computer addiction'; the fact that there is a computer involved here is more-or-less irrelevant. These people are not addicted to computers, but to *communication*; the global scope of Internet MUDs implies not only a great variety in potential conversants, but also 24-hour access. As Figure 2 shows, the sun never really sets on LambdaMOO's community.

While it is at the more macroscopic scale of whole MUD communities that I feel least qualified to make reliable observations, I do have one striking example of societal consensus having concrete results on LambdaMOO.

From time to time, we wizards are asked to arbitrate in disputes among players concerning what is or is not appropriate behavior. My approach generally has been to ask a number of other players for their opinions and to present the defendant in the complaint with a precis of the plaintiff's grievance, always looking for the common threads in their responses. After many such episodes, I was approached by a number of players asking that a written statement on LambdaMOO 'manners' be prepared and made available to the community. I wrote up a list of those rules that seemed implied by the set of arbitrations we had performed and published them for public comment. Very little comment has ever been received, but the groups of players I've asked generally agree that the rules reflect their own understandings of the common will. For the curious, I have included our list of rules in Figure 6; the actual '`help manners`' document goes into a bit more detail about each of these points.

It should be noted that different MUDs are truly different communities and have different societal agreements concerning appropriate behavior. There even exist a few MUDs where the only rule in the social contract is that *there is no social contract*. Such 'anarchy' MUDs have appeared a few times in my experience and seem to be quite popular for a time before eventually fading away.

3 The Prospects for Mudding in the Future

> The clumsy system of public gatherings had been long since abandoned; neither Vashti nor her audience stirred from their rooms. Seated in her arm-chair, she spoke, while they in their arm-chairs heard her, fairly well, and saw her, fairly well.
> *Ibid.*

A recent listing of Internet-accessible MUDs showed almost 200 active around the world, mostly in the United States and Scandinavia. A conservative guess that these MUDs average 100 active players each gives a total of 20,000 active mudders in the world today; this is almost certainly a significant undercount already and the numbers appear to be growing as more and more people gain Internet access.

In addition, at least one MUD-like area exists on the commercial CompuServe network in the United States and there are several more commercial MUDs active in the United Kingdom. Finally, there is Habitat[4], a half-graphical, half textual virtual reality in Japan, with well over 10,000 users.

I believe that text-based virtual realities and wide-area interactive 'chat' facilities [6] are becoming more and more common and will continue to do so for the foreseeable future. Like CB radios and telephone party lines before them, MUDs seem to provide a necessary social outlet.

The MUD model is also being extended in new ways for new audiences. For example, I am currently involved in adapting the LambdaMOO server for use as an international teleconferencing and image database system for astronomers. Our plans include allowing scientists to give on-line presentations to their colleagues around the world, complete with 'slides' and illustrations automatically displayed on the participants' workstations. The same approach could be used to create on-line meeting places for workers in other disciplines, as well as for other non-scientific communities. I do not believe that we are the only researchers planning such facilities. In the near future (a few years at most), I expect such specialized virtual realities to be commonplace, an accepted part of at least the academic community.

On another front, I am engaged with some colleagues in the design of a MUD for general use here at Xerox PARC. The idea here is to use virtual reality to help break down the geographical barriers of a large building, of people increasingly working from their homes, and of having a sister research laboratory in Cam-

- **Be polite. Avoid being rude.** The MOO is worth participating in because it is a pleasant place for people to be. When people are rude or nasty to one another, it stops being so pleasant.
- **'Revenge is ours,' sayeth the wizards.** If someone is nasty to you, please either ignore it or tell a wizard about it. Please *don't* try to take revenge on the person; this just escalates the level of rudeness and makes the MOO a less pleasant place for everyone involved.
- **Respect other players' sensibilities.** The participants on the MOO come from a wide range of cultures and backgrounds. Your ideas about what constitutes offensive speech or descriptions are likely to differ from those of other players. Please keep the text that players can casually run across as free of potentially-offensive material as you can.
- **Don't spoof.** Spoofing is loosely defined as `causing misleading output to be printed to other players'. For example, it would be spoofing for anyone but Munchkin to print out a message like `Munchkin sticks out his tongue at Potrzebie.' This makes it look like Munchkin is unhappy with Potrzebie even though that may not be the case at all.
- **Don't shout.** It is easy to write a MOO command that prints a message to every connected player. Please don't.
- **Only teleport your own things.** By default, most objects (including other players) allow themselves to be moved freely from place to place. This fact makes it easier to build certain useful objects. Unfortunately, it also makes it easy to annoy people by moving them or their objects around without their permission. Please don't.
- **Don't teleport silently or obscurely.** It is easy to write MOO commands that move you instantly from place to place. Please remember in such programs to print a clear, understandable message to all players in both the place you're leaving and the place you're going to.
- **Don't hog the server.** The server is carefully shared among all of the connected players so that everyone gets a chance to execute their commands. This sharing is, by necessity, somewhat approximate. Please don't abuse it with tasks that run for a long time without pausing.
- **Don't waste object numbers.** Some people, in a quest to own objects with `interesting' numbers (e.g., #17000, #18181, etc.) have written MOO programs that loop forever creating and recycling objects until the `good' numbers come up. Please don't do this.

Figure 6: The main points of LambdaMOO manners

bridge, England. In this context, we intend to investigate the addition of digital voice to MUDs, with the conventions of the virtual reality providing a simple and intuitive style of connection management: if two people are in the same virtual room, then their audio channels are connected. Some virtual rooms may even overlap real-world rooms, such as those in which talks or other meetings are held.

Of course, one can expect a number of important differences in the social phenomena on MUDs in a professional setting. In particular, I would guess that anonymity might well be frowned upon in such places, though it may have some interesting special uses, for example in the area of refereeing papers.

Some of my colleagues have suggested that the term 'text-based virtual reality' is an oxymoron, that 'virtual reality' refers only to the fancy graphical and motion-sensing environments being worked on in many places. They go on to predict that these more physically-involving systems will supplant the text-based variety as soon as the special equipment becomes a bit more widely and cheaply available. I do not believe that this is the case.

While I agree that the fancier systems are likely to become very popular for certain applications and among those who can afford them, I believe that MUDs have certain enduring advantages that will save them from obsolescence.

The equipment necessary to participate fully in a MUD is significantly cheaper, more widely available, and more generally useful than that for the fancy systems; this is likely to remain the case for a long time to come. For example, it is already possible to purchase palm-sized portable computers with network connectivity and text displays, making it possible to use MUDs even while riding the bus, etc. Is similarly-flexible hardware for fancy virtual realities even on the horizon?

It is substantially easier for players to give themselves vivid, detailed, and interesting descriptions (and to do the same for the descriptions and behavior of the new objects they create) in a text-based system than in a graphics-based one. In McLuhan's terminology [3], this is because MUDs are a 'cold' medium, while ore graphically-based media are 'hot'; that is, the sensorial parsimony of plain text tends to entice users into engaging their imaginations to fill in missing details while, comparatively speaking, the richness of stimuli in fancy virtual realities has an opposite tendency, pushing users' imaginations into a more passive role. I also find it difficult to believe that a graphics-based system will be able to compete with text for average users on the metric of believable detail per unit of effort expended; this is certainly the case now and I see little reason to believe it will change in the near future.

Finally, one of the great strengths of MUDs lies in the users' ability to customize them, to extend them, and to specialize them to the users' particular needs. The ease with which this can be done in MUDs is directly related to the fact that they are purely text-based; in a graphics-based system, the overhead of creating new moderate-quality graphics would put the task beyond the inclinations of the average user. Whereas, with MUDs, it is easy to imagine an almost arbitrarily small community investing in the creation of a virtual reality that was truly customized for that community, it seems very unlikely that any but the largest communities would invest the greatly-increased effort required for a fancier system.

4 Conclusions

> Vashti was seized with the terrors of direct experience. She shrank back into her room, and the wall closed up again.
> *Ibid.*

The emergence of MUDs has created a new kind of social sphere, both like and radically unlike the environments that have existed before. As they become more and more popular and more widely accessible, it appears likely that an increasingly significant proportion of the population will at least become familiar with mudding and perhaps become frequent participants in text-based virtual realities.

It thus behooves us to begin to try to understand these new societies, to make sense of these electronic places where we'll be spending increasing amounts of our time, both doing business and seeking pleasure. I would hope that social scientists will be at least intrigued by my amateur observations and perhaps inspired to more properly study MUDs and their players. In particular, as MUDs become more widespread, ever more people are likely to be susceptible to the kind of addiction I discuss in an earlier section; we must, as a society, begin to wrestle with the social and ethical issues brought out by such cases.

Those readers interested in trying out MUDs for themselves are encouraged to do so. The Usenet news group `rec.games.mud` periodically carries comprehensive lists of publicly-available, Internet-accessible MUDs, including their detailed network addresses. My own MUD, LambdaMOO, can be reached via the standard Internet `telnet` protocol at the host `lambda.parc.xerox.com` (the numeric address is 13.2.116.36), port 8888. On a UNIX machine, for example, the command

```
telnet lambda.parc.xerox.com 8888
```

will suffice to make a connection. Once connected, feel free to page me; I connect under the names 'Haakon' and 'Lambda'.

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