

MirandaNet: a Learning Community – a community of learners.

This paper was originally published as:

Cuthell, J. P. (2002). A Community of Learners In: Distributed Cognition Karasavvidis I (ed.). Journal of Interactive Learning Research. 13 (1/2) (pp. 169–188) Association for the Advancement of Computing in Education Norfolk, VA

Abstract

Traditional models of learning have reified into concepts of learning, with the teacher frozen as the embodiment of skills and knowledge that have to be passed on to students. In the United Kingdom, the New Opportunities Funding CD-ROM, produced to develop teachers' ICT curriculum competence, was the embodiment of that viewpoint at the junction of the 20th and 21st centuries.

The pace of change in industry and technology had burst through into schools. The syllabus had been expanded to the point of absurdity: the application of knowledge became a critical issue for those who navigated these shoals as captains of industry. Just-in-Time became the watchword for Learning, as it was in industry. Whereas Industry had re-engineered itself, however, Education, like Lot's Wife, looked backwards.

The pace of change often means that teachers carry a train of conceptual baggage, with expectations as to what should be taught and why it should be taught. These conflict with students as practitioners, who battle with the teachers and academics who act as the gatekeepers over what constitute standards.

Knowledge is seen as contained in artefacts – 'knowledge artefacts', whereas for many students knowledge is contained *within* the artefacts of production: the artefacts produced.

The MirandaNet community consists of teachers and academics as practitioners, who embody the problems faced by their students at the bleeding edge of technology. Within this community cognition is manifested as both materiel and social. New technology is both the network for communication and also the collective memory of the community.

The website acts as the repository of memory: newsletters, case studies, the forum for meetings, workshops and conferences; the source of expert knowledge, with the posting of questions and collaborative learning.

This paper examines the ways in which MirandaNet, as the social construction for how we learn and why we learn, forms the focus for life-long learning. The distributed cognition manifested within this grouping of practitioners disseminates into the wider structures of education.

MirandaNet: a Learning Community – a community of learners.

Background

“MirandaNet is an international Fellowship of educators, established in 1992, who have been using Information and Communications Technology (ICT) to change their teaching and learning practice and to develop innovative models for continuing professional development. The mission statement (developed by its on line community,) proclaims that MirandaNet strives to enrich the lifelong learning of professionals involved in education. Using advanced technologies the Fellowship spans social, vocational, cultural and political divides to create lifelong learning solutions for the education market place. MirandaNet provides an innovative and inclusive forum for the agents of change that recognises individual learning patterns through peer mentoring and action research strategies. Research, evaluation and on-going discussion underpins and supports good practice and the sharing of enabling strategies. Dissemination and publication are central to the Fellowship process.

Central to this learning community communications internally and publicly are a web site, MirandaNet, and Mirandalink, the closed conference system. The central research interest of MirandaNet is in the use of action research methodology as a means of empowering teachers who use ICT in the classroom. The Fellowship was able to study wider applications of on line community building since 1999 because they piloted Think.com, a web based learning environment, in partnership with Oracle.” (Preston, 2000)

Definitions of a learning community

Initial definitions of a learning community emerged in the USA from 1990 onwards. They were seen as communities consisting of a large number of students and a small number of teachers, with the community supporting and developing the students’

learning. In this context the learning community was a part of the wider community of a college or university in which the learning was situated. (Gabelnick et al.,1990; Tinto, Love, and Russo 1993; Dana Foundation Report 1990)

In this context creativity and learning become synonymous: for those engaged in teaching, the experience of being a learner once more is a valuable corrective to what have often become 'professional reflexes'. The opportunity for creative collaboration within a learning space is often in sharp contrast to the working environment of curriculum delivery, administration and meetings.

What is a Learning Community?

A learning community is a social structure which "purposefully restructures the curriculum to link together courses or course work so that students find greater coherence in what they are learning as well as increased intellectual interaction with faculty and fellow students" (Gabelnick (1990 p. 5)). It usually involves some combination of collaborative and active learning, team teaching, and interdisciplinary themes or approaches. Essentially, a learning community is "any one of a variety of curricular structures that link together existing courses--or restructure the curricular material entirely--so that students have opportunities for deeper understanding and integration of the material they are learning, and more interaction with one another and their teachers as fellow participants in the learning enterprise" (Gabelnick, (1990 p.19)).

The idea behind a learning community is to provide students and faculty with an opportunity to experience courses clustered with others connected by time, space, and intellectual interests. Learning communities provide students with an opportunity to meet others who share common classes, which in turn "allows students to feel comfortable in those classes and enables them to build a network with peers that then functions as both an academic and social support system by providing study partners, sources of class notes, and help with homework, and class assignments" (Tinto et al., (1993, p. 18)). Clustering students to form learning communities allows faculty to "teach students college-survival and text processing skills; provide enrichment and accelerated instruction in selected courses; provide adjunct or supplemental instruction congruent with specific course content, lecture, and objectives; help students build personal communities around shared academic interests, and train students to study cooperatively, to become a support network for one another, that is, to become partners-in-learning" (Betty McEady-Gillead 1992, p. 4). Learning communities are seen as especially

appropriate for lower division general education courses and for freshman. In essence, they "fundamentally restructure the curriculum and the time and space of students" (Smith 1993, pp. 32-33).

The expectations in the early 1990's, then, were essentially administrative and pedagogical: part of the academy, rather than a community of equals. Nevertheless, it was clear that the existence of the community predicated a range of learning outcomes that were dependent on the community.

Broadening expectations

At the same time as learning communities were identified as transformational in the relationships between learners, online communities were emerging that themselves facilitated learning.

Network communities are a form of technology- mediated environment that foster a sense of community among users. One of the design dimensions of network communities is developing a sense of persistent, shared space - an environment that frames the presence of multiple actors and provides mutual awareness. The shared space of a network community offers the potential for verbal and non-verbal communication at all times, but the space does not exist only when explicit communication is taking place. There is a "there" there, even when participants are quiet or absent.

In 1993, Rheingold identified the opportunities for the development of on-line communities

"Virtual communities are social aggregations that emerge from the Net when enough people carry on public discussions, long enough and with enough human feeling to form webs of personal relationships in Cyberspace."

Technology and transformations

Heppell saw the opportunities for learning communities and preserving diversity on the Net. "The ability to contribute is not only important in building effective communities, it is also the only protection for small cultures; without this two way bandwidth, powerful authoring tools and the resultant opportunity to originate material these small cultures (and Europe is rich in their diversity) will be engulfed in the same way that they have

been by the economies of scale of television or cinema. Culturally, dissemination technology is imposing, communication technology is empowering."

Online communities, then, were communities because of the technology. Their existence was both dependent on and a result of the technology, with its use embedding itself in the interactions of their members and their praxis. The more the community members participated, the more the virtual community embodied itself: and the embodiment of the community was the listserv or website which was its 'home'.

Heppell's concept of technology as empowering, however, is more than traditional concept of technology as a tool. The affordances generated by the actual tools of computers, keyboards, monitors and a telecomm system are the base on which the superstructure of the virtual community and its virtual tools are constructed. These generate a set of affordances which develop with each of the social interactions that take place within the community. As the interactions increase, the knowledge embedded within the community becomes available to all of its members. Each iteration becomes more powerful than its predecessor.

Learning and the online community

Learning to operate successfully within an online community involves stages that are remarkably similar to the stages of cognitive development. The first stage is dependent upon an understanding of email, listservs, websites and the ways in which the user can interact with these. Some users experience a long period of frustration before they are able to participate. These may be compared with the Piagetian sensorimotor/preoperational stages, or Bruner's enactive phase of learning.

The second stage requires the participant to learn the norms, the routines and etiquette, and the management systems of the community. In many ways these mirror the concrete operational or iconic phases of learning theories.

When the user is able to operate independently, mirroring Piaget's stage of formal operations, or Bruner's symbolic phase, the interactions within the community become transparent. Not only that, the competences can be transferred to other online communities.

The learning curve for the individual, then, is supported by the cognition distributed within the community. This distribution may be within the structure of the community: help files; automated messaging; checks supported by the software on which the

community is based. Cognition is also distributed among exchanges contained within the archive to which members have access. The greatest store of cognition, however, is distributed among the members of the community, to which the individual has access.

The exchanges that follow illustrate the ways in which knowledge is constructed from a series of exchanges. The summary of these is then embedded within the structure of the community. It is available for those who may wish to use it either as a source of reference, or to transform further applications.

Buddies

Buddies are devices that enable a computer to be shared between two users. Each user has her own monitor, keyboard and mouse. The computer – hardware and software – is independently used by the students. Members of MirandaNet were trialling the devices. The exchanges between community members were then summarised.

Couple of good questions I have been asked about Buddies:

Question 1:

What are the implications for software licenses: in other words, does one have to shell out another licensing fee to Microsoft for every buddy that one has? It could be a problem - it would double the cost.

Answer:

Yep - if you're using m/office - ed site licence at approx £60 you still have a second computer for £150. Oh how the money goes! If you have a whole school licence you need to check upper limit 100, 100 - 250, 250 - 500 etc. You may not need to pay anything.

Question 2:

Buddy sometimes locks up when saving from two users.

Answer:

This is a software issue - not a buddy problem. Read the FAQs and Technical listed below - good stuff.

Buddy also doesn't like some combinations of network cards being present - but then they are meant to be in computers without network cards. Removing the card often makes the problem go away.

Once working they are good - we've installed 6 - only one problem and that was a redundant network card in the same computer.

Hope that helps.

Users were then directed to an online resource where more basic issues could be resolved.

Buddy website:

<http://www.austin.com.sg/>

For Buddy hints and tips - FAQs and trouble shooting guide look at:

<http://www.austin.com.sg/b210web/b210tech.html>

Alastair

Scoop: an online learning environment

MirandaNet members spent a year trialling software from the Oracle Corporation designed to be used to support educational communities. Feedback from users enabled the software development team to effect changes on a continual basis. Of possibly more importance was the way in which users were able to extend and expand their own understanding and use of the site. The software, Think.com, was originally called Scoop.

Is anyone else encountering real problems with Scoop?

I've spent so long trying to get material onto to my page without success that I've now given up. Every time I try to add an image, I wait for fifteen to twenty minutes for it to load 39% of the file and then everything gets hung up. This is really becoming annoying as we are supposed to be running an early adopter trial. I'd like to know if others are struggling with similar problems. David

David, Is anyone else encountering real problems with Scoop? I've had very few problems indeed - quite the opposite experience!

I wonder why some early adopters are having problems?

The sequence that followed this posting gave a diagnostic checklist, designed to identify the problem. The underlying assumption was that the fault lay with the end-user's equipment and connection.

- What bandwidth have you got on your connection?
- At what speed are you connected?

- What is the size of the image you are trying to upload (I keep to 40 - 70K per image)?
- Who is your ISP?
- Are you using dial up or are you going through a school proxy server?
- What type of computer are you using and what OS?
- How much memory is available?

If we can narrow down the cause and replicate it with a similar system then we are doing a good job as early adopters. Alastair

One of the group who was responsible for producing the evaluation of the trial responded to the posting. Her question produced responses from a range of users, many of whom had assumed that the problems that they were experiencing stemmed from problems with their connections.

I think Alastair's questions here to David are very useful. Perhaps if everyone who is having problems with Scoop could give answers to these then we might serve a really useful service at an early stage. I do not have any problems accessing Scoop, putting information on or reading colleagues pages. I have cut and pasted articles on and this seems to work fine. Do we need to formalise Alastair's questions? Best wishes Jane (Field)

Is anyone else encountering real problems with Scoop?

Yes, I am - the first problem is actual logging on to the site - I find that I can't do it through MirandaNet - it takes so long that I am timed out! I can get in straight through to the newspaper bit of the site though. My next problem is similar to David's: waiting so long to put material on my page - even simple text, I have not even tried to put in an image. My problem is only with the Scoop site. I am logging on through JANET, the university system, which normally is pretty fast, no modems or problems with my own speeds of access, etc. Why then can Alistair get on easily and not some others? Regards John Meadows

At this point Jane Dorner, the web mistress, intervened in the debate. Her role was to provide feedback to Oracle, and her feeling was that they were more likely to identify any underlying problems.

Could ALL of you reading this return this email to me by clicking [HERE](#) (not the Reply button) and answer each question, whether you have a problem or not. I will co-ordinate all the replies.

The problem is also that I don't know the answers to these questions about bandwidth or connection speed - I just know I connect through JANET and it works for all the other web sites I visit! John Meadows Senior lecturer Education Division South Bank University

John's note about not knowing bandwidth is important for many people who will need to use the site. Teachers and pupils are unlikely to have control over the bandwidth they use, so we need some sense of whether there is a need for a minimum specification. I'd guess that this should not be a very high spec, since the system seems to run with most browsers.

I'm using the fastest modem I can get home, ISDN at school. I've used AOL and the school's local provider with similar problems. When we met to look at Scoop in November it was suggested that any file format could be used - is that really the case or the source of problems? David

I wonder if David is having an "AOL" problem rather than a Scoop one. AOL is a bit non-standard in the way it does things - especially the way it assigns addresses when you log on. Over to the techies. Ben

I'm afraid I'm like John and don't know all the answers to the questions! I just know it works ok for me. Jane (Field)

I have mixed experiences. Over the weekend when everyone is resting, I have no problems. Last night it was impossible to log on, we waited for a while then timed out. Putting a picture on in the early days was impossible, but that has now been improved. There are no guidelines to tell you how you are doing - ie your picture is being uploaded. Next time you log on it will be there! More interactive help is needed.

At school, because of volume of traffic we are slow, and I think that is down to bandwidth. I know when 20 students log on anywhere, we grind to a virtual standstill. I explain this as me standing in the door and 20 students trying to get out - no chance! I wonder if that is what is happening with Scoop - everyone wants to get in, but it is getting overloaded. What chance have we then when hundreds of students all want to get going? Basia

The problem also exists using other providers - not just AOL -it was the first thing I checked ! David

A number of users had identified similar problems, checked possible solutions and, though pooled resources, provided the information the engineers needed to resolve the issue.

Creating knowledge

This exchange was summarised by the web mistress, who sent out a message to all members of the community.

On Behalf Of Jane Dorner Sent: 01 October 1999 14:52 To: Mirandalink Where Why Which and What. Fellows and Scholars:

If you haven't yet visited Scoop, please access our own home page www.MirandaNet.ac.uk and go to it from there. Please do this rather than going direct as we want to monitor web traffic from our site to Scoop.

*We are trying to develop Good MirandaPractice -- i.e. the best ways of using the Scoop environment *for our community*. But some of you have reported difficulties with getting around Scoop. So, as your web editor, I have written a help file, which also tries to make suggestions about how we might make it work for us. This is not set in stone and I can change anything on request. It is at Scoop, but as you may prefer to read it offline I attach an HTML file of it (updated today).*

These two discussion threads centred on individuals' hardware and the software they were using. Knowledge was available within the members of the community: what this environment provided was an ecology that linked the elements of knowledge. It also combined them to produce an additionality that could be both shared by all of the MirandaNet community, and at the same time to transform the way in which the Scoop software was developed and used.

Distributed cogs in the machine

The final sequence of exchanges was generated by a posting from the Director of MirandaNet, Christina Preston. It reveals the range of relationships embodied within this virtual community, and the different ways in which its members approach learning and the construction of knowledge.

---Original Message----- From: Christina Preston Sent: Thursday, 20 January, 2000 8:37
Subject: mirandalink Are you a lurker? It is a published rule of thumb that of registered mail list user one third are active one third read one third are not really engaged Is this true? Which one are you? Tina Christina Preston Senior Research Associate MirandaNet Director Institute of Education University of London

I'm afraid I'm a reader - an avid one, but don't get the time to reply to things. Michael Denton

Or they might have and not replied -or then again they might have been too busy to reply. I think I fit all three categories at some time or other. Robert Ellis

I am an avid reader, feeling as if I have another life as I follow what is happening in the school environment and consistently impressed with the high level of resourcefulness and engagement being demonstrated by Mirandalink correspondents. The only messages I don't like reading are the ones consisting of one or two words - disappointing! At this small liberal arts American international university we are developing the use of First Class, inter-university collaborations, refining students' use of the internet for research, and in April will have a conference on our Richmond campus about software for teaching languages. If anyone is interested please contact my colleague on Best wishes and good luck to everyone, Alice Tomic -

Hi I'm here! (if not very active). Hence the late reply. Paul Paul Shabajee ARKive Research Associate Faculty of Education University of the West of England

Does semi active count? It really depends on how busy I am. Most of the time I am active David Fuller Oundle IT Centre

As a regular reader, I now realise you expect everyone to reply. So I become more of an active participant. Isn't this what scientists say about all observation affecting the results? Anyway, I'm happily here, always reading, very active in ICT issues broadly (including doing quality assurance work for the NOF trainers), and therefore welcoming membership - if at times passive - of MirandaNet. I was even talking at BETT last week - but on another day, another topic. I'd prefer 'listener' to 'lurker', but either way, I'm one. Julian

Steve Copley P.S. After my pre-Xmas stop about personal messages on Mirandalink (my mail box was rather full of them after 2 weeks of neglect!) I'd like to say a nice big thank you to everyone for just putting up messages that we all want to read. Hoorah!

This last posting followed a discussion started by a request for information about the most appropriate PC to purchase.

Well - I may be a lurker but I've been especially fascinated by the debate on 'What computer' best yet. Julie

I guess a bit of all three at one time or another. Geoff Manuel

A wonderful response to the lurking poll! Great to know you are still there. Just carry on in whatever way suits you best. Any more out there? (You are proving the rule of thumb ratio!) Regards

Subject: Re: mirandalink Are you a lurker? Date: Fri, Jan 21, 2000, 6:29 PM I guess a bit of all three at one time or another. Geoff Manuel

Yes, I am. I do my best to read this list regularly. From Chile.... Enrique

I guess I'm an avid reader, frequent idea-taker and URL-copier, but only rarely reply. I did once start a discussion ... (got some interesting replies, but they were to me rather than to the whole group. Francis Howlett

Tina I thought a Lurker was a kind of gun dog - cross between a greyhound and a border collie - perhaps its an apt image - I am always chasing things that other people have just shot down!! Sue Heightman

I think Sue you mean a lurcher (the dog) Anyway I read everything, respond to most things when I have an opinion and sometimes do nothing because I've lost the thread.

Yes, I am a constructive lurker, meaning: do not kick me off just yet! I read 80% of MirandaNet mailings, and if there is an issue of use to the group and my current project - training for women entrepreneurs and women - run small business to use the Internet effectively - - it could be useful. Hilary, WEEN Co-Ordinator University of North London

Just lurking too! John Konrad Senior Lecturer in Professional Development School of Professional Education & Development Leeds Metropolitan University

Just Lurking as well. John Seward

Dear MirandaNet members, I have to apologise that one of my messages to a list of international MirandaNet people has been copied to the whole Miranda list - it was not my intention to start this discussion about lurkers etc., but rather to check on the list I was given. However, it does seem to have had an effect on many more people, and the discussion about "lurkers" vs active members of a List is an interesting one. Many people begin (sensibly, I think) by "lurking", i.e. reading the messages and thinking about them, without actually responding publicly. Often this "lurking" period is followed by a more active phase, but in some caases, we may keep on a list, without

actively contributing, for a number of other reasons. I think the "lurker" role is a useful one and that people should not always feel obliged to contribute automatically. Thoughtful and considered responses are usually much more useful than instant replies anyway. What do others think - is there a useful role within this idea of "LURKING"?
Regards John John Meadows Senior lecturer Education Division South Bank University

Dear John et al, It has been fascinating to learn of the wide extent of the Miranda people network, so please do not apologise. We even learnt about DOGS during the discussions. Lawrence (Lurker number: 365)

Hi, I suppose I am a bit of all three. I always find time to read and catch up although not always contributing to discussions. I do enjoy keeping up to date with current issues through MirandaNet, and learn from them. As I am deep in my induction year I have at times become disengaged, but only for a short while. Regards Rukhsana

Hi I agree (with John) 'lurking' is useful function, in fact I think possibly a very necessary function in larger communities. Here are some things that strike me as important and interesting: 1) the role 'lurkers' play in defining a community, simply 'knowing that they are there', I think plays a large part in the 'sense of community identity of any community - physical or virtual. Many 'conferencing systems' have the facility to see a list of members. I certainly use that facility as part of 'getting to know' a community. 2) background communication - many people don't communicate via the public face of the mail lists or list serves (or physical meetings), and mail other members directly. So they appear to be 'lurking' but are actually 'active'... has anyone quantified that kind of thing? 3) in the larger community of communities (virtual and physical) some one 'lurking' in one community may be active in others. The transfer of ideas/information/hot topics/requests for help/jobs/... between them is probably facilitated in large part by the 'lurkers'...Again has anyone quantified that kind of thing? 4) I have been recruited to two virtual communities by 'lurkers' from those communities... so perhaps they play a significant but silent role in community building too? Paul Shabajee ARKive Research Associate Faculty of Education University of the West of England

I have a contribution on the etymology of LURKER courtesy of the Encyclopaedia Britannica-The EB explains the pronunciation of LURKER (lerker if you will) is the N American (USA) rendering of the name of lorca as in Garcia Lorca the Spaniard who wrote the odd play and poem. Sorry if this is a bit recondite but I am very much an occasional Lperson so I offer these diversionary observations to avoid getting drawn into

the frank admission that I am not. On the other hand I would be interested to find the Lorca web site to see what is going on! Anyone got the address? Sue Heightman

I am just making a note of recondite Something to do with Colonel Bloodknock? John Seward

When I was a student I read a novel by H P Lovecraft (whose name I know sounds more like a pay-as-you-go arrangement with Anne Summers!). It was a very gothic horror story called 'The Lurker at the Threshold', in which 'the Lurker' was a kind of nameless awfulness which hung around at the margins of the physical world, just waiting to pop in and make a hell of a mess for us humans by wantonly destroying and spreading evil and body parts in equal measure. Since then, every time I came across the notion of 'lurkers' in discussion of electronic communities, it conjured up images of Lovecraft's Lurker for me. How pleased I am, therefore, that the notion of lurking has now taken on altogether more benign connotations, as proved by recent discussions on MirandaNet. Tony Fisher School of Education Jubilee Campus University of Nottingham

Don't start on HP Lovecraft! They're coming to get me aghhhhhhhh! and such like. -- David Fuller Oundle IT Centre 01832 277129

Re: the last email... You can tell it's Friday afternoon... Have some people NO work to do? Lawrence (Sitting idly at his computer)

".....make a hell of a mess for us humans by wantonly destroying and spreading evil and body parts in equal measure." This description sounds like secondary school kids - what changes? A rather fed up, end of Friday, overworked, overstressed teacher of ICT. Enjoy your weekend Basia

I sent an anti-lurking message which seems to have gone astray - I hope not censorship! - ----- Me a lurcer? No - I read avidly, consider all and then apply Wittgenstein's dictum: 'Wherof one cannot speak, thereon one must remain silent.' Best wishes to all, Gordon.

I'm definitely a lurker and the fact that this is a day or two behind everyone else, it's because I don't seem to find the time to lurk very often. I'm glad when I do though and pick up useful bits of info. Very rarely respond because I feel there is so much stuff to read already that my two penn'th is not likely to contribute greatly. When I feel I can say something useful, however, I shall do more than lurk. Watch this space.

It all reminds me of that scene at the end of Spartacus, where all the downtrodden slaves claim to be Spartacus, so that they can have the honour of being done to death by the noble Romans. Me! Me! Take me! I'm a lurker! But isn't that how a whole lot of learning does on? One of the brightest students I've ever taught never said very much: half looked out of the window: looked rather bored. But every now and again he'd ask a question to clarify something that was puzzling him. He'd been tracking what was going on, but felt that he had nothing to contribute. I certainly feel that: I note all the postings about topics that aren't of direct concern to me, and only reply to those that I feel are relevant. And I reply to the sender, most of the time, rather than the group. I think that the use of the mail list is rather like the use of a discussion group: people feel that, because it's there, everyone has to use it. And those that don't aren't true believers. Enough of that. John

Mentors, Fellows, Scholars and Lurkers I intend to invest in a new data projector - I note the previous advice given. I want something portable which has a nice carry case, replacement bulbs that last (almost) forever and which don't cost a weeks pay. It has to be bright enough to work without total blackout and simple enough for almost anyone to use with no more than a quick look at the instructions. It should also be capable of being set up in a very short space of time and able to survive frequent trips to primary schools in some part of my car. I welcome your thoughts on the matter - or sample data projectors to test! PS I got my learning schools programme suitcase from OU/RM last week and have had happy hours explaining to 30 of our staff what NOF funding is all about. Robert (A lurking moth in the rich tapestry of life) Ellis

Distributed cognition in an online community.

The experiences of MirandaNet members encompass a range of roles. The themes with which they engage are as diverse as the backgrounds from which they are drawn. What is shared, however, is an involvement with education and learning. The involvement is both personal and professional, with demarcation between the two impossible. The ways in which one learns shapes one's teaching, and the ways in which one learns shapes further learning.

It is, perhaps, this last factor that provides the key to our understanding of the ways in which cognition can be distributed in an online learning community. Using the environment stimulates further learning, and this in turn shapes the way in which the environment is used. The debates about lurking provided the key for this: that active

learning is about participation, and engagement with the online learning environment counts as participation. The act of signing up to an online community and reading the postings provides access to the cognition distributed within that organisation.

Those who are active within a community, in that they contribute to postings, initiate debate and synthesise the submissions of others, are increasing the sum of the cognition distributed within the artefact/environment. This artefact/environment, consisting of hardware, software and what Lovink refers to as 'wetware', exists on a server, on people's hard drives as an archive but, most importantly, within the collective consciousness of the people – the 'wetware'. The cognition may be centrally stored by hardware, but it is distributed between the users' hardware and the users' consciousness.

And it is available for others to use.

References

- Adler, A. Xerox Systems Architecture adler@parc.xerox.com
- Barber, M. (1996) The Learning Game. Victor Gollancz, London
- Barber, M. (1997) In: Building A Literate Nation N. McClelland, Ed. (Trentham Books Limited, Stoke on Trent
- Bateson, G. (1972). Form, Substance, and Difference. In: Bateson (ed.) Steps to an Ecology of Mind. New York: Ballantine Books. pp. 448-466.
- Bruner, J. S. (1974) Beyond the Information Given. London. George Allen & Unwin Ltd.
- Bruner, Oliver & Greenfield (1966) Studies in cognitive growth. New York. Wiley.
- Bruner, J. S. (1966) Towards a Theory of Instruction. Cambridge. MIT Press.
- Charles A. Dana Foundation Report, (1990) Berkeley's Dana Center Runs A Race with Demand for New Strategies in Minority Education: A Wide Ranging Interview with Uri Treisman: vol. 5, no.1.
- Clements, D., Meredith, J. (1985) Research on Logo: Effects and Efficacy. State University of New York at Buffalo.
- Clements, D.H.; Nastasi, B.K. (1988) Social and cognitive interactions in educational computer environments. American Educational Research Journal. 25: p. 87-106.
- Clements, D.H; Gullo, D.F. (1984) Effects of computer programming on young children's cognition. Journal of Educational Psychology. 76: p. 1051-1058.
- Clements, D.H; Nastasi, B.K. (1985) Effects of computer environments on social-emotional development: Logo and computer-assisted instruction. Computers in the Schools. 2 (2-3): p. 11-31.
- Gabelnick, F. et al., (1990) Learning Communities: Creating Connections Among Students, Faculty, and Disciplines. Jossey-Bass, Inc., San Francisco.
- Ito, M. Stanford University & Institute for Research on Learning mito@portola.com

Lovink, G. (1995) 'The Media Gesture of Data Dandyism' CTHEORY 'Theory, Technology and Culture' Concordia, Canada <http://www.ctheory.com/> (27.11.1996)

Maturana, H.R. (1970) 'Biology of Cognition' In: Maturana & Varela: Autopoiesis and Cognition Reidel Dordrecht.

McEady-Gillead, B. (1992) 'Partners-in-Learning: Clustering Students for Academic Success.' Unpublished paper.

McShane, J. (1991) 'Cognitive development: An Information Processing Approach.' Oxford. Basil Blackwell.

Mynatt, E. D. 'Design For Network Communities' Xerox PARC
mynatt@parc.xerox.com

Norman, D. A. (1991). 'Cognitive Artifacts.' In: Carroll, J. M. (ed.) Designing Interaction: Psychology at the Human-Computer Interface. Cambridge, UK: Cambridge University Press. pp. 17-38.

Norman, D. A. (1988). 'The Psychology of Everyday Things.' New York: Basic Books.
Also, 'The Design of Everyday Things.' 1990. New York: Doubleday.

Norman, D. A. (1992). 'Turn Signals are the Facial Expressions of Automobiles.' Reading, MA: Addison-Wesley Publishing Company, Inc.

O'Day, V. L. 'Xerox PARC' oday@parc.xerox.com

Pea, R. D. (1992) 'Practices of Distributed Intelligence and Designs for Education' Technical Report No. 21 'The Institute for the Learning Sciences.

Pea, R. D.; Gomez, L. M. (1992) 'Distributed Multimedia Learning Environments: Why and How?' Technical Report No. 25 'Northwestern University' 'The Institute for the Learning Sciences.

Piaget, J. (1953) 'The Origin of Intelligence in the Child.' London. Routledge & Kegan Paul.

Piaget, J. (1968) 'Structuralism.' London. Routledge & Kegan Paul.

Piaget, J. (1972) 'The Principles of Genetic Epistemology.' London. Routledge & Kegan Paul.

Preston C. , Cox, M., Cox, K. (2000) Teachers as Innovators. An evaluation of the motivation of teachers to use information and communication technologies. London. MirandaNet.

Resnick, L. B. (1991). Shared Cognition: Thinking as Social Practice. In Resnick, L. B., Levine, J. M., Teasley, S. D. (eds.) Perspectives on Socially Shared Cognition. Washington, DC: American Psychological Association.

Schank, R. C.; (1990) Teaching Architectures Technical Report No. 3 Northwestern University The Institute for the Learning Sciences.

Schank, R. C.; Edelson, D. J. (1990) A Role for AI in Education: Using Technology to Reshape Education Technical Report No. 1 Evanston, IL Northwestern University The Institute for the Learning Sciences.

Schank, R. C.; Jona, M. Y. (1990) Empowering the Student: New Perspectives on the Design of Teaching Systems Evanston, IL Northwestern University The Institute for the Learning Sciences.

Searle, J. (1969). Speech Acts: An Essay in the Philosophy of Language. Cambridge, UK: Cambridge University Press.

Smith, B. L. (1991) Taking Structure Seriously, The Learning Community Model. Liberal Education, Vol. 77, n.2:42-48.

Smith, B. L. (1993) Creating Learning Communities. Liberal Learning, Vol. 79, no.4:32-35.

Smith, B. L., MacGregor, J. Learning Community Models. Washington Center for Improving the Quality of Undergraduate Education.

Tinto, V., Goodsell Love, A., Russo, P. (1993) Building Community. Liberal Learning: Vol. 79, n.4:32-35.

Vygotsky, L.S. (1962) Thought and Language. Cambridge. MIT Press.

Wertsch, J. V. (1991). A Sociocultural Approach to Socially Shared Cognition. In Resnick, L. B., Levine, J. M., Teasley, S. D. (eds.) Perspectives on Socially Shared Cognition.

