Attention Structures and Computer Mediated Communication among Hong Kong Secondary School Students

Rodney H. Jones
Department of English and Communication
City University of Hong Kong
enrodney@cityu.edu.hk

A paper presented at the Annual Meeting of
the American Educational Research Association
April 11-15 2005
Montreal, Canada

This paper explores the differences between home-based computer mediated literacy practices and school-based literacy tasks, especially those involving the use of computer technologies. The data comes from a six month long participatory ethnographic study of fifty Hong Kong secondary school students[1] which involved them in conducting participant observation among their peers, monitoring and reflecting on their own computer use, and maintaining web sites on which they shared their findings. Other data included a corpus of written assignments from school, videotapes of classroom interaction and in-depth interviews with teachers and parents. The theoretical approach used comes from *mediated discourse analysis*, which focuses on the kinds of social practices and social identities that semiotic and technological tools make available to users.

Results of the study show a wide divergence between the ways students use computers at home and the ways they use them in school. These differences are explained in terms of 'attention structures'. Attention structures are cultural tools distributed across individuals, mediational means and interactional conventions that determine how cognitive and social attention are distributed in different kinds of social practices. The ways in which attention structures reinforce social structures and ideologies, and the kinds of interactional struggles that occur when multiple attention structures compete are discussed.

> 'Everybody knows what attention is. It is the taking possession by the mind, in clear and vivid form, of one of what seem several possible objects or trains of thought. Focalization, concentration of consciousness, are of its essence. It implies withdrawal from some things in order or deal more effectively with others.'
>
> William James, 1890

> 'It's better to think of attention as a way of describing relations between people. Social encounters involve many subtle and coded ways of distributing attention, scaling it up and down, focusing or diffusing it…We can go so far as to say that attention is how we get in synch with one another.'

[1] Computer Mediated Communication and Youth Literacy in Hong Kong: A Participatory Ethnographic Approach (Principal Investigator in collaboration with Dr. David Li). Hong Kong RGC Competitive Earmarked Research Grant # 9040856.
http://personal.cityu.edu.hk/~en-cyber/Cyberkids/Home.htm

Attention Wars

> *Mr. Lam is a secondary school English teacher in Hong Kong. His school, like nearly every school in the territory, is equipped with a 'Multi-media Learning Center' (MMLC), a room fitted with the latest in computer technology built as part of the government's drive to promote the use of IT in teaching. But Mr. Lam never uses it. 'When you take your class there,' he says, 'it's a constant battle for their attention. They go crazy in the MMLC.' Ms. Cheung, a teacher in another school agrees. 'As soon as they come into contact with computers, the class is out of control. They play games. They even get the track ball out of the mouse.' Even though the computers in the MMLC are networked so that the teacher should be able to monitor and control what students do at their stations, she explains, some of her students have learned how to disable the system.*
>
> *For the teachers in St. Teresa's School, the problem goes beyond controlling students in the MMLC. Computers, they insist, have even made it more difficult for them to manage their ordinary classrooms. 'It's the on-line games,' one insists. 'They can't pay attention to anything else.' 'They fall asleep in class,' another adds. 'You can always tell those who play on-line games together because they fall asleep together.' Last year the school implemented a campaign to crack down on excessive game playing, especially the patronage of 'mong ba's' (Internet cafes devoted almost exclusively to games). 'We check students wallets to make sure they didn't have any 'mong ba' membership cards,' the teachers explain, 'and sometimes we go out in teams to the 'mong ba's' around the school to look for our students.'*

The opinions expressed by these teachers are not uncommon, either in Hong Kong or other places in the world where computers have become an integral part of both youth culture and educational practice (Lewis and Finders 2002, Luke 2002). Many teachers feel as if they are engaged, in the words of Mr. Lam, in a 'constant battle' for their students' attention, and their adversary in this battle is technology, especially the technologies of the internet, computer games and instant messaging. This perception is reinforced by local media, which consistently construct adolescent computer use (specifically ICQ and on-line games) as detrimental to users' cognitive development and academic success (see for example Chan 1999, Lee 2004).

As can be seen from the stories above, these perceptions have an important impact not just on the ways teachers and parents react to the out-of-school computer use of teenagers, but also on the way technology is used in the classroom. Sadly, despite the Hong Kong government's enthusiastic commitment to making IT an integral part of teaching, a commitment backed up by significant financial resources, few teachers, especially in the field of language and literacy education, share this enthusiasm, (Hong Kong Department of Education 2001). Most teachers, in fact, avoid using computer technology whenever they can, and the resulting under-use of school resources is not lost on the students. When asked what she thought the purpose of the MMLC was in her school, one of the students in our study replied, 'I think the main purpose of it is to show it to parents on parent's day...to show the computers to the parents.'

Whose Attention?

The concept of 'attention' has been central to most current discussions of literacy and learning, and in most of these discussions the main issue around attention is invariably students' 'lack' of it (Lankshear and Knobel 2002), whether this 'lack' is seen in terms of 'short attention spans' or in more clinical terms (as in the diagnosis of *attention deficit hyperactivity disorder*). Electronic media, especially television, computers and video games, are often implicated in this alleged deficit of attention among young people in both popular and scientific literature. Gloria DeGaetano, author of *Parenting well in a media age* (2004), for example, insists that television and video games distort brain development, causing hyperactivity, reactivity, lack of impulse control and the general shortening of attention spans in children, and Jenson and his colleagues (1997) suggest that extensive exposure to video games may encourage the

development of brain systems that scan and shift attention rather than those that focus attention. According to Jane Healy, author of *Failure to connect: How computers affect our children's minds and what we can do about it* (1998):

> The computer software that's being rushed into market is training kids to be attention deficit disordered. It's training them to be impulsive, to have meager finger control because they're just using a small part of their motor system. These are the hallmarks of attention deficit disorder. (Healy n.d.)

A myriad of metaphors have been used by educationalists and psychologists to talk about the mechanism of attention. It has been described as an economic resource, a pipeline, a gate, a computer, a spotlight, and an executive (Schmidt 2001:16). What all of these views have in common, however, is that they see attention solely as a function of individual cognition: attention is an internal process of focusing and controlling mental resources. This view of attention is, in fact, not much different from that put forth by William James in the late nineteenth century, a view which sees attention as originating and operating from within.

Some, however, have taken a more social view of attention and its role in literacy and education. In their article 'Do we have your attention? New literacies, digital technologies and the education of adolescents', Lankshear and Knobel (2002) focus on attention as a kind of 'exchange'; attention is not just something that occurs (or fails to occur) inside the mind of an individual. It is something that we grant, withhold, seek or discourage in interaction with other people. In their discussion, Lankshear and Knobel draw on current perspectives on 'the attention economy' (Goldhaber 1997, MacLeod 2000, Lanham 1993), the idea that, in the 'signal rich' communication environment of the contemporary world, what gives value to information is the amount of attention it can attract. The real currency of the information age is not information, but attention.

This perspective shifts our focus from attention as a quality of the individual mind to attention as a social commodity. The ability of the mind to process information and focus attention resides not just within the individual, but is also a function of the various 'attention structures' (Lanham 1993), socially and technologically mediated 'frames' or 'organizers' which facilitate selective attention to and efficient use of data. Literacy education, insist Lankshear and Knobel, must help prepare students for this new economy, both by giving them opportunities to master new techniques in 'attention getting' and by helping them develop and use 'attention structures' to organize the rich and varied data available to them.

While the importance of efficiently exchanging and organizing attention is in many ways made more salient by new communication technologies, it is really nothing new. Social interaction has always, by its very nature, been a matter of 'attention economics'. All communication, whether it involves interacting with another player of an on-line game or interacting with a teacher in a classroom situation, is based on getting attention and 'paying attention'. Not only is attention organized around behavior, but behavior is organized around attention. Furthermore, all signals, no matter how 'rich', require 'attention structures' to help us make sense of them, some way of knowing what to attend to and what not to attend to. As Scollon and Scollon (2003:58) put it:

> The process of careful and social selection of what to pay attention to is central to our ability to make sense of the complex array of discourses we find in place in such simple social activities as crossing the street, entering a shopping mall, driving across town, or…carrying on a conversation in a coffee shop.

The important point here is not just that making sense of all these situations involves a process of selection, but that this process is *social*, not individual. What this perspective on attention makes clear is that 'attention structures' are not a matter if internal mental

processes, but rather processes that are distributed among the external mediational means we use to take actions (such as classrooms, airplane cockpits, and chat windows), the practiced ways people use these tools with others to reproduce some aspect of their social identity, and the workings of the individual mind or 'habitus' (Bourdieu 1977, 1990). Attention structures take form in our socio-cultural worlds, and are reformed as we interact with those worlds.

The purpose of this paper is to develop this idea of attention structures as distributed throughout and contingent upon social situations and to use it to examine some of the issues around attention and technology raised by the teachers quoted above. In particular, I will use the concept of attention structures to analyze and compare the kinds of activities that young people in Hong Kong engage in when they use their computers at home (instant messaging, on-line game playing) and the ways they are expected to use computers in school environments like the 'Multi-media Learning Center'.

The data for my discussion comes from a participatory ethnographic study of computers and youth literacy in Hong Kong which involved tracing the in-school and out-of-school literacy practices of fifty secondary school students for six months. The kinds of data collected include diaries, video observations in various in-school and out-of-school settings, focus group discussions, web pages created by participants, screen movies of participants' computer use, texts from on-line diaries, forums, message boards and instant messaging sessions, focus group discussions and in-depth interviews with the participants, their teachers and their parents. The project also involved arranging seminars in which the students reported the 'results' of their participation to teachers and

parents, and activities in which teachers and parents were asked to 'try out' certain literacy practices (for example 'playing ICQ') which their students and children were regularly involved in.

The main points I wish to highlight through this analysis are:

1) Different kinds of social situations (literacy events) involve different economies of attention and different sets of multiple, overlapping and sometimes competing attention structures.
2) Attention structures are not a matter of individual cognition or consciousness, but rather are distributed among physical settings, social relationships and individual *habitus* (or 'historical body').
3) Attention structures can be conceived of as particular orientations towards space, time and mode which are promoted by different configurations of mediational means.
4) Because attention structures are social rather than cognitive, they are never neutral. They are fundamentally ideological. The interplay among multiple attention structures within a given situation is basically a narrative of power and resistance.

Mediated Discourse Analysis and Attention Structures

The methodological framework for this study comes from *mediated discourse analysis* (MDA) (Norris and Jones forthcoming, Scollon 1998, 2001, Scollon and Scollon 2003, 2004), an approach to discourse analysis which takes as its object of study not discourse, but rather the actions which discourse makes possible. Drawing on the work of Wertsch and his colleagues (Werstch 1991, 1998, Wertsch, et al. 1995), MDA sees all actions as mediated through 'cultural tools' which may be physical (such as hammers, can-openers and computers), may be psychological (such as language and other semiotic systems, mnemonic devices), or may be social (such as teams, committees, families, crowds or queues). The goal of MDA is to understand how people take social actions with these various mediational means and how the constraints and affordances embodied in them affect the kinds of actions that can be taken, and thus the kinds of identities and social relationships that can be established, maintained, claimed and imputed.

According to Scollon and Scollon (2004), all social actions take place at the *nexus* of three elements in the social situation: the 'semiotic aggregate' that constitutes the physical setting, the social arrangement and relationships among participants, and the life experiences (memories, learning, skills, plans) of the individuals. They call these three elements the *discourses in place*, the *interaction order* and the *historical body* (see fig. 1).

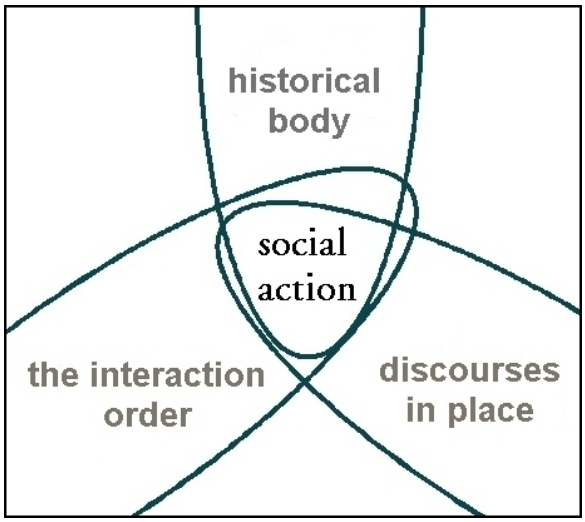

Fig. 1 (From Scollon and Scollon 2004, p. 20)

Each of these elements is made up a various configurations of mediational means with their own affordances and constraints on social actions and their own histories. The affordances, constraints and histories of these mediational means are carried through what the Scollons (2003, 2004) call 'cycles of discourse', semiotic trajectories that flow though cultural tools, physical spaces, human relationships and individual historical bodies. When discourses in place, interaction orders and historical bodies are brought together in mediated actions, these cycles of discourse interact with one another in 'interdiscursive dialogicality' (Scollon and Scollon 2003).

As discourses in place, interaction orders and historical bodies interact, they activate particular patterns for channeling and distributing attention. Attention structures

are the ways in which the configuration of mediational means available within a particular element shapes orientations towards time, space and mode. These mechanisms of attention not only affect the ways social actors focus their attention, but also the ways they are able to or expected to display their attention and to monitor the attention of others.

Discourses in place or the physical environments in which we take actions, for example, channel our attention, block our attention or amplify our attention though written or spoken texts, images, sounds, technologies and the configuration and layout of spaces (walls, windows, doors, furniture). At the same time, different environments present different possibilities for displaying or communicating attention to others or of deflecting or modulating attention through what Goffman (1963) calls 'involvement screens,' aspects of the physical environment which allow actors to partially or fully shield their behavior from others.

Interaction orders channel our attention through socially developed ways of interacting. Different kinds of people in different kinds of relationships to us demand or require different kinds of attention, both cognitively and socially, and different kinds of social arrangements also require different levels of attention and involve different conventions for displaying, giving and getting it.

Finally, the experiences stored within our *historical bodies* help us to determine which facets of different situations require focal attention and which and which facets will be backgrounded, as well as how attention is most appropriately displayed and interpreted. Though learning, our historical bodies also allow us to *not* pay attention to particular aspects of a social action in order to be able to distribute our attention more

efficiently (Schmidt 2001). When we first learn to drive, for example, we may have to devote considerable attentional resources to working the automobile's clutch, break and accelerator pedals. After this is sufficiently mastered, we are able to devote our attention to more important aspects of driving such as the flow of traffic. Automation of particular actions and reactions within our historical bodies is an important aspect of how attention structures develop and grow as we interact with the world as members of social groups. .

The notion of the historical body owes much to Bourdieu's concept of *habitus*, which he describes as:

> a system of durable and transposable dispositions which, integrating all past experiences, functions at every moment as a matrix of perceptions, appreciations, and actions, and make it possible to accomplish infinitely differentiated tasks, thanks to the analogical transfer of schemata acquired in prior practice (Bourdieu 1977: 261).

Instead of referring to *habitus*, mediated discourse analysis chooses to borrow the term 'historical body' from the Japanese Zen philosopher Kitaroo Nishida (1958), mostly because it emphasizes the *embodied* nature of consciousness, and because (like Bourdieu's *habitus*) it make porous the distinction between the individual and society; for Nishida, 'historical body' had a dual meaning: the historical 'becoming' of a society or people, and the ways this 'becoming' is manifested in and enacted by individuals. So, in this model, even at the level of the individual, attention is not just a matter of the individual mind, but rather involves the entire mind/body of the social actor as it has developed in embodied interaction with his or her society and culture.

Scollon and Scollon (2003, 2004) use the example of crossing a city street to illustrate the interaction among discourses in place, the interaction order and the historical body, and this particular social action also provides a good illustration of how attention structures operate within these elements. The attention structures embodied in

the physical setting of an urban intersection are obvious: signs, lights, lines and arrows alert us to what we should pay attention to as we are crossing the street. This single attention structure, however, is not sufficient for successful accomplishment of this action since, as the Scollons point out, there are many other discourses in place (such as shop signs and car license plates) which are not part of the attention structure for this action and must, in fact, be *disattened to*. Thus the attention structures of the discourses in place must be joined with the attention structures that have built up in the historical bodies of individuals through many previous crossings of busy intersections as well as through years of formal and informal education regarding the 'meaning' of various traffic signs and symbols. Finally, the way we distribute our attention when crossing the street will invariably be affected by the interaction order within which the activity occurs; if we are crossing the street alone, for example, we might take extra care in checking for on-coming traffic, whereas if we are part of a large crowd of people, we might pay more attention to the actions of other pedestrians to decide when to cross, or, if we are in what Goffman (1963) calls a 'with', we might find the need to distribute our attention between the action of crossing the street and some other action such as carrying on a conversation or making sure our companion (if they are, for instance, a small child) gets across the street safely.

As can be seen in this example, in practiced social actions like crossing the street, playing a video game or participating in an English lesson, the attention structures embodied in these three elements work together and reinforce one another: the attention structure within the historical body is built up through contact with the discourses in place and with different kinds of social arrangements. The attention structures within the

interaction order grow out of the history of interactions between individuals and within particular discourses in place. And the attention structures in discourses in place are often designed to accommodate or enforce particular interaction orders or the plans, schemes or whims of particular historical bodies. At the same time, attention structures within these three elements can also work at cross purposes. You may, for example, have developed within your historical body an attention structure for crossing the street in one country which you find slightly out of synch with the attention structure embodied in the environment and social conventions of another place, or the attention structure embodied in your relationship with the person you are crossing the street with might cause you to disregard or even behave at odds with the discourses in place or your own inclinations. In other words, the attention structures embodied in these three elements of a mediated action can be, to a certain degree, either in or out of 'synch' with one another. Understanding how these simultaneous and overlapping attention structures interact with one other in *interdiscursive dialogicality*, I will argue, is the key to understanding many of the problems around attention and computer use in school mentioned above.

Orientations towards Time, Space and Mode

One useful way of understanding how attention structures work is to see them as configurations of mediational means whose affordances and constraints promote particular *orientations* towards time, space and mode in the context of particular mediated actions.

All social actions are entrained in time and space on multiple levels and take place through the employment of multiple modes. Times and spaces are layered and folded into

one another in every action. They extend outward across minutes, years, centuries, millimeters, and miles, and across biological, physical and social processes.
We carry within us as well the memories of other times and spaces which we overlay upon our present experience

. While the times, spaces and modes that overlap within an activity are potentially infinite, our attention is not. Through attention structures, we choose which aspects of time, space, or mode to operate upon. In this way, attention structures produce the spaces, times and modes that we experience in mediated actions. We construct time and space by what we do, and what we pay attention to when we do it (de Certeau 1984, Harvey 1996, Jones forthcoming, Leander and Johnson 2002, LeFebvre 1991).

The way time space and mode intersect and interact in any action, and the way our attention selects, separates and laminates (Goffman 1967) these aspects of our reality is immensely complex. For the purpose of this discussion, I will consider just two aspects of this process, the aspect of 'scale' and the aspect of 'separation'. 'Scale' refers to the circumference of our attentional focus. 'Separation' refers to the boundaries that we create between one thing and another.

Every action is entrained within multiple, overlapping 'timescales' (Jones and Candlin 2003 , Lemke 2000, Scollon forthcoming) in what Blommaert (2004) calls *layered simultaneity*. A lesson takes place within an hour, within a school day, within a curriculum cycle, within a year, within a school career, within a lifetime, within the histories of cities, countries, ideologies and social formations. Within a lesson we have smaller units like lectures and activities, and still smaller exchanges, down to words, sounds, glances, muscular movements and the firing of neural impulses (Lemke 2000).

Attention structures help to determine the circumference of time through which we extend our awareness. These multiple timescales, however, are continually interacting, whether we are paying attention to them or not., with actions at shorter timescales building up into actions on longer scales, and actions on longer timescales setting contexts which constrain what is possible on shorter ones (Lemke 2000).

When I speak of boundaries I am concerned with how we use time as a boundary to define our activities. Hall (1959), in his study of time across cultures, identifies two basic tendencies in the way people see the relationship between time and action. He refers to these orientations as *monochronism* and *polychronism*. A monochronic orientation treats time as linear, tangible, and divisible and actions are seen to 'occupy' points in time at the exclusion of other actions. A polychronic orientation sees time as more fluid and layered, allowing for the simultaneous occurrence of many actions.

Similarly, all actions take place in multiple and overlapping spaces which also have dimensions and boundaries. Space moves from the smallest and innermost spaces of our bodies, through personal space, social space (Hall 1959,1966) classrooms — school districts—cities—nations.. The circumference of our horizon in any mediated action is the result of the nexus of attention structures embodied in the discourses in place (through, walls, windows, the placement of furniture) the way the interaction order is reproduced in space, and the expectations about space we bring into the situation though our historical bodies.

Finally, attention is both distributed and channeled through the configurations of modes that are available to us in interaction and our ability to employ these modes. All interactions involve a myriad of modes, some more central to the interaction than others.

Norris (2004) suggests that the way attention shifts through different aspects of interactions can be analyzed through observing the way interactants deploy and attend to various modes (e.g. speech, posture, proxemics, gaze, layout, text and music). She divides modes into those which are embodied (like speech and gesture), and those that are not (like text and architectural layout). Attentional focus on a particular mode is referred to as *modal density*. The distribution of attentional resources over multiple modes is called *modal complexity*. There are also situations in which certain modes which might be available in similar situations are conspicuously absent or purposely *disattended* to, a phenomenon I have called *modal muting* (Jones 2003). In a traditional classroom situation, for example, verbal and written texts tend to acquire high modal density, while other modes are backgrounded. In certain forms of computer mediated communication, embodied modes like speech and gesture are muted, channeling more attention to written texts, graphics and other aspects of interaction like timing.

The first step to unraveling how attention structures operate, interact and develop is to focus on participants' orientations towards time, space and mode as they perform various mediated actions, and to ask what orientations are made more or less possible through the discourses available in the place, the social relationships among participants in the action and the skills, experiences and dispositions of the individuals involved.

Out-of-School Literacy Practices

> *I like to play on-line games when I am using ICQ. But this time, the difference is the number of participants. I have Iris and Jackie sitting next to me. But instead of playing the games with me, they chatted with my ICQ friend! (Without my permission!! :)) We all have gone crazy because Iris tried to type "I love....". I was so surprised and wanted to stop her from sending the whole thing out. It would be very embarrassing if my friend received this ridiculous message from ME.*

Our participants engaged in a wide array of out-of school literacy practices involving computers, including instant messaging, web-surfing, reading and contributing to message boards, writing and drawing on 'flash boards', visiting chat rooms, posting on-line diaries, contributing to forums, sharing (mostly pirated) music, videos and software through websites and peer to peer applications, and playing on-line games. But the most noticeable thing about the way they engaged in these practices is that, as is illustrated by the quote above, they almost never performed them alone. These practices were almost always parts of 'event complexes' in which attention was polychronically distributed over a wide array of tasks at once. This makes it difficult to discuss one particular practice in isolation, or sometimes even to understand what constitutes a practice, where a practice begins and ends. When asked the question 'how much time do you spend on ICQ in a particular week', for example, most participants in our study could not answer, saying things like: 'How do I know? The ICQ is on all the time.'

What the quote also makes dramatically clear is that not all of the tasks that make up these literacy practices go on on the screen. On-screen and off-screen actions mix and overlap in sometimes very intimate ways. Not only does the immediate physical environment interact with online spaces and processes, but on-line processes are often part of larger off-line practices and relationships that stretch over multiple spaces and timescales. Just as on-line literacy practices and off-line literacy practices converge, so do 'out-of-school' and 'in-school practices, as students chat about homework on ICQ or search message boards or forums for material for school projects, and as ICQ, computer games, flash-boards and the like migrate into subversive spaces within the school day (Jones 2001, Leander and Johnson 2002).

This essentially polychronic orientation towards action was the thing that distinguished these kinds of literacy practices from those participants normally engaged in in school, and the kinds of attention structures that develop around this kind of orientation clearly had a lot to do with the way participants distributed their attention in other situations. Below I will consider two of these practices, 'Playing ICQ' and on-line gaming. I choose to look at these particular practices both because they were the most frequently and universally occurring practices our participants engaged in, and because they are the on-line practices most frequently mentioned in professional and media discourses, and the informal discourses of teachers and parents, in discussions of literacy and attention.

'Playing ICQ'

Ask any parent in Hong Kong what they think of ICQ, the chat and instant messaging program that has become a ubiquitous part of youth culture (Au-Yeung 1999), and they probably will not have much good to say about it. In local media, ICQ has been linked with crime, dishonesty, unregulated sexuality, addiction, psychological problems, and even youth suicide (Jones 2001). Perhaps the most consistent charge leveled against ICQ is that it is contributing to a decline in literacy among Hong Kong students, with the language students use on-line seen to interfere with their ability to master standard English and Chinese, and the time students spend on-line seen to take them away from more 'worthy' pursuits like reading ('An unworkable…' 1998, Au-Yeung 1999, 'Email slang…' 2000, Jap 1999).

Whereas parents and teachers see ICQ as something that takes up too much attention, students see it as a complex tool for distributing their attention among various

social tasks and social relationships. Our participants frequently used words like ‘convenient’ and ‘direct’ to describe it. Not only did it provide a direct and immediate means of interaction for things like collaborative work and file sharing, it also gave them ways to organize and operate their complex social networks.

The discourses in place in the ICQ interface provide various affordances and constraints for managing social and relational spaces and distributing attention through them. Messages appear in separate windows of ‘persistent text’ which help users to manage and keep track of separate of multiple, simultaneous conversations. Interlocutors appear on contact lists which can be categorized and are linked to personal information. These lists constitute virtual social gatherings in which interactants enact presence on multiple computer screens. The kinds of presence one can enact can be modulated through adjusting one’s on-line ‘status’, indicating, for example that they are free for chat, busy or temporarily away from their computer. There are means as well to introduce other modes of interaction such as video conferencing, voice chat, or the making available of shared files on users’ computers. Users can also choose to be ‘visible’ or ‘invisible’ to selected parties.

The environment constituted by these discourses enables the channeling of attention in very different ways than in face-to-face or telephone interaction, and young people who use this medium frequently are extremely adept at operating within the attention structures of this virtual world. As a result, they have built up perspectives on the relationship between time, space and interaction that are very different from those of their parents and teachers. One of the teachers in our study, for example, asked, ‘Why do people communicate in this way? Why don’t they just telephone each other?’ Underlying

this question is a basic understanding of communication as focused and monochronic. When one of our participants, on the other hand, was asked what the difference was between ICQ and the telephone, he said, ‘with ICQ you can communicate with many people at one time. With a phone you can only communicate with three.’

The practice of ‘playing ICQ’ is also shaped by and helps shape the attention structures of the discourses in place beyond the screen, in the rooms and buildings where students sit at computers. For our participants, these spaces were most often crowded urban flats in which the computer was situated in the living room within range of the television set and other goings on of family life. In such situations, not only is attention distributed across on-line and offline spaces, from ICQ windows, to television screens to social interactions with parents and siblings, but also boundaries to attention are established. ‘Playing ICQ’ in fact, is an important means for teenagers to control boundaries between on-line and off-line spaces. One of the chief ways it amplifies social actions is through enabling users to extend the territory upon which they can act to realms to which others (parents, siblings, teachers) have no access and cannot police. It simultaneously facilitates *connectivity* and *privacy*. The best thing about ICQ, one participant noted, is that ‘No one will know what we are talking and doing in ICQ.’

The practice of ‘playing ICQ is also affected by attention structures distributed over larger spaces and longer timescales, timescales of conversations that transverse on-line and off-line spaces, timescales of relationships, of school calendars, class timetables, assignment due dates, public examinations, as well as the life events of pop idols, movie schedules, and TV timetables. Conversations on ICQ are parts of *cycles of discourse* that travel through multiple modes and media. The conversation started yesterday at school is

‘resemiotized’ (Iedema 2001, 2003) into words and symbols in a chat window, which may later be resemiotized into an entry in an on-line diary, an exchanges of files from one computer to another, an on-line gaming session, a homework assignment or a further conversation in school the next day.

Perhaps the most important discourses in place in ‘playing ICQ’ are the messages that appear in the chat widows. These short texts orient attention not just through their timing and placement on screens, but also through the rhetorical schema they construct and the relationships between participants that they promote. One of the things that the teachers in our project consistently complained about was the lack of ‘content’ in ICQ messages and the difficulty in being able to engage their students in ‘meaningful’ communication when using the medium. ‘They don’t talk about anything’, said one teacher. ‘The ideas are muddled. All of the phrases are broken and there is no sense of coherence,’ said another.

The following short exchange might be an example of what they mean:

Cheesecake 2000/7/2 AM 12:20 hihi
SnowBread 2000/7/2 AM 12:29 wowo
Cheesecake 2000/7/2 AM 12:33 kaka~~~
SnowBread 2000/7/2 AM 12:38 ~^.^~

The problem, of course, is not that this kind of communication is ‘contentless’ or incoherent, but that the content does not consist of information (as teachers often view content) but of relationships and the coherence comes not from the text but from the context of countless interactions between Cheesecake and Snowbread and their friends. Participants’ conversations on ICQ, particularly with friends tended to be extremely ‘high-context’ (Hall 1976), decoding them requiring attention to wider events, life histories and social relationships.

In many ways ICQ was not so much about ‘communicating’ for our participants as it was about distributing and attracting social attention. As on-line and off-line interactions and relationships blend and interactants play with the medium's inability to convey who's directing attention towards whom, ‘playing ICQ’ comes to reflect the attention structures of interaction orders that extend over on-line and offline spaces. ICQ contact lists and strategies for managing them resemiotize aspects of students’ social relationships: who’s in; who’s out; who is more deserving of attention; who gets assigned ‘invisible’. At the same time, ICQ changes the interaction order in ways that affect both on-line and off-line interaction. On-line communicating often alters relationships of power associated with things like gender, appearance and social status, allowing people to seek and distribute attention in ways they could not in face to face interaction. Many of our participants noted that they felt more comfortable and were less ‘shy’ when communicating on ICQ, and certain kinds of attention were found to be easier to exchange on-line, like expressions of love or affection. Teachers who chatted with their students also remarked on the egalitarian face systems that prevail in the medium. ‘They could act as my friend and ask questions they could not ask in school,’ one of them noted. Of course, this kind of economy of attention can come into conflict with off-line interaction orders and institutional roles. Another teacher told us that a student’s mother could not believe her daughter was ‘playing ICQ’ with a teacher: ‘Her mother scolded her because she thought she was lying. She didn’t believe a teacher would ever talk to her students through ICQ.’

The attention structures inscribed in the discourses in place and enacted in social relationships interact with and affect the attention structures that develop in the historical

bodies of users. Our participants had years of practice in distributing attention over multiple interactions and tasks. They had become masters of simultaneously attending to homework assignments, electronic social interactions, listening to music, watching television, talking on the telephone and interacting with family members to the point where it was difficult to separate out and measure their different activities. The teachers, on the other hand, had not developed attention structures in their historical bodies to manage the practice, and so sometimes had great difficulty. One teacher described chatting with her students as 'the most painful experience I've had in years.' Another teacher described it like this:

> It was a mixture of feelings. I was very busy and almost unable to handle the chaotic situation when about ten dialogue boxes appeared on the screen simultaneously. My fingers were trembling and I didn't know which one to click on. I felt more confused when the computer kept on 'Ak-Ohing' me. A great variety of topics popped up. They ranged from my hobbies, my computer literacy, HKCEE, moving to another living district, psychological tests and humor, and my students saying that I was a 'low B' (not very intelligent) in handling the confusion that the ICQ messages had created.

What is interesting about this reaction is that the teacher attributes her failure in this literacy practice to the external 'chaos' of the discourses in place and the interaction order. When students fail in literacy practices in school, however, the 'confusion' is usually situated in the historical bodies of individuals, and the discourses in place and interaction orders are rarely questioned. Other teachers, however, came to consider through the exercise the ways people react and feel when attention structures in the discourses in place, the interaction order and the historical body are not 'in-synch'. One said, 'in my ICQ experience I can understand why some students are scared of English. My feeling of trying to do something that made absolutely no sense to me must be similar to my students when they encounter formal English.'

'Counter Strike'

If ICQ is constructed as an enemy of attention by parents and teachers, computer games are constructed as its absolute nemesis. The local press if full of stories of promising students who have succumbed to 'addictions' to on-line game playing at the expense of their school work and family lives.

One reason video games command so much of young peoples' attention is that they are designed to do so. The design of video games is imbedded in an economy of attention in which designers must make them more interesting and challenging as time goes on in order to get people to continue playing (and buying) them (Gee 2003).

Gee (2003) suggests that learning to play video games is learning a 'new literacy'. Each new game requires players to master new 'design principles' and their accompanying attention structures. He also suggests that ('good') video games operate under extremely efficient principles of learning. Through playing users learn

> to situate meaning in a multimodal space through embodied experiences to solve problems and reflect on the intricacies of the design of imagined worlds and the design of both real and imagined social relationships and identities in the modern world. (Gee 2003:48)

The game I will take as an example is not, perhaps, among the most interesting or sophisticated games from the point of view of literacies. It is, however, the game that was the most popular with our participants. In fact, it is a game which for five years has been the most consistently popular multiplayer on-line game in the world. As one of our participants' put it, 'There's not a kid in the world who hasn't heard of this game.' The game is Counter Strike.

The history of the game itself illustrates the way economies of attention work in the world of video games, both on the level of their design and on the level of their play. Counter Strike is a 'mod', a modification of another popular game (Half Life), put together from the ground up by a few individuals. Its transformation into a cultural

phenomenon, however, also depended on attracting the attention of others who constantly added to and modified the game by, for example, writing new maps, formulating new scripts to move their characters, and maintaining servers where particular configurations of players, sometimes constituting tightly woven social networks, could congregate to play. The development of Counter Strike (and many on-line games, in fact) is a striking example of distributed cognition.

Counter Strike is a first person shooter game, which means that the object of the game is basically to kill as many of the other players as possible. The context for play is built around the opposing identities of 'terrorists' and 'counter-terrorists', and scenarios include things like hostage rescue, bomb planting and defusing, and defending or taking targets. These scenarios are played out on different 'maps', different virtual environments each with different attention structures—different walls and doors, buildings and tunnels, different ways to shield oneself from the attention of other players, and different strategies for reading threats and possibilities in the dynamic situation of play. Through practice, players learn to 'read' these 'physical' environments (Gee 2003) in the same way people learn to read other texts.

Encountering a game like Counter Strike does not, for most young people (as it did for me), involve mastering an entirely new set of attention structures. The attention structures of video games (as those for other things like movies and lessons) are intertextual. Those of Counter Strike are a reflection of larger generic attention structures of first person shooter games, also seen in games like Doom and Rainbow Six.

Counter Strike makes available a wide array of mediational means for players to accomplish their goals, including pistols, shotguns, sub machine guns, rifles, knives,

grenades, bomb defusing equipment, kevlar vests and night vision goggles. Different weapons open up for players different possibilities of action (such as shooting through doors), and different weapons in the hands of opponents make it necessary for players to pay attention to different things in their surroundings. Some weapons have the effect of either amplifying or muting attentional resources: night goggles can help you see in the dark, but a flash bomb from your opponent can blind you.

The game also involves the distribution of attention across multiple timescales and spaces, though in perhaps not such a dramatic way as does ICQ. On the one hand, Counter Strike radically narrows the timescales players need to focus on, forcing them to concentrate on minute movements, sounds, reflexes. In Counter Strike, attention is focused squarely on 'the moment'. On the other hand, decisions of the moment are contingent upon events and experiences on longer timescales. Playing the game well requires both hindsight and foresight.

The scale of the virtual space players operate in is also rather narrow, especially when compared to real time strategy games like Age of Empires, which require users to distribute attention over vast areas of virtual space. Also, unlike strategy games in which ones attentional resources are spent creating virtual spaces, in Counter Strike attentional resources are spent more on reacting to the environment rather than changing it.

Coping with this environment involves considerable modal complexity as players shift attention from the visual to the verbal to the textual. Which modes require the most attention, however, is highly contingent on the moment. One particularly important mode in this game is the mode of embodied sound—the ways bodies and objects communicate their position or status through the sounds they make. Players become accustomed to

attending to and rapidly analyzing sounds of gun shots ricocheting off walls, footsteps as they become louder or softer, the squeak of doors and the crunch of gravel.

Just as with ICQ, the contours of the virtual spaces created by Counter Strike spill into and interact with the physical spaces in which the game is played. While often played at home (and sometimes played in school), among our participants a more popular option was playing in *mong ba's* with groups of friends. In such situations participants played together, sometimes on the same, sometimes on opposing teams, adding further modal complexity to their play as the sights and sounds of their computers mixed with real time utterances, glances and gestures. For our participants, these off-line interactions were as important as the game itself. One participant said, 'on-line games can actually increase face-to-face communication. I go out and play with my friends and we are chatting all the time. It makes us closer.'

Whether you are playing at home with players from all over the world or playing in a *mong ba* with your best friend right next to you, the game's chief appeal appears to be not so much that you are shooting people, but that you are interacting with them. Counter Strike is all about social contact, about mastering not just the physical environment of play, but also the social environment of the interaction order. When asked what he liked best about Counter Strike, one participant said, 'You learn how to build up social networks. You learn how to interact with others. Rules about how to act. You get to learn all that stuff.' Team play is essential. The success of a single player depends upon his or her ability to coordinate with the actions and attention of other players, 'covering them' when they are in danger and relying on them to 'have your back'.

As players play together more, the attention structures of interaction orders develop even further. Leaders emerge as do favorite strategies. Players build their on-line identities through the people that they play with. These interaction orders may even involve more institutionalized structures, the setting up of ‘clans’ (teams that play together frequently, usually competitively), the establishment of servers for different kinds of players, the proliferation of forums and message boards and chat rooms devoted to the game. The interaction orders that build up around the game develop their own conventions and their own ideologies.

What Counter Strike offers young people is a new environment in which to gain attention and gain respect, one whose rules are different from their ordinary environments. Although the interaction order in Counter Strike is intensely hierarchical (in fact, downright Darwinian), this hierarchy is based solely on ones skill in playing the game. A fifteen year old can be far more worthy of attention than a fifty year old. Working for and taking up ‘identities of expertise’ (Jones 2005) was a large part of playing the game for many of our participants. Posting ones high scores, contributing to forums, hosting websites and servers, and establishing long-term relationships with other players were all part of participation in the Counter Strike attention economy. ‘I’ve learned a lot about myself as a person,’ one participant said. ‘How to fit into society. What I want to become in the future. It’s a reflection of myself.’

As players develop the skills of playing the game, particular attention structures are established and maintained within their historical bodies. The historical body stores information from previous embodied experiences with the game, allowing certain tasks to gradually become more routinized, freeing up attentional resources for other tasks. At the

same time, like most good video games (Gee 2003), Counter Strike also works against rountinization, each game with different players introducing an entirely new set of contingencies. Thus, there is a dynamic relationship between the attention structures in the discourses in place, the interaction order and the historical body which insures that the attention structures within the individual must constantly adapt and grow. The attention structures within the game itself also grow and adapt to different users as players also resemotize their historical bodies into idiosyncratic keyboard settings or personal scripts that allow them to execute several commands with the press of one button (for example jumping and crouching at once).

Perhaps the most important aspect of the attention structures involved in the practice of playing Counter Strike is that attention is always situated in a clear material and social context. (Gee 1996, 2003). The management and focus of one's attention has constant and immediate consequences on the 'physical' world of the game and on the 'well-being' of the virtual selves players enact. Players are involved in an 'embodied story' (Gee 2003), and the 'embodied' quality of mediated actions in the game, like 'fragging' an opponent, are palpable. The attention structures stored in the historical body are stored not as information, but as intuition as, knowledge 'built into the movements, bodies and unconscious ways of thinking (players) have built up through repeated practice' (Gee 2003:110).

It is the 'embodied' nature of game playing that makes the attention structures that it develops so different from those that develop around the 'disembodied' and abstract information that is often part of school-based literacy-tasks, though whether or not these attention structures interfere with successful schoolwork is a matter of opinion.

Our participants did not think so. In fact, some of them insisted that the kinds of attention structures they had built in their historical bodies from on-line gaming had had positive effects on their studies. One said, ‘I have no trouble studying and memorizing things and playing games. I think it works quite well. Faster. As I have to think while playing games. I have already started thinking, thinking how to type. My brain is already functioning. So it is faster for me to study. Faster and easy to memorize.’ Another said, ‘I think because when playing games, I warm up my brain, so when I go back home to study, I can memorize things more easily.’

School-based Literacy Practices

The ways computers are integrated into school-based literacy practices from government and school policies down to actual classroom processes and procedures articulate theories of attention that are very different from the orientations involved in the out-of-school practices discussed above. For one thing, most school-based literacy practice and the policies that inform them come from a fundamentally monchronic orientation towards mediated action. This orientation is perhaps best exemplified by the recommendation from the Education Department that teachers ‘use IT in twenty-five percent of their teaching’, as if the ‘use of IT’ is something concrete that can be measured. For our participants, on the other hand, IT was something that was woven into the fabric of their lives and integrated with multiple activities.

This monochonic orientation has developed in the more traditional classroom settings that are characteristic of Hong Kong schools. Most literacy classes in Hong Kong still take place in traditional *panopticon* style settings (Foucault 1977) in which the physical environment, social relationships and the habitual practices of participants

channel attention towards the teacher. Even when discussions involve small groups, the teacher monitors the flow of action. Conventions for gaining and granting attention built into the interaction order of classrooms include teachers electing students for attention or students inviting it by raising their hands. The control of attention is based on clear hierarchical relationships Attention giving or attention seeking outside of this rather strict economy is seen as disruptive. This teacher-focused flow of attention contrasts sharply with the complex flows of attention in out-of-school computer based literacy practices in which attention is distributed among many participants at once.

Boundaries for attention are established through the classroom layout, the gaze of the teacher, posture and gestures of the participants, and spoken and written texts. The topics of these texts are syllabus defined and teacher-controlled. (Scollon and Scollon 2004). Though classrooms involve a large degree of modal complexity, text and speech are the modes which normally have the highest density, with written discourse often privileged over spoke discourse (Scollon and Scollon 2004). Utterances tend to be monologic with intermittent bursts of question and answer exchanges, very different from the short, dialogic interaction characteristic of ICQ and on-line gaming.

MMLCs were established in the territory's secondary schools to enhance interactive and experiential learning and promote 'computer literacy'. One of the schools our participants attend promotes their MMLC on their website with the following description:

> The setting up of the MMLC is to enhance teaching and learning effectiveness across the school curriculum and to enhance the language proficiency of students with the application of information technology. Through the Multimedia Learning System (MMLS) in the MMLC, teachers may make use of the resource materials available in various media formats, such as audio and video tapes, VCD disks, DVD disks, CD-ROMs, prepared video clips and the Internet to enliven the learning environment.

> By using the user-friendly graphical user interface, teachers can easily control all the Audio/Visual (A/V) equipment for teaching and have full control over students' workstations to supervise them.

In this description, there are two economies of attention working. In the first paragraph, information technology is seen as a way of attracting and maintaining the attention of students, using multiple modes to 'enliven their learning environment.' The second paragraph, however, speaks to another attention economy, the economy of surveillance. Information technology is constructed as a way to *monitor* the attention of students.

Most teachers, however, are actually unable to perform the level of surveillance the technology offers. They do not have the attention structures in their historical bodies to allow them to attend to teaching, monitoring students' physical activity and concerning themselves with information on the screen at the same time. Their students, however, are expectedly adept at using computers to deflect attention, some even developing ways to over-ride the surveillance technology. The result is that teachers work to design activities for the MMLC in which students use computers in the most restrictive ways possible if at all. One participant said:

> It's like the classroom. The only difference is that we have a computer in front of us. Sometimes, she may type something outside and we see. She controls our computers. We only see. You can never use the computer throughout the class. We only sit and see.

The particular lesson I will consider involved F.3 students in an English class. The class used the MMLC about once a fortnight in response to a regulation imposed by the school administration. Usually these forays to the MMLC involved working through exercises on a multimedia CD-ROM called *Planet English*, filling in on-line grammar exercises, watching movies or practicing 'speaking' (which usually meant pronunciation). On the occasion of our observation, the students were instructed to read a passage from

their textbooks into a microphone and then listen to it through their computers. At the end of the lesson the teacher played back some students' attempts for the class to discuss.

As can be seen in figure 2[2], the discourses in place in the form of the layout of the class mirror the arrangement of the traditional *panopticon* classroom. At the same time, however, the ability of the teacher to use this attention structure to monitor students is limited by the computer screens, which shield students from scrutiny, making it necessary for the teacher to situate herself in the aisle to see what they are doing (a position that makes it impossible for her to make use of the computer monitoring system on her own screen at the font of the class). Furthermore, penetrating the rows of computers to reach students farther away from the aisle is nearly impossible.

Figure 2

Figure 3

The second important aspect of the discourses in place is the written text which students are meant to recite (Figure 4). In fact, it is on this text that the most attentional resources are meant to be focused. In contrast, the third aspect of the discourses in place, the text displayed on the computer screen, which would normally be considered the most important in such settings, here is almost totally non-consequential. Students' screens (at

[2] Pictures used with permission of participants.

least when being monitored) showed simply an interface based on the controls of a tape reorder (Figure 5).

Figure 4

Figure 5

One of the most striking things about the ways this teacher and other teachers we talked to and observed used the MMLC is that they so seldom involved the use of ‘information technology’. Instead, computers were appropriated into old-literacy practices, turned into tape recorders, written texts and fill in the blank exercises. One of our participants remarked, ‘we have listening in MMLC. But it has nothing to do with computers.’ Another recalled:

> We had an English lesson in Form 4 in MMLC. Our teacher told us to go online, logon a website about tense and work on it. We were instructed to do some tense exercise on that website. Very stupid exercise. We only needed to fill in the same tense form in one exercise and another tense form in another. We had done this exercise long time ago. I found the MMLC class very meaningless
> .

A third participant put it perhaps most succinctly when he said simply, ‘Our teacher uses computers to teach book content.’

Another striking aspect of the discourses in place in this situation is that they have very little to do with one another. The meaning of the room filled with computer equipment, the meaning of the teacher’s movements throughout the room, the meaning of the text students are reading and the meaning of the words and symbols on their screens are totally divorced from one another. The actions participants are meant to take with

these discourses in place are disconnected from the meanings expressed in the texts themselves, and seem to have little to do with the way such discourses are used to take actions in 'real' social practices (where we do not normally read to our computer). While teachers complain that ICQ communication has no 'content', lessons like this lack a sense of context with which to make sense of their content.

The interaction order in this situation is based almost totally on surveillance rather than interaction. The teacher's physical and virtual monitoring of activities helps give shape to the students' attention as they perform or resist performing the assigned task. The task dictates that they interact only with the teacher or with themselves in the form of a recording of their own voice.

Into these discourses in place and interaction orders, participants bring historical bodies which are habituated to multiple attention structures, both attention structures associated with *panopticon* classrooms and attention structures associated with out-of-school computer use, and in performing the lesson they borrow from these different attention structures. The ways these borrowed attention structures are integrated into the action are often more contradictory than complementary.

Just as teachers find themselves in *panopticon* classrooms within which the traditional ways of monitoring students does not work, students find themselves in front of computer screens with no way to make use of the attention structures they normally offer. Some, however, find subversive ways to activate these structures. In figure 6, two students manage to open an on-line gaming site without being detected. Others resist the attention structures of the environment and interaction order simply hiding behind their computers and 'pretending' to do the task, or using their screens to shield off-line byplay

and side play with their classmates, resemiotzing in their physical postures the polychronnic attention structures of their out-of-school interactions (Figure 7).

Figure 6

Figure 7

Through this analysis I do not mean to dismiss the pedagogical value of recoding and listening to ones pronunciation, nor am I trying to suggest that interesting and interactive lessons which keep students 'on-task' cannot be performed in rooms like these. In fact, that is what they are designed for. This cannot happen, however, as long as practices in these rooms attempt to impose attention structures from traditional classrooms and traditional literacy practices that fundamentally contradict the orientations towards time, space and mode characteristic of computer mediated communication.

As illustrated above, literacy practice involving computers are characterized by complex webs of interactivity. Learning how to be popular in ICQ or how to get good at Counter Strike involves 'networked learning' (Lemke 1998) and distributed cognition. Computers not only promote this kind of interaction, but in some ways demand it. Educational activities which do not involve this kind of interaction are fundamentally 'out-of-synch' with the discourses in place and the interaction orders implicit in the

technology and with the attention structures students have built up in their historical bodies through years of using it.

Perhaps the more obvious point I'm trying to make is that the problem of attention in such classrooms is not the fault of the individuals, and not the fault of the computers, but the result of a complex nexus of overlapping and competing attention structures in the discourses in place, the interaction order, and the historical bodies of participants.

Conclusion

The main point I have tried to make in this paper is that, like learning and literacy (Gee 1996, 2003), attention is primarily a social achievement. It is not just a matter of individual cognitive processes, but fully embedded in the material, social and psychological worlds of social interactants.

Attention structures are reflections of larger social formations and ideologies. They are linked to 'appreciative systems' (Gee 2003), systems with which we assign value to objects, people and experiences, and they act to reinforce particular relations of power and norms of interaction implicit in these appreciative systems. S. Scollon (forthcoming), for example, has discussed how institutional discourses reinforce power structures through directing readers' attention towards actions on one timescale while backgrounding actions on other timescales, a process Blommaert (2004) calls *synchronization*. Attention structures not only work to orient us towards different aspects of time, space and mode; in very fundamental ways they shape our social identities and social relationships. Situations in which competing attention structures overlap are sites of social struggle in which people reproduce or resist particular social positions. Fairclough (1992) argues that in cases where different situations create the need for

diverse positionings, people either accept and modify their behavior to cope with each setting or they struggle and contest for change. For students using the MMLC, one strategy for contesting the positioning imposed on them is to simply 'switch off' their attention in much the same way teachers 'switch off' their computers in attempts to combat distraction.

Just as the attention structures in the historical bodies of individuals change and adapt to situations, however, so can the attention structures embodied in discourses in place and interaction orders. Just as people 'learn', so do rooms, so do relationships, and so do syllabi and policies. The key to maintaining the attention of students in such settings is not to try to make their internal attention structures conform to discourses in place and interaction orders imported from other settings and other practices, but to allow external attention structures to adapt to the situated and embodied ways of learning students have developed in their on-line experiences. 'I read more in playing ICQ than I ever read in school,' said one of out participants, 'because what I'm reading matters.' Another said, 'video games get me to think because I can always see the result. You're always aware when you play video games. If you know you are going to do better in the game, then you pay attention.' 'You can get me to pay attention,' said another, 'just by getting me to care.'

References

Au-Yeung, K.. (1999) Youth survey reveals net time wasting by students. *South China Morning Post*, August 3, 1.

Blommaert, J. (2004) *Discourse: A critical Introduction*. Cambridge: Cambridge University Press.

Bourdieu, P. (1977) *Outline of a theory of practice*. Cambridge: Cambridge University Press.

Bourdieu, P. (1990) *Logic of practice*. Cambridge: Polity Press.

Chan, A. (2003) Gravity 7. http://www.gravity7.com/cd_glossary.html#attention.

Chan, Q. (1999). Internet users suffer withdrawal symptoms: survey Web habit is hard to kick. *South China Morning Post*, Nov 7, 2.

de Certeau, M. (1984). *The practice of everyday life* (S. F. Rendall, Trans.). Berkeley: University of California Press.

DeGaetano, G. (2004) *Parenting well in a media age: Keeping our kids human.* Fawnskin, CA: Personhood Press.

Hong Kong Department of Education (2001) Preliminary study on reviewing the progress and evaluating the information technology in education projects. Available from the World Wide Web at http://www.ited.ed.gov.hk/Documents/ ITEd_Report/FinalReport_v3.0_web.htm

Fairclough, N. (1992a) *Discourse and social change.* Cambridge: Polity Press.

Fishman, B.J. (1999) Characteristics of students related to computer-mediated communications activity. *Journal of Research on Computing in Education 32*:1: 73-

Foucault, M. (1977) *Discipline and punish*. New York: Pantheon Books.

Gee, J.P. (1996) *Social linguistics and literacies (2nd edition)*. London: Taylor and Francis.

Gee, J.P. (2003) *What video games can teach us about leaning and literacy*. New York: Palgrave Macmillan.

Goffman, E. (1963) *Behavior in public places*. New York: The Free Press.

Goffman, E. (1974) *Frame analysis: An essay on the organization of experience*. Boston: Northeastern University Press.

Goldhaber, M. (1997). The attention economy and the net. *First Monday*. http://firstmonday.dk/ issues/ issue2_4/goldhaber/ <http://firstmonday.dk/%20issues/%20issue2_4/goldhaber/>.

Hall, E.T. (1959) *The silent language*. Garden City, NY:Doubleday.

Hall, E.T. (1966) *The hidden dimension*. Garden City, NY: Doubleday.

Hall, E.T. (1976) *Beyond culture*. Garden City, N.Y.: Anchor Press.

Harvey, D. (1996). *Justice, nature and the geography of difference*. Cambridge, Mass.: Blackwell.

Healy, J. (1998) *Failure to connect: How computers affect our children's minds and what we can do about it*. New York:Simon and Schuster.

Healy, J. (n.d.) Endangered minds: An interview with Jane Healy. *Stay Free Magazine* Issue 18. http://www.stayfreemagazine.org/archives/18/healy.html.

Iedema, R. (2001) Resemiotization. *Semiotica 137* (1/4): 23-39.

Iedema, R. (2003) Multimodality, resemiotization: extending the analysis of discourse as multi-semiotic practice. *Visual Communication 2* (1): 29-57.

James, W. (1890/1983) *The principles of psychology*. Cambridge, MA: Harvard University Press.

Jensen, P. S., Mrazek, D., Knapp, P. K. Steinberg, L., Pfeffer, C., Schowalter, J., and Shapiro, T. (1997) Evolution and revolution in child psychiatry: ADHD as a disorder of adaptation. *Journal of the American Academy of Child & Adolescent Psychiatry 36* (12):1672-1679.

Jones, R. (2001) Beyond the screen: A participatory study of computer-mediated communication among Hong Kong youth .A paper to be presented at the Annual Meeting of the American Anthropological Association, Washington D.C., Nov. 28-Dec. 2.

Jones, R. (2003) Inter-activity: How new media can help us understand old media. A paper presented at the International Conference of Historical Linguistics. Copenhagen, August 11-15.

Jones, R. (2004) The problem of context in computer mediated communication. In P. LeVine and R. Scollon (eds.) *Discourse and technology: Multimodal discourse analysis*. Washington DC: Georgetown University Press.

Jones, R. (2005) Mediated addiction: The drug discourses of Hong Kong youth. *Health, Risk and Society 7* (1): 25-45.

Jones, R. (forthcoming) Sites of engagement as sites of attentionL Time, space and culture in electronic discourse. In S. Norris and R. Jones (eds.) *Discourse in action: Introducing mediated discourse analysis*. London: Routledge

Jones, R. and Candlin, C. N. (2003) Constructing risk along timescales and trajectories: Gay men's stories of sexual encounters. Health, Risk and Society 5 (2):199-213.

Lankshear, C. and Knobel, M. (2002). DO we have your attention? Mew literacies, digital technologies and the education of adolescents. In D.E. Alverman (ed.) *Adolescents and literacies in a digital world*. New York: Peter Lang, 19-39.

Lanham, R. A. (1993) *The electronic world*: *Democracy, technology and the arts*. Chicago: The University of Chicago Press.

Leander, K. and Johnson, K. (2002) Tracing the everyday "sitings" of adolescents on the Internet: A strategic adaptation of ethnography across online and offline spaces. A Paper presented at the Annual Meeting of The American Educational Research Association New Orleans, 3 April.

Lee, W.S. (2004) Internet poisoning. *Young Post* April 23, 2004

Lefebvre, H. (1991) *The production of space*. Cambridge, MA: Blackwell.

Lemke, J. (2000) Across the scales of time: Artifacts, activities, and meanings in ecosocial systems. *Mind, Culture, and Activity 7*:273–290.

Lewis, C, and Finders, M. (2002) Implied adolescents and implied teachers: A generation gap for new times. In D.E. Alverman (ed.) *Adolescents and literacies in a digital world*. New York: Peter Lang, 101-113.

Luke, A. (2002) What happens to literacies old and new when they are turned into policy. In D.E. Alverman (ed.) *Adolescents and literacies in a digital world*. New York: Peter Lang, 186-204.

MacLeod, R. (2000). Attention marketing in the network economy. Paper presented at The Impact of Networking: Marketing Relationships in the New Economy. Vienna: 17-20 September.

Nishida, K. (1958) *Intelligibility and the philosophy of nothingness*. Tokyo: Maruzen Co. Ltd.

Norris, S. (2004) *Analyzing multimodal interaction*. London: Routledge.

Norris, S. and Jones, R. (eds.) (forthcoming) *Discourse in action: Introducing mediated discourse analysis*. London: Routledge.

Schmidt, R. (2001) Attention. In P. Robinson (ed.) *Cognition and second language instruction*. Cambridge: Cambridge University Press. 3-32.

Scollon, R. (1998) *Mediated discourse as social interaction: the study of news discourse*. London: Longman.

Scollon, R. (2001) *Mediated discourse: The nexus of practice*. London: Routledge.

Scollon, R. (forthcoming) The rhythmic integration of action and discourse: Work, the body, and the earth. . In S. Norris and R. Jones (eds.) *Discourse in action: Introducing mediated discourse analysis*. London: Routledge

Scollon, S. (forthcoming) Agency distributed through time, space and tools: Bentham, Babbage and the census. In S. Norris and R. Jones (eds.) *Discourse in action: Introducing mediated discourse analysis*. London: Routledge

Scollon, R. and Scollon, S. (2003) *Discourses in place*: *Language in the material world*. London: Routledge.

Scollon, R. and Scollon, S. (2004) *Nexus analysis*. *Discourse and the emerging internet*. London: Routledge.

Wertsch, J.V. (1991) *Voices of the mind: A sociocultural approach to mediated action.* Cambridge, MA: Harvard University Press.

Wertsch, J.V. (1998) *Mind as action*. New York: Oxford University Press.

Wertsch, J.V., del Rio, P. and Alvarez, A. (eds.) (1995) *Sociocultural studies of mind*. Cambridge: Cambridge University Press.