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RFCs, MOOs, LMSs: ASSORTED EDUCATIONAL DEVICES

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Abstract. This paper discusses implicit social consequences of four basic internet protocols. The results are then related to the field of computer-assisted teaching. An educational on-line community is described and compared to the emerging standard of web-based learning management.

Origins are auratic places or events. This holds true both for high and low culture. The so-called "birth of an idea" is just as likely to be a distinguished event as the rise of a pop star. The same thing does not seem to hold for engineering, yet it is difficult to avoid a shiver of awe and recognition when reading the opening sentence of John Postel's "Request for Comments" #821. We are dealing with the foundational document of what was to become electronic mail. The document is dated August 1982 and it starts off with the following remark:

> The objective of Simple Mail Transfer Protocol (SMTP) is to transfer mail reliably and efficiently.

The sentence seems inconspicuous at first glance. Given the common concept of "mail" the protocol is supposed to ensure its implementation in a networked environment. But there is more beneath the surface of this plain, no-nonsense statement. In fact, one guiding motive of the CATaC conferences can easily be illustrated by closer scrutiny of this pronouncement. Notice the implicit discrepancy of cultures. There have been countless attempts to "transfer mail reliably and efficiently" within the framework of traditional services. John Postel refers back to precedents as he introduces a new development. This is the treshhold at which mail enters the realm of telecommunication.

One might call it an act of baptism. We are to be given the outlines of the "Simple *Mail* Transfer Protocol". "Mail" is no homonym like "Paris" in "Paris, Texas". The working of the term is closer to "New England" which indicates the transference of a certain set of social and cognitive attitudes into a largely unknown environment. There is no paper involved in this kind of "mail", to pick just the most obvious difference. Socio-historical projections and questions of technological design are inextricably interwoven at the very beginning of this new area as engineers apply their common sense understanding of mail to a context lacking the appropriate precedents.

The CATaC position is that technology is perceived differently around the globe and that standards developed in advanced North-atlantic countries are not to be taken as universally valid. Nevertheless, this paper's focus will be on *domestic* ethnography, i.e. on the cultural divide separating Western home grown attitudes and their transformation

within our very society's technological development. The point is that we tend to neglect those pre-dispositions towards technology. A convenient division of labor affords us a deceptive familiarity with internet-related innovations. But we are far from actually grasping what's going on at home and in particular we have barely begun to analyze how traditional perceptions of communication enter into the models of information technology and – in due course – re-configure those very perceptions.

My presentation will approach its aim at two different levels of generality. The first part will touch upon some essentials needed to discuss the impact of the most elementary internet protocols on contemporary society. Lawrence Lessig has forcefully argued that the architecture of the internet is dependent on technological as well as political decisions. (Lessig, 1999; Kruse, Yurcik and Lessig 2001) Design standards like the end-to-end principle (which calls for non-interference with content on the network transportation layer) can be seen as powerful socio-economic tools. (Cf. Clark, 1988; Bush and Meyer 2002) Looking more closely one finds several key internet protocols the importance of which has barely been explored in the literature. One aim of this talk is to demonstrate the remarkable social implications of different "Requests for Comment", i.e. proposals to establish some communication standard. The second part will apply these findings to a recent and more elaborate field, namely the development of e-learning tools.

A rich literature on adapting the classroom to the challenge of computer-assisted teaching has emerges (Aronowitz, 2000; Tergan and Zentel, 2003; Downes 2003) and coping with the various social implications of what started out as engineering rules turns out to be an important issue. The situation is paradigmatic for an assessment of how the IT-market is determining common sense in rich Western countries. Big companies charge universities considerable sums for e-learning platforms that are supposed to boost pedagogical performance and save expenditure for teaching staff. Consider this variant of Postel's dictum: "The objective of e-learning platforms is to teach students reliably and efficiently." The basic humanistic impulse is, of course, to flatly reject the analogy. This rejection is a privilege available within the framework of the division of labor mentioned above. Like Hegel's masters in his "Phenomenology of the Spirit" such humanists are bound to end – at best – as decorative social props. The message of this paper's second part is that paying attention to the protocols helps to cut through a lot of propaganda and mystification. It is an exercise within the culture wars of the prosperous West, but it carries strong suggestions of how to break the West's simplistic approach towards its own IT development.

Some Protocols

SMTP

From the point of view of end users email is an exchange of messages that has widely replaced traditional methods of delivery. The switch is triggered by the substitution of physical transport by digital inter-process communication. SMTP defines the rules that two relays of data-exchange have to obey in order to be considered "transferring mail". It is important to notice that computers engaged in information transfer may follow numerous different procedures modeling a wide variety of common sense notions. One

simple exchange is a so-called "ping", which amounts to ascertaining the availability of a remote machine. The interesting question then becomes: *what* features of the historical mail system are taken up by Postel's model and *how* they are implemented in the digital realm? Its pretty straightforward. SMTP defines a user mail request addressed towards a receiver. The SMTP-user is a digital process which literally initiates a dialogue with the SMTP-receiver. Certain sequences of ASCII code, i.e. "MAIL", "RCPT", "DATA" or "O.K." are exchanged between the participants in an orderly fashion. Here is the general idea as outlines by the RFC:

> The SMTP design is based on the following model of communication: as the result of a user mail request, the sender-SMTP establishes a two-way transmission channel to a receiver-SMTP. The receiver-SMTP may be either the ultimate destination or an intermediate. SMTP commands are generated by the sender-SMTP and sent to the receiver-SMTP. SMTP replies are sent from the receiver-SMTP to the sender-SMTP in response to the commands.

This sounds like a perfectly reasonable way to automatize mail exchange. The familiar vocabulary is in place and technical details are relegated to the appendix. But there is much more going on behind this deceptive facade. Postel's initial move in adapting mail for an internet environment is simple and bold: his "users" are digital processes, conforming to the rules previously obeyed by humans. I am not complaining about technoid reification here, the case is more complex than that. Postel's prescriptions organize the digital realm according to the traditional paradigm — but there is one important twist.

This is *digital* mail delivery: given certain constraints a client process transmits data to a server process. But what about the user *of the mail system?* Postel's design imprints our notions of mail exchange upon digital procedures, bracketing the entire context of human use of the protocol. In adapting the concept of mail for application within an inhomogeneous computer network he does not touch upon socio-cultural considerations such as which persons are supposed to send a mail to which recipients. Many people would hold that it is all right to skip the socio-dynamics of message control in favor of establishing an immensely efficient framework for data exchange — and this is where we hit upon a characteristic feature of Western attitudes towards technological innovation. Computer programs lack intentions. Conceptualizing them as "users" deprives one of the descriptive means to impute them bad faith by spamrning a mailbox.

Such activities fall outside the range of SMTP, which is, however, not completely innocent. It is precisely because this protocol embodies the decision *not* to take care of possible abuse that we are currently confronted with massive spam and security problems. It would have been comparatively easy to include some authentification clauses into SMTP, it just did not occur to the author and the reason has become obvious: The human users actually employing the programs implementing SMTP did not enter the picture of inter-process communication. This is a typical situation and — to repeat — I do not want to turn it into an argument against technological advances. The aim is rather to show the social embedding of selected internet protocols and to discuss some consequences of the feedback between models from computer science and their originals, i.e. SMTP and mail.

TELNET

Spam is a highly charged example, I'll continue with more general observations about the social character of some protocols. We have to distinguish two types of "users", digital processes and humans. Keeping an eye on this distinction one can describe the communication pattern implemented by SMTP as an asymmetric and asynchronous message exchange. E-mail is a one-way transaction, allowing for a certain time-lag, subject to the contingencies of data delivery and the recipient's behavior. This is in marked contrast to another kind of protocol of which "telnet" is an early and easy example. John Postel (together with J. Reynolds) is, again, the author of the RFC in question (RFC #854, dated May 1983). And his introduction is, as before, a beautiful setting of the stage:

> The purpose of the TELNET protocol is to provide a fairly general, bi-directional, eight-bit byte oriented communication facility. Its primary goal is to allow a standard method of interfacing terminal devices and terminal-oriented processes to each other.

Telnet is bi-directional and synchronous. The protocol, like SMTP, is designed to link two IT-entities within the conceptual framework of employment in use: "The 'user' host is the host to which the physical terminal is normally attached, and the 'server' host is the host which is normally providing some service." This type of exchange is basically meant to interact with distant computers regardless of the hardware specifics of either the local or remote system. ASCII code is transmitted back and forth, but not to be dispatched to a human user mailbox. Telnet provides facilities to list information and run programs on computers available in the network. There is no obvious predecessor to this digital transaction, hence the lack of a suggestive name. And it is not by coincidence that this protocol — and in particular conforming applications — are much less familiar than SMTP.

Telnet is an expert's tool. In general, there is no need for an ordinary user to interact with remote machines. Starting and monitoring processes is part of system administration. This is where the synchronous nature of the protocol comes in handy. Its workings are modeled along the pattern of the physical employment of some machines, for example microwave ovens. A user interacts with such items in real time. She transmits commands that are (in most cases) to be directly executed, making her a participant in a live event, which simultaneously includes human input, digital sequences and their mutual feedback. Obviously, this is more demanding — and interesting — than e-mail. It is a very simple instance of tele-presence in the following sense: A person is afforded global, on-line access to digital resources in real time. This protocol close-circuits the human user and her digital opposite. It does not only copy text from one place to another but, additionally, enables one to personally execute programs in faraway locations, since text strings can be interpreted as command sequences on the host machines. SMTP and telnet represent quite different modalities of internet space, clearly involving distinct temporal patterns and diverging, attitudes. The point can be made more forcefully by looking at another synchronous protocol.

IRC

This one, dating from May 1993, provides the standard for chatting, or, as it is officially called, for the "Internet Relay Chat". The general description is characteristically concise:

> IRC is a teleconferencing system, which (through the use of the client-server model) is well-suited to running on many machines in a distributed fashion. A typical setup involves a single process (the server) forming a central point for clients (or other servers) to connect to, performing the required message delivery/multiplexing and other functions.

The traditional prototype invoked is of a one-to-many telephone conversation, establishing a shared information space in real time. IRC is meant to be a two-way communication platform for humans rather than an human-computer-interface and it provides one of the most remarkable cases of a concept being morphed into dramatically new forms in the course of digital implementation. (Turkle, 1995; Holmes, 1997) The case is different from the mail system and its re-invention within the bounds of digital networks, since tele-conferencing is an established pre-Internet practice. It is, in fact, easy to run phone conversations over data lines, but this has, interestingly, not yet proved very popular. No extra disembodiment is involved here, it is just a matter of different transport layers transmitting the human voice. The surprising impact of IRC is only indirectly linked to digitization. The crucial move is the transposition of voice into writing. This is not even mentioned in the protocol specifications, even though it completely upsets many customary rules of group interaction. It is an impressive example of cultural change via the experimental redeployment of a given practice within a new technological framework.

Group conversation can only succeed if people take turns in talking. There are social and visual cues governing the necessary procedures. Now, if one substitutes "conversation" by "writing", sticking to the rest of the parameters, surprising changes ensue. Participants in global, real-time group writing can very well be active simultaneously. Rather than their voices drowning each other, their sentences appear in linear order on the terminal. Furthermore, no bodily cues are available, not even vocal modulations indicating the beginning and the end of an utterance. At the moment of typing a contribution a group member cannot know what's next to appear on her screen. No wonder that chat strikes first time users as a chaotic event. "Teleconferencing" just does not capture the phenomenon.

The IRC protocol outlines a globally comprehensive electronic board for people to exchange messages in writing simultaneously and with a minimum of access restrictions. One might justifiably argue that these are optimal conditions on which to build uncoerced discourse along the lines suggested by the Frankfurt School. I cannot give a more detailed phenomenology of this new communication setting here and thus conclude the first part of my presentation with drawing attention to an important difference between SMTP on the one hand and telnet or IRC on the other. While the former protocol delivers information regardless of the momentary activity of the human exchange partner, telnet and IRC demand immediate involvement. Its "asynchronous" versus "synchronous" if you want to put a label on it. But, as my second part will show, this terminology barely captures the social and methodological distinctions the respective protocols give rise to.

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Teaching Aides

Internet Protocols serve many purposes and presuppose a variety of real life scenarios. There is no general rule determining how those scenarios are to be modeled in computer science constructs. The concepts of "time" and "name", to pick two examples, are implemented in the "Network Time Protocol" (NTP) and the "Domain Name System" (DNS) respectively and do not follow any common translational pattern. But it has become obvious that some of those protocols preserve the structure of their common sense prototypes relatively well, whereas some others induce more fundamental changes. A "ping" is easily recognizable as a kind of "knock on the door" and SMTP owns its popularity to the fact that, for all its amazing achievements, it fits in pretty well with established practice. IRC, on the other hand, might be called an *unsettling* protocol. It does not so much extend but rather explode the concept of tele-conferencing. Why should one pay attention to these matters? One reason is that those protocols produce very different kinds of social behavior once they are re-appropriated by cultural agents. We have to learn to distinguish between more or less conservative techniques. To show the inhomogeneity of the field I turn to an, admittedly eclectic, account of internet use in university teaching. The first point of reference will be a tool-set developed along the lines suggested by IRC, whereas the second reference, exemplifying the more reassuring part of the juxtaposition, will be to so-called LMSs, i.e. Learning Management Systems.

MUDS OBJECT ORIENTED (MOOS)

Chats, while providing instant global tele-presence, are transitory events, like conversations. A "chat room" comes into existence by fiat, all that is needed is for a user to define its name and it ceases to exist with the last participant "leaving" the chat room. There was, therefore, an early interest in a more stable environment, enabling people to "come back to a given place" and actually customize it by adding some design. One way to do this is to build a server program that does not only switch messages on the network, but in addition administers a database containing extra information and in particular keeping records of participants as well as storing the descriptions of separate accessible "chat room". Such programs were the technical underpinnings of what was to be called text-based, inter-active virtual worlds. These worlds, in turn, are the underpinning of "virtual communities" that provoked considerable theoretical interest in the late nineties of the last century. (Jones 1995; Shields 1996) Digital communities are, indeed, an issue of utmost importance for the understanding of how real life concerns are projected into a tele-communicative network.

One basic principle quickly emerged: in order to achieve the desired persistence, you have to draw on common cultural pre-dispositions. It's not sufficient to invite people into the columns of a database. You have to address their imagination. The contents of those databases were, consequently, elaborate descriptions of "rooms" to change between and to "meet friends". The prevalent cultural pattern among the early participants in this enterprise were fantasy- and role playing games as well as adolescent combat simulations, so most of the resulting "MUD" (Multi User Dungeon) servers offered a rather quixotic brand of "virtual community".

One should not be deceived by the fringe character of those early explorations. As global, digital tele-communication expanded, MUDS where among the first attempts to

test and transform given social institutions within the framework of emerging social IT-structures. Among the basic terms that were re-defined in those virtual environments where "talk", "move", "look", "take" and "exit", to name but a few. To analyze how these and similar terms were constructed within programming languages is a fascinating exercise that has, unfortunately, to be omitted here. Let me just mention that a considerable amount of popular hype about "virtual space" might profitably be exchanged for a few remarks on the translation between socially shared real life imagination and talk of servers joined to databases.

For the present purpose this concludes the pre-history of the pedagogical device I have in mind. "Muds Object Oriented" (MOOs) are a refinement of MUDs that introduce the present standard of software development, i.e. object oriented design, into the language used to manipulate the data core. Some such cores are explicitly designed for educational purposes and one of them, whimsically called "enCore" served as a teaching tool in several of my classes since 1999, well before the craze of learning platforms hit the continent. The standard reference to enCore is Haynes and Holmevik (1998). Jan R. Holmevik (2004) is a comprehensive Ph.D. thesis on the subject. For the history of online communities see Bruckman (1992), Reid (1994) and Preece et.al. (2003).

FREIRAUM

You might be familiar with a popular genre of computer games exemplified by the "Civilization" series. The players are supposed to create and foster for a digital tribe, which is either modeled after some literary original or loosely similar to a genuine historical society. The appeal of such settings seems to be the nation-building angle with a human actor playing God to her subjects. Adapting a MOO had a flavor of such games. Some helpful tools are already built into the database. In addition to being able to add "rooms" users could quickly create "notes" and "containers", include texts and pictures as well as links to distant "rooms", designed by colleagues. They had, at their disposal, the prototype of a "tape recorder", and a "movie camera" as well as the bare outlines of a "bot", i.e. a programmable software gadget entering into (some kind of) conversation with the avatars populating the MOO.

From the point of view of the teacher an interesting feature is enCore's generic "lecture room" providing some welcome filtering of the conversational turbulences that quickly result when students are invited to gather at a place and listen to a MOO lecture, which is another built-in resource, enabling a teacher to publish a pre-recorded text in real time and in a piece-meal fashion, interspersed with live discussion. This procedure can, in fact, be extended to provide the equivalent of a power point presentation. One command set provides for pictures being sent to a browser frame visible to any user present in the "lecture room". This is sufficient equipment to map some of the most common classroom practices onto an IRC-plus-database environment. Basically, it is an internet protocol supplemented with a set of special purpose software add-ons. So, how was this framework actually used, or should I say how was it inhabited by the participants of my seminar on Friedrich Nietzsche's "Also sprach Zarathustra"? (Cf. Hrachovec, 2002)

The Freiraum MOO developed into a playground for experimental writing, philosophical employment of software and virtual encounter. While I took care to put away enough time for traditional classroom instruction on Nietzsche's book students soon began to react by taking up *Zarathustra* motives, transforming them into narratives within the MOO. Zarathustra's zoo was established, as well as a brothel featuring the famous photograph of Nietzsche and Lou Andrea Salome. There was a cemetery including God's grave and a desert dedicated to the author of the lines "... weh dem, der Wüsten birgt". A monastery was built, pointing to the achievements of the Christian regime in preparing for the "Overman" who was, of course, depicted in comics fashion. One could enter an itinerary telling the tale of the demise of "the true world" and a labyrinth containing an extensive hypertext discussion of Deleuze, Klossowski and Foucault on Nietzsche. And one of the most elaborate sights was a sequence of rooms offering a Nietzschean view of Sergio Leone's film "One Upon a Time in the West".

The MOO server had, in short, triggered a surprising variety of individual reactions to a philosophical doctrine, evoking an unprecedented drive to merge private fantasies into an imaginary, yet public architecture, held together by the loose metaphor of a small German 19th century town. Philosophers like to write general accounts about the tension between technology and culture. The MOO experience provides another approach. All participants were perfectly aware of the fact that they were entering text into a database. Yet, they were just as certain about the social meaning of the enterprise. Technology and narrative were not perceived as separate domains. One had to simultaneously learn the languages of Nietzsche and the MOO. While the result might not be up to the standards of professional exegesis of the Nietzsche corpus it is a persuasive exercise in media philosophy.

So much for creative writing. (On this point see Bauer, 2003; Le, 2002) I now turn to the philosophical employment of the software and will touch upon two examples. The first one is a kind of self-made edutainment project. Taking their cue from adventure games a group of students designed a high-rise building which, at each level, offers material on Nietzsche's life and philosophy. In order to ascend to the next level you have to be familiar with the instructions given on the previous one. This will let you answer a key question needed to proceed. When a player finally reaches the top and steps out on the roof she is greeted by Zarathustra's animals, i.e. the eagle and the serpent. Nietzsche's catharsis is mirrored in the adventure format and the reward for having completed the game is playfully fused with the philosopher's own doctrine of self-fulfillment exceeding the human subject. This is, to be sure, not profound philosophy. The second example, however, is a more sophisticated exercise in circularity, a technophilosophical demonstration of the eternal recurrence of the same. The "Galerie Bois" is a collection of 24 icons arranged in a dial-like fashion. Pointing the mouse at an icon pops up a Nietzsche quote. And as you explore the room you notice an endless flow of text produced in the adjacent frame. Two little girls keep repeating an invitation. "Hello, Danny. Come and play with us. Come and Play with us. Forever. And ever. And ever." The girls and the quote are taken from Stanley Kubrick's "Shining". When, finally, you klick the button to leave, you are, however, in for a surprise. There is no exit; you are returned to where you started. It's only after several tries, accompanied by appropriate comments, that you are released from this intelligent and entertaining philosophical trap.

The Freiraum experience points back to the issue raised in the first part of this talk. Social behaviour and even philosophical articulation are built upon (and in turn shape) software constructs. A MOO is not just a text depository. Due to the IRC heritage it is a place where persons or, to be precise, their avatars, are quite literally moving between letters. Within the shared digital space provided by the server, text and visuals of different origins are synthesized, items taken from the data base *and* items inserted from on-going tele-typing are fused into a screen output. Secondly, a virtual community of human participants built upon hybrid data exchange can be regarded as an emergent property of the server functions. Questions concerning identity, embodiment, representation and responsibility arise in due course, yet I shall confine myself to an observation concerning tele-presence.

The IRC protocol is of considerable philosophical interest because of the following novelty: It enables interactive live exchange between persons at widely different locations. (Goldberg, 2000; Hrachovec 2003) Notice that they share a common time, but not a common place; real time meets the virtual blackboard of the chat server. In other words, the participants are present to each other even though it is only their avatars "meeting" on the screen. Our received notions of presence and absence are in for some revision here and, to stick to the current case, the change is already well under way. The MOO is quite unique in inviting participants to use pre-programmed as well as live on-line interaction with avatars to develop ideas and to provoke thought. It is a medium not only to contain and transport information but, at the same time, allows users to explore the modalities of mediation and to *employ* them in turn as (meta-)information. Here is a quick and concluding example. We had arranged a guided tour through Freiraum for students from the department. As they logged in they were invited to enter a "bus" that led them to assorted sights. Suddenly the bus got stuck in a traffic jam that was, as it turned out, caused by a demonstration of students protesting cuts in the university's budget. Do I have to add that this very day a real life demonstration was to take place?

LEARNING MANAGEMENT SYSTEMS (LMS)

I started by discussing the peculiarities of three internet protocols and proceeded to describe, in some detail, how an offspring of IRC and interactive text-adventures can be employed in a philosophy class. A hidden agenda has been governing those remarks. Surveying the field of e-learning which is currently very much in vogue all across the Western hemisphere you are unlikely to find much on protocol issues or on the MUD-MOO-tradition. You'll rather observe vice chancellors and deans struggling to prepare their institutions to meet the challenges of "knowledge society" and "innovative teaching". (See e.g. the SETT Guide) Committees are established to lay down criteria and to advice policy makers on how to pick one of several high-power "platforms". Tutorials are offered to the teaching staff and students on very different levels of digital expertise, some of them clearly outperforming their teachers are approached. This is a dense and confusing situation. My claim is that beneath the numerous strategy papers and feasibility reports the RFC regulations are still instrumental in determining the kind of social interaction promoted by e-learning experts. And a quick way to describe the scope of those platforms is to point out that – contrary to IRC-based software – they are built upon the HTTP protocol.

Earlier on I have distinguished relatively unassuming protocols like SMTP from a more exiting variety exemplified by IRC. HTTP, for all its pervasive power, is more similar to e-mail than to chat. It is, most importantly, a so-called "stateless protocol". A client asks for a resource from a server, the server attends to the request and this is it. In an important sense there is no tele-presence involved. Here is the initial self-description of the project, written by Tim Bemers-Lee (RFC # 1945):

> The Hypertext Transfer Protocol (HTTP) is an application-level protocol with the lightness and speed necessary for distributed, collaborative, hypermedia information systems.

Like e-mail, which extends, but does not dispose of, the notion of mail, the WWW adds considerable strength and versatility to the time-honored practice of textual cross-references. But even as it developed into a truly hypermedia information system it still preserved a clear distinction between author and reader, provider and consumer. The mail system defines senders and receivers; text, hypertext and hypermedia are likewise products coded into a medium well before they are offered for distribution. On the web there is nothing approaching the instantaneous interchange of contributions essential to IRC. Efforts have been made to provide user identification and persistent processes are constructed by means of cookies and applets. The WWW is, nevertheless, to a large extent a gigantic shopping mall, offering commodities from the inexhaustible reservoir of human culture.

To observe this is not to belittle the *effort.* The fact that this kind of consumer-enhanced information system has proved to be a profound success has to be recognized. Yet, in order to keep things in balance, one has to take the alternatives into consideration. And in particular one has to ask whether the almost exclusive reliance of standard e-learning platforms on the HTTP protocol is the only desirable option from the educational point of view.

There are, to be sure, some glaring deficiencies in the pedagogical use of MOOs that make employment of HTTP very attractive. I have to mention that the enCore suite of programs, even though it can be run outside the WWW, relies on a web server for its multimedia content and for easy click-and-go functionality. But, more importantly, even though MOOs are built on data bases, those resources are not what you might expect. The core of the lambda server underlying the type of MOO sketched above is an essentially free-style aggregation of software "objects" like rooms, tools, user data and so called "verbs", i.e. code sequences applicable to objects, causing a certain behavior. None of this is held together by any overarching structure. In other words: while users are welcome to build their own personal fantasy worlds it takes quite an effort to coordinate those activities and make them transparent to an outsider.

MOO worlds are unique constructs, difficult to categorize and almost impossible to generalize. This is, of course, part of their appeal, but it also means lack of standards and considerable difficulties in finding one's way. Databases employed on the Web are, on the contrary, usually well organized to fit a particular purpose, e.g. to support a forum, to hold a list of items, to provide a picture gallery or to answer search requests. Since the scope of opportunities is very different, the question arising is obvious: On what kind of protocol should computer assisted teaching be based?

Two answers immediately suggest themselves:

- The adequacy of electronic tools depends on the general pedagogical strategy employed.
- There really is no question here. Web-based e-learning platforms are all there is. Experimental educational MOOs are but an insignificant exception.

Both replies are plausible – and this is just the issue the preceding exposition has been leading to. As the time-honoured practice of university teaching is gradually drawn into the effective range of tele-communication technology various protocols are beginning to exert their influence. And it is a patent fact, as well as a somewhat disturbing observation, that a certain kind of protocol is widely seen to be the only option available. Put in traditional terms this is the equivalent of reliance on text books in contrast to the on-going activity of teaching itself. The hypertext protocol, supplemented with database support for greater ease of administration and orientation, offers an exiting extension of multimedia strategies.

IRC, on the other hand, redefines what it means for persons to interact in the digital realm. *Both* options are, of course, promising approaches and should be investigated and evaluated. E-learning platforms are well suited to model the institutional framework of university teaching and to provide easy access to an attractive range of hypertextual as well as audio-visual educational modules. Such platforms do not provide an electronic classroom, though. Teaching is, among other things, a live endeavor. Students are given the opportunity to experience knowledge in action. If you want to try *this* on the internet you have to turn to a teleconferencing protocol. And it seems highly significant that very few educators do.

I have, for expository reasons, presented a simple contrast and hasten to add some modifications. Many available e-learning platforms include awareness software and chat facilities. Protocols can be mixed within an overarching program catering for *both* the need for a pedagogical repository *and* educational events. The basic alternative, however, remains in force. One option is to start with educational material and add a forum or some kind of live component to what is, in essence, previously given content. Alternatively, one might put the emphasis on the tele-communicative process and regard content as something resulting from the exercise. In actual teaching both steps are, obviously, systematically intertwined, but this is not often the case in e-learning. Hypermedia content and educational tele-presence do not mix well. The obvious reason is the difference in protocols and we can now retrace the problem.

Nobody would even *think* about confusing a text with the classroom teaching of this text. Educational competence consists in mediating both sides. Consider, however, the following scenario. Texts are building blocks of HTTP transactions, whereas live conversation is ordinarily handled by the IRC protocols. Two windows show up on your monitor, obeying similar rules on the level of the operating system and entirely different ones as far as user interaction is concerned. Precisely because those windows (most likely) look quite the same, the crucial discrepancy is not even noticed. So-called e-learning platforms are less than helpful in mediating the soliloquy of the experts with the polyphony of the student's voices. Since this seems to be the crucial move in teaching and *learning* those platforms are somewhat miss-named.

Do not mistake me for a MOO evangelist, I only want to get the record straight. The Web is, to repeat, an excellent place for information transfer and it is not a medium for context dependent feed-back procedures. The asymmetry between server space and

client requests is written into its agenda. It is a highly effective distribution mechanism but one would want university teachers to think twice before exclusively focussing on this capacity, which is, after all, a fancy way of spreading handouts. *Applying* content and thereby changing its initial status is just as important an exercise, even though it is an unpredictable, in-orderly and less than transparent process. To put it in another key: it is a creative cognitive enterprise and in particular so if one explores the yet largely uncharted terrain of live on-line education. If one is clear about this one will be in an better position to assess the actual promise of current LMSs.

Imagine a collection of paper handouts. They are bound to be of different scope **and** quality, covering a wide range of topics on various levels of detail and quite possibly contradicting each other on a number of points. Exactly this situation currently holds with regard to the educational content available in e-learning platforms. University teaching has traditionally been an aggregation of micro-practices based on comparatively loose standards and a considerable amount of idiosyncratic choices. It is, therefore, not surprising that digitized educational material exhibits similar patterns. But this, of course, is only part of the story. Network access to teaching aides inaugurates unprecedented opportunities to transform collections of handouts into a much more coherent body of knowledge.

The issue, obviously, is too big to be covered here. But it serves well to draw attention to the direction higher education is headed to in a networked society. E-learning platforms will increasingly be expected to implement standard procedures to classify and advertise content. This will enhance the interchange in educational material and significantly contribute to the creation of a market for digitized pedagogical commodities. Several meta-level description of the relevant teaching resources have been proposed and it is to be expected that they will eventually merge into a set of guidelines governing inter-platform employment of digital educational materials. An unequaled opportunity to compare and improve such tools will thus arise. It has to be admitted that globalization of knowledge components will put considerable pressure on local traditions of learning, very likely narrowing the scope of what is considered accepted scholarship. Yet, on the other hand, knowledge can be distributed more extensively, much easier and less costly — on the condition that it is not closed in by "elite" institutions and commercial data providers. (Cf. Faber, 2002) Standards for information exchange are important to enable a wide variety of content to be shared on a global scale. HTTP is a prominent example of how successful such protocols can become. But don't forget that there are alternative protocols, by no means less general and yet addressing different needs and giving rise to more localized cultures.

In Place of a Conclusion

Pavel Curtis is a software engineer and author of the server program underlying the enCore MOO. He is also the founder and arch-wizard of LambdaMOO. Here is a rather somber sum-up of his experience:

> Deep in its very structure, LambdaMOO depends on the wizard and on the owner of its machine. These are not and cannot be purely technical considerations. Social policy permeates nearly every aspect of LambdaMOO's operations, and only the wizards can carry out those operations. As a result, the wizards have been at every turn forced to make social

> decisions. Every time we made one, it seemed, someone took offense, someone believed that we had done wrong, someone accused us of ulterior motives. (Curtis in Haynes, 2001 p. 41)

Computer enhanced learning mixes the need for strict compliance with a digital ruleset with previously unknown prospects of social interaction. It is to the credit of the engineer that he articulates the resulting dilemma. Compare this to a homepage or to the handling of a content management system E-learning can hardly succeed without facing the conflict between protocols and pedagogy. This conflict is obvious in MOOs, but hidden behind standardized teaching design in "Learning Management Systems".

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Some Relevant Web Sites .

Requests for Comments: http://www.ietf.org/rfc.html
MUDs: http://www.mudconnect.com/
Lambda MOO: http://www.moo.mud.org/

EnCore: http://lingua.utdallas.edu/encore/

E-learning platforms: http://eml-sig.euleam.net/services/Links/displaycat.cfm?Catldd¯336

Collections of Learning Objects: http://www.uwm.edu/Dept/CIE/AOP/LO_collections.html

http://www.northern.edu/idtc/faculty/leamobjects.htm

Educational Modeling Language: http://eml.ou.nl/eml-ou-nl.htm

Steven's Web: Knowledge – Learning – Community: http://www.downes.ca/
Freiraum: http://freiraum.philo.at:7000.