"WORKING-CLASS COMPUTER LEARNING: AN HISTORICAL MATERIALIST ANALYSIS OF PARTICIPATION, PRACTICE AND LEARNING IN THE EVERYDAY"

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ABSTRACT

In this thesis I explore the class dimensions of adult computer learning amongst industrial workers in Southern Ontario (Canada). My interests are to understand the full range of computer learning that working-class people engage in which is largely obscured by a coherent set of universalized, individualized, pedagogically-oriented tendencies that run through conventional adult learning theory. I use historical materialist and neo-Vygotskian frameworks in an integrated analysis of in-depth interviews (n=73), case studies of micro-interaction as well as original analysis of large-scale survey data. I argue that computer learning is deeply embedded in relations of advanced capitalism. Central concepts include "common sense" (Gramsci, 1971), working-class learning "habitus" (Bourdieu, 1984), and "frame analysis" (Goffman, 1974). The material structure, orality and commodification in working-class computer learning are considered. Combining this analysis with a careful consideration of social standpoints in everyday activity we are able to understand computer learning as composed of differentiated and differentiating patterns of participation.

Focusing on everyday practices, I claim that class standpoints provide the starting point for understanding a working-class learning habitus. When fully expressed in materially stable conditions this habitus gives rise to spontaneous, mutualistic and democratic learning communities. The establishment of these conditions is also influenced by gender and racial standpoints. Working people's computer learning activities centre around tactical methods, interstitial locations of practice, and class-based cultural networks. At the same time, computer learning activity is mediated by a highly fragmented and contradictory technological common sense which is dominated by individualized consumption, mystification of technology, exchange-value oriented activity and a process of incorporation into capitalist political economic relations.

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Chapter 1
Introduction

During what I thought was the very last of my schooling life, I began work as a press operator at a local auto parts factory not far from where I grew up. I worked there approximately two years, full-time in the summer and intermittenly, on-call for the rest of the time. Near the end of my second year, I applied for the job permanently and was turned down. The following autumn, I began doctoral studies and work toward this thesis.

Production life over that short time taught me something very specific about learning and education that years spent as a student and teacher hadn't. Though I'd worked in other industrial settings growing up, it was at the auto parts factory that I paid attention to the details of industrial work and learning for the first time. I noticed that in being a new employee and in shifting from job to job around the plant there was a vast amount to learn. At the same time, I arrived at the situation with a good deal of confidence as a kind of 'certified learner'. During the completion of my different diplomas and degrees I'd received good marks. In the plant, however, my papers didn't mean very much.

As I moved from operation to operation to fill in for workers on holiday or sick-leave, typically I'd be shown a machine by a senior worker, have its operation demonstrated to me with instructions always shouted through the noise and only half heard. I was stationed mostly in the cold form department where metal was stamped into shape by giant industrial presses. Instruction included locating the buttons that made the machine cycle, the places where you weren't to put your body parts, vague demonstrations of acceptable quality, and the parts production quota number for the shift. After this I'd be left to my own devices. Usually a couple dozen pieces later something would go wrong: the parts would begin to come out with mistakes or the machine would simply stop working. I'd peer into the machine, turn it off and on, walk around it, and then (inevitably) begin to wander the department in search of the worker who had got me started. If this person wasn't available another might help me, or if the machine really had broken down, I'd be a kind of peripheral member of a congregation of workers who'd drop what they were doing and wander over to my machine for a brief look and a kind of half-yelled discussion that, because of the noise,

was made more of actions than of words. Sometimes, after only a while these people would have to scatter because a supervisor would appear. Other times, people milled around the large machine in a type of pattern with more experienced workers taking the initiative, less experienced workers trailing close behind, occasionally checking a hunch on their own, and novices like me on the outside watching closely yet staying out of the way. I was truly dependent on the group of fellow workers in my department. People who've been in the position I'm describing know that, if fellow workers do not take you under their wing, learning can be a long and brutal experience of social exclusion and powerlessness no matter what kind of diploma or degree you have.

I remember the anger I felt at being so dependent on fellow workers I didn't know during these very first months at the plant. I imagined that if I could just get a written manual with standard procedures, I'd be fine. I could do my learning by myself. But there was no manual and nor could there ever be one that met the needs I experienced. What I learned was that one's knowing depended - even for the most experienced worker on the floor - on your ongoing interaction and integration with others. Learning also depended on your ability to move about the plant, how closely you could be watched by supervisors, the structure of your time and your ability to control the pace of work. Learning was based on the opportunities you had to participate in casual conversation, solving a problem or just being around other workers, and learning was a matter of breaking down the different barriers to these things. The reality of this learning had precious little to do with the carefully structured world that makes sitting down *alone* to write a test relevant to what a person could do or know. On the shopfloor, solidarity and social connection defined one's "learning capacity". And, these barriers, in all their different forms, and the ways we beat and didn't beat them, and the stories people would tell about trying to beat them - these were our ways of escaping boredom and solving practical problems of stubborn machines or idiotic rules.

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Contrary to the symbol of Auguste Rodin's "The Thinker" in which thought and learning are symbolized as a serious, isolated, internalized and perhaps even a painful event (Greeno, 1997), in this research I want to set aside this common sense view of learning to

consider what real people do in their everyday life. My focus is on the working-class and the sets of practices that surround a broad conception of "computer learning". It is a response to the fact that working-class capacities are typically denied, ignored or denigrated within educational literature which, in turn, has important social and political significance.

To understand what working people actually do, I spent time reflecting on my own learning as well as talking with workers about their computer learning. As I did this it became obvious that the symbols associated with Rodin's sculpture were systematically misleading. Computer learning was an active process which spread across different places and times and, in fact, sometimes it didn't involve an actual computer directly at all. This learning was a definitively social and participatory process rather than simply an internalized and cognitive one. And, it was inextricably rooted in and defined by the types of barriers pre-figured in the recollection I opened the chapter with above. This alternative perspective suggests that learning is part of the *ongoing* social lives of *particular* people, that learning is full of moments of choice and contingency, but that it is also subject to specific types of limits unique to participant's social standpoint in society. When I speak of 'particular people', I mean to emphasize that social relations can never be understood nor can they ever be produced from a universal, generic position in the world (Haraway, 1991). People's activities are always accomplished from a particular position is social and material space. This contributed to my general methodology as I was committed to hearing and beginning from the standpoint of the diverse working-class subject and the stories of people's real lives. At the same time, my own standpoint in this research process is not that of a *disinterested* academic observer but as an *intensely interested* trade union member, labour activist and socialist academic. My argument is that recognizing the specific standpoints of people in either case does not contribute to bias but instead prepares readers for a evaluative reading in which research methods and analysis must stand the test of honest criticism.

But why computers? Computers represent an important form of tool-mediated activity in this phase of capitalist development. Though often thought to be simply eliminating the skill and knowledge of workers on the job, it is equally possible that they open up a range of possibilities for, both sanctioned and unsanctioned, worker-mediation of

production. As many of the workers in this research outline, there is an interesting convergence between workers' home and community-based computer learning, on the one hand, and their workplace-based computer-mediated activity on the other. It is in some ways reminiscent of earlier forms of industrial production in which craft workers, though labouring under the proprietor's roof, actually owned their own tools. While the industrial workers in this research do not own the tools of the workplace, they do often own tools (i.e. home computers) that provide significant and detailed insight into the functions of these workplace tools. Their learning, therefore, shows a particular type of independence from the supervised and controlled experience with the tool in the workplace.

These important dimensions aside, in the core industrialized countries, computer technologies are becoming an ever pervasive dimension of people's personal and working lives. A glance at some basic statistics help confirm this trend (Table1.1).

Table 1.1: Use of Information Technology in Canada

(% of Households)	1982	1987	1992	1995	1996	1997	1998
Home Computer Ownership	--	--	20	29	32	40	45
Modem	--	--	--	12	16	25	32
Internet	--	--	--	--	7	17	25

(Statistics Canada Catalogue 11-001-E)

According to Statistics Canada home computer, modem and Internet use are all rapidly on the rise across this country. In the workplace we see growing computer use in virtually all occupational groups (average = 15 hours/week) with scientists, clerical workers and managers leading the way in time use (25, 23, 19 hours/week respectively) and manufacturing workers averaging approximately 14 hours/week (Catalogue 75-001:27-28). Large-scale surveys by Betcherman, Leckie and McMullen (1997) confirm that both computer use and computer training is on the rise in Canadian workplaces, but they add that access is overwhelming provided to "those with a post-secondary education, in management

or professional positions" (p.47). However, these statistical overviews tell us little about actual, everyday, computer-based activity, and even less about exactly how social class shapes and is produced within the course of computer learning.

> From the pages of the MIS Quarterly to PC Magazine, the computer revolution is typically fought in a black box where we never learn what people do, only that they should now be able to do whatever they do faster and more easily by computing. What meaning can the "service economy," the "information economy," the "knowledge economy," and similar terms have unless they denote substantive changes either in what people do for a living or how they do it? The obvious answer is little. Yet journalists, futurists, and even sociologists routinely employ such epithets without explaining precisely what kinds of work they have in mind.... We sorely need rich descriptive data on what people do and how they do it... (Barley in Introduction to Orr, 1996:xi-xiii)

This gap in the academic literature has been recognized in isolated streams of adult learning, workplace learning, and labour process literatures, however focussed empirical studies of actual practice continue to be rare. Learning that is not formally structured, tacit knowledge and accounts of the complexity of the social situation of learning where people can be seen to be active and knowing participants remains particularly elusive. Building on a critical review of adult learning literature, my response to this gap is to draw on theories of learning that have either emerged directly from the work of soviet psychologist Lev Vygotsky (1978) (e.g. Activity Theory) or which show a significant degree of orientation to the core elements of Vygotskian thought (e.g. Situated Learning). My use of the term 'neo-Vygotskian' then is a flexible conception that includes more than simply those who cite Vygotsky as their primary inspiration..[1] It is the critical application of this type of neo-Vygotskian framework that, in fact, forms what I'd call the *"core"*, unifying project of this research. Generally however, I use what could be described as a dialogic approach which brings different methodologies and theoretical perspectives together to investigate the relationship between social class and computer learning in everyday activity. A *secondary*, somewhat less conclusive project involves the expansion of the basic neo-Vygotskian framework with additional theoretical

[1]It is important to note that there are significant differences amongst this group of writers (not the least of which is methods) who, in some ways, I'm constructing as a unitary "body". A full discussion of these differences is beyond the scope of this current work.

concepts which, in themselves, have no previous, direct connection to the tradition. These are concepts aimed at the integration of micro and macro-levels of analysis and an better understanding structure and agency in terms of learning and social class. Before providing a more detailed introduction of each of these different projects, however, I want to briefly explain my basic perspective on social class.

1.1 Social Class and Class Standpoints

The conception of social class that I begin from in this research is rooted in the basic observations made by E. P. Thompson in the introduction to his classic 1963 historical work The Making of the English Working Class. For Thompson, like Marx, "working-class" was, above all, a relational concept. It referred to social, historical, ideological and material relationships between real people. As Thompson pointed out at the time, there could be no rich without the poor, and no working-class without a dominant, capitalist class. Class was not a reified category but a living, social relationship.

Beyond this, social class is understandable in a number of ways. In their study of class structures and consciousness Livingstone and Mangan (1992; 1996) note that several (neo)Marxist and (neo)Weberian formulations can be used to meaningfully understand class positioning, and that most people (of all classes) tend to a "middle-class" self-descriptions. Given this it becomes important to carefully consider other methods of explicating class relations. Livingstone and Mangan emphasize ownership relations and employment status criteria as central to understanding both class positioning and consciousness, though at the same time we should recall that Marx outlined proletarian and capitalist distinctions as a relational abstractions in which the real constitution of society by no means consists only of the class of workers and the class of industrial capitalists (Marx, 1861-3/1987: 312-32). Thus, class distinctions are probably best understood as a social relation stemming from the material production of people's real lives in a world that involves a variety of other forms of determination. Social class represents a central set of social relations closely related, but in no way limited, to the process of paid work in which people who sell their labour power in order to survive are continuously brought into contact with those who own the means of production and who purchase this labour power in order to engage in a process of capital

accumulation. While this relational approach to social class is figured in the original work of Marx, my use of class also draws on the work of Lukács (1971) and the conceptual work of various Marxist-Feminists theorists. It is the latter group of scholars who've contributed to the development of the concept of social standpoint specifically in terms of counter-hegemonic perspectives and situated social action. Therefore, in this research the analysis of working-class dimensions of learning begins with a recognition of a *standpoint* within specific sets of social relations that people produce in everyday activity.

A focus on the social relations that shape people's actual computer learning practices in the concrete, living world implies a type of materialism originally advocated by Marx, particularly, in his early writings. This materialism is rooted in Marx's philosophical analyses in The German Ideology (1845-6/1996). It is the analysis of what in his Theses on Feuerbach (1845/1996), he called "practical", "real, sensuous activity", but it does not simply stop with the movement of people's bodies materially through time and space. Rather this approach also seeks to take into account that people use discourse, ideas and other tools in the organization of their concrete activities. People make use of tools which bear in them a history of human activity and thought. They make choices in their activities, and actively make sense of their world. Therefore, while notions of history, language, thought and consciousness are conventionally understood as being non-material, through their activation in real situations in the material world they in fact come to take on materiality.

Class relations also relate to political economic forces that, in capitalism, give rise to the contradiction between what is known as "use" and "exchange" value in commodities: use-value referring to the value of goods/services/skills realized in actual use, and the exchange-value referring to the value of goods/services/skills realized in exchange on a market.[2] The process of commodification helps to realize capitalist relationships in society and in so doing (re)produces class relations. One's class standpoint, in practice, is constantly

[2] An example might be the comparative use/exchange value of diamonds and water. Water has displayed exceptional use-value in human life and negligible exchange-value due to its relative abundancy; diamonds on the other hand have little practical use but demonstrate surprising exchange-value. However, while goods, services, skills and so on typically must have some "use" value to be exchanged, they needn't have exchange value to be of direct use.

reiterated through one's relations to the production, distribution and consumption of commodities. I argue in fact that the process of commodification is intimately related to the computer learning activities that people in this research engage in; that this process gives rise to, expresses and perpetuates class relations; and, that this provides a basis for understanding different learning activities, not as value-neutral but rather, as inextricably linked with either the realization of or resistance to capitalist political economy. As researchers have increasingly begun to recognize (e.g. Engeström, Miettinen and Punamäki, 1999), research emerging from the neo-Vygotskian tradition has not, generally speaking, offered very elaborate accounts of different standpoints in activity, and nor have they generally sought to situate practices within broad historical and political economic frames.

1.2 Approaches to Adult Learning

In this research I seek to contribute to a Marxist sociology of learning by making visible the class dimensions of computer learning in the everyday lives of working-class people. At the same time, I seek to contribute to the general Adult Education literature an empirically-grounded clarification of existing "self-directed" (Tough, 1979; Brockett and Hiemstra, 1991), "transformative" (Mezirow, 1994), "informal" (Garrick, 1998), "incidental" (Marsick and Watkins, 1990), and "experiential" (Brookfield, 1981) learning. The notion of learning in the everyday, however, is not so much a novel concept within Adult Education literature as it is one that has been under-investigated in class terms at the specific level of analysis I propose. This research builds on previous work (Sawchuk, 1997; 1998a; 1998b; 1999a; 1999b; 2000; Livingstone and Sawchuk, 2000; forthcoming), but in particular, extends the investigations of "working-class computer learning networks" in Sawchuk (1996). There I demonstrated how working-class people developed and carried out their own, collectively and informally organized computer learning, but did not examine the sets of extended social relations and tool-mediations in any sustained way. At the root of the argument was the need to find a better way to make explicit the learning that working-class people do that so often goes unnoticed. As I explain in my research here, hegemonic conceptions of "learning" express and help to reproduce elements of class bias by emphasizing specific features while ignoring others. It is important to note that, in this sense,

the necessary first step for analysing class-relations of computer learning is to shift the way that learning itself is conceptualized. As a social-relational approach to learning, neo-Vygotskian analysis provides the basis for just this type of alternative conceptualization.

The work of Soviet psychologist Lev Vygotsky forms the starting point for my analysis in this research. Emerging in the early soviet period in which the valorization of proletarian life was proclaimed by the Bolshevik state, Vygotsky developed a theory of personality and learning rooted in social relations, tool-mediation, and the material organization of social life rather than individual cognition (Bakhurst, 1991). It is in fact primarily through these forms of social organization that people in participation with each other come to develop internalized knowledge and skills. "Cultural tools", for Vygotsky, included language and mediated practices and provided an historical basis for ongoing activity. More recent writers in this tradition, which I refer to as "neo-Vygotskians", include Activity Theory (e.g. Cole, Engeström and Vasquez, 1997) which actually defines learning relationally as shifting participation in activity systems. This approach fuses processes of social interaction, learning content, tacit operations, goals, motives and context in one analytic unit called "activity". This is, in fact, *the* key underlying difference between neo-Vygotskian theories of learning and conventional Adult Education theories. For neo-Vygotskians, the social is not simply an additive to the concept of learning (as in social learning) but in fact constitutes the very essence of the term. While clarifications of this basic neo-Vygotskian approach will be made, it remains the theoretical backbone of the research specifically because of its ability to make visible to us how learning is a broadly situated, social practice.[3]

I outline the concept of learning in the everyday by drawing on interview data that both affirms the importance of a neo-Vygotskian approach *and* offers a critique of

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[3]One important point of clarification that should be made involves my use of the concept of "activity" and "learning". Though it may seem parochial to readers less familiar with traditions like Activity Theory, strictly speaking, the concept of activity subsumes that of learning. I use both terms throughout, though not simultaneously (i.e. learning activity - which would have a very specific meaning for Activity Theorists). For sociologists of education, adult education specialists, and a variety of others new to neo-Vygotskian tradition, this is an editorial decision that will hopefully make the analysis a little more accessible while at the same time not abandoning the analytic power concepts such as "activity" provide.

conventional theories of adult learning. The conception of learning that emerges from neo-Vygotskian literature is distinct from self-directed, informal, incidental and experiential learning that have been developed to date. It does (like these other concepts) expand our view of what should be legitimately thought of as learning, in that it considers practices that occur outside of the classroom. However, neo-Vygotskian formulations allow us to move beyond notions of learning as strictly individualized and consciously planned (i.e. self-directed learning), and they allow a more critical understanding of situations than do theories of incidental learning. Neo-Vygotskian approaches also involve a situated conception of "experience" that surpasses the undifferentiated mass of interaction pre-figured in experiential learning, and they approach learning in such a way as to move us beyond simple categorical distinctions of formal, nonformal and informal learning. The neo-Vygotskian approach provides an explanation of what I refer to as "learning in the everyday", a general social-relational concept that expands our means of understanding the relationship between social interaction and learning generally. Learning in the everyday occurs in formal as well as informal settings because it refers to a specific dimension of the general mode of participation in social life. At the same time, however, we'll see that in this research I *primarily* focus on learning in the everyday that occurs *outside* of formalized settings. This is because, simply put, this is precisely where these working-class adult learners can be seen to do so much of their computer learning.

In defining the concept of learning that I use it is perhaps important to also briefly clarify how I use the concepts of "knowledge" and "skill" in the research as well. In recent work, Smith explains:

> Concepts, beliefs, ideas, knowledge, and so on (what Marxists know as consciousness) are included in this ontology of the social as practices that are integral to the concerting and coordinating of people's activities. (Smith, 1999:75)

> Knowledge is socially organized; its characteristic textual forms bear and replicate social relations. Hence knowledge must be differently written and differently designed if it is to bear other social relations than those of ruling. The forms of knowledge we take for granted in social science have been created externally from our local actualities, standing over against us in a relation of dominance and authority. (Smith, 1999:94)

A definition of knowledge in the context of this research, then, has two dimensions. First, knowledge (and skill) can be understood as the individually embodied, socially generated "knowing" (ideas, plans, physical skills, techniques, sensitivities, dispositions, tastes, and so on) which is only separable from its production in "activity" in a process of abstraction and analysis. The active-verb form, "knowing", in the first sense, is meant to indicate that "knowledge" is always something that has to be *done* in actual coordinated activity. Though in this research I do not deal very much with the second dimension of "knowledge", it can be understood as the relationship between local knowing and large-scale coordination of relations which stand external to our local activities (and are largely text-mediated, see Smith, 1999:94). These are the conventional "forms of knowledge we take for granted in social science" that Smith talks about in the second quotation above.

It is the first approach - connected to notions of the everyday (Smith, 1987) as well as 'tacit knowledge' (Polanyi, 1967) - that are central to the analysis of learning and class I present here. From the original Vygotskian perspective the first approach to knowledge describes relations found in any set of coordinated human activity (what Vygotsky called "cultural formations") mediated by cultural/historical tools or artifacts including texts, technologies, discourse, ideas, language and so on. Tools, signs and technologies are understood as objectifications of social relations of production (which include a specific division of labour according to Marx and Vygotsky) and project a certain range of uses which shape activity, but which do not determine it. Tool-mediation represents an key dimension of the structuring of ongoing learning practice.

1.3 Structure of Argument, Imported Concepts and Research Claims

While I provide a comprehensive, step-by-step outline of chapter contents in the following section, I want to outline a more general structure to the argument building on the notion of core and secondary projects introduced earlier. These projects do not run consecutively, but rather concurrently. While I proceed with the core project throughout, I try to take advantage of openings as they arise to expand the secondary analysis. Overall, this thesis is constructed as a set of mini-analyses that are held together by a guiding interest in the relationship between social class and computer-mediated learning. I suggest there is a

need for a more comprehensive understanding of class-based contradictions in activity systems and the standpoints from which these contradictions are experienced and actively produced. Each chapter accentuates a particular feature of learning: its theoretical implications in relation to Adult Learning Theory (Chapter 3); its relationship to working people's concrete activities (Chapter 4); its relationship to computers and class broadly (Chapter 5); the micro-interactive achievement and tacit dimensions of computer-based activity systems (Chapter 6); the social structure of working-class computer learning networks and tool-mediation (Chapter 7); the way that social standpoint defines working-class computer learning (Chapter 8); the oral dimensions of working-class computer learning networks (Chapter 9); the material constraints on working-class computer-based activity systems (Chapter 10); and finally, the relationship between activity, use and exchange-value contradictions in working-class computing (Chapter 11). Through each of these chapters I build an analysis of computer learning which piece-by-piece allows us to see its socially situated, working-class character.

My application of the concept of class-standpoints to the issue of working-class computer learning provides an important initial clarification to the basic neo-Vygotskian approach. Building from this clarification, we see that the interrelation of specific micro and macro contexts becomes important. Class is something that people actively accomplish in their everyday lives but it is also a major feature of broad political economic relations. At the same time, we also see that although people exercise freedom in their participation with each other as individual human agents, they are not free to participate in any way they chose. These represent classic sociological questions and cannot be definitively resolved. They are, however, the inspiration for my efforts to import concepts related to the work of Pierre Bourdieu and Erving Goffman which I argue can contribute to the clarification of the neo-Vygotskian framework which describes how people have different experiences by virtue of their social standpoint, undergo change and, in turn, produce activity in both patterned and sometimes unexpected ways. It is a model of adult learning that is both *differentiated and differentiating*. The need to pose these broader issues stems from the fact that the neo-Vygotskian framework as I describe it is not without its limitations. The approach I take

relates directly to issues of maintaining the active, knowing subject while at the same time reiterating the coordinated, social relational character of learning. Several chapters and concepts relate to this secondary project. Chapter 6, for example, relates to the micro-interactional and tacit choices that learners can be seen to make, whereas the introduction of Bourdieu's concept of habitus and Goffman's "frame analysis" offer a means to make visible the structure and agency of computer activity.

More specifically, in Chapter 6 I use a micro-analysis of a case study of workers learning together in a computer lab to demonstrate a key principle of the neo-Vygotskian framework in terms of a fine-grained, moment-by-moment analysis. Those familiar with micro-analyses in the tradition of "Conversation Analysis", however, shouldn't confuse my use of the techniques with those who seek to make universal statements about human interaction. Rather, my use of "turn-taking" directs our attention to the situated character of people's interaction and the surprising degree of variation in the way people accomplish their activities - a degree of variation which is made visible specifically through the use of sequential analysis. These studies support basic neo-Vygotskian claims about learning in a unique way by documenting the complexity of the *active* choice-making that learners accomplish tacitly in participatory, interactive systems. These learners are demonstrated to be skilful social agents in their own learning rather than passive, individual information processors. The production of knowledge is shown to be a collective achievement in which there was no expert per se. The processes in which two people actively produce expertise and knowledge collectively rather than have it inserted into them in a pre-constituted form is clearly demonstrated. At the same time, however, micro-analyses such as these have limitations as well. It would have been ideal, for example, to have captured some strip of learning outside the institutionalized setting of the labour education centre computer lab where part one of Chapter 6 focuses.[4] Nevertheless, in the context of the study as a whole this strip of activity does serve the purpose of providing a basic model of the actual

[4] I say it would have "ideal" because the interview data predominantly focuses on learning in the everyday outside of formalized, classroom-type settings and micro-analysis of this activity would have more closely matched the interview data.

interactive processes of learning that people accomplish. This case study expands our basic understanding of the character of learning, and in so doing opens up important opportunities for understanding computer learning that goes on both outside and inside the classroom.

Similarly, the second case study in Chapter 6 also provides an important element to our understanding of the production of computer-based activity, this time emphasizing the structuring effects of computer software and organizational relations. In this case study I make use of another type of sequential micro-analysis focussing on clerical work in an auto parts factory purchasing office. While industrial workers are the focus of much of the research outside of chapter 6, this case nevertheless demonstrates, in graphic detail, several key principles of structured class-relations of everyday computer practice/learning in the workplace. Worker's modes of participation both with each other and the computer software itself can be heavily conditioned by workplace rules and broader political economic forces. The case study provides a detailed example of how learning practices are not universal but situated and inextricable from the process of tool-mediation. While interviews and large-scale survey data situate working-class computer learning practices broadly, these micro-analysis provide an important resource for our understanding of the many tacit processes and local interactional structures that interviews and surveys must largely assume. These micro-analyses add an important dimension to our understanding of how a variety of activity systems are actually produced in the everyday.

Moving beyond these mini-analyses, we see that neo-Vygotskian approaches to learning emphasize that there are different levels of activity (e.g. operations, goals, motives). However different levels of activity are subject to re-arrangement and different contexts of activity overlap. In this research for instance, working-class computer learning practices were, virtually simultaneously, understood as a personal recreation activity, a child-rearing activity, and/or an activity aimed at preparation for the labour market. These practices could be a neighbourhood or community development activity, a form of resistance to workplace routinization and alienation, a situational opposition to supervisors, or part of a more general opposition to capital. People sometimes learned physical and social skills that went on unconsciously with only indirect relevance to the object of the activity. Typing or reading

skills, for example, may be developed in the course of computer use, computer repair, and so on. There were also activities embedded in "computer learning" which did not involve a computer at all, such as chatting with co-workers, neighbours or family-members about computers, reading newspaper articles, listening to a radio or television programs, and so on. These activities could be planned or incidental, incorporated into the learning process immediately or even retrospectively. All these are practical dimension of broad computer-mediated activity systems rooted in multiple physical locations.

As I've noted, people participate in activity systems, but they are not completely free to participate in any thing or in any way that they choose. Participation is structured by various organizational and political economic relations, however it is also structured by people's orientation to particular activities which is shaped over time. I make a case that working-class people in this study participate in computer learning for reasons that arise from a range of specific class experiences. However, understanding these embodied dispositions and how they translate into activity in class terms may be more easily done by reflecting on a concept outside the conventional neo-Vygotskian framework.[5]

In order to better understand this complex of dispositions and its full social significance, I draw on the work of Pierre Bourdieu. Building upon a critical review of Bourdieu's concept of habitus and field (e.g. 1977; 1984), I outline the notion of a *working-class learning habitus*. I suggest a slightly narrower variation of the term which is a type of "habitus-in-action" approach. Briefly, a class-habitus refers to dispositions, habits and preferences that people develop and use as a means of selecting and being selected into various learning practices and modes of participation in activity. At the same time, however, this habitus is not static, but is a working heuristic open to reformation in the course of activity itself. The working-class learning habitus is composed of contradictory orientations to aspects of learning practice which, in fact, reflect the contradictory character of class experience generally. Working-class interviewees in this research, for example, held highly

[5]We could actually try to understand the kind of dispositions I'm referring to as a type of "tool" in a process of tool-mediation which is more in keeping with the conventional Activity Theory perspective. However I suggest that the fragmentary and contradictory dimensions of these types of class-based dispositions is better described by other concepts introduced below.

situational and contradictory perspectives toward formal schooling, "intellectual" content of learning, the value of their own learning, and so on.

Closely related to my discussion of working-class learning habitus is a characterization of respondent's orientation to computer technology itself. This orientation affects people's computer learning in a profound way. I described this orientation in terms of a *working-class technological common sense* building on the notion of "common sense" suggested by the Italian Marxist Antonio Gramsci (1971). I show how this form of common sense is composed of dominant notions of technological progress on the one hand, and lived working-class experience. An analysis of this common sense proved helpful in order to develop a full understanding of the class-relations of the broader *goal* and *motive-structure* of computer-based activity (i.e. learning). Together, these notions of common sense and class-habitus make a key contribution to the basic neo-Vygotskian approach and form an important part of our understanding of the class dimensions of computer learning.

Certainly the identification of class-standpoints in activity systems, the explication of the content of class-habitus and technological common sense helps us to understand how these activity systems are shaped. However, they aren't enough to actually penetrate the complexity and contingency of concrete practice. Class-habitus, for example, does not simply translate, in an unmediated way, into the production of coherent activity systems. Rather, an individually embodied habitus-in-action must enter into a *negotiated* frame of activity. How then do we make visible the linkage between people's own subjective participation in activity systems in ways that move beyond our understanding of actors as, what Harold Garfinkel (1967) called, "judgmental dopes"?

Neo-Vygotskian research tends to rely on a much more general analysis of stability and change in activity systems that is based almost exclusively on structural contradictions. While this level of analysis is vital, it tells us precious little about the practical role of the agency of real people in the accomplishment of this stability and change in everyday contexts. There is little in the neo-Vygotskian repertoire of conceptual tools that adequately helps us understand how it is that, in Goffman's words, people "locate, perceive, identify and label a seemingly infinite number of concrete occurrences" (1974:112), particularly in social

interactional rather than purely cognitivist terms. While it is more preliminary than my other claims, I suggest that a possible remedy to this gap is to be found in Goffman's "frame analysis" (1974). Briefly, frames refer to identifiable elements of the organization of social life that govern social events as well as people's subjective involvement in them. Goffman demonstrates that the "frame of activity" involves "organizational premises sustained both in the mind and in activity" (1974:247). I provide a critical review of Goffman's frame analysis beginning in Chapter 4 and reflect on its relevance for the data intermittently throughout the core analysis.

A central element of frame analysis is what Goffman refers to as the "keying" of primary frames of activity. This concept, in fact, provides an important elaboration of the simultaneous openness yet orderliness of people's active production of activity systems. Such procedures describe the socially achieved orderliness of what Goffman calls attended and disattended tracks of information which roughly parallels the kind of differences neo-Vygotskians describe in terms of levels of activity. As Goffman points out, the keying of frames of activity are a means of understanding not simply constraint in activity, but the production of meaningful variation. Keying builds on established frames of activity within which negotiated changes can occur. Drawing on one of Goffman's own examples, applying the concept of keying of "primary" frames of activity allows us understand how "fighting" activity can become "play fighting", a subtle variation with different rules, purposes and outcomes.[6] Frame analysis helps explain the kind of impressive variation and openness of activity in the real world. Goffman's work does not help us understand the broader social significance of particular standpoints and retains a strong sense of political disinterest. Nevertheless, in frame analysis we have the potential to extend our understanding of the inter-subjective character of activity systems and working-class computer learning that highlights the relationship between people's consciousness and the organized social interaction they help produce. It can play an important role, for example, in helping us to

[6]Indeed, Goffman (1974) draws on the work of Gregory Bateson for inspiration in this example (and throughout Frame Analysis), as does Engeström (1999) in his comments about different "levels of learning" and change (p.8).

understand how people "learn" from the otherwise undifferentiated flow of human "experience", or how it is that computer-mediated practices that take place within a huge array of separate activities (in the home, workplace, neighbourhood, etc.) can be re-organized by people into a coherent activity system of its own.

As I explain more fully in Chapter 4, framing/keying and the notion of habitus-in-action as I've outlined them, can complement each other nicely and together they can fill an important gap in neo-Vygotskian scholarship despite their origins in different theoretical traditions. Habitus has little use to a critical materialist analysis if it is simply a static description of preferences, class histories, and dispositions, or if it is necessarily saddled with invariant structure such as Bourdieu's "fields". Habitus is a means of explicating the type of physically and culturally embodied set of dispositions that shape, but do not determine, the participatory roles that are available to them, and which they would be interested in taking on in the first place. Framing and keying of frames, on the other hand, are a means of understanding the contingency and variability that is made available by human agents in the course of real interaction despite the relative durability of the class habitus.

Having outlined the basic structure of the argument I can now more effectively summarize the claims that I make in the research. I am primarily interested in explicating the social relations that shape the computer learning practices of working-class people in advanced capitalist economies such as Canada. My most basic claim is that the working-class people in the study are engaged in a wide range of computer learning activities. In the research I outline specific topics of interest, context and methods of their learning. The findings of my research clarifies some large-scale educational research on computer learning based on computer access and use data by showing the complex and often hidden ways working-class learning takes place. These findings also run against a type of class-bias in educational literature that tends to ignore, denigrate or deny the capacities of working-class people to collectively develop and carry out their own learning. Indeed, I claim that these more negative portrayals of working-class learning depend, first and foremost, on the dominant way that "learning" is conceptualized which obscures much of the learning that working-class people actually do.

Beginning from a basic neo-Vygotskian framework, I claim that the learning practices that the people in this research engage in cannot be properly understood as an individualized, cognitive event distinguished by formalized, pedagogical or expert/novice relations. Rather this computer learning is inextricably integrated with everyday life, it is mediated by artifacts including computer hard- and soft-ware, organizational settings, linguistic devices, orality and class habitus. I further claim that this learning is historically and materially mediated in ways that express the contradictory character of class life in advanced capitalist society generally. I claim there are, in fact, many different ways of making class dimensions of computer learning visible. I demonstrate how class dimensions are inherent in respondent's perspectives on computer technology, their reasons for entering into computer learning, and their general orientation toward "education" and "learning". I claim that respondent's relationship to the material structures of computer learning, and the types of dispositions, narratives, and forms of membership in specific social networks also express class relationships. Indeed, specific forms of respondent's practice arise from and are shaped by capitalist labour processes of the factory directly. Furthermore, I argue that interviewee's relationships to the contradictions of the commodity form are expressed directly in the types of learning projects people choose.

1.4 Summary of Chapter Contents

The order of the chapters (beginning even in the opening autobiographical description) emerges from a desire to deal first with the most immediately comprehensible experiences of learning and technology: concepts of learning, experiences of learning, perspectives on computers and the detailed micro-interaction that makes up computer activity. Based on this firm foundation, I felt we would be in a better position to begin to discuss broader and more distinctive features of working-class computer learning such as networks of learning, conscious and organized expressions of class standpoint, orality, material structures of computer learning, and commodification. It is a presentation of claims and evidence that, with some exceptions, parallels my own analytic process of discovery.

In *Chapter 2*, I describe the type of multi-disciplinary and multi-methodological approach I take in investigating computer learning in the everyday. I provide description of

data collection and analysis, and briefly outline relevant background for each traditions. I also provide a description of subject selection and variance, and include a discussion of the need for attention to power dynamics in the research process.

Chapter 3 provides a brief discussion of what Livingstone (1999) has called "class deficit theories" of learning and a review of key adult learning theory that is relevant to make visible the social relations that shape computer learning in the everyday from specific class standpoints. I make use of a working heuristic that I call "Capitalist Learning Hegemony" (CLH) as a means of making clear the mutually reinforcing tendencies that run through the adult learning theories discussed. I conclude the chapter with a brief sketch of the foundational work of Soviet psychologist Lev Vygotsky.

Chapter 4 outlines the shift from Vygotsky to the neo-Vygotskians. Drawing on the interview data, "learning in the everyday" is defined as a problematic for inquiry. Interview data are interspersed in a review of neo-Vygotskian writers such as Lave and Wenger (e.g. 1991) and Engeström (e.g. 1987). I close the chapter with a critical discussion of the key, additional concepts I've introduced above - Pierre Bourdieu's concept of "habitus" and Erving Goffman's "frame analysis".

In *Chapter 5*, I situate computer technology historically. I begin with brief remarks on the development of computer technologies and the social relations 'cemented' in modern computer artifacts primarily by drawing on the work of David Noble. I provide a brief sketch of technological use and the political economic context in North America and Canada specifically. In the second portion of the chapter, I draw on respondents' comments on the meaning and experiences of computer technology in their lives. I go on to outline a working-class technological "common sense" that emerges specifically from class-relations in the home, community, the workplace and labour market.

Chapter 6, as I've already described, deals specifically with computer-based activity through the use of fine-grained micro-analysis of interaction. Two case studies are provided which serve as "specimens" of people's everyday computer learning practices, a process Smith (1990:165-167) calls "botanizing" or working from very specific examples to reflect on the social concerting of activity more generally. The first example deals with two

unemployed men "learning" computers together in a computer lab in a Labour Education Centre in Toronto (Canada). Though situated in a more formalized setting, this case study nevertheless provides a detailed, "real time" analysis of two people's interactive computer learning. It is meant to link major elements of my critique of adult learning theories with computing specifically, and serve as a basis to interpret aspects of interview-based data later on. In the second case study, I present an analysis of worker-machine-organizational interaction through a detailed analysis of the screen-texts of company software in an auto parts factory purchasing office. We see demonstrated the local coordination of worker's activity vis-à-vis software in an organizational setting, and we also see the highly constrained ways that workers, nevertheless, find ways to learn together in interaction with the computer systems.

In *Chapter 7*, I present interview data that shows how working-class computer learning is accomplished in the everyday. I demonstrate how this computer learning is tool-mediated, and involves solidaristic networks that operate at the intersection of multiple systems of activity. I also provide further grounded discussion of the concepts of frame and habitus in the context of computer activity, the latter of which is more fully developed in terms of working-class learning practices specifically.

Chapter 8 offers the most focussed analysis of working-class standpoint in computer activity. I focus on how issues of working-class standpoint (reflecting briefly on the work of Georg Lukács and Marxist-Feminist theory) can be used to radicalize neo-Vygotskian approaches making visible the working-class dimensions of computer learning. I discuss the relevance of working-class habitus and the process of framing for understanding how working-class standpoints and computer learning practices are actively accomplished by skilled agents. I also draw on original analysis of large-scale survey data concerning inter-class comparisons in terms of learning methods, and compare the computer learning amongst workers who are unionized and non-unionized. I also provide brief analysis of an 'upper-class' mini-sample and show how their perspectives on both technology and learning processes are different for those of the working-class group.

Chapter 9 discusses the relevance of everyday conversation in people's learning

practices by building on the work of Orr (1996). Following Orr (1996), I show how talk is used for working-class computer learning in two ways: i) within the course of learning practice, and ii) outside of actual ongoing practice as a means of knowledge storage (using a series of oral devices), coordinating group membership, and expressing class standpoints in activity.

In *Chapter 10,* I focus on the material structures that face working-class computer learners. I discuss issues of standpoint in terms of these material structures of activity, and I draw on original analysis of large-scale survey data again to show class differences. I reflect, in particular, on the interacting gender/class effects with examples that focus on the gendered dimensions of class experience in workplace learning, and the division of labour at home. I point to my own previous research that provides examples of how segmented labour markets and relations of language in the workplace also help to differentiate people's learning experiences in terms of race/class interactions. I critically evaluate recent Canadian computer access and use data (Nakhaie and Pike, 1998) and demonstrate how these results can be interpreted in the context of my own sets of data. I also discuss how working-class people creatively respond to these material structures in the home, community and workplaces.

In *Chapter 11,* I discuss the process of commodification for its role in the coordination of computer learning from a working-class standpoint. Specifically, the chapter expands upon existing theoretical apparatus to show how class-relations are implicated in the commodity-form and the motive-structure of activity. Exchange-value orientations in activity are said to represent a process of incorporation into capitalist relations whereas use-value orientations are said to represent processes that can run tangential or in opposition to the logic of capital accumulation.

Chapter 2
Methods and Epistemology

> The old question, Which side are you on?, cannot be avoided. Openly taking sides at the start, when it is necessary to be on one side or the other, is not only the radical thing to do. It is the honest thing to do. And who, but those whose interests are hurt by the truth, would want us to be dishonest? (Ollman, 1993:177)

In this chapter I outline the different methods, methodological considerations, types of analysis and subject selection used in this research. At the same time, I also want to show how the methodological decisions were closely related to content, standpoint and political alignment of the research as well. I want to indicate, however briefly, why the academic knowledge production process should be viewed reflexively. In short, I argue that research findings cannot be meaningfully understood separate from their modes of production.

One of the most basic ways we can describe any research process is by recognizing it as composed of both 'process' objectives and 'content' objectives. The process objectives of research tend to be more general in nature such as: verification, evaluation, prescription, description and understanding (Glesne and Peshkin, 1992:16). Content objectives on the other hand are thought to concern the specific object of study. However, as many social science researchers are now coming to understand, the process and content objectives are not only mutually reinforcing, they are in many ways mutually constituting.

> The research methods we choose say something about our views on what qualifies as valuable knowledge and our perspective on the nature of reality... quantitative methods are, in general, supported by a positivist or scientific paradigm, which leads us to regard the world as made up of observable, measurable facts. In contrast, qualitative methods are generally supported by the interpretivist paradigm, which portrays a world in which reality is socially constructed, complex, and ever-changing. (Glesne and Peshkin, 1992:6)

Epistemological and methodological commitments are directly linked to the topic of interest. What we understand as legitimate and useful knowledge directly bears on what we are willing to try to bring into view and attempt to understand through our research methods. In the work of Gouldner (1970) we see a discussion of *reflexive sociology*. Under this model of social science, one's interests and concerns become necessary features of accounts of data,

and a legitimate part of the sociological text. It is through this type of reflexive activity that we can begin to talk about the ways that sociological work is deeply informed by actual social relationships, political struggles and the inescapably politicized dimensions of researcher and the researched.

Topics in which we're interested, which we find legitimate and useful are also linked to beliefs of the nature of existence or the state of "being", and from this what is available to us as "knowledge". The notion of ontogenesis captures an important part of this mutual constitution of aims, interest, methodology, epistemology and ultimately ontology. I begin this chapter with a reminder of these notions of interrelations within academic practice and ontogenesis to show these seemingly abstract concerns have very real, practical implications.

2.1 A Multi-Disciplinary Approach

> The notions of social space, symbolic space, or social class are never studied in and for themselves; rather, they are tested through research in which the theoretical and the empirical are inseparable and which mobilized numerous methods of observation and measurement - quantitative and qualitative, statistical and ethnographic, macro sociological and microsociological (all of which are meaningless oppositions). (Bourdieu, 1998:2)

Bourdieu's comments are a relevant way to begin a discussion of the way I have sought to make direct connections between the everyday achievement of ongoing practices and larger sets of social relations that shape working-class computer learning. I draw on several methods of data gathering to make visible the linkages between class relations and computer learning in different ways. Primarily, I depend on in-depth interviewing. However, I also draw on ethnographic observations (in the home and workplace), micro-analyses, and analysis of large-scale survey data. I argue that a multi-methodological approach is important in order to avoid essentialized understanding of learning by producing a broadly situated account; and, to avoid 'topic/resource confusion' where our ways of thinking/talking about a topic (which are *resources* for investigating the topic) becomes confused with the *actual topic* of the investigation. My experience has in fact reiterated that traditional fine-grained interactional analysis of actual "learning" practice (as developed in the ethnomethodological/conversation analytic (EM/CA) traditions), ethnographic traditions,

large-scale surveys, and, in depth interviewing methods *can* be used effectively in a kind of *dialogic* process of investigation.

Before getting into detailed descriptions of each of the methods I've used however, I'd like to provide a brief overview of how I've envisioned these different methods being integrated into a single, broad-based account. First, what I've called the methods of 'fine-grained' analysis offer a means to develop our understanding of what we are actually referring to when we talk about learning in everyday activity. So much literature on adult learning takes for granted the actual processes of "learning" that, to my mind, it remains a kind of 'black box'. "Learning" just happens; people internalize "experience" unproblematically; internalized experience is meaningful in the same way to different people; and, internalized experience (somehow) becomes something we might call skill or knowledge. However, learning doesn't work in such an unproblematic and undifferentiated fashion. Rather, it is an inherently active, social process with both self-conscious and tacit dimensions.

In Chapter 1, I presented a preliminary core definition of learning that emerges from the neo-Vygotskian tradition and which acts as a point of departure for a critical formulations. However, it should be noted that definition, delineation, and the way one 'cordons off' the phenomenon of learning is an important feature of studying learning. This is, at its core, the imposition of a scholastic mode of knowledge production and mustn't be understood as a necessary part of the topic itself. Related to this is an important point made by Smith (1987) involving the distinction between "phenomenon" and "problematic". In order to maintain an integrated analysis in which relations internal and external to the immediate practices remain co-present in the analysis, Smith prefers the term "problematic". For her, this clarification signals the fact that when performing the phenomenological shift (isolating an object of analysis or "bracketing" as phenomenologists call it), the interrelations and the broader social contexts of objects must remain intact, ever-present in our understanding of how the phenomena is constituted. It is a terminology that serves to remind us that the kind of abstraction that the phenomenological shift provides is an analytic feature and not a feature of the actual practices per se.

The tacit dimensions of learning are an important methodological challenge for any

theory. During an interview, for example, the tacit is, by definition, not open for self-conscious expression by interviewees. Neo-Vygotskian writers have made room for, though not fully explicated, the role of tacit knowledge in their approach to learning. Activity Theory, for example, approaches the issue primarily as a matter of operations (versus goal-directed actions) within activity. As the founder of Activity Theory, Leont'ev discusses the issue as revolving around the notion of 'psychic reflection', 'consciousness', thought, and so on.

> Thus when we are dealing with any activity - for example, learning - very little of what is perceived by the subject, and without which the carrying out of activity is impossible, is also actually recognized by him [*sic*]. In spite of what is apparent, what is actually recognized is only that which enters into the activity as a subject of one or another action that is carried out as its direct goal. (Leont'ev, 1978:155)

The relevance of the inclusion of an analysis of the tacit dimensions of learning is two-fold. First it directs our attention to a range of only half-acknowledged social processes which nevertheless play an important role in shaping how activity systems actually function and specific sets of social relations get reproduced. And second, this level of analysis directs our attention to yet another way of understanding how people are active agents in the production of activity even if this active participation is tacit and less self-conscious.

One of the basic outcomes of the realization that there are important tacit dimensions to "learning in the everyday" involves the use of methodological and epistemological approaches that are relevant, reconcilable and/or conversant with conceptions of social actions that are not based simply on models celebrating the conscious, autonomous, rational-choice-making actor. Fine-grained analysis can be useful in this regard. At the same time, analyses of moment-by-moment interaction do not typically provide access to how practice is situated in the broader context. In-depth interviewing offers a means of making the micro/macro linkages visible, yet it is prone to what I earlier described as "topic/resource confusion".[1] We should recognize that in-depth interviewing provides only an indirect type

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[1]Bitner (1974) discusses ways of investigating the notion of "organizations", but we can apply his comments to this research by substituting the term "learning" for "organization" to understand how 'topic/resource confusion' relates to interview materials that may broaden the social context.

Plucked from its native ground, i.e. the world of common sense, the concept of rational organization, and

of access to the *actual* practices of computer learning in the everyday. This access is mediated by the language and local production of the interview which is a strip of activity in its own right. The interview process is, in this sense, a "language game", and it is vital to understand how these dynamics play an important role in both the analysis of data as well as the conduct of the interviewer (Mishler, 1986).

In-depth and open-ended interviews in combination with ethnographic observation can, in my view, compliment micro-analytic perspectives, and provide a sensitivity to the larger contexts for ongoing interaction, whereas micro-analysis establishes linkages to the concrete production of material and social life in its complexity and local contingency. A dialogic and multi-methodological approach to investigating learning offers the opportunity to establish alternative programs of inquiry that can operate in the gaps between these traditions in a productive manner.

2.2 In-Depth Interviewing[2]

As I've indicated, in this research I rely primarily on in-depth, open-ended interview

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the schematic determinations that are subsumed under it, are devoid of information on how its terms relate to facts. Without knowing the structure of this relationship of reference, the meaning of the concept and its terms cannot be determined. In this situation an investigator may use one of three research procedures. He [*sic*] can, for one thing, proceed to investigate formal organization while assuming that the unexplicated common-sense meanings of the terms are adequate definitions for the purposes of his investigation. In this case, he must use that which he proposes to study as a resource for studying it. He can, in the second instance, attach to the terms a more or less arbitrary meaning by defining them operationally. In this case, the relationship of reference between the term and the facts to which it refers will be defined by the operations of inquiry. Interest in the actor's perspective is either deliberately abandoned, or some fictitious version of it is adopted. The investigator can, in the last instance, decide that the meaning of the concept, and of all the terms and determinations that are subsumed under it, must be discovered by studying their use in real scenes of action by persons whose competence to use them is socially sanctioned. (p.74)

[2]The following is transcription notation that will be used throughout this research:

[ ]	interviewer's annotated comment, observation or addition to the transcript
/	interruption
-	self interruption or break in flow of sentence
?	interrogative or upward intonation
...	material deleted for brevity
I	interviewer speaks
R, R1, R2	interviewee or interviewees speak

Note: As mentioned briefly earlier, for the sake of anonymity, the specific pseudonyms, titles, towns and other identifying material have been selected, but which also suit particular elements of the individuals, places, neighbourhoods, etc. In addition, many of the "umms" "ahhs" and the normal verbal routines of stopping, starting and repeating have been tidied up in an effort to make the quotations more readable.

data. This in-depth interviewing is an example of what I referred to in Livingstone and Sawchuk (2000) as a "learning life-history" method which draws on, as the name suggests, life-history interviewing.

> The defining element of the [life history] method remains its concern with understanding an individual's life history as an entry point into understanding society as a whole [or part]. (Watson, 1993:415)

Issues of historical context, social standpoint, and the voice of subordinated groups are features of the interview process that life-history interviewing is specifically meant to make explicit.

> Anthropologists who recognize that, in writing culture, they structure and interpret the experiences of others, appreciate life histories because "the other" speaks for herself and describes her own experiences in them. Life histories interest scholars engaged in "post-positivist cultural studies" because of their commitment to "lived experience" and to "developing insights and deepening understanding of the complexities and constructedness of culture through participation in forms of life where observer and observed become interlocutors (Conquergood, 1987:2).... To groups who have been ignored, to emergent collectivities who are just beginning to speak in their own name and to develop their own past and future, life histories are an important, perhaps essential, tool for formulating, publicizing, and pursuing change as well... life histories become important tools for reconstructing knowledge not only about them, but about the society of which they are part. Stories tell about society from particular vantage points. (McCall and Wittner, 1990:46-47)

Beyond the notion of "topic-resource confusion", it is important to recognize other potentially problematic features of interviews. For example, the "interview" encounter is subject to range of (material and symbolic) power-differentials. Charlesworth (2000: 131-149) outlines issues specific to class differences in interviewing citing issues of subordination, authorization and symbolic violence that can occasion encounters between academics and working-class people. Mishler's important text in this area (1986) details a conception of interviewing that truly is a process of "inter"-"viewing", i.e. the interrelation of people actively viewing (and producing views and accounts for) each other. Another dimension of these potential difficulties can be discussed in terms of discursive relations,

> ... in which what is not yet spoken struggles dialogically to appropriate language sedimented with meaning before the moment in which she speaks. It is through and through saturated with the social relations, including the social relations of discourse,

> in which what is being spoken of is embedded as well as those of which the moment of speaking is part. (Smith, 1997:394)

Smith is well aware of both these dimensions when she writes, for example, in her edited collection of Sally Hacker's work (1990:5), that with trained-sensitivities, interviewers can still gain a great deal by *reading through the text* which the interview encounter produces. Smith outlines the notion of "active listing" and the problem of interpretation of interview data as follows:

> The simple notion of the everyday world as problematic is that social relations external to it are present in its organization. How then are their traces to be found in the ways that people speak of their everyday lives in the course of interviews of this kind. We do not expect them to speak of social organization and social relations. The methodological assumptions of the approach we are using are that the social organization and relations of the ongoing concerting of our daily activities are continually expressed in the ordinary ways in which we speak of them, at least when we speak of them *concretely*. How people speak of the forms of life in which they are implicated is determined by those forms of life. Wittgenstein opposed the philosophical practice of lifting terms out of their original home and their actual uses in order to explore their essence. I am taking the further step of arguing that the way terms are used in their original context, including their syntactic arrangements, is "controlled" or "governed" by its social organization and that the same social organization is present as an ordering procedure in how people tell others about that original setting. As interviewers we persuade people to talk about the everyday worlds in which they are active.... In the interview situation, the original setting is not operative, but registers as an underlying determinant of how the informant talks of the setting because it is the only way in which it makes sense to talk. Given that we do not disrupt the process by the procedures we use, open-ended interviewing should therefore yield stretches of talk that "express" the social organization and relation of the [original] setting. (my emphasis; Smith, 1987:188-189)[3]

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[3] In Heap (1980), there is another explanation of these types of "readings" of data (one's own and that of others):

> ...there is an avenue for discovering actual and therefore possibly recurring, reusable practices. That avenue is EM first-person research on properties produced and used by the researcher (cf. Heap, 1975). Taking Dorothy Smith's' nice turn of phrase (1978 [unpublished]), members' practices are our practices as members. The methodological question is whether the inside literal description of a contingent practice can be used to aid in the identification and description, when possible, of that practice from an observer's perspective... (footnote 8, p.99)

Building on these recommendations, my method is to "read through" the accounts[4] to make explicit the social organization of practice in the actual contexts of neighbourhood, pub, factory, and so on.

Another way of understanding the relations between people's talk and their actual practices however can be taken from a variety of analyses of practice which I discuss throughout this research, including Orr (1996), Suchman (1987), Bourdieu (e.g. 1977), and Lave (1988). In these works, writers talk about a distinction between "canonical" or espoused practices and actual practices. A useful metaphor to explain the difference that Bourdieu uses is the comparison between a trip a person makes somewhere and the depiction that a standard road-map can provide of that trip. The formalized lines, distances, orientations and elevations provided by the map (i.e. canonical representations of practice) pale in comparison to the myriad of sense and interaction that make up actual practice. Bourdieu (1977) also speaks of the terms *modus operandi* versus *opus operatum*, i.e. the difference between viewing a task as it unfolds over time (*modus operandi*) versus the view of the same task in hindsight (*opus operatum*) as a summary that displays a character and logic not present in the course of actual moment-by-moment interaction. As a methodological concern, difficulties arise in the interview process in that interviewees themselves often use canonical descriptions of their practice which resists the kind of "reading through" procedures Smith (1987) suggests.

The interviewing in this research typically involved several audio taped sessions per interviewee each lasting between 1-3 hours. Full, informed consent concerning the purposes and uses of the research was given (see appendices), and interviewees were encouraged to, as

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[4]The issues I cite here have some relation to what the EM/CA traditions refer to as "documentary processes" of cognition and perception (see Heritage, 1984) as well as the "indexical" nature of language:

> The activities whereby members produce and manage settings of organized everyday affairs are identical with members' procedures for making those settings 'account-able'. The 'reflexive', or 'incarnate' character of accounting practices and accounts makes up the crux of [this] recommendation. (Garfinkel, 1967:1)

Garfinkel (1967:3), for example, begins his discussion of accounts by noting that their 'fit' to the circumstances they describe is 'loose' and subject to adjustment by ad hoc devices - that accounts, like actions, are understood by reference to a mass of un-stated assumptions and that the sense of an account is heavily dependent on the context of its production. The indefinitely - and unavoidably - self-referential character of anything we can say "in-so-many-words" means that the meaning we make in interviews must not be understood as describing actual practices but rather as running parallel and providing clues to them.

much as possible, actively think aloud about how they understood learning itself as well as the actual computer learning practices in which they engaged. Beyond the type of active engagement, and clarification processes that take place within open-ended interviewing of this kind, the actual analysis of transcripts revolved around basic qualitative methods of sorting, coding and finally the arrangement of key examples in the text. Through activities such as labelling transcripts, field-notes, and accompanying information, sorting specific stretches of talk into emerging themes, and selecting the best examples of each, theoretical dimensions are made explicit for critical reflection. When appropriate, further verifications were made on key themes and secondary materials examined.

The life-history interview clearly has the potential to produce not only long interviews, but deeply personal ones as well. This was one of the stated purposes of the method in that the interviewee, their life, their own perspectives and practices, and the types of social organization that they faced on an ongoing basis were placed at the very centre of the analysis. Interviews took place in location that interviewees felt most comfortable such as their homes, local hang-outs (coffee shops, pubs), and occasionally the workplace. This was also a means to make an immediate connection (for the analyst) to the informal contexts in which the kind of everyday learning (though not necessarily computer learning) took place. This produced the opportunity for, not just talk and reflection, but also demonstration of learning processes. People would often invite me to sit with them at their home computer, for example, to show me materials or equipment they were working with and so on. Though transcribed audio-tape hardly does them justice, the many examples of this type of "physical" demonstration provided important background to the analysis.

2.3 Micro-Analysis of Computer Learning

To compliment the interview data, I sought to integrate two micro-analyses of computer learning focussed on the moment-to-moment, local accomplishment of technologically mediated social interaction with the other qualitative and quantitative methods. I drew on traditions of analysis inspired by Garfinkel (1967) and Sacks, Schegloff and Jefferson (1974). Briefly, CA is concerned with the analysis of the interactional competencies which underlie ordinary conversational encounters (Heritage, 1984). CA is

particularly concerned with the elementary role of sequencing and turn-taking in the course of verbal interaction. Sequential analysis is particularly important, as no analysis of utterances - not syntactic, semantic, or pragmatic - taken on its own out of sequence will yield their importance in use or will show what co-participants themselves might make of them:

> ...conversation is informed by the general assumption - common to both speakers and hearers - that utterances which are placed immediately next to some prior are to be understood as produced in response to or, more loosely, in relations to that prior. This assumption provides a framework in which speakers can rely on the position of what they say to contribute to the sense of what they say as an action. (Heritage, 1984:261)

At the same time, as I indicated above, micro-analytic approaches, including CA, are not, on their own, able to make explicit the historical and extra-local relations that are nonetheless co-present coordinators of them. As Cicourel has commented,

> [T]he key concept of adjacency-pairs in conversational analysis is not useful for understanding therapeutic discourse and the turn-taking issues do not become relevant for analysis of the discourse in question. An unresolved problem is that the content of the exchanges remains of residual interest, being primarily a tacit resource for information rather than a topic for analysis. (Cicourel, 1981:55)

CA cannot provide the sole basis for understanding the relevance of social interaction. However, the claims it can make with regard to how subjects are active producers of their interaction rather than mere judgmental dopes, and with regard to how learning is a process of collective, moment-by-moment construction, are nonetheless important for a full understanding of how activity systems actually function.

In the first case study the interaction of a pair of unemployed workers' in an adult education computer lab is examined. Detailed audio/video data were gathered and analysed for the organization of turn-taking in learning interaction sequences. The data includes over three hours of computer learning interaction which is analysed using a basic form of CA. Traditional CA is carried out on the data as outlined originally in Sacks, Schegloff and Jefferson's seminal work A Simplest Systematics for the Organization of Turn-taking in Conversation (1974), but does not stop with the description of these turn-taking mechanisms. While turn-taking may or may not be a phenomenon worthy of investigation in its own right (Sacks et al., 1974:697), I've tried to contextualize this analysis as a dimension of the active

production of computer-based activity systems more broadly.

In the second case study (clerical work), I used a interactional *mock-up* of actual workplace activities and "organizational sequences of action". As I mentioned in the introduction, this case study showed how the social organization of wage-labour and specific computer software shape modes of participation and learning. The 'mock-up' is a basic technique that has been used successfully by analysts facing similar constraints of access to the actual work site.[5] It involves audio-taped explanations which make use of a full series of paper print-outs of computer screen/texts from the workplace software. Using these print-outs the interviewee grounds her explanation in concrete activities and provides a level of access to tacit features of daily work activities and computer-mediated interaction. The mock-up technique allows several important features of actual interaction to be drawn out by providing a means of maintaining a focus in the interviews on concrete interaction with the screen-texts. The analysis of the data consisted of establishing how the clerical worker interacted with the specific fields of the computer software screens, and the effects these screens had in coordinating work activity.

2.4 Ethnographic Observations of Computer Learning

One of the other means by which educational writers, including Lave (1988), Lave and Wenger (1991), have sought to analyse learning is through detailed ethnographic techniques. Educational anthropologist Ogbu outlines the strength of ethnographic approaches this way,

> Contextual analysis entails viewing events within the matrix of their interconnections with other events (past, present, anticipated) and with their environments of occurrence (physical, socio-cultural, temporal). As such, it necessarily integrates processural [agency] and structural perspectives. (Ogbu, 1991:195)

Reflection on selected ethnographic studies of working-class home, community and work-based learning were essential as a general method of orienting to the contexts described in the

[5] See Jordan and Henderson (1994) for an outline of a similar mock-up technique making use of 'elicitation' based on viewing tapes. Bødker (1996) makes use of a similar technique in the context of human-computer interface.

course of my research interviews. This method sensitized and oriented notions of relevancy that interviewees relied upon but could not always express. My earlier comments about the importance of understanding social context emphasize the importance of ethnographic work as a means of developing the shared store of tacit knowledge, understandings, and so on which are essential for the successful co-creation of an interview encounter. I kept detailed notes on encounters, including visits to workplace, homes, union halls and so on, and where there was an interview integrated key quotes with these notes at the next available opportunity.

2.5 Reflections on Large-scale Survey Data

Finally, in an effort to develop a full appreciation of class relations, learning and computer practices beyond the local settings, I reflected on selected large-scale survey reports and original data. Specifically, I assess the class differences surrounding computer access and use, favoured methods and social systems of learning, and differences in the material resources typically available for working-class versus ownership/managerial class respondents. Reviewing other large-scale computer access/use studies (particularly the recent work of Nakhaie and Pike, 1998) and carrying out my own statistical analyses of data derived from the NALL Canadian Survey of Informal Learning (see Livingstone, 2000 for complete description of survey) I compare different class groupings on an aggregate level. The NALL survey samples 1560 respondents, however for the purposes of relatively clear comparison, I've utilized a specific formula to narrow down the respondents into two class groupings which only involve 612 of these respondents.

Drawing on the NALL survey data, I use a statistical formula developed by Livingstone and Hart and explained fully in Livingstone and Mangan (1996). This formula was created for use in the statistic software I used to analyse the data (SPSS 7.5). As I explain in the chapter where I first present this data, this formula is based on a modified Marxist model of social class which is rooted in relations of production differentiating those who purchase and those who sell labour power in order to survive. Technically speaking, the "capitalist class" of large-scale employers, however, is quite small (less than 2% of the NALL survey sample). Therefore, in order to provide greater statistical significance to

comparisons between classes I include corporate executives and managers with this group of large-scale employer class to form a "capitalist class grouping". Likewise I include industrial and non-industrial workers together to generate a "working-class grouping".

2.6 Selection of Subjects

This study primarily examines the learning experiences of the employed, industrial, working-class in Southern Ontario, Canada. Initial contact with interviewees was made through subjects' involvement with the "Working-Class Learning Strategies" (WCLS)[6] project at the Ontario Institute for Studies in Education. Selection for the WCLS project and this research depended one's position as a wage-labourer. In formal terms, workers in these industrial sites are extremely low in terms of "the hierarchical control over production".[7] The original selection of subjects into the WCLS project also involved attempts to gain representative samples in terms of gender, occupation (i.e. skilled, unskilled), department, age, and union activism which is likewise reflected in the sample used in this research.

Status as an employed, industrial manufacturing worker is by no means the only category through which we can investigate class relations and working-class standpoints. Rather relations of social class can take on a myriad of concrete forms including working-class unemployment. Indeed, I am well aware of the fact that in core industrialized countries, the great working-class communities, centred around a large, relatively stable manufacturing facility are on the wane. Given this we might ask ourselves about the relevance of a study that begins with a focus on such a group? The relevance of the study of this group rests, first of all, in an understanding that the underlying set of objective class relations in capitalist society remains the same for this and any other working-class group despite the different concrete ways in which they are lived. In my analysis, I am careful to relate the practices I analyse not simply as discrete phenomena in their own right but as linked to these underlying relations. Perhaps more importantly however, the industrial working-class are the primary

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[6]The "Working-Class Learning Strategies in Transition" project headed by Dr. David W. Livingstone (SSHRC funded). See Livingstone and Sawchuk (forthcoming) for further details.

[7]See explanation in Livingstone and Mangan, 1996 for a brief outline of these criteria and their relationship with class theory.

focus of this research because it is here that the polarization of ownership and control is well establish *historically,* and it is here we can expect to find specifically class-based relations of *both* domination *and* resistance most developed. The organized, industrial working-class remains an example of a formalized, resistant, class-based community. Its decline in core industrial countries is not as much a reflection of its own mistakes as it is a reflection of the recognition of capital that these forms of organization must be eliminated if accumulation is to continue to proceed unfettered. Indeed, it's my view that if we are interested in not only analysing class relations but also in analysing viable solutions to the reproduction of these relations, then we would be hard-pressed to find a starting point which would be as fruitful.

Having said this, in terms of selection for this dissertation research specifically, participants can be broken into two basic groupings. The core participants selected were employed in industrial manufacturing operations in southern Ontario primarily within the industries of auto assembly, auto parts and chemical manufacturing. The majority of core interviewees would be classified as either "semi-skilled" or "un-skilled" production workers. The un-skilled typically worked on an assembly line and/or operated a machine within a batch processing labour process. However, supplementing this core sample was a smaller sample of clerical, custodial, telecommunications workers who largely made up the household partners of the core interviewees. Interviews with these people were meant to broaden an appreciation for collective activity beyond the workplace and the trade union, but provide some additional insight into class relations in work settings beyond the factory. In addition, for the sake of some brief comparative analysis, interviews with a mini-sample of (self-reported) "upper-class" respondent's and corporate executives from the Toronto area were also considered.

Formal, in-depth, loosely-structured, life-history style interviews were conducted with a sample of 73 people overall. The sample contained 42 males and 31 females with an average age 39 years (range of 22-65 years). The formal educational attainment, on average, was something just below a Canadian high school diploma with 26 people having attained this, 20 having dropped out previous to this, 5 having done a formal trade apprenticeship or technicians courses, and the remaining 22 people having gone on to complete varying levels

of post-secondary schooling.

In the table of interviewees (see appendices) I've also included people's self-designation of class status, which confirmed the dominant tendency (see Livingstone and Mangan, 1996) for people to claim "middle-class" status. Race and ethnicity status is of ancillary status in the research and is only drawn on briefly in discussions in Chapter 10 where I reference earlier work (Sawchuk, 1999a) on the effects of ethnicity and language on learning opportunity in the workplace. We see that race/ethnicity backgrounds are diverse with only 35 respondents self-defining strictly as "Canadian".

2.7 The Political Economic Context for Workers in Ontario (Canada)

Before proceeding with a basic outline of the economic context in Canada, let me provide sample of descriptions of class life and the economic context from the perspectives of the working-class interviewees in this research. Despite the variation in the self-identification of social class when we scratch the surface we nevertheless see some strikingly clear descriptions of class distinction and dimensions of social alienation. For the interviewees cited below, for example, all described themselves as being middle-class (with R14b claiming social class distinctions did not apply to her).

> What do I do? I come home from work, I watch TV, I have my dinner, I go to bed, what kind of life's that? (R14b)

> Well it's not that I don't want to do [over-time], it's that I don't want to be made to feel that if I don't do it that I'm going to be shoved down that corporate ladder even further and the fact of the matter is that you know it is expected of you that you give your 110%. They even quote that to us you know, '100% is not good enough. We expect 110% from you' and if you're not willing to do it, not willing to produce it then we'll find someone else who will. It's just really that cut and dry. (R18b)

> Like that big line-up for jobs at GM [General Motors Car company]. It's pretty brutal out there. You'll actually hear that kind of stuff from supervisors 'If you don't like it there's plenty of people out there who'd take your job'. The job market is brutal. There's over-qualifications and lack of jobs. It's all the debt that's on my mind, houses, cars. You're not a true Canadian unless you're in debt though so, I'm a true Canadian boy I guess. (R48a)

> I mean, who's solid nowadays, really? You know... [my company] is one of the biggest, and they're still, I mean, they're laying off. (R5)

> Would I say that I'm interested in the job I'm doing? No. I'm doing it because the money's good ... You know it's like, 'I hear this job pays $20 an hour.' 'Well what do you do there?' 'I don't know really - it's $20 an hour man. Who cares what the fuck I do.' (R29)

As this research makes an attempt at contextualizing the experiences and practices of interviewees, it is important to begin with some basic information regarding the socio-economic situation for working people in Southern Ontario (Canada), that, in fact, gives rise to the comments, perspectives and experiences outlined above.

This research centred around the learning-lives of working-class men and women. While many partners of core respondents and small number of secondary respondents worked in other sectors (mostly lower-tier service sector jobs), the core respondents were all employed in the manufacturing sector. However, the recessionary periods of 1980's and 1990's in Canada, and in particular in Canada's industrial heartland of Southern Ontario, have put a great deal of stress on workers in terms of both the fear of unemployment and intensification within the labour process itself. It is clear throughout the interviews that insecurities on the job and in the labour market, and the intensification of work provide an inextricable backdrop for virtually all activities including, perhaps even *especially* in terms of, computer-based learning.

In Canada, workers have experienced a relatively steady increase in unemployment following World War II, with peaks of 12 and 11 percent official unemployment (actual unemployment is somewhat higher) in 1983 and 1993 respectively (the highest post-depression era point in Canada).[8] Across Canada, manufacturing employment, as a proportion of the workforce, has dropped by approximately 20% between 1981 and 1996. According to Krahn and Lowe (1998), this has been precipitated by both large-scale job-loss as well a shift toward service work during this fifteen year period. At the same time however, in Ontario manufacturing remains vitally important and employs more people than any other single sector. In 1996, approximately 18.5% of the Ontario workforce was

[8] In addition, duration of unemployment has also crept up with, for example, the late 1970's average of about 15 weeks, 21 weeks in 1985, and 28 weeks in 1996. Indeed, in 1996 about one-quarter of unemployed Canadians had unsuccessfully tried to find work for 6 months or longer (Krahn and Lowe, 1998).

employed in the manufacturing sector with the next largest sector, education/health/welfare, accounting for approximately 15.8% of the workforce (Krahn and Lowe, 1998).

As interviewees indicated, in this period of economic restructuring it now takes two incomes to maintain a household, and the statistics clearly bear them out. A review of basic social and economic statistics in Canada in the 80's and 90's indicates,

> The economic restructuring path that Canada has chosen over the last decade has pushed real wages down, intensified work, created high unemployment, endangered the environment, decimated some industrial sectors and created others, increased part time employment and reduced government services... It now takes twice the number of paid hours of work to maintain a household as it did twenty years ago. A large proportion of households now have two adult wage earners who are both working at higher levels of productivity, for long or irregular hours. Most adult wage earners, particularly women, are carrying two and sometimes three jobs: that is, one or more paid jobs as well as unpaid caring labour at home. (Communication, Energy and Paperworkers, 1994:2)

The report goes on to indicate that the movement towards the dual earner household has been underway at least since the mid-70's and that this hits working-class households hardest. Indeed, it was estimated that the number of families living below the poverty line would increase by almost 80% if secondary earners withdrew from the labour force (Communications, Energy and Paperworkers, 1994). The core interviews for this research centred around workplaces in three different manufacturing industries, below I provide a brief overview of the economic context in each.

According to Industry Canada (1998), the micro-economic climate for auto assembly in Ontario is relatively stable. Constant threats of shifting trade law and rulings on key trade agreements by the World Trade Organization aside[9], the company for whom the respondents in this research worked has posted record profits throughout the last ten years. Indeed, companies in the industry as a whole have enjoyed massive productivity growth in the 1990's. According to economist Jim Stanford (1999), between 1991 and the first quarter of 1999 productivity (measured as real value-added per employee) grew by an incredible 80%

[9] At the time of this printing, the World Trade Organization was in the process of providing a ruling on a complaint put forth by the Japanese auto industry concerning the Canada's "Auto Pact" trade and tariff agreement. This ruling has the potential to affect job and investment levels in the Canadian auto assembly as well as the auto parts industry considerably.

exceeding expectations, and contributing to further product mandates in Canadian plants.

However, the employer has undertaken what is called "lean production" (constant cost reduction programs and work intensification) and workplace rationalization. Indeed at the time of the interviews, the president of the Canadian wing of the company (General Motors) was quoted as saying,

> In response to competitive pressures and global events General Motors has embarked on a restructuring of its operations to reduce cost, improve quality and bring products to market that reflect state-of-the-art design and technology. In this regard, our Canadian car assembly plants have been leaders in the implementation of lean manufacturing processes, to eliminate waste and increase productivity in our operations. (quoted in Roth, forthcoming)

Globalization, inter-corporate competition and technological change would seem to have made it necessary for auto manufacturers to rationalize their assembly operations to a degree never before realized, and these issues have an active presence in the plans and activities of workers in this research.

In terms of the auto parts manufacturing plants in this research (there were two), the first one involved workers from a medium-sized, unionized plant (100-120 workers). Workers at this plant described workplace rationalization, reorganization and intensification initiatives coupled with an unpredictable cycle of lay-offs, call-backs, and creeping unemployment through attrition. This workplace was highly polarized occupationally with workers split into a small but stable trades and technicians group (mostly men), and a larger group of operators (mostly women) who experienced heightened insecurity, tight discipline, narrowly defined work and wage stagnation. In addition, more than half these hourly waged workforce were English-as-a-Second-Language (ESL) workers. The second auto parts plant was a somewhat larger but non-unionized plant (600 workers). In contrast to the previous auto parts plant, this one was owned by a large, transnational corporation with diversified operations on five continents. Here computers had begun to be heavily involved in automated production, and, in contrast, to the first plant, nine out of ten workers were white, english-as-first-language, men.

The broader context of the auto parts industry in Canada provides further information

for our understanding of working life at these specific workplaces. On the surface, the auto parts and accessories sector in Canada is in a healthy state of employment growth with levels having more than doubled in the last two decades.[10] The auto parts industry has, in fact, benefited from the movement of employment away from the mostly unionized auto-assembly plants (Auto Parts Manufacturing Association, 1996) where wages and benefits were comparatively high. However, at the same time there is a consolidation process occurring in the industry as greater, capital-intensive operations are required including product development, greater quality assurance, and most significantly according to Industry Canada reports (1997), full warranty responsibility. These additional functions clearly favour the larger firms. The overall result has been that since the mid-eighties the number of Tier 1 suppliers (both the company in this research) to auto assemblers has contracted radically from approximately 2500 in 1985 to a projected 375 in 2005 (APMA Report, 1997) with such multi-national giants as Magna, the Woodbridge Group, A.G. Simpson, TRW and ABC Group coming to dominate the national market. All this suggests a dynamism in the sector, yet at the same time, one which has translated into insecurity for large numbers of workers.

According to Statistics Canada, the Canadian Chemical industry as a whole is riding a long wave of increasing domestic demand and stable market pricing which, after a slight dip in the first half of the 90's, have been accompanied by generally stable employment levels and renewed capital investment (Industry Canada, 1997). Indeed, continued growth in all of these areas is projected into the near future.

The specific company where the chemical workers in this research were employed has been a staple in the Financial Post's top 200 net sales, has recorded dividend increases for the last 26 years straight (indeed they've paid dividends uninterrupted since 1899) and has demonstrated stable employment and strong growth primarily on the strength of its North

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[10]

Year	Employment Levels
1965	31,900
1975	42,600
1985	84,400
1990	86,400
1995	100,600
1996	92,500

(Source: Ward's Automotive Reports, 11/1997)

American operations.[11] Despite the seemingly positive working and learning environment that these conditions would suggest, as we'll see in the course of the analysis workers at the chemical plant continue to struggle against work intensification and a clear sense of insecurity to which they respond with a concern over issues of training, education and workplace learning.

Considering the context of workers in all three industries, the seeming stability of productivity and record profit-making should not distract us from the pressures they feel on a daily basis. Automation is a particular, ongoing threat to workers' livelihoods. North American companies continue to downsize irrespective of growing productivity, profit levels and capital investment (see Merrifield, 1999). These dynamics are, in fact, endemic to the capitalist mode of production, and provide the backdrop for interviewees' daily life activities including those involving computer learning.

2.8 Power Relations in the Research Process

In this final section of Chapter 2 I think it is important to say a few words about the inherent power relations within the research process. I am positioned as an academic researcher (as well as a white male) within a larger web of historical power relations. However, I do not speak *only* from these standpoints. Rather, like the respondents I've worked with most closely, I can also speak from a type of political vantage point that arises from the point of *dialogue* between two specific types of working-class standpoint: traditional proletariat standpoint of the interviewees on the one hand, and my own intellectual proletariat standpoint on the other. I raise these issues now as a means of introducing a final point which is related to methodological decisions that deal with the possible exploitation and appropriation of subordinate knowledge and experience.

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[11]

Chemical Industry Trends

Year	Employment ('000)	GDP ($M x '000)	GDP/Employee ($ x '000)	Capital Invest. ($M x '000)
1992	91.1	7.2	79.1	1.7
1994	84.3	7.9	93.6	1.3
1996	84.6	8.2	96.5	1.4
1997	84.8	8.2	97.0	1.9

(Source: Statistics Canada, SIC:371 "Canadian Chemical Industry Statistics Handbook", 1997 http://strategis.ic.gc.ca (Industry Canada))

I believe that the methodological choices I've outlined here offer an important means of attempting to resist this exploitation. Certainly one of the most elementary issues of exploitation involves the faithful expression of the "voice" of participants. The idea of working-class voice is an important issue within this research. And, as authors such as Ridell (1992), Fryer (1993), Lynch and O'Neill (1994) and others have pointed out in their critiques of class analyses, virtually all research has the potential to colonize subordinated groups. As an opening attempt to resist the exploitation of the academic text, I take very seriously and apply quite literally the Vygotskian notion that words reflect consciousness (Vygotsky, 1987). Following this, I try to provide extended strips of talk in the text which are meant to include elements of a situated consciousness that cannot be fully articulated (or appropriated by) the academic text. In this regard, in-depth, learning life-history interviewing in particular offers important opportunities for the words and thoughts of respondents to be expressed more fully and faithfully. Importantly, these strips of talk also include the talk of the interviewer, which allows the reader to see the words and to some degree the course of interaction from which the conclusions and analyses arise.

One way of discussing the importance of the voice of subordinate groups in research is expressed in the work of Spender (1987). In this work, naming is understood as both a theoretical concept and a political strategy.

> ...the means whereby we attempt to order and structure the chaos and flux of existence which would otherwise be an undifferentiated mass. By assigning names, we impose a pattern of meaning which allows us to manipulate the world. (1987:163)

Freire also advocates "naming" as a mode of counter-appropriation of experiences and meaning. For Freire (1987), naming is a way to engage all participants in an essential form of liberatory social action. It is a way for subordinate groups to appropriate meaning so as to assert control over and against oppression. Though naming is important, however, we should not overstate its importance in the research process. Methods of selection, systems of relevance and exclusion are at work even in the most straight forward presentations of data. Interviewee's ability to "name" that is partially made possible by open-ended interviewing, in fact, struggles with the institutional context of "knowledge production". While I've

attempted to make the interviewing process as transparent as possible, the struggle against the institutionalized knowledge production process remains, admittedly and perhaps unavoidably, only partially resolved.

Chapter 3
An Historical Materialist Review of Theories of Adult Learning

> [People] made clothes for thousands of years, under the compulsion of the need for clothing, without a single [person] ever becoming a tailor. (Karl Marx)

> Each time that in one way or another, the question of language comes to the fore, that signifies that a series of other problems is about to emerge, the formation and enlarging of the ruling class, the necessity to establish more 'intimate' and sure relations between the ruling groups and the national popular masses, that is, the reorganization of cultural hegemony. (Antonio Gramsci)

Is it possible that the way we think about learning is conditioned by a very specific complex of social relationships and historical assumptions? If it was, then we might notice that what stands for adult learning is less an expression of individual human capacities than it is an expression of the more general social organization of our society and the social tools that it has developed over time. As Marx observed almost a century and half ago, people made clothes for thousands of years before there ever was such thing as a tailor. Gramsci understood that words we used were very much integrated with how our society is organized, controlled and altered. Could it be that people developed knowledge and skills for thousands of years without ever being considered a "learner"? And, could it be that the imposition of the language of "learning" and the "learner" has signalled a specific process within the ongoing reorganization of a broader capitalist hegemony?

The principal goal of this chapter is to briefly review several streams of contemporary adult learning theory in an effort to indicate dominant tendencies in the way many people (including professional researchers) think about learning. The purpose is to ground, over the course of this and the following chapter, an alternative approach to adult learning that will make visible the social relations, and processes of differentiation that go on within it. It represents the first step in understanding the relationship between adult learning and social class, and specifically the working-class dimensions of computer learning. Before going any further however, a few comments on the concept of hegemony which is important to our understanding of dominant approaches to understanding adult learning.

The term hegemony can express two types of power relations: the first describes a group's *domination* of over other groups; and the second describes a group's *leadership*. Raymond Williams (1976) outlines how the word's origins are rooted in political terms within the 19th century, closely linked to the idea of imperialism, and later, revolutionary activities. In later work Williams understands hegemonic relations, in contrast to structuralist forms of Marxism, as a conceptual means of understanding the totality of domination relations that corresponds to the "reality of social experience very much more clearly than any notions derived from the formula of base and superstructure" (1997:37). For Williams, hegemony represents a whole body of practices as well as expectations, assignment of energies, and ordinary understandings of the world in terms of meanings and values. In essence, the concept expresses relations of leadership and domination that produce a general sense of coordinated reality for most people. The term however is most associated with the original work of early 20th century Italian Marxist Antonio Gramsci. To summarize, Gramsci used an historical analysis of specific periods of French and Italian society in order to refer to a system of alliances within a dominant "historical bloc". This bloc was dependent on what Gramsci referred to as the "powerful system of fortresses and earthworks" of civil society including the multitude of social, economic, cultural organizations, groups and corresponding ideologies amongst which there is significant room for compromise although only on non-hegemonic terrain (1971:161).

According to Williams, the notion of dominant, residual and emergent cultural forms dove-tails with the complexity of Gramsci's original formulations of hegemonic relations.

> ...while retaining the epochal hypothesis, we can find terms which recognize not only 'stages' and 'variations' but the internal dynamic relations of any actual process. We have certainly still to speak of the 'dominant' and the 'effective', and in these senses of the hegemonic. But we find that we have also to speak, and indeed with further differentiation of each, of the 'residual' and the 'emergent', which in any real process, and at any moment in the process, are significant both in themselves and in what they reveal of the characteristics of the 'dominant'. (Williams, 1977:121-122)

Williams's basic framework in conjunction with an understanding of hegemonic relationships provides a starting point for an understanding of the play of oppositional, alternative, and incorporated elements of people's real activity. It is a starting point for understanding how

people's learning practices are not simply part of universal, value-neutral activities but have a specific and intimate relationship with the dominant political economic forms and tensions of the period. Williams's analysis of contemporary English cultural forms (e.g. organized religion, rural community, the monarchy) can be used to demonstrate the point that residual elements of each are incorporated into dominant, alternative and oppositional forms in actual practice. As Williams notes however, much influential work in counter-hegemonic practices is historical (Williams, 1977), and this is not without problems.

> ...this in turn has little effect unless the lines to the present, in the actual process of the selective tradition, are clearly and actively traced. Otherwise any recovery can be simply residual or marginal. It is at the vital points of connection, where a version of the past is used to ratify the present and to indicate directions for the future, that a selective tradition is at once powerful and vulnerable. Powerful because it is so skilled in making active selective connections, dismissing those it does not want as 'out of date' or 'nostalgic', attacking those it cannot incorporate as 'unprecedented' or 'alien'. Vulnerable because the real record is effectively recoverable, and many of the alternative or opposing practical continuities are still available. Vulnerable also because the selective version of 'a living tradition' is always tied, through often in complex and hidden ways, to explicit contemporary pressures and limits... often ideal in form, including complex elements of style and tone and of basic method, can still be recognized, demonstrated and broken. (Williams, 1977:116-117)

The notion of emergent forms of practice that lie in some form of opposition to a dominant or hegemonic bloc in the sense that Gramsci and Williams have described them, is an important starting point for this research. First, the notion provides a basic framework for understanding the character of these alternative practices as oppositional to a complex of dominant presumptions. Building from this notion we can see that practices emerging from non-dominant social standpoints are not strictly reproductive of a particular hegemonic order. They can, at times, run tangentially to it and possibly even in direct opposition, yet in both cases represent an active, living process in which alternatives struggle against incorporation. In less abstract terms, we are talking about people's activity and learning that is rooted in a process and/or directed to goals that either align with basic assumptions and structures of society, have little to do with these dominant assumptions and structures, or in some cases actively subvert major premises upon which the current societal order operates. In class terms specifically, we are talking about activity that is incorporated into systems of capitalist

accumulation and labour processes, are somehow outside this logic, or oppose it in some way. In this first sense we focus our attention on the relationship between the relationship between working people's practices and capitalist hegemony. A second way the notion of hegemonic relations and emergent social practices and perspectives provide a starting point for this research however involves dominant ways of conceptualizing adult learning, and focuses our attention on the language or discourse of learning. The opening quotation from Gramsci highlights the fact that concepts, as they are integrated with actual practices, can ratify deep historical continuities, and become important at key moments in particular periods. While I will return to the first application later in the thesis, here I want to argue that the very first step in an analysis of working-class dimensions of adult learning is to recognize that there are in fact several articulating, tendencies that together form a discourse-based, theoretical version of a dominant, hegemonic bloc.

The concept of hegemony is useful for understanding features of adult learning theory and practice because it brings into view an alliance of articulating interests and perspectives that offer means of sorting relevant from non-relevant features of daily practice. The result is a more or less stable system of interlocking tendencies. This alliance represents a system of relevancy that privileges certain practices and forms of activity while obscuring, denigrating or denying others forming a type of *"Capitalist Learning Hegemony"* (CLH). Of course, this notion is not a hard and fast claim. Rather, I use it as a kind of research heuristic, a working formulation that allows systematic reflection on the most stable elements of our discourses on the learning process. Given this qualification, I define CLH as a general set of theoretical tendencies that have a continuity with Capitalist political economy as analysed originally by Marx. This formulation allows adult learning theory to be understood as an articulating set of central assumptions that reflect and make a major contribution to the ways that both professional and laypeople think about learning which in turn acts to shape practice. The notion of CLH suggests an order to what, in the context of academic practice, may seem to be a dispersed set of competing theoretical interests and research programs. The activation of these tendencies is similar to the process that Latour (1987) described in his notion of "inscription" in which a set of articulating assumptions represent a specific mode of

understanding and representation of social reality by which control, domination, and the compliance of others is ultimately achieved.

The three central tendencies that I trace in the course of this brief review of adult learning literature below are as follows: i) individualist and cognitivist tendencies; ii) universal and ahistorical tendencies; and, iii) formal learning/schooling, expert/novice and pedagogical tendencies. Together with what I discuss in the following sub-section as "class deficit theorizing" (e.g. Livingstone, 1994; Livingstone and Sawchuk, 2000; forthcoming), this system of tendencies produces a powerful form of class bias which can be seen to contribute to dominant ways of viewing, understanding, acting upon, strategizing about, policy-making for adult education and adult learning. The identification of these types of tendencies is not, of course, all that novel. Indeed, this system of critique parallels Marx's own methodical critiques of philosophy. It is in these writings that notions of individualist and universalist philosophy are consistently identified as central components of a bourgeois philosophy, a bourgeois social science, and even a more general bourgeois worldview.

In terms of theories of adult learning specifically, however, we should begin with a clarification concerning whether we are talking about the concept of "learning" as a state of being (gerund verb form) or "learning" as a process (active verb form). As has been pointed out (Thomas, 1991), while this distinction appears elementary, it continues to have important methodological and theoretical implications. In fact, the distinction is in many ways a microcosm of competing theories of social reality and social action that underlie any theory of learning. In this research, I focus on relations of computer "learning" in the everyday as a an active *process*. Learning as outcome is generally referred to as skills and knowledge. In this research, I tend to provide learning as outcome a very specific conceptualization the most prominent of which include 'habitus' and 'common sense'. Principally, however, I detail how learning must be understood as a form of active social practice rooted specifically in capitalist social life. The notion of learning I use is through and through an historical and social-relational one rooted in the political economic forces of this period. Marxists, of course, have a particular interest in drawing distinctions between historical as opposed to epochal features beginning with the distinctions that Marx himself outlines in The Grundrisse

(1858/1978:222-227). These distinctions are helpful in terms identifying the class-based character and broader structures of learning practices.

A major critique I make of many of the theoretical programs I discuss below is the lack of systematic empirical work. Taylor (1997), in fact, provides us with an important example of this tendency in his examination of Mezirow's Transformative Learning Theory which is arguably one of the more prominent theories of adult learning currently available.

> Interesting as these discussions have been, there is almost no discussion (in publication) about transformative learning theory as a viable model for adult learning or about implications for practice based on empirical studies. (35)

As Taylor goes on to outline (1997:35), it is not clear whether the problem originates with scholars, their publication habits or their publication vehicles. There is a palpable lack of empirically-based work that seeks to critically evaluate the problematic of "learning" itself either in terms of established theoretical tradition or in efforts to build new ones. While part of the reason for this is certainly related to the exemplary traditions in Adult Education to emphasize practical engagement with learners (e.g. Spencer, 1998) as opposed to theorizing about them, we are left with a lagging set of theoretical traditions with which to re-invigorate new forms of critical and progressive social change.

3.1 Cultural Deficit Theories of Social Class

Before entering into a review of relevant adult learning theory, it is important to briefly consider dominant perceptions of working-class capacities and working-class cultural forms. Dominant accounts of working-class culture have an important reciprocal relationship to the type of hegemonic tendencies I wish to trace. As we noted in Livingstone and Sawchuk (2000), for most academic researchers and teachers today "working-class culture" is devoid of positive significance. Though it is obvious that people remain dependent on the wage-system even in increasingly globalized forms of capitalism, many regard issues of "social class" as increasingly irrelevant. Cultural forms, expressions, perspectives, dispositions of subordinate groups including the working-class are portrayed as merely oppositional (reactive and uncreative) and episodic (centred around specific events, strikes, protests, etc.) in major media, at the same time that the destabilisation of working-class

communities by capitalist reorganization continues to threaten capacities for concerted collective representation (Seccombe and Livingstone, 1999). The resulting phenomenon is that in both popular media and intellectual spheres, working-class agency in active and creative cultural forms is largely denied, denigrated or ignored.

Important examples of this type of approach can be found in elements of the work of Bourdieu (1984; Bourdieu and Passeron, 1977) and Bernstein (1974; 1990; 1996)[1]. Both can be seen to express versions of a "cultural capital" theory and both have drawn on basic Marxist language in developing their approaches to class relations, with Bernstein at times drawing explicitly on the work of Vygotsky himself. A critical appreciation of their contributions is needed in order to move beyond the limits of a cultural capital theory of class relations and learning.

In the context of learning activities specifically, both authors place an emphasis on forms of class-specific cultural knowledge, sophisticated vocabularies and grounded empirical investigation of how class reproduction, schooling and learning are intertwined. Children of the affluent classes, who have acquired familiarity with bourgeois cultural forms at home (through exposure to their parents' knowledge, manners and linguistic practices) are seen to possess the means of appropriating school knowledge relatively easily. Both authors insist that the cultural and linguistic tools imparted to upper and middle-class account for their systematically differentiated rates of success in schooling. Working-class kids, in contrast, find their unfamiliarity with these cultural forms to be a major obstacle to successful school performance.

Turning to the work of Bourdieu specifically, it is important for this research to distinguish two key dimensions. Amongst the variety of insightful engagements with Bourdieu's work available (Harker, Mahar and Wilkes, 1990; Calhoun, LiPuma and Postone, 1993; Livingstone, 1999; Bohman, 1999) several authors have been quick to observe that Bourdieu seeks to provide, on the one hand, a perspective on "practical reasoning" (e.g.

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[1]The recent work of Charlesworth (2000) seems to build on this same tradition utilizing a Heideggerian perspective. Like Bourdieu, Charlesworth offers an extremely sensitive account of the most dominating elements of working-class 'being-in-the-world', but offers little in terms of the ways that subordinate groups can produce openings, forms of resistance, and so on.

Bourdieu, 1998) and social action in the everyday, and on the other a traditional social scientific account of the production of meaning which explicitly gives rise to his "cultural capital" thesis. As I discuss more fully in the next chapter, while the former is useful to us here, many of the problems of the latter aspect revolve around the inter-relations of two of Bourdieu's central concepts (Calhoun, 1993): "capital" and "field".

Bernstein's arguments specifically highlight class-based differences in "elaborated" and "restricted" linguistic codes which cause differential levels of routinization and predictability of speech, i.e. "the extent to which each facilitates (elaborated code) or inhibits (restricted code) an orientation to symbolize intent in a verbally explicit form" (1974:25). For Bernstein, these are windows into social capacities for expression and self-control which are dominated (and rewarded in schooling) amongst the middle-class students. However, in these formulations we see a range of narrow assumptions about legitimate forms of social organization and cultural practice: elaborated codes align with the assumption of individualist, even competitive contexts; restricted codes align with social cohesion and consensual/negotiated contexts. While fuller critiques of Bernstein's work can be found in Curtis, Livingstone and Smaller (1992) and Sadovnik (1995) - the underlying dynamic is captured by White and Siegel (1984: 275) in their comment that the former emphasizes the "I" while the later emphasizes the "we" orientation toward social action.

To their credit, both Bourdieu and Bernstein have carried out extensive, empirically grounded verification and refinement of their work. Both have made important contributions to the explication of relations of class reproduction, but as Curtis, Livingstone and Smaller (1992:16-18) outline, their accounts remain one-dimensional, functionalist descriptions of the status quo rather than real explanations of it. As I'll demonstrate throughout this research, working-class computer learning practices are undertaken by creative, energetic and skilled people operating from specific class-histories, in specific social and material contexts and within a specific phase in advance capitalism in Canada. The processes of reproducing class relations, or specific relations of learning are never foregone conclusions, but as I emphasized at the beginning of this chapter, fraught with residual and emergent practices that resist incorporation. As E.P. Thompson (1963) has remarked, the working-class were present at

their own making! And, so too are the working people in this research actively present in the construction of their own learning lives.

3.2 Adult Learning Theory

While others have drawn together more general reviews of adult learning theory which are highly relevant (e.g. Boud, 1989; Selman and Dampier, 1991; Hart, 1992; Mezirow, 1991a; 1996; Usher, Bryant, Johnston, 1997) and broader coverage can be found there, the goal of this chapter is to specifically evaluate approaches to adult learning, on the one hand, for their relationship to the dominant bloc of tendencies identified earlier on as CLH, and on the other, for their capacity to contribute positively to a retheorization of learning from an active, working-class standpoint.

The theoretical approaches that I deal with below are selected based on a combination of contemporary importance within the literature, and/or for their constructive capacity for relating to learning in everyday contexts with some recognition of alternative standpoints. The basic theoretical approaches I evaluate in this chapter include the following: Andragogy (Knowles, 1970; 1975; 1977); Self-Directed Learning (Tough, 1967; 1979); Transformative Learning (Mezirow, 1991; 1994); Critical/Radical Pedagogy (Giroux, 1983; Livingstone, 1987); and the notion of conscientization in the work of Freire (1970; 1996).

In beginning the discussion of adult learning, I think it's important that we first make brief mention of the work of Malcolm Knowles and specifically his notion of Andragogy: "the science and art of helping adults to learn" (1980:43). It is in many ways a seminal piece of theoretical work in the field of adult education. The important piece of Knowles's argument for the purposes of this thesis is his claim that adults are more or less autonomous beings whose learning practices take place within a developmental and social context very different from that of children. This offers a basic starting point for an analysis of learning that begins to differentiate amongst people rather than merely assuming a type of universal experience. Knowles's notion of this difference centres around the concept of children's physical as well as emotional-cognitive development in comparison to adults. As others have pointed out, however (e.g. Hartree, 1984; Tennant, 1986; Pratt, 1993), the notion of the autonomous adult requires considerable clarification beginning with what Selman and

Dampier identify as its uncritically "humanist psychology" foundation (1991:33). Indeed Welton's (1995) comments that individual adult autonomy must be situated in socio-historical context is particularly appropriate to the type of argument I'm trying to make here. In order to have relevancy today, theories of adult learning must continue to seek to come to grips with the nature of specific historical and social as well as simply developmental differences as they relate to learning. In Andragogy there is simply no means to make any such further differentiations. Nor, in Knowles, is there explicit questioning of the assumption of institutionalized adult learning as adult learning appears to necessarily includes a kind of expert facilitator. Learning without such facilitators, as well as tacit learning in the everyday, is not explained. Though Andragogy is an important historical part of the field of adult learning, for over two decades serious critiques have been raised. Recently, Draper (1998) has even offered the suggestion that, in fact, Andragogy was not even a "theory of learning" at all but rather simply a delineation of phenomena from which theory might possibly emerge. As is seen throughout much of the Adult Education literature (variations in the types of pedagogical and expert knowledge forms required aside) the presumptions of a type of individualism and autonomy (see Keddie, 1980 for another formulation of this same observation) is often observable. From this basic perspective, action and activity begins, and for the most part ends, from the standpoint of the autonomous, adult individual. On this point postmodern theorists have perhaps been most incisive in their critique (e.g. Usher et al., 1997), though a variety of others have come to similar conclusions (e.g. Welton, 1995; Garrick, 1996; Scott, 1998; Chovanec, 1998).

One of the people most identified with the theorization of the autonomous, informal, and 'self-directed' adult learning outside of Knowles himself is Allen Tough (1967; 1979). Developing in a sort of dialogue with earlier empirical work of Houle (1961) as well as Knowles (1970), Tough sought to understand and identify adult learning as the ways in which adults seek to produce some "lasting change in himself [*sic*]" (1979:6) through conscious self-directed learning projects. The relatively far reaching effects of Tough's work, to my mind, can be read as a testimony to the relevance of the development of a empirical/theoretical program of inquiry in Adult Education. Moving the object of inquiry

beyond the reach of the facilitator and into the realm of the everyday led Tough to document the massive extent to which adults "learn" outside formalized settings. Tough (1979) specifically estimated that people regularly undertook a median of eight distinct learning projects yearly which account for anywhere from just under 100 hours per year to as many as 2000 (average = 500 hours/year). Such research has been correctly recognized as seminal (Percy, Burton and Withnall, 1994). Like Knowles however, Tough's work requires some important clarifications. In the first instance, beyond his sampling of a range of occupational groupings from factory workers to university professors (1979), Tough's research is largely class, gender and race-blind. Power relationships, systematic distribution of time, resources and human energy, all display significant structuring effects (and express class, race and gendered dimensions) on self-directed learning but remain[2] beyond Tough's self-directed learning theory. Women learners in Tough (1979), for example, appear as relatively disengaged whereas closer examination of women in, for example, Hart (1995) and Sawchuk (1999a), Livingstone and Sawchuk (2000; forthcoming) reveal them to be at the centre of a complex set of negotiations of cultural as well as material constraints in their daily lives. Indeed, though often scattered throughout the narrow openings of time and physical energy in their daily lives, working-class women could nevertheless be seen to engage in a number of learning activities. In both Knowles and Tough, learning is viewed as an act definitively individualized, internalized, conscious and psycho-physical in character. Learning outside the direct, unmediated and conscious control of the autonomous individual is not registered. There is little room for making explicit (through their concepts) the effects and operations of local collectivities and informal groups, nor is there any theory of how even seemingly individualized processes of learning are socially mediated by cognitive, linguistic as well as physical tools. While Tough's work is a pioneering attempt to chip away at particular elements of CLH, namely its formal learning and pedagogical biases, it nevertheless remains aligned with the dominant theoretical bloc in other ways.

A focus on learning in the everyday has been in the process of emergence in

[2]Based on Tough's conference presentation, New Approaches to Lifelong Learning research Network (February 1998 - Ontario Institute for Studies in Education of the University of Toronto, Canada).

professional scholarship for some time in the variant guises of informal, incidental, natural, vicarious, experiential, and self-directed learning. In his review of the adult learning literature in this area, Rossing (1991) concludes:

> Most of these studies are notable, however, for the absence of any guiding or emerging theory.... [T]heory pertaining directly to informal incidental learning from experience was not available... (46-47)

Rossing tells us that the field of adult education, at least up until the early 1990's, was led by an energetic, if generally atheoretical, group of scholars, including men such as Knowles and Tough, amongst whom traditional humanist, psychologically-based approaches tended to dominate.

Certainly one of the more heavily discussed contemporary formulations of adult learning theory is Mezirow's theory of transformative learning (1991a; 1991b; 1994; 1996). It attempts to build on Jürgen Habermas's critique of modern rationality translating it into the context of adult learning. This is a sustained attempt to apply the work of the Frankfurt School's leading contemporary voice, and has generated a great deal of lively scholarly discussion (Newman, 1994; Welton, 1995; Taylor, 1997; Scott, 1998; Cranton, 1998). As in Habermas (1984:Vol.1 & 2), Mezirow centres discussion on ideal relations of communicative action which Mezirow claims, through his study of university-level continuing education students, are key to understanding learning that synthesizes the disparate and competing forms of rationality. Though providing a relatively thoughtful reading of Habermas's basic formulation as well as an important linkage to relevant social theory, Mezirow leaves a good deal of the theory behind, and even goes so far as to state the need to disconnect his theory of transformative learning from the actual specificities of real, concrete situations. As in the discussion of Knowles and Tough above, in this approach we are left with what Newman (1994) has correctly described as a vision of free-floating communicators, unfettered by material constraints or issues of class, race or gender. Hart's (1990; 1993) critique of Transformative Learning theory centred around Mezirow's insufficiently problematized universalism.[3] Mezirow's preference for the lofty heights of high abstraction over the dirty

[3]Despite his claims to the contrary in his early response to critics (Mezirow, 1991b).

specificity of material life (Mezirow, 1994) invariably leads him to considerable sacrifices conceptually. In many ways, we are faced here with both the power and somewhat problematic contribution to learning which Critical/Radical Pedagogy attempted to make several years earlier: the concretization of critical social theory in the form of a coherent method of understanding educational practice both within and beyond the classroom. Mezirow's formulation is styled as emerging in defence of universal rationality (unproblematically translated into notions of social justice and human freedom) in opposition to what he describes, on the one hand, as a "diverse group of social cognitivists" and, on the other, the "postmodernist threat that society's power and influence inevitably corrupts critical discourse and rationality" (1996:171). Mezirow fails, however, to convincingly demonstrate a relevant critique of, or alternative to, either.

In contrast to the relatively unsuccessful program of Transformative Learning, a broad-based engagement with Critical Theory as well as the Western Marxism of Antonio Gramsci, British Cultural Studies and the work of Paulo Freire by Critical/Radical Pedagogy (Freire, 1970; Giroux, 1983; Simon, 1985; Livingstone, 1987) offers a much more nuanced and, to my mind, more successful explication of the complexity of education and learning relations in advanced capitalist society. Rather than beginning with a critique of rationality however critical pedagogy, and particularly the group of authors assembled in Livingstone (1987), began as I do, with a conscious shift to consider learning and praxis from the standpoint of the oppressed themselves. Their method of praxis is well captured by Simon's definition of critical pedagogy,

> ... a procedure that consists of three inter-related moments. First, transformative critiques view knowledge as socially produced, legitimated, and distributed... Second, knowledge is apprehended as expressing... particular interests and values... Third, seeking to negate the "objective" nature of knowledge and forcing the educator to confront the relation between knowledge, power and control, critique additionally requires the articulation and consideration of transformative action. (1985)

However, a decade later as Wardekker (1997) points out, critical pedagogy, outside the work of Freire himself perhaps, still appears to be in search of "a concretization of the elusive ideal

of emancipation" (p.3).[4] It is also note-worthy, in terms of my formulation of CLH, that Critical Pedagogy's interests remains largely fixed on issues of formalized education and pedagogical relations of knowledge production. Indeed, though Freire himself was deeply committed to the notion of learning outside formal schooling, Critical Pedagogy appeared to have been only minimally concerned with actively researching and theorizing a broader conception of learning per se. This in fact has not gone unnoticed by critical pedagogy theorists themselves (e.g. Livingstone, 1987). Wexler, Martusewicz and Kern, for example, make an important clarification by insisting that critical pedagogy should necessarily include building from "...existing practically-inspired educational movement as well as more informal critical education discourses within far broader social movements" (1987:227). Despite the constructive critiques and massive theoretical synthesis over the years, it would appear that a line of systematic, empirically-based research has yet to emerge in anything but isolated and sporadic form. Though this appears to be changing somewhat (e.g. Weis and Fine, 1993), Critical Pedagogy appears to suffer from an over-emphasis on formalized relations of learning which - though accompanied by a deep understanding of oppressed vantage points and the fluid relations of a cultural hegemony - is only now beginning to compare to research produced from projects with greater commitment to empirical programs of inquiry outside of schooling.

As a central element of Critical Pedagogy but with wide ranging implications beyond it, the work of Paulo Freire and particularly the notion of conscientization/praxis should also be considered briefly. As early as the 1960's, Freire had begun organizing his notion of conscientization and his 'pedagogy of the oppressed' in the midst of his own activities spanning Brazil, other parts of Latin America, Africa as well as parts of Europe, North America, and Australia. Perhaps the most illuminating feature of conscientization is its explicit commitment to understanding relations of learning as grounded in specific racialized, gendered, classed, and 'metropole-satellite' (Frank, 1967) standpoints of the second and third-

[4]This doesn't mean to say that some detailed empirical-analytic work hasn't gone on. Any number of scholars moving from a Critical Pedagogy orientation have approached a variety of topics from Computers (Olsen, 1987) to Curriculum (Apple, 1991). However, interests in learning among most of these scholars remain focussed on schooling generally.

world. As Freire notes, the standpoint of the oppressed provides the basis (for generative themes) upon which not only a critique of dominant practices of schooling, curriculum and even the broadest relations of social power exists, but counter-hegemonic practice itself is made possible. Conscientization is firmly rooted in the Marxist notion of historical/revolutionary critical action or praxis. Herein, lies a key access point to a critique of learning hegemony. It is a focus on the achievement of actual activity in the concrete social world, what Freire and Macedo called "*act[s]* of knowledge" (1987:52). Freire appears well aware of the necessary linkage between power, culture and formalized education. Indeed, he has partially identified the way particular conceptions of "learning", "studying", "literacy" seem intertwined with a popular common sense consciousness of formalized relations of schooling.

> The preoccupation of this text with the act of studying seems obvious; for example, combatting the ideological, though not always explicit, belief that one only studies in school. School may be considered, from this view, *the* matrix of knowledge. Outside of academia there is no knowledge, or the knowledge that exists is believed to be inferior, to have nothing to do with the rigorous knowledge of the intellectual. In truth however, this disdained knowledge, "knowledge made from experience," has to be the point of departure in any popular educational effort oriented toward the creation of a more rigorous knowledge on the part of the people. While an expression of the dominant ideology, this myth about academia deeply influences the people, sometimes provoking disdain for themselves due to their feeling that they have little or no "reading." It becomes necessary, then, to emphasize practical activity in concrete reality (activity that never lacks a technical intellectual dimension, however simple it may be) as a generator of knowledge. (Freire and Macedo, 1987:77-78)

A practical-critical, activity-based approach to learning, not the least important element of which is its grounding in and effect on historical memory (Adorno through to Freire and Giroux: Freire, 1987), offers an opening for a focus on learning in the everyday amongst historically situated people.

Conscientization however, also appears to have its limits which can be traced in two interrelated ways: the theorization of collective action and a dependence on pedagogical relations of knowledge production. In the first case, although grounded in collective political action implicitly, the concept of conscientization itself offers little direct indication as to inter-personal or collective nature of these processes. Provided useful generative themes and

the use of proper pedagogical techniques, the appearance of new forms of consciousness is relatively unproblematic. How people actually produce their own transformation socially is not as clear. It can easily be argued that conscientization suggests some sort of (whether individual or collective) internalized construct rather than a social relational one. Second, as with critical pedagogy generally, conscientization seems to assume an 'enlightened' other (whether teachers, or Freire's facilitators in cultural circle activities). Hart's comments in this area are instructive,

> ...the term, "emancipatory learning" resonates with the elitism of a well-informed "objective" professional educator who has figured out how to use learning methods to educate the ill-informed masses who are in the grip of domination. (1995:1)

Indeed, Misgeld's (1985) observation as to the need to blur the distinctions between teacher and pupil begins to points to a resolution of this same issue.

> The identity of learners and teachers is just as much at issue and to be discovered through the pedagogy they cooperate in as the content of what they learn.... Freire's pedagogues (teacher-students or initiators of activities in cultural circles) can therefore allow themselves to learn, and they must learn from their students. The learning we speak of is *not merely incidental.* It is not a question of merely monitoring student performance so that a learning task can be presented with greater teaching efficiency. Rather the purpose of the educational enterprise is learned and relearned from and with the students. (106-107; my emphasis)

But how are we to understand spontaneous, self-led, collective working-class learning? What Misgeld identifies as "merely incidental" remains something of a mystery for most theories of learning. At the level of actual interaction and cultural practice, what if there is no expert animator, no recognized leaders in the "cultural circle"? What if, as with the working-class computer learners in Sawchuk (1996a; 1996b; 1997; also see Chapter 6), expertise and 'responsibility' for animation is fluid and mobile such that 'expertise' is unrecognizable beyond anything but moment by moment exchanges? In these contexts, pedagogical relations are replaced by collective, informal learning networks which is clearly a departure from conventional understandings of pedagogical relations. These social problematics, in fact, call for something much more than is offered by Freire, Critical Pedagogy, Transformative Learning, and so on. These problematics focus our attention on the need for a theory of

learning as a kind of ongoing, situated activity. Freirian critical pedagogy is no panacea. It remains too rooted in: i) the moment of critique; ii) the analysis of individual consciousness (versus a broader ongoing cultural material practice which includes and in fact produces consciousness); and, in the final instance, the work of the pedagogue. While Critical Theory as well as Freire and Critical Pedagogy orient towards investigating social practices in order to unmasks ideologies - they do little to understand the masking and unmasking practices that go on in the daily lives of the oppressed outside formal and pedagogical relations altogether.

3.3 Vygotsky

The conception of learning that has been used to partially orient the critique of the work above is derived from a neo-Vygotskian[5] approach initiated in the original Cultural Historical school of psychology beginning with the work of Lev Vygotsky (1978; 1985; 1994). And, it was also members of this Soviet school of psychology who developed the Activity Theory of personality and learning based on social relations in labour, tool-mediation and language (Leont'ev, 1978). Clearly, an important feature of the development of this tradition was the period of reconstruction of the Soviet Union into a state socialist society which ideologically declared the valorization of the lives of previously oppressed classes. Related ethnographic and linguistic research conducted with workers during this period provides suggestive insights into the interrelations between modes of social practice and modes of thinking and learning (e.g. Luria, 1976). Following Vygotsky's premature death in 1934 and an extended period of suppression, Vygotsky's and Vygotskian work re-emerged in the post-World War two period, and the approach, particularly in the last two decades, has enjoyed a minor resurgence (Newman and Holzman, 1993). The reasons for this resurgence and the particular forms of appropriation that it has undergone, as Simon (1987) has pointed out, are somewhat open to interpretation.

> It is hard to know what to make of the rise in the United States of "Vygotskians" concerned to expound, criticize, modify, apply, and extend the theoretical and cultural

[5] As I noted in Chapter 1 and as I'll explain again later on, the term neo-Vygotskian is meant to loosely delineate approaches to learning that more or less relate to the break that Vygotsky's original work made possible rooted in tool-mediation and the primacy of concrete social practice over internalized cognition (i.e. being determines consciousness).

> approach of a young Marxist who changed the course of psychology in the Soviet Union during the decade of 1924-34. (1987:610)

Nevertheless, Vygotsky-inspired work is now as much as ever ripe for development in terms of the relations between adult learning and working-class socio-cultural activity specifically. However, under the difficult conditions of (competing and multiple) translations of original texts, transference across time and space, and the fact that Vygotsky's approach was not explicitly developed for the analysis of adult learning - his work has been taken up in a variety of distinctive ways.

The most essential element of Vytgotsky's developmental psychology work is that "learning" is collective and "socio-cultural" (1985:46). That is, it "presupposes a specific social nature" as well as an historical one (1978:88).

> Vygotsky argued that they [psychological processes] have their source not in biological structures or the learning of the isolated individual but in historically developed sociocultural experience...(Minnick in Vygotsky, 1987:19)

In these terms, Vygotsky's notion of "turning" or "interiorization" is vitally important. "Turning" defines the process in which external social relations and social systems are transformed into internal mental actions or outcomes and embodied states we associate predominantly with notions of knowledge and skill. While Vygotsky paid a great deal of attention to the analysis of child development, his writings did not exclude issues of labour process, the cooperative-collective features of social activity, and, particularly important for this research, the concept of tool-mediated character of human activity.

Vygotsky's own empirical work was centred primarily around issues of child development. We can trace the types of arguments that led Vygotsky to his original formulations regarding the socio-cultural, active and participatory origins of what we think of as "learning". In Thought and Language (1986) his line of analysis dealt with cognitive and linguistic development. Here he concluded that later forms of the intellect and speech, specifically the development of (in an interesting inversion) "inner speech" and "verbal thought" are constituted in and constitutive of cultural historical relations. The specific character of adult thinking and learning are cultural historical, participatory and discussive

rather than internalized, natural or innate.

> If we compare the early development of speech and of intellect - which, as we have seen, develop along separate lines both in animals and in very young children - with the development of inner speech and of verbal thought, we must conclude that the later stage is not a simple continuation of the earlier. The nature of the development itself changes, from biological to socio-historical. Verbal thought is not an innate, natural form of behaviour but is determined by a historical-cultural process and has specific properties and laws that cannot be found in the natural forms of thought and speech. (1986:51)

As with the work of most scholars, interests and discussion tends to be based in theoretical debates of the period. In Vygotsky's case, this took the form of a sustained attack on the theories of development and learning put forth in the work of Piaget (see Vygotsky, 1985).

In terms of the further development of Vygotskian thought and its linkages to neo-Vygotskian or Vygotskian influenced scholarship, Leont'ev as the founder of "Activity Theory" (1974; 1978; 1981) is typically considered the bridge between Vygotsky's original work and the development of modern theories of adult learning which has given rise to the most organized grouping of Vygotskian-inspired scholars on the contemporary scene. Elaborating upon and comparing the work of Vygotsky and those Soviet psychologists that were influenced more or less directly by Vygotsky, Leont'ev's work outlines much of the central arguments, key structures and concepts in concise fashion. In his oft-referenced 1974 journal article The Problem of Activity in Psychology and later in the fuller development of its themes and several others in Activity, Consciousness, and Personality (1978) and Problems of the Development of the Mind (1981), Leont'ev outlines the central critiques of cultural-historical psychology, as well as its relationship to Marx's original historical materialist critique of bourgeois social sciences. Indeed, the connection between psychology, Vygotsky and Marxism is, for Leont'ev, of particular relevance: "Only after the work of L.S. Vygotskii... did the meaning of Marxism become fully understood" (1978:11).

Leont'ev (1974) also outlined the basic relationship between Activity Theory, behaviouralist and cognitivist psychology, and Marxism referencing Marx's own Theses on Feuerbach. In this context, historical materialist psychology with its emphasis on material practice should clearly *not* be equated with any kind of neo-behaviouralism. Even in

seemingly straightforward cases of cognitive perception of an object, Leont'ev demonstrates the primacy of action and "activity" in the creation of, what on the surface appears as, the unproblematic "invariance and/or stability" (1978:37) of sensory perception. Colourful examples of the surgeon probing for bullets in a patient are used to highlight the inseparability of subject-activity-object and to extend the idea of tool-mediation. Second, Leont'ev emphasizes the need to understand historical dimensions of activity in terms of something he called "en-culturated" practices. Here the notion of "plausibility" (1978:40) or the application of a system of relevance is introduced to clarify simplified notions of perception. The notion of "plausibility" in Leont'ev's scheme appears to describe embodied patterns of relevance, recognition, and dispositions amongst participants. As I'll argue, this has important implication and parallels my concern to introduce a dialogue between this approach and the concepts of habitus and frame (which I outline further in Chapter 4). For Leont'ev (1978) however, the notions of plausibility and enculturation in Activity Theory need to be set apart from the theories of "socialization" which he saw as particularly problematic in the analysis of learning:

> For a psychology that is limited by the concept of "socialization" of the psyche of the individual without its further analysis, these transformations remain a genuine secret. This psychological secret is revealed only in the investigations of the genesis of human activity and its internal structure. (1978:52)

According to Leont'ev (1978), Vygotsky initiated the development of a structured approach to understanding learning as participation in social practice defined by dynamic transformations, change and inter-relations with other social systems. At the same time, Vygotsky's writings also outlined a clearly discernible faith in the *essentially* progressive nature of formal schooling which Van Der Veer and Valsiner critique as type of imagined "educational utopia" (1994:6). However, Simon (1987; Simon and Simon, 1963) points out that the relationship between Vygotsky and notions of formal schooling may be more complex than at first glance. In this regard, Simon (1987) specifically outlines changes that Vygotsky's work has undergone in its *Americanization* at the hands of leading scholars such as Cole, Wertsch, and

others.[6]

What was, until recently (e.g. Engeström et al., 1999), quite clear however was that the majority of these appropriations have taken Vygotsky-inspired work away from its original foundation in a Marxist theory of history and historical materialism, and consequently away from the possibility of understanding the role of power relations and interests from the standpoint of the subordinated groups such as the working-class. Vygotsky himself wrote,

> It is my belief, based upon a dialectical materialist approach to the analysis of human history, that human behaviour differs qualitatively from animal behaviour to the extent that the adaptability had historical [elements]... Naturalism in [bourgeois] historical analysis, according to Engels, manifests itself in the assumption that only nature affects human beings and only natural conditions determine historical development. The dialectical approach, while admitting the influence of nature on man, asserts that man, in turn, affects nature and creates through his changes in nature new natural conditions for his social existence. This position is the keystone of our approach to the study and interpretation of man's higher psychological functions and serves as the basis for the new methods of experimentation and analysis that we advocate. (Vygotsky, 1978:60-61)

It is precisely at this point that much contemporary neo-Vygotskian Activity Theory scholarship is at its weakest. Newman and Holzman note,

> ... as a Marxist, [Vygotsky] understood that the activity of producing was inseparable from the product. Vygotsky's revolutionary monistic discovery of the radically synthesized individual-in-society (in history) - sociological expression of the ZPD [zone of proximal development], transforming the very institutions that determine one's learning and development - has been lost in a good deal of neo-Vygotskian work. The activistic revolutionary Marxian concept of activity has been 'pacified',

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[6]Focussing on several key shifts in translation/interpretation by these later interpretation of Vygotsky's paper (titled in an earlier translation) "Learning and Development at School Age" which Luria refers to as Vygotsky's "clearest treatment" of formal schooling (Simon, 1987:612). Simon catalogues a number of examples of changes in American translation that form a problematic pattern including: the dropping of the "School Age" focus in the American re-cast (most obvious in the title change to "Interaction between Learning and Development"); and, the concluding formula: "the only good *learning* is that which is in advance of development" (my emphasis in earlier translation) becoming "the only good *teaching* is that which outpaces development" in the American version (1987:612). The shift from age specificity to a more general statement, and the shift towards the assumption of pedagogically-based relations as a necessary part of learning both do not fit particularly well with a theory of adult learning as a mutualistic and ongoing form of cultural activity. Instead we see hints, even in some neo-Vygotskian scholarship, of a formal-school centred and pedagogical tendency in the conceptualization of learning.

> turned into a setting, which is nothing more than the 1990's term for what in the 1970's was called scene or context. (1993:74)[7]

The latent potential of neo-Vygotskian approaches in the development of a rigorous engagement with the standpoints of subordinated people in the field of Adult Education revolve around a critical theory of learning that is empirically-grounded. This type of engagement clearly offers an important means of moving beyond the hegemonic structures suggested in CLH.

3.4 Summary

I began this chapter with a quotation from Marx's Capital. It was meant to suggest the importance of historicizing our understandings of the concept of "learning" itself. I sought to trace a heuristic notion of Capitalist Learning Hegemony (CLH) - a notion meant to express the way that several important, interlocking tendencies operate in contemporary theories of adult learning. This critique emerged with reference to a working-class standpoint. This standpoint will be developed further throughout the remaining chapters, but particularly, in its most sustained way in Chapter 8. I also briefly dealt with an associated trend toward class-based "deficit" theorizing. Finally, I introduced the major context and features of Vygotsky's work itself. It is a radicalized neo-Vygotskian perspective that I believe holds the most promise for a penetration into the type of hegemonic bloc of theoretical tendencies I describe as CLH. Taken together, the suggestions offered in this review provide a starting point for a program of inquiry into learning that directly critiques individualism, bourgeois psychology, universalism, the formal schooling bias while at the same time producing a means to empirically ground a concept of learning that avoids class deficit theorizing. This synthesis directly challenges mainstream Andragogical, Self-Directed, and Transformative Learning traditions, and the continuities they represents with regard to the current political economic context.

Interpreted through the Marxist lens, the above observations help to reflect another way of differentiating types of learning activity in a way that I shall consider more

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[7] In this light it is more than ironic that Chaiklin's (ed) 1993 collection of Situated Learning research explicitly sets forth to examine the "problem of context".

extensively in later Chapters. Newman and Holzman (1993) draw direct connections between Marxist historicism and learning theory by pointing out the distinction between societal versus historical activity:

> Adapting to history means engaging in the revolutionary activity of changing totalities; adapting to society, in the case of the societies in which we currently live, means carrying out certain acts, behaviours and roles appropriate to and having exchange value within the narrow confines of this particular time and place (moment) in history. Thus in our day-to-day society all determined and commodified 'activities' are not activity at all in the Marxist, historical sense. (1993:44)

In this way, the "learning" that is most recognizable in dominant bourgeois discourse (because it is first and foremost of direct use in the accumulation of capital) can be differentiated from the learning which only indirectly contributes to the accumulation of capital, does not contribute to the accumulation of capital, or contributes in some way to historical revolutionary outcomes. As I indicated at the outset, the critical expansion of the concept of learning itself is the necessary first approximation of a class analysis of adult computer learning in the everyday.

Chapter 4
Learning as "Activity": Grounding an Historical Materialist Critique of Adult Learning Theory

In this chapter I focus on the social relations that define the problematic of learning from a working-class standpoint. I pose a series of questions that problematised the dominant tendencies of adult learning theory discussed in Chapter 3, and then outline a neo-Vygotskian framework as an alternative. Within the first section, however, I also try to draw attention to the need to understand the way that working-class standpoints, particularly as they are produced in formal schooling, contribute to a body of dispositions, a habitus, that orient one's ongoing participation in learning activity. Also interwoven in this first section is a grounded introduction to the concept of framing and keying procedures in working-class learning. Both habitus and frame analysis are then discussed fully in closing sections.

As we've already noted, it is beginning with Vygotsky and the other Soviet Cultural-Historical psychologists (e.g. Leont'ev, 1974; 1978; 1981; Luria, 1976; 1982) that we see theories of learning and development conceptualized, firstly and primarily, socio-cultural rather than psycho-physical in nature. Building upon Marx's materialist critique was the development of the notion of human cultural historical "activity" (i.e. Activity Theory) which appeared first with Leont'ev (1978; 1981), and which has since undergone considerable development by the likes of Cole (1996), Wertsch (1991), Engeström (1987), Davydov (1988; 1990), Nardi (1996), and others. However, this framework still demonstrates significant conceptual remnants, methodological preoccupations and debates rooted in the psychological tradition from which it emerged. In brief, neo-Vygotskian approaches appear to be locked in an active struggle which pits the (psychological) disciplinary traditions from which it sprung against the radical, social-relational departure that Vygotsky's work actually made possible.

As many writers working from the tradition have noted over the past decade and half, there are other theoretical traditions that offer important clues to managing the classical tensions the neo-Vygotskian tradition has sought to resolve. Influences cited in a recent collection of Activity Theory research (Engeström, Miettinen and Punämki 1999) for

example include Dewey, Mead, Goffman, Garfinkel, Wittgenstein, Bakhtin, Bourdieu, Gramsci and Foucault. Amongst these emerging "dialogues" between neo-Vygotskian scholarship and various social and cultural theories, however, there remains a nagging level of political dis-interest. Only a narrow few of these recent developments have the potential to contribute to a conceptualization of learning as an active process of *differential* (racialized, gendered or classed) participation in social life situated more broadly in a theory of social struggle and societal change in the best traditions of Vygotsky and Marx. While many neo-Vygotskians have acknowledged a debt to Marx on a general philosophical level (e.g. Engeström, 1999), few have attempted anything like a full, contemporary engagement with the weight of historical materialist analysis in a grounded way. In short, my critique of the field of neo-Vygotskian scholarship suggests that there is a need for greater empirical analysis of the connection between people's activity and specifically class-based relations through which a more sustained development of the connections between the participatory activity of learners and the broader social relations and political economic forces shaping these practices can be initiated.

4.1 Understanding Learning in the Everyday

R1: People learn whether want to or not, sometimes they just baulk at it!
R2: They don't recognize it as learning. I guess it's because at school it's fed to you. You have to learn. You gotta do it. 'Do your math!' This is the time you do this and this and this. When you're at home it's just an endless process really. (R17a/b)

In examing interviewee's descriptions of learning, in thinking over the type of activities that I recorded ethnographically, and in reviewing the learning which I analysed in terms of micro-interaction, it became clear that this "learning" did not fit easily into theoretical frameworks such as those examined in Chapter 3. The quote above from an auto part worker and his partner provides a starting point for this section because I want to explore both how learning is a "endless process" and why it might be that working-class people "baulk at it". Below I use interview data to pose a series of questions that bring this mismatch to the fore in an empirically grounded, and inductive rather than *a priori* way.

One of the most apparent difficulties in identifying learning in the everyday is the fact that there are so few of the important cues that we so often take for granted in understanding

an activity as "learning". These cues include, for example, openings and closings of "lessons", evaluation, or the integration of practices with identifiable and "expert" knowledge forms. While my focus on computer learning helps to delimit the problematic significantly, in a discussion of the nature of learning generally we should recognize that there is the possibility that, like notions of "experience", learning can be understood as virtually any and everywhere. In the course of interviewing I began to actively question the ways that both the interviewee's and I were actually thinking and talking about learning. It became clear that even those activities that were not typically talked about as "learning" were nonetheless important as opportunities for participation and personal/collective changes of some kind. Respondents talked about activity that seemed to be instances of learning, yet sometimes had difficulty naming it as such. For example, consider the following activities described by this chemical worker and his partner. This couple had recently bought their first home in a new subdivision in which a number of young families were also settling. The couple became immersed in a new set of social relations. From getting to know neighbours, talking about visions of neighbourhood life, a mutual problem was identified in this loose, emerging social group. It came to people's attention within the group that a neighbourhood park was under construction and they wanted to have a say in its design, scheduling and construction. I visited the couple's home for one of my interviews, and it became clear that the "problem" itself, beforehand only half noticed and barely defined, emerged from participation in this group. Importantly, while there was a range of learning activities that took place, the couple was surprisingly resistant to describing their activities as "learning" in any conventional sense.

R1: We were very involved in the building of a park that was supposed to be going in behind us. We all started a neighbourhood committee and that's been going on for a while now. To make a long story short, we decided it would be a good idea to get our hands into the development of the park.

I: How many people?

R1: Initially it was about 20 people, all neighbours, but there ended up being about 4 of us who are really keeping up. It helped us get to know other people in the neighbourhood.

I: You must of had to do some reading and looking into bylaws and stuff around this park issue?

R2: Yeah, actually we had a bylaw initiated.
I: So you must have had to do some learning around that?
R1: I guess so, like we had to attend council meetings and we didn't know how any of that worked. But I wouldn't say we went out to the library and did any training or anything, it was just sort of a go and get our hands on really... We've had to learn a lot, but I don't know if I'd say I learned about it?
R2: Well, I wouldn't say we've studied it, but/
R1: Like I've read up on it because we had to help come up with a design, and we had to do some investigating as to what would be good for our area but... (R18a/b)

There is a type of struggle with the discourse of learning demonstrated in this excerpt that was quite common for the working-class people I interviewed. Mixed into the attempts to name activity as learning are other words like "training", "studying" and the phrase that so many people in these interviews seemed to use: "go and get our hands on". The definition of learning is not straightforward as we entering into real, ongoing activity of everyday life. For working people, the "fit" between their experience, actual practices and the dominant ways of thinking and talking about "learning" was not exact. It is a way of talking about their experience that structures what they can say about in the very process of speaking.

Having reviewed several interview excerpts I want to take a more focussed look at how they might relate to the dominant tendencies within conventional learning theory I discussed in Chapter 3. Looking back to this interview excerpt (R18a/b), we see that this couple didn't get together with their neighbours with a particularly stable outcome in mind.[1] As a sequence of action, the couple (R18a/b) were presented with a new, emerging group of

[1]As we think about this fact, it is important to note that accounts provided in the course of an interview will exert a "pull" towards a coherence that was not necessarily part of the actual production of activity. In other words, what EM/CA theorist call "documentary cognition" (Heritage, 1984), tends to convert a set of contingent and open-ended local achievements into a coherent story-line that can then be remarked upon. To combat this we can try to look at the activity in a moment-by-moment way. It bears mentioning that the construction of these examples (by the author and the respondents) as discrete happenings contributes to their alignment with dominant approaches to adult learning. Producing these examples as discrete events (e.g. focussing conversation on them in the interview; picking them out of the interview data for presentation here), in a sense, enhances the appearance of "individuals" as the *agents* of learning. Such a process works the complexity and contingency of the real world into a more isolated exchange in which knowledge/skill which *belongs* to one individual is then acquired by another, and particular people under specific material and cultural conditions are brought into social contact with each other in the first place. The active, situated relationship in which knowledge/skill is collectively brought into existence and socially produced tends to be lost. Vast amounts of underlying social relations are left unspoken and therefore outside the system of relevance that helps us talk and think about "learning".

neighbours because they moved to a new house. Both from this and in conjunction with their own observations concerning the need for a specific type of local park, the problematic of the formation of the park emerged. It is important to note that in their description of activity, there was no discrete, core set of skills and knowledge that oriented individual or group activity from the outset. In this way, knowledge and skill learning in the conventional sense of passing information from an expert to a novice was really not possible. Neo-Vygotskians explain this by citing the relation between the object of actions which are conscious and other levels of the activity which tend to be disattended or at least less self-consciously undertaken. Though the gain in skills and knowledge are substantial, the planning for this development is merely a half-conscious byproduct of participation in a local community. The individualized, conscious planning of learning is a fiction. This learning is contingent and situated in a more general set of community relations. This actually helps explain part of the difficulty the couple had in naming their practices as "learning". At the same time, the problem of neighbourhood involvement co-existent with other, separate, everyday motives which, as the couple mentioned, were to get to know even more people in the neighbourhood. In sum, it appears that mundane examples like these suggest how knowledge/skill forms arise not in autonomously planned, isolated "learning", but instead in collective, non-pedagogical modes of participation that have multiple objectives and occur in uneven, non-linear ways.

Some respondents did, however, find it easier to talk about learning in the everyday than others. This chemical worker, for example, talks about her musical interests. This learning is rooted not in any pre-formulated plan to learn music, but rather emerges from a kind of general set of relations that overlap family, musicians and involvement with a neighbourhood community of regulars in a bar. She is drawn into more advanced and particular forms of participation through these intersecting communities. She is also quick to note the difference between her way of thinking about learning and a more standard, dominant one.

R1: We used to go down to the pub every Saturday night - there used to be a whole group of us you know - and then this guy that used to have his own band he used to get people up to sing. And we used to do 2 or 3 songs and you know then after doing that for a couple of years he said well come on, we'll get you up every set to do 3 or 4

songs. So I kept on doin' that for a long time. And then I started taking music lessons - like playing guitar right? .... And then there was learning all the different songs. I mean I have to sit down there and learn the songs. And then if they're not easy songs you can't expect the other ones to pick it up, so I mean if you want to sing it they have to sort of know it basically, so you hopefully give them the tape and they have the time to learn it .... [But] it's not like one person teaches all the time - it's a group of people. It's not like the school sets things up. You're doing it with a group of people.

I: And that's different than how you learn things in the school system?

R1: I think so, yeah. Because when you're in the school system, I mean, you sit in the classroom and the teacher teaches you things, like you know, after that you're sort of on your own to do your own work. You can't say these 4 kids get together and do our homework, or let's get our answers together. I don't know, back when I went to school they didn't do it. You did your own homework. You didn't come in and say, `Can I copy your homework?' You know? That type of thing. So I more or less worked on my own when I went to school. I did my own thing. But when I've had a job like, you work with people. (R12)

This woman draws some important distinctions between school-learning and the learning in the everyday she does with her music group, and co-workers at the factory. In so doing she charts a kind of 'peripheral to core' movement in intersecting systems of activity, the result of which is the appearance of skill, knowledge and something understandable as a "learning" process.

This use of a comparison between school-learning, and the type of learning working people do in the everyday was often used by interviewees to describe their practices. Another chemical worker, for example, describes his view of the relationship between learning and formal training. In an interview that turned toward a discussion of how workers do not get credit for all the learning they do in the course of the workday, this interviewee experienced a noticeable shift in his understanding of his own work life. This person actually began to re-appraise his past experience in a way that was more oppositional to management and formalized training.[2] Indeed, his involvement in his local union and the type of social participation it provided, allowed him to re-evaluate, or "re-key" a whole range of experience (practices he had nevertheless actively accomplished at the time) into something recognized as important and legitimate learning.

[2]Workers in the auto parts factories commonly referred to the company's training as a process of "getting your brain sucked out" (R17a).

R: You forget about how much you learn because you do it every day and you think it's only second nature, but it's not when you think about it. Most of the things you do in there you learned. Like the computer stuff you do in your department and driving the fork-lift, the safe procedures for doing things.
I: And it's not really in a course?
R: No it's not. Most of it is just out there doing it.
I: What percentage would you say, is from out there doing it and learning with other workers especially?
R: I'd say about 90%. The training programs we get are pretty well useless. They're not very good at all. They give you just a very basic idea about what's going on and they say, 'Okay, go.' But it's the co-workers around you who fill you in and say, hey - don't do that! (R31)

This re-keying of existing frames of activity brought different elements of practice to the conscious level and was a by-product of this worker's involvement with his local union and the opportunity provided in the course of the interview itself.

From my perspective accounts such as these pose some serious questions about the nature of learning as a problematic. Linking this discussion with the review of literature I presented in the previous chapter, in what way, for example, could we describe the learning above as planned? In what ways could we say that these activities were "learning projects" carried out by autonomous individuals? While individual people are obviously involved in the process, are there other units of analysis that are equally or more appropriate for making visible the factors that shape people's practices and from which "learning" seems to be an ever-present byproduct? And, particularly striking, how can we understand the hesitancy (which was not unusual in these interviews) of the first working-class couple to call their practices "learning". These are questions relating to the conceptualization of learning activity that is appropriate for understanding ongoing social practice and the relationship of these practices to broader structures of society and major social divisions.

Specifically, the strips of talk cited above can be used to introduce the class-dimensions of learning, for example, through a closer reflection on the relations underlying references to formalized learning, training, studying and schooling. As a barrage of writers (e.g. Martell, 1974; Bowles and Gintis, 1976; Willis, 1979; Anyon, 1981; Davis et al. 1989; Curtis, Livingstone and Smaller, 1992; Luttrell, 1997; etc.) have established different ways,

> ...there is an unspoken assumption that important life decisions are made in schools, decisions that contribute to or justify one's social standing. Put bluntly, talking about school is a code for talking about class. (Luttrell, 1997:3)

Schooling and other types of formalized learning are through and through saturated with relations of social class. Writers as diverse as Bourdieu and Passeron (1977), Bowles and Gintis (1976) Bernstein (1990), Livingstone (1987), Giroux (1983) and others have drawn clear connections between the schooling and the reproduction of class relations. School or book-learning was a dominant form to which other less formalized practices were understood relationally. This auto parts worker describes how moving from job to job brings him into informal relationships with co-workers which provides access to a whole range of learning opportunities. Like the chemical worker, R12, quoted above, he specifically sets this mode of participation in opposition to schooling.

R. A lot of people are sponges.
I. Yeah.
R. When I worked in the heavy forging department. Every day, I learned something new from [co-workers]. The guy is ten years younger than me, but I learned something new because he worked in the welding industry and the metal-handling industry all his life so, you know?
I. Well, he's gonna know different things.
R. He knows different things, but I've worked in the trucking industry and machine repair and all this kind of stuff and I taught him things... And that's the biggest thing about people learning from other people. You don't realize it in school when you're younger, I guess. (R4a)

Likewise, this chemical worker and trade union activist describes how schooling did not provide his "education".

> Education? I don't have any, I don't believe in it. I left school when I was 15. Never stayed on further than I had to.... My real learning came when I joined the Miner's strike. You learned what the state apparatus is, keeping people in order, protecting the issues. That was my education. (R51)

Participation in social life not thought of as learning could be "re-keyed" in the context of social interaction and access to alternative cultural communities.

These diverse accounts of learning in the workplace and in school suggests that, from a working-class standpoint, there is a specific relationship between the experience of

formalized learning on the one hand and a more general notion of learning on the other. Building on the theme already introduced that learning arises from more general sets of class relations, this auto parts worker described her experience of a family life structured by parent's movement from job to job.

> I had a bad time in school... I didn't feel like I was learning a whole lot. It messed me up. By grade 6 I was doing pathetic in certain classes, math being the main one and I ended up failing a year and had to stay after school or go in an hour early just to get extra tutoring in math. I didn't want to learn about that then. I liked school when first went in grade 1 and 2 had a great time but by grade 5 and 6 I was bored. Bored to point that didn't want to be there. To be honest, in grade 8 I would go home and spend half day there. They'd wonder where I went to. I was bad. The principle pulled some stunt and ended up catching me, reported me to my parents and I got in trouble for it. Got caught smoking under age. I was a bad kid, bad kid. My parents were happy when I left school. In grade 8, the principal offered me a chance to go to an alternative trade school. He said it would be so much easier there, no exams, no homework, so of course I went. Now that was my type of place!.... I think that I've turned out okay. It was just the getting there that was the hard part. Like I used to say to my parents I must a have a mental block about school. To this day I have an attitude about schooling and I'm putting it down to what's happened to me in my childhood. I don't know--I can't think of anything else to put it down to. (R53)

My objective here is not to fully explore the relations between class standpoint, life-histories and schooling. Rather, I only wish to register, in a grounded way, the fact that "schooling" does play an important role in the minds and social practices of working-class interviewees. It is a comparative against which these people largely define, explain and understand their ongoing practices. Schooling and even formal training provide experiences that seem to play an important role in forming dispositions which people, in turn, use to understand and accomplish their learning long after school is over. Schooling plays a significant role in people's ongoing understanding of and participation in the whole range of learning activities. Understandings of learning that seek to trace class-relations cannot ignore the powerful influence of schooling in the minds and practices of learners. Tracing class relations in learning therefore begins with a recognition that the experience of school is not generic and universalized across social groups, but is specific to particular social positions in society. Dominant ideas, topic areas, processes and class-bias that characterize mass schooling in contemporary North American society, in fact, become embedded in people's perspectives on

learning as a practice in the form of a body of dispositions, tastes and preferences that, though subject to reformulation, sets the stage from which future participation occurs.

In the cases presented above, we see "learning" as a feature of ongoing social life of the workplace, the local pub, the neighbourhood, and so on. In none of the cases do we see the particularly compelling relevance of internalized, individual capacities for understanding what exactly is going on. Simply put, individualistic formulations shed a very dim light on dynamics and coordination of actual practice of specific people in specific contexts.

Now consider the important role that people's framing and keying of experience (either ongoing or in the course of subsequent interaction) plays in understanding learning as social-relational concept yet one in which people play an active inter-subjective part. Specifically, let's consider the connection this framing has to specific social organizations or activity systems. I provide a more extensive development of the concept of "frame" and "keying" later in the chapter however at this point consider framing simply as a patterned and coordinated way of responding to the virtually infinite bits of information that present themselves to an individual on a moment-by-moment basis in the course of our daily lives and consider the notion of "keying", analogous to the musical definition, as altering the frame slightly while retaining many of its essential qualities. Take this example of the role of participation in the labour union for this interviewee attempting to "learn" about his life and his position within a particular political economic context. Participation in the trade union helps to key the ongoing frame of working life in a particular way that has the potential to highlight one's class position, to affect ongoing participation in a variety of settings, and so on. In effect, it shifts what was otherwise background, 'seen but unnoticed' subordinate tracks of interaction into focus.

> ...the trade union's role as I see it is to highlight what knowledge we actually do have and how we attain it. How we actually do learn things, and I'll give you an example a quick example. Four people in this room learned about health and safety the hard way. They learned about workers' compensation the hard way. Only through their experience. They never went to any course - they learnt it when the employer fucked them and then they had the time to sit down and say, 'Why'd they do that to me - after all I've given them.' And that's the best, unfortunately it's the hardest as well, the best experience a worker can get because it cuts through all the nonsense because it hits you directly, it gives you time to think and to read and ask questions and start

understanding what it's all about. (R51)

This worker outlines the role of existing community relations (in this case the trade union) in producing a standpoint and a specific social class-based keying of the frame of ongoing activity of work. Such a keying produces the practices as an oppositional worker's learning activity specifically.

Framing/keying techniques are used by each of us to plan, make decisions and coordinate ongoing social practices with others. These concepts refer to a coordinated frame, yet one that is open to ongoing, negotiated variation. As analysts, we can refer to framing/keying techniques to understand how people carry out the coordinated production of activity, and the concepts specifically allow us to understand how some activities can be consciously understood as "learning" while others produce "learning" less self-consciously as a byproduct.

4.2 The Neo-Vygotskians

Neo-Vygotskian educational thought is a diverse body of literature unified by its social-relational approach to learning based on the original work of Soviet psychologist Lev Vygotsky.[3] Having reviewed the work of Vygotsky himself in Chapter 3, I now turn to some key theorists who've extended his original thinking. For purposes of this discussion, this body of literature includes the work of Leont'ev (1974; 1978) Engeström (e.g. 1987), Lave (1988; Lave and Wenger, 1991), and Holland (e.g. 1998) principally. While discussing some basic features of the framework, I want to specifically look towards the development of a means of understanding different social standpoints in activity.

Researchers such as Luria (1982) and, in particular, Leont'ev (1978) clarified these findings into workable methods of inquiry, in the former instance demonstrating the change in consciousness associated with the collectivization of economic production, and in the latter producing a central conceptual term known as "activity".

Activity is the minimal meaningful context for understanding individual actions.... In

[3]It is important to note that there are significant differences amongst this group of writers (not the least of which is methods) who, in some ways, I'm constructing as a unitary "body". A full discussion of these differences is beyond the scope of this current work.

> all its varied forms, the activity of the human individual is a system set within a system of social relations... The activity of individual people thus depends on their social position, the conditions that fall to their lot, and an accumulation of idiosyncratic, individual factors. Human activity is not a relation between a person and a society that confronts him.... in a society a person does not simply find external conditions to which he must adapt his activity, but, rather, these very social conditions bear within themselves the motives and goals of his activity, its means and modes. (Leont'ev, 1978:10)

This general framework provided the foundation for a social relational view of learning. It also provided a perspective that necessarily required learning to be historicized and contextualized. The concept of activity, as used by Activity Theorists, also involved a series of sub-concepts that provide the analysis of activity with multiple layers.

> An analysis leading to an actual disclosure of sense cannot be limited to superficial observation... After all, from the process itself it is not evident what kind of process it is - action or activity. Often in order to explain this, active investigation is required: substantiating observation, hypothesis, effective verification. That to which the given process is directed may seem to be inducing it, embodying its motives; if this is so, then it is activity. But this same process may be induced by a completely different motive not at all coinciding with that to which it is directed as its results; then it is an action.... In spite of what it seems to be from the superficial point of view, this is a way that confirms the objectivity of its bases to a high degree inasmuch as this way leads to an understanding of the consciousness of man derived from life, from concrete beginnings, and not from the laws of consciousness of surrounding people, not from knowledge. (Leont'ev, 1978:173-4)[4]

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[4]While this obviously not fully elaborated, the following can be considered key terms of the basic Activity Theory approach according to Leont'ev (1974; 1978):
Activity: subject, object, actions and operations; "activity is the minimal meaningful context for understanding individual actions" (1978). The famous example of Leont'ev (1978) concerns primitive hunters who, in order to catch game, separate into two groups: catchers and bush beaters. Bush beaters frighten the game toward the catchers. When compared with the goal of hunting - to catch the game, for food and clothing - the actions of the bush beaters in themselves are irrational; they can be understood only as part of the larger system of the hunting activity.
Subject: a person or group engaged in an activity.
Object: held by the subject and motivates activity, giving it a specific direction behind objects there "always stands a need or a desire, to which the activity always answers"
Actions: goal-directed process; different actions can be undertaken to meet the same goals; "...just as the concept of motive correlates with that of activity, so the concept of goal correlates with that of action." (1974:23)
Objects and actions relations: typically undergo transformation, though with some stability over time.
Operations: "...methods by which an action is realized. Their uniqueness is that they respond not to motive and not to a goal of action but to those conditions under which the goal is assigned... (164); "Actions are related to goals, operations to conditions. Let us assume that the goal remains the same; conditions in which it is

However, there are a number of distinctions that can be made amongst approaches that operate from a basic neo-Vygotskian framework. Engeström (1987;1996) and Nardi (1996), for example, outline a range of approaches and theoretical dialogues within the ground tradition. Beyond traditional Soviet Cultural-Historical psychology, there is also "Activity Theory" (Leont'ev, 1974; 1978; Engeström, 1987; 1992), "Cultural Psychology" (Cole, 1996), "Situated Learning" theory of Lave and Wenger (1991) and the North American cognitive psychology approach known as "Distributed Cognition" (e.g. Norman, 1988). Each of these share some common ground. At the same time, they display differences in terms of foci, methods, epistemological commitments, and conceptual tools.

According to Engeström's review (1996), neo-Vygotskian scholarship can be related to three distinct currents: Davydov's approach termed "Ascending from the Abstract to the Concrete" (1988; 1990); Engeström's "Learning by Expansion" (1987; 1993), and Lave and Wenger's "Situated Learning" (1991). In terms of distinct developments of Vygotsky, we might also want to add the strident critical stance taken by Newman and Holzman (1993) who seek to reassert the "revolutionary" tenor of Vygotsky's original Marxist influences. For the purposes of this section, however, I focus principally on the work of Engeström, and Lave and Wenger.

Engeström's work as a whole, and particularly as he considers actual work situations, is penetrating. While he has discussed issues of schooling and formalized training, it is his analysis and theorization of learning outside these settings (e.g. court systems, the doctor's office, etc.) that is most instructive. Engeström's research on expertise (1992) provides an

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assigned, however, change. Then it is specifically and only the operational content of the action that changes." (1978:65)

Central technical focus: mediation of activity by socio-cultural/historical artifacts.

Goal: "...like a law determines the mode and character of action... Let us take the case of a person's activity energized by food. Food is his motive; however, to satisfy this desire for food he must carry out actions not immediately directed at obtaining food. For example, his goal may be to make a hunting weapon. Does he subsequently use the weapon he made, or does he pass it on to someone else and receive a portion of the total catch? In both cases, that which energized his activity and that to which his action is directed do not coincide.... actions are not special, separate entities that comprise activity. Human activity exists only in the form of actions or chains of actions." (1974:23-24)

Tools: "...tool is a material object in which are crystallized not actions or goals, but modes and operations" (1974:26); "A tool, for example, viewed apart from its connection with a goal, becomes as much an abstraction as an operation viewed apart from its connection that the action it realizes." (1974:28)

important example of learning beyond schooling. It details how "expertise" is a co-production within an entire activity system. Making use of detailed interactional analysis, the activity system Engeström describes is comprised of the individual participant, co-participants, the tools of the activity system (e.g. both material and conceptual tools), and the shared negotiated objects, goals and motive-structure as well as broader context. One of the most provocative observations that Engeström develops in this research, in fact, deals with the way that activity systems are enmeshed within a "multi-dimensional network of [other] activity systems" which interact, support, destabilize and inter-penetrate (1992:13). Here, in my view, lies an opening for further work that allows for a critical examination of different standpoints in activity systems. Through this, for example, we might begin to offer accounts of differential participation structured along the lines of social class. Differential participation in terms of major social divisions of society, however, appears to be underdeveloped in Activity Theory and in neo-Vygotskian work generally including that of Engeström (e.g. 1987; 1992; 1996; 1999). Throughout we see generic participants differentiated only by the occupation and/or skill level.

Another related way to examine these issues building from Activity Theory's own conceptual tools, is through expanded discussion of centre/periphery and multiple centres of activity systems. Activity systems are composed of competing and overlapping systems that may orient to alternative sets of values by virtue of their position in a single activity system broadly conceived, and within the web of inter-related activity systems. Narrow conceptualizations of activity actually presume a system of relevance favouring particular goals and motives as legitimate while obscuring competing ones which might emerge from alternative standpoints and closer analysis. The potential to theorize these types of differential standpoints in activity in Engeström's own formulations revolves around suggestions of a "heterogeneity of expertise" and "multi-voiced-ness" (Engeström, 1992:9) which develops on Bakhtin's notion of dialogism, but to date, appear to be relatively underdeveloped as a sustained focus of empirical inquiry.

It is not a coincidence that discussions of learning outside of formal schooling are often most penetrating. Indeed, Lave and Wenger (1991) explain that the analysis of learning

in formalized schooling or training settings may be difficult for a reason. This is because schooling establishes a particular conception of "learning" from which, according to Lave (1988), it is difficult for fledgling theory to remain distinct. Lave presents a convincing case when she outlines schooling as an institution where scientific rationality, particular conceptions of learning, and psychology as well as broader community life, so-called "folk theories" of education and learning form a web of relationships that solidifies the type of dominant conceptions of learning discussed earlier.

> One example of these intricate ties is a widely shared belief that "scientific thought" is a proper yardstick with which to measure, diagnose and prescribe remedies for the "everyday thought" observed in experiments and schooling. This belief has long historical roots (see Chapter 4) that have influenced cognitive theory, the institutional form of schooling, and folk theories alike. Further, Western culture links science, schooling, and everyday practice in a hierarchical ordering of the kinds of thinking and knowledge supposed to be characteristic, respectively, of professional experts, "laypersons" (a term that should give pause, and "just plain folks"). There are influential networks of communication between academic psychology, the school establishment that educates both laypersons and scientists, and the alumni of the institutions. These networks ensure that psychological theories affect, though not reliably, both educational theories and educational practice, which in turn shape and are shaped by the beliefs of students. Alumni of schooling are the objects whose after-(school)-life is theorized about by psychologists and educators, who at the same time are the theorists, the teachers, and the parents of children in school. (Lave, 1988:4)

Learning and education in institutional settings (and in the popular consciousness) are so intertwined that, according to Lave, it becomes exceedingly difficult to critically theorize learning in the context of formal schooling.

> We have already outlined some reasons for turning away from schooling in our search for exemplary material, though schooling provides the empirical basis for much cognitive research on learning and also for much work based on the notion of ZPD [Zone of Proximal Develop]. Such research is conceptually tied in various ways to school instruction and to the pedagogical intentions of teachers and other caregivers.... Because the theory and the institution have common historical roots (Lave, 1988), these school-forged theories are inescapably specialized: They are unlikely to afford us the historical-cultural breadth to which we aspire. (Lave and Wenger, 1991:61)

Lave and Wenger have contributed to neo-Vygotskian scholarship more generally (1991; also Lave, Murtaugh and de la Rocha, 1984; Lave, 1988; Lave, 1993; Wenger, 1998)

in their development of a provocative reformulation they call Situated Learning which shows many connections to Vygotsky's original work. Using mostly ethnographic materials (their own and those of others), they provide a program of inquiry into learning as a dimension of cultural practice generally.

> Social practice is the primary, generative phenomenon, and learning is one of its characteristics.... In our view learning is not merely situated practice... learning is an integral part of a generative social practice in the lived-in world. The problem... is to translate this into a specific analytic approach to learning. (1991:34-35)

Their studies of grocery shopping (Lave, Murtaugh and de la Rocha, 1984), recovering alcoholics, navy quartermasters, butchers, Vai and Gola tailors (Lave, 1988; Lave and Wenger, 1991) convincingly open a whole new sense of the concept. Lave and Wenger (1991) define "learning" as a collective practice in which novices shift their patterns of participation in relation to experts in a "community of practice" which is roughly analogous to the concept of activity system. For Lave and Wenger, the "situated-ness" of learning is defined as follows:

> In the concept of situated learning we were developing, however, the situated-ness of activity appeared to be anything but a simple empirical attribute of everyday activity or a corrective to conventional pessimism about informal, experience-based learning. Instead, it took on the proportions of a general theoretical perspective, the basis of claims about the relational character of knowledge and learning, about the negotiated character of meaning, and about the concerned (engaged, dilemma-drive) nature of learning activity for people involved. That perspective meant that there is not activity that is not situated. (1991:32-33)

This is a major step toward understanding learning in an expanded way, beyond a focus on organized classroom settings, beyond individualized and discrete events, and embracing the complexity and contingency of the everyday. It is a conceptualization of learning which helps us, to clarify the way that people's everyday learning is integrated with social life and the reproduction of specific forms of social difference.

The key shifts that the work of Lave and Wenger (1991) make possible in relation to the dominant approaches to adult learning already reviewed in Chapter 3 are three fold. The first shift is produced in relation to a conceptual apparatus that allows, indeed encourages, the analyst to enter into grounded empirical work in a range of settings in a way that traditional

individualized, psycho-physical models of learning do not see as relevant. The second shift is produced by placing "participation", i.e. social relations, at the centre of the analysis. This is important for overcoming the initial barriers to our understanding of learning rooted in, for example, our concerns about formal curriculum, the institutionalization of learning through mass schooling, and the mutual development of learning theory/practice within the context of education per se. Learning is literally everywhere, understandable beyond the narrow-ness of the credentialization and labour market exchange. Rooted in these two shifts, the dominance of individualism and cognitivism is seriously challenged. As Lave describes in earlier work:

> The question is, 'Why does the mind with its durable cognitive tools remain the only imaginable source of continuity across situations for most cognitive researchers - while we isolate the culturally and socially constituted activities and settings of everyday life and their economic and political structures and cyclical routines from the study of thinking, and so ignore them?"... reactions to the study of cognition-in-context follow from strong beliefs and longstanding practices that create a taken-for-granted divide between cognitive processes and the settings and activities of which they are a part. (Lave, 1988:76)

The third shift is closely connected to the others and involves the potential to move beyond hierarchically organized systems of dominant cultural values and relevance in the context of learning. This de-stabilizes the tyranny of CLH in that legitimate knowledge/skill production can be located outside professionalised curriculum, but more specifically anywhere we identify everyday social practice: to use Vygotsky's phrase wherever there are "cultural tools and signs" available.

At the same time however, Situated Learning requires the sharpening of existing conceptual tools for a broader, more historicized and socially transformative program of inquiry. Although Situated Learning needn't suffer from narrowly contextualized analyses of micro-interaction, it nevertheless seems to. The "context" of learning remains trimmed of important cultural and historical relations. In addition, Situated Learning, while critical of the formal schooling bias, at a more fundamental level still appears to display a commitment towards forms of expert/novice relations of learning. In this matter, Lave and Wenger are quite explicit: learning is the relations between members in a field of expert and novice practitioners. In this context, Lave and Wenger's (1991) social-relational theory of learning

becomes somewhat more ambiguous: certain social relations are, in effect, favoured over others as relevant to the learning process.[5]

The final features of Situated Learning I'll take a critical look at concern issues of micro-context and cultural material power. While Lave and Wenger comment on the essential need to theorize issues of conflict/cooperation as well as issues of cultural/material power, at the level of their actual empirical analyses these relations are highly underdeveloped. I trace these problems to an understanding of the basic structures of opportunity and participation captured in the notions of "legitimacy" and "peripherality", which Lave and Wenger themselves indicate are a bit tricky.

> Legitimate peripherality is a complex notion, implicated in social structures involving relations of power. As a place in which one moves toward more-intensive participation, peripherality is an empowering position. As a place in which one is kept from participating more fully - often legitimately, from the broader perspective of society at large - it is a disempowering position. Beyond that, legitimate peripherality can be a position at the articulation of related communities. In this sense, it can itself be a source of power or powerlessness, in affording or preventing articulation and interchange among communities of practice. The ambiguous potentialities of legitimate peripherality reflect the concept's pivotal role in providing access to a nexus of relations otherwise not perceived as connected.... There is not place in a community of practice designated "the periphery" and, most emphatically, it has no single core or centre... We have chosen to call that to which peripheral participation leads, full participation. Full participation is intended to do justice to the diversity of relations involved in varying forms of community membership. (1991:36)

Peripherality (like marginality) is a relational concept, and therefore is impossible to understand without also assuming a centre. Furthermore, there is the question of "legitimacy" according to whom? Despite the apparent open-ness toward multiple perspectives there is, nestled away in the explanation, a type of unproblematized assumption called "the broader perspective of society at large" (p.36). Who is 'society at large'? Does it have a gender, a race or class?

Both Engeström (1987; 1992), and Lave and Wenger (1991; Lave, 1988) provide

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[5]Engeström's work on expertise, by comparison, is more open in this regard. By definition there are few "pedagogues" for the virtuoso and Engeström seriously considers the notion of knowledge production beyond pedagogy and expert/novice relations altogether, postulating the notion of "learning what is not yet there" (1992:14-18).

important contemporary elaborations of the work of Leont'ev and Vygotsky. However, there is a shared need to more critically evaluate issues of social standpoint in activity. Social standpoints draw our attention to the broader motive-structures of activities. Understanding standpoints in activity parallels the research interests expressed in Leont'ev's discussion of a gang of primitive hunters. What seems to be irrational behaviour amongst certain members, if brought into perspective by the appropriate goal and motive structures of activity, can suddenly become understandable.

4.4 The Need for Further Concepts

The development of the type of grounded approach to learning in the everyday I suggest here extends the tenets of historical materialism, first and foremost, by placing actual activities of historically situated human agents at the centre of the analysis. Neo-Vygotskian approaches provide the central point of departure, however some of the features that I problematised initially in section 4.1 (such as the need to understand different social standpoints in activity and the need to maintain the active subject who is the producer of activity) are not completely reconcilable with existing neo-Vygotskian approaches. The idea of a dialogue with other compatible approaches is not new for neo-Vygotskians, and below I specifically outline the relationship between Goffman's concept of "frames" and Bourdieu's "habitus" (though they are not 'neo-Vygotskians') as important additions to the basic neo-Vygotskian framework.

In clarifying class standpoints in activity abstract notions of standpoint are not good enough to provide a critical account of people's actual social practice. Rather standpoints are always accomplished by active human agents, inter-subjectively in encounters with others. While he does not critically theorize the broader social significance of social standpoints, I agree with several neo-Vygotskians who have suggested the general relevance of the sociology of Erving Goffman.[6] Goffman's work, in particular his notions of "framing and keying" procedures (Goffman, 1974) is, I think, particularly important for extending the critical, grounded examination of the inter-subjective basis of social interaction. Neo-

[6]For a recent discussion of the continued relevance of Goffman for sociological analysis see Riggins (1990) as well a collection of papers in Sociological Perspectives (1996; volume 3).

Vygotskians have not, to date, provided convincing explanations of how the structure of activity is both reproduced and at the same time surprisingly open to variation at the inter-subjective level.

When we examine interview data such as those presented in section 4.1, we can see that a person's ongoing mode of participation in activity systems is partly dependent on the frame of meaning he or she ascribes to the situation. Following the examples presented above, whether it's the way ongoing work experience is understood, how working-class positions in society are made visible in ongoing activity, or even how learning is understood as a dimension of virtually all social practice, it is a general meaning or frame that provides the basis for coordinated interaction with others. For Goffman a "frame" is an identifiable element of the organization of social life that governs social events and our subjective involvement in them. It provides us a way of thinking about the organization of human experience in the structured contingency and complexity of ongoing interaction.

> [F]raming does not so much introduce restrictions on what can be meaningful as it does open up variability. Differently put, persons seem to have a very fundamental capacity to accept changes in organizational premises which, once made, render a whole strip of activity different from what it is modelled on and yet somehow meaningful, in the sense that these systematic differences can be corrected for and kept from disorganizing perception, while at the same time the story line is maintained. (Goffman, 1974:238)

> It has [been] argued that these frameworks are not merely a matter of mind, but correspond in some sense to the way in which an aspect of the activity itself is organized, especially activity directly involving social agents. Organizational premises are involved, and these are something cognition somehow arrives at, not something cognition creates or generates. Given their understanding of what it is that is going on, individuals fit their actions to this understanding and ordinarily find that the ongoing world supports this fitting. These organizational premises - sustained both in the mind and in activity - I call the frame of activity. (1974:247)

Goffman adds a barrage of mini-concepts that are both fascinating and useful for virtually any analysis of ongoing cultural practice. The sensitivity they add to interactional analysis is important and complements the tools of analysis that neo-Vygotskians already use. To the notion of frames Goffman adds the following supplementary concepts:

a) A main activity contains tracks, or channels of activity and includes: a story line; an

evidentiary boundary; and, at least 4 subordinate tracks (one sustaining disattended events; one directional; one overlaid communication; and, one of matters of concealment)

b) Participation status shift according to group size, context and casting.

Building from this, a primary frame is defined as follows:

> Primary frameworks vary in degree of organization. Some are neatly presentable as a system of entities, postulates, and rules; others - indeed, most others - appear to have no apparent articulated shape, providing only a lore of understanding, an approach, a perspective. Whatever the degree of organization, however, each primary framework allows its user to locate, perceive, identify, and label a seemingly infinite number of concrete occurrences defined in its terms. He is likely to be unaware of such organized features as the framework has and unable to describe the framework with any completeness if asked, yet these handicaps are no bar to his easily and fully applying it. (1974:21)

Framing thus has the potential to represent a multi-faceted and complex social reality including its tacit dimensions which was not lost on Goffman:

> ...what appear to be its external brackets take their character (in part) from the presence of internal ones. But from a different point of view - a wider, more inclusive one - these external brackets can be seen as internal ones too. Thus the good-bye ritual that terminates a day at the office can be seen as an external bracket from the point of view of that particular day's work, but it can also be viewed as an internal bracket relative to a more abiding undertaking, namely, the continuing performance of the work role, a performance that is interrupted at the end of each weekday, on weekends and at holidays. (1974:261)

For Goffman, "keying" is an important element of understanding the complexity of framing procedures. It is concepts such as keying, that clearly demonstrate Goffman's acknowledgment of the active subject which can work within and indeed shift the structures of social life described by frames in the course of interaction.

> A set of conventions by which a given activity, one already meaningful in terms of some primary framework, is transformed into something patterned on this activity but seen by the participants to be something quite different. The process of transcription can be called "keying". A rough musical analogy is intended. (1974:44)

> Actions framed entirely in terms of a *primary framework* are said to be real or actual, to be really or actually or literally occurring. A *keying* of these actions performed, say, onstage provides us with something that it not literal or real or actually occurring.

> Nonetheless, we would say that the staging of these actions was really or actually occurring.... And to this must be added the real that is construed retrospectively - brought to mind because of our way of defining something as not qualifying in that way. (1974:47)

These framing/keying procedures provide a means to account for how people consciously and socially negotiate and coordinate the full range of operations and actions within a frame of activity together.

Goffman himself differentiated between "learning" and doing as an issue of framing and keying. This is expressed in typically eccentric Goffman-esque, in his use of this quote from the San Francisco Sunday Examiner and Chronicle (about a local college course on "guerrilla warfare"):

> This unusual college class, a subject of controversy off campus, is being investigated by the state attorney general's office. 'If it is a classroom discussion on guerilla warfare,' says Charles O'Brien, chief deputy attorney general here, 'that is one thing; if it is an exercise in guerrilla warfare, if they are training guerrillas, that is quite another thing.' (Goffman, 1974:68)

Although certainly not a central focus of frame analysis, it is important to note that Goffman also understood the limitations or structuring effects inherent within frames. Goffman's notion of "casting" and what he referred to as "person-role formulae" (1974:270) was never developed in terms of any particularly explicit theory of power-relations, but through them we can see that despite the contingency of the "interaction order" people are neither free to participate in any activity they choose and nor are they free to participate in any way they choose.

> Who can qualify for playing [a certain role]?... Obviously there exist what might be called social factors, preferred or ancillary qualifications required of the person who takes the role, these organized in our system of age grading, sex typing, class and ethnic stratification. (1974:27)[7]

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[7]Indeed, Goffman also acknowledges the relevancy of particular standpoints in frames of activity when he uses the term "casting". Though notion of casting is not extensively developed in his work, Goffman does suggest the relevance of a particular group's "cosmologies"(or "framework" of framing procedures) as a means of understanding the collective experience of particular groups operating from specific structuralized standpoints.

> Taken all together, the primary frameworks of a particular social group constitute a central element of its culture, especially insofar as understandings emerge concerning principal classes of schemata, the

Reflecting back on the data I presented at the outset of this chapter, consciousness of "learning" situation, particularly in ongoing everyday activity (or retrospectively), can be seen to be dependent on interviewees' framing and keying of the situation which brings certain tracks of interaction into conscious focus. If, as neo-Vygotskians such as Lave and Wenger (1991) say, learning is defined as changing forms of participation and movement from peripheral to full participation, then the keying of frames of activity that bring into focus the interactional machinery through which one alters their mode of participation is central to the process. Using the notion of frame as a "figured world" and drawing on Bakhtin's idea of the "space of authoring", Holland et al. comment on the necessarily social character of even the most individualized practice.

> [T]he cultural figurings of selves, identities, and the figures worlds that constitute the horizon of their meaning against which they operate, are collective products. One can significantly re-orient one's own behaviour, and can even participate in the creation of new figured worlds and their possibilities for new selves, but one can engage in such play only as part of a collective. One can never inhabit a world without at least the figural presence of others, of a social history in person. The space of authoring, of self-fashioning, remains a social and cultural space, no matter how intimately held it may become. And, it remains, more often than not, a contested space, a space of struggle. (Holland et al, 1998:282)

Changing modes of participation and thus learning can, and do, occur without this level of self-consciousness. Holland et al.'s discussion of the social processes in which alcoholics "learn" to become "non-drinking alcoholics" (1998) is a well developed example of how the conscious keying of frames (in new forms of activity and also retrospectively to re-appraise past activity) in social groups (Alcoholics Anonymous) leads to a specific type of "learning". Here the authors trace how people are brought into fuller participation in a new social network through collective efforts to use narratives to shift ongoing modes of participation, or what the authors' call identities-in-practice. In Holland et al. (1998) we see the extension of this discussion of limitations in the active production of frames. "Placement" or

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relations of these classes to one another, and the sum total of forces and agents that these interpretive designs acknowledge to be loose in the world. One must try to form an image of a group's framework of frameworks - its belief system, its "cosmology" - even though this is a domain that close students of contemporary social life have usually been happy to give over to others. (Goffman, 1974:27)

"positionality" for Holland et al. (1998) refers to the casting that people take on in specific frames of activity, but is not limited to strictly discursive or "narrativized" dimensions.

> Another type of placement is at least as important as narrativized or discursive placement: positioning by access to space, to associates, to activities and to genres... Perspectives are tied to a sense of entitlement or disentitlement to the particular spaces, relationships, activities, and forms of expression that together make up indices of identity. . . . Even in the face of powerful situational determinants...these identities, especially when supported by others of like perspective, afford some self-control and agency. (p.44-46)

As a theory of learning that focuses on social participation, neo-Vygotskian frameworks have something to gain in reflecting on Goffman's concepts. These concepts display a level of sensitivity towards both the variability and structured coherence of social interaction at the inter-subjective level that is clearly beyond neo-Vygotskian formulations to date. However, Goffman suffered from a well articulated sense of political disinterest (Psathas, 1996:384) that clearly limited the ability to develop his concepts more fully for the type of class-based project that I've initiated with this research. For this we can consider a theory of the reproduction and change of embodied preferences, comportment, dispositions and tastes offered in Bourdieu's concept of class-habitus.

As introduced in Chapter 1, Bourdieu's notion of class habitus arises from his more general "Theory of Practice" (1977; 1990) which places at its centre a sociology incorporating certain materialist and social constructivist ideas about structure and constraint. For Bourdieu habitus is defined as follows,

> ...generative and unifying principle which retranslates the intrinsic and the relational characteristics of a position into a unitary lifestyle, that is, a unitary set of choices of persons, goods, practices. Like the positions of which they are a product, habitus are differentiated, but they are also differentiating. Being distinct and distinguished, they are also distinction operators, implementing different principles of differentiation or using differently the common principles of differentiation. (Bourdieu, 1998:8)

My use of habitus/field appears to be a much more narrow one than proposed by Bourdieu and those working through his work (e.g. Charlesworth, 2000). My use of the concept

focuses on habitus as 'habitus-in-action'.[8] In a recent article flagging a similar preference Rabinow and Dreyfus explain it this way:

> We want, however, to distinguish two components in Bourdieu's work: an ontologically informed research program, which we call "existential analytics", and the scientific theory of social meaning - Bourdieu's theory of symbolic capital - which we argue is a specific and contestable interpretation of who we are and what we are always up to. We think that these two components are analytically separable and that objective description is the appropriate way to approach what human beings are and how their social practices cohere. (Dreyfus and Rabinow, 1999: 84-85)[9]

Habitus is central to Bourdieu's efforts to move beyond the opposition of structure and agency in making sense of the social world. It is an attempt to break the barriers that, as Calhoun (1993) writes,

> ...grasp practice solely as constituting, as expressed in methodological and ontological individualism (phenomenology), and those that view practice solely as constituted, as exemplified by Levi-Strauss's structuralism and the structural functionalism of the descendants of Durkheim. (Calhoun, 1993:4)

Bourdieu's solution is the conception of habitus as a semi-durable feature of human practice that can partially travel through space and time. However I say 'partially' because habitus travels only to be activated and in so doing undergoing some elements of change. It constitutes participation in practice but in so doing is re-constituted.

> the habitus... makes possible the achievement of infinitely diversified tasks thanks to analogical transfers of schemes permitting the solution of similarly shaped problems, and thanks to the unceasing corrections of the results obtained. (Bourdieu, 1977:83)

The basic parallels between what Bourdieu, above, describes as "schemes" and similarity in "shaped problems" on the one hand, and Goffman's notion of frames is notable. In the real world of actual activities, this perspective on habitus is meant to collectively refer to the use of past experiences and modes of interaction that produce a person's ability to frame, key and

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[8]Bourdieu credits the work of Merleau-Ponty as well as Heidegger for the phenomenological sensitivity that opens the way for "non-intellectualist, non-mechanistic analysis of the relations between agent and world" (1990:10) which is of direct interest to what I've referred to in Chapter 1 as the secondary project of this analysis.

[9]Calhoun (1995) evidently agrees with this basic formulation also suggests that the determinations of the latter can be left behind (p.153).

find a place from which to begin micro-coordinated accomplishment of social interaction. Habitus is a concept that allows us to delve deeper into the social significance, and the relations of differentiating practices of constraints that any individual faces in attempting to participate in activity.

For Bourdieu, however, a person's habitus is closely connected to its realization in a specific "field" of activity. The concept of field is meant to refer to a scope of relevancy for interaction complete with specific roles, logic of operation, history, and so on. An example of this would be the field of education which makes relevant certain issues (and makes irrelevant others) with relatively stable sets of social roles including student, teacher and so on, its own institutionalized practices, etc. In its basic form the field is said to be semi-autonomous with an underlying foundation in broader fields of "institutional power" and "class relations" (Bourdieu, 1998:32-34). However the turn toward what Dreyfus and Rabinow refer (1999) to as an implausible "scientific theory of social meaning", which the authors argue is far too static and structural, occurs in Bourdieu's formulation of field and specifically habitus/field relations, not, I argue, in the conceptualization of the habitus per se. Field is defined by Bourdieu as the distribution of appropriate forms of capital. This, unfortunately sets the stage for what many (e.g. Calhoun, 1993; Dreyfus and Rabinow, 1999; Butler, 1999; Livingstone, 1999) consider to be Bourdieu's distorted and one-sided structuralist[10] descriptions of class domination. Theories of habitus/field which provide the basis for Bourdieu's "human capital" thesis go beyond the otherwise warranted claims he makes concerning the historically and culturally situated practices of active human agents. Though habitus/field relations indicate a process of virtually totalized class, gender and race domination, these process are virtually never as complete as one might assume from Bourdieu.

Framing/keying and the notion of habitus-in-action as I've outlined them,

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[10]Butler comments that, "...the field, often figured as preexisting or as a social given, does not alter by virtue of the habitus, but the habitus always and only alters by virtue of the demands put upon it by the "objectivity" of the field." (1999:117)

complement each other nicely and together fill an important gap in neo-Vygotskian scholarship. Habitus has little use to a critical materialist analysis if it is simply a static description of preferences, class histories, and dispositions, or if it is necessarily saddled with invariant structure such as Bourdieu's "fields". Habitus is a means of explicating the type of physically and culturally embodied set of dispositions that shape, but do not determine, the participatory roles that are available to people, and which they would be interested in taking on in the first place. Framing and keying of frames, on the other hand, are a means of understanding the contingency and variability that is made available by human agents in the course of real interaction despite the relative durability of the class habitus.

4.5 Summary

The discussion so far has provided several important steps toward the analysis of working-class computer learning in the everyday by organizing a specific program of inquiry into class-based learning. I began by posing a series of questions that arose from interviews with working people about their learning. I then provided a critical discussion of current neo-Vygotskian literature, and ended with suggested means of filling important gaps in the neo-Vygotskian framework by reflecting on the work of Erving Goffman and Pierre Bourdieu. Issues of social standpoint, the active subject, differentiated participation, and the structures of participation are pre-figured in the approach I mapped in this chapter.

The chapter introduced examples and themes that initiate a grounded analysis of working-class dimensions of learning and a working-class learning habitus specifically. Preliminary features of this habitus included a type of relational and at times oppositional disposition toward formal education rooted in past and ongoing experiences. Indeed, in section 4.1, people talked extensively about having had "bad times" in school, "not believing" in school, how real life is "not the way school sets things up", and how formal training was not useful to actually doing the job. Preferences were developed in the course of learning in the everyday from a working-class standpoint, and revolved around collective, hands-on learning in settings that were not set up for learning, training or education specifically. These latter suggestions form preliminary features of a working-class learning habitus as well.

Chapter 5
"That's Technology": Understanding Working-Class Perspectives on Computer Technology

> For half a century, along with television, space flight, nuclear weapons, and automobiles, computers have formed the technological backdrop for the [North] American mental landscape. Revered as the consummate representatives of an ever more technological civilization, they are tools for work and toys for play, assistants to science, fixtures of daily life. The are icons of efficiency, social status, and a high-tech future. (Edwards, 1995:69)

> It is questionable if all the mechanical inventions yet made have lightened the day's toil of any human being. (John Stuart Mill)

> See, that's a funny word, technology. (R7)

While in the previous chapter I dealt with an approach to adult learning that opens up our understanding of class differentiation, in this short chapter I want to focus on computer technology, and more specifically its relationship to capitalism and class experience. These discussions relate to a neo-Vygotskian theory of "tool-mediation". This documentation of general "perspectives" and class experiences is relevant as it provides a sketch of the specific goal and motive-structure of working-class computer-based activity.

I will argue two basic points in regard to a working-class perspective on computer technologies. First, I suggest that these perspectives form what Antonio Gramsci (1971) called "common sense" which is filled with various contradictory elements. Working-class people openly provide a description of computer technologies in terms of efficiency and control when discussing these technologies in the *abstract*. However, as people begin to discuss these same technologies in the *concrete*, many begin to identify competing negative effects (e.g. job-loss, loss of operator control, safety concerns in the workplace and so on). This contradictory character of "common sense" is not confined to the working-class and is not simply a set of half-truths, folk myths and fairy tales. Working-class technological common sense is actively produced out of the contradictory character of actual working-class life in advanced capitalist society. In other words, these contradictions are less dependent on individual abilities to make "good sense" (Gramsci, 1971) as they are a reflection of the

contradictory experiences of life activity, a specific class-based mode of participation. Second, I suggest that these perspectives provide important clues and background knowledge for making explicit the goal and motive-structure of people's activity. As neo-Vygotskians beginning with Leont'ev (1978) have argued, we cannot understand the meaning of people's practices without understanding the larger structure of the activity in which they're engaged. Implicated in this goal and motive-structure are the dispositions, comportment, preferences and tastes (i.e. the class habitus) that surround and inform orientations toward "learning" practices specifically.

According to Roszak (1994), the word computer entered the North American public vocabulary in the 1950's. This was at a time when the most advanced models were still room-sized beasts that burned enough electricity (given the circuitry of the day) to present a serious cooling problem. Today, the sophistication and power of both the devices and the associated rhetoric have expanded considerably. Everywhere we are inundated with images of the high-tech, "info-bahn" world. However, despite the dominant rhetoric of technology, it is doubtful that John Stuart Mill's observation above, made over a century ago, is any less true today. A host of critical writers on technology note this fact explicitly. Therefore, we are presented with a set of contradictory claims: expanded power, efficiency and influence of technology on the one hand, and questionable claims as to the range of shared positive benefits on the other. Digging a little deeper into the different effects that technologies have on the population, we see that the United States Bureau of Labor Statistics reports that there will be a massive growth in rates of employment in the computer sector by 2005 (certainly a positive finding for people who depend on a wage to live). On the other hand, in a (U.S.) population predicted to grow to between 280 and 300 million by this time, we see that the total numbers of people actually employed in this sector will still be under a half a million people. Looking at computers in the workplace in Canada, Krahn and Lowe's (1998:104-105) examination indicates that primary, service, and manufacturing sectors lag behind management, science and professional occupational groups by an average of 318% in terms of percentage of computer use on the job (21% and 66.8% respectively) and 141% in terms of total hours per week. These sets of statistics begin to draw our attention to the class-based

character of technology and technological change. We see both an over estimation of the knowledge-based work of technologist and programmers on the one hand, and a bifurcation of the technological opportunities in the workplace based on occupational status on the other. The basic use and access statistics presented in Table 1.1 (Chapter 1) also indicate important changes in the home and workplace. Clearly there has been some sort of technological revolution, but the character and dynamics of this revolution tell us more about relations of class, occupation and capital accumulation than the developmental trajectory of computer technologies themselves. From the standpoint of working people, it is a revolution in which positive features (e.g. some growth in "knowledge work"; the potential for greater discretionary time due to automation; the potential for lower consumer costs) are often wildly overblown and negative features (e.g. technological-based unemployment; work intensification; deskilling; heightened surveillance) are just as wildly understated.

Despite this growing awareness of computer-based technological revolution, for the vast majority of Canadian manufacturing workers, the infusion of computers directly into their lives on the shopfloor is little over a decade old (McMullan, 1996). Indeed the majority of manufacturing workers I spoke to in this research who actively used computers in the workplace, indicated that this technology had only appeared on their shopfloor in the first half of the 1990's. Nevertheless, according to Menzies (1996), for blue collar workers the structure of capitalism is shifting toward "quick-response" and "just-in-time" manufacturing. Workplaces are being re-engineered into global "cybernetic systems" permitting centralized financial and managerial control, intensification, commodification of activity, unprecedented fragmentation and surveillance of the labour process that does not represent a real break from current practices, but rather represents an intensification of its basic logic.

> It is business as usual with a vengeance.... With the information highway signalling the network-integration phase of a computerized restructuring which dates from the 1970's, the industrial paradigm is shifting [to] exploit the highway network as a "unified system" of production, marketing distribution, and consumption. This isn't a strictly technological development, nor a deterministic one. A host of ideological and historical choices are at work, including deficit cutting and government down-sizing; privatization, free trade, and deregulation, plus downward ratcheting of social and labor standards. (Menzies, 1998:87-89)

Descriptions of computer learning and labour process in the following chapter (particularly Chapter 6) in fact provide a detailed look at how these processes are actively achieved in the workplace.

This picture of computer technological development and the perspectives that are produced in relation to it are, in fact, closely related to the discussion of the forces of technological development that Marx outlined originally in his exposition on work intensification, and changes in the relation of fixed to constant capital (Marx, 1867-68/1990:Vol. 3). However, issues of computer technologies can be understood in another way as well. We can examine computerization beginning with the perspectives, experiences and actual practices of working-class people themselves. In the sections below and in later chapters, these concerns over working-class common sense becomes relevant to computer learning in three interrelated ways: as a working-class technological discourse that itself is a form of tool-mediation; as a major element of the broader goal and motive-structure of activity; and, specifically as an element, that together with one's class learning habitus, orients ongoing framing and accomplishment of local interaction and learning. Before turning our attention to this however, let me first provide a brief reflection on the historical trajectory of computer technology and then provide a critical framework with which to proceed.

5.1 Situating Computer Technology Historically

Technology hasn't simply descended to the earth from the heavens. It has been brought into being by specific historical and political economic relations. David Noble in his ground-breaking work, Forces of Production (1984; see also Noble, 1986; 1993), provides us with an impressive example of just how such forces have conspired to provide us with the kinds of technologies, specifically micro-computer technologies, which working people are faced with today. Noble demonstrates how elites - in the context of the post-war industrial-military complex and post-war capitalism in the US - actively produced the types of information technologies that specifically have led to the modern micro-computer.

Briefly, the concerted activities of specific corporations, principally General Electric, Westinghouse, RCA, AT&T and IBM, can be seen as essential for the appearance of

computer technologies we know today. However, this is an accomplishment achieved not by the use of private research and development, but rather, as Noble shows, it was achieved through the conscious, forceful and direct use of material resources and political power resulting in unprecedented access to public funding. This conscious use of power helped to amass huge profits for elites during World War II through military contracts and was then extended to create and then reap benefits of the American military-industrial complex within the cold war era. What's more, Noble shows how this control of public monies and the extension of the reach of these programs into public research institutions such as the Massachusetts Institute of Technology, led directly to specific forms of computer technology such as Computerized Numerical Control (CNC). These same concerted efforts continued well past the early post-World War II period in North America and continue in increasingly complex forms today as original production-based technologies expand into spheres of distribution, marketing, communications and consumption vis-à-vis the home computer industry (e.g. see Mosco, 1993; Menzies, 1996; McChesney, 1998).

Returning to these earlier roots however, we see that CNC technologies emerged from, were designed for, and were further modified in the practical world of work under the specific requirements of capitalist accumulation. It is through this process of mediation, that computer technologies have come to be inherently *capital-centric*. What makes this even more clear in Noble's work, however, are the alternative technologies that could have achieved many of the publicly-stated purposes of technological research and development, but which differed only in their degree of capital-centricity. The key example in this regard was "Record/Playback" (R/P) computerized technology. The distinction between CNC and R/P technologies lies in the fact that under R/P practical skills and knowledge of workers themselves control the 'programming' of the machinery. In this way, R/P forms of computer technology can be considered more *labour-centric*; however, as Noble puts it: "to the software engineer, this places far too many cards in the hands of the lowly machinist" (1984:190). A similar dynamic in which power and control directly influence available technologies is described in pan-historical terms in the work of Mumford,

> [F]rom late neolithic times in the Near East, right down to our own day, two

> technologies have recurrently existed side by side: one authoritarian, the other democratic, the first system-centred, immensely powerful, but inherently unstable, the other man-centred [*sic*], relatively weak, but resourceful and durable. (Mumford, 1991:14)

In our times this trajectory of technological development is a clear example of how capitalist relations actively produce tools which nevertheless come to be regarded as neutral. The concrete political and financial mobilization in the industrial, governmental, military and higher education spheres by elite groups that Noble examines have actively cut-short the possibility of labour-centric technologies such as the R/P system. Decades of formal as well as practical experimentation, research and development (and enormous public financial resources) were directed instead to CNC technologies and its line of development thereby narrowing the possibilities of R/P and similar democratizing, labour-centric technologies.

New alternatives do and will continue to appear as Mumford's comments suggest. McChesney uses the Internet as a (potentially) progressive example of this kind.

> The Internet has opened up very important space for progressive and democratic communication, especially for activists hamstrung by traditional commercial media. Some have argued that the Internet will eventually break up the vice-like grip of the global media monopoly and provide the basis for a golden age of free, uncensored, democratic communication. Yet whether one can extrapolate from activist use of the Internet to seeing the Internet become the democratic medium for society writ large is another matter. The notion that the Internet will permit humanity to leapfrog over capitalism and corporate communication is in sharp contrast to the present rapid commercialization of the Internet. (McChesney, 1998:21)

As the detailed practical analysis of Cockshott and Cottrell (1993), Bansler (1989), Ehn (1988), Taylor and Sawchuk (2000) and others demonstrates, alternative uses and development of computer technologies remain possible. To draw on some political and labour-based examples, we can look at my own union's (Canadian Union of Public Employees) internationally ground-breaking Solinet, Russia's original GlasNet, various forms of distance education (e.g. Open Universities in the U.K. and Canada), and the recent plans for an online international labour university (see Lee, 1997), as well as the myriad of small-scale, local initiatives including activist list-serves, Bulletin Board Systems's (BBS) and the like, all of which suggest a persistent democratizing pressure emanating from below. The

labour-centric model of technologies will continue in whatever form it can not only because alternative forms and visions of genuinely democratic social life continue, but as Wilkinson (1983), Engleberger (1977) and others noted some time ago, because the actual differences between capital versus labour-centric technologies, in terms of publicly stated purposes, remain an ambiguously open question.

> The first point to be made about 'efficiency', 'product quality', 'productivity', etc. is that these, generally unquestioned, indicators of technological success are difficult to measure with any degree of accuracy, and in any case are rarely measured in sufficient detail to determine the exact economic advantages over any alternatives. (Wilkinson, 1983:82)

5.2 Outlining a Critical Approach to Computer Technologies

Reviewing various types of technology literature we can discern two basic approaches. This two-type model draws on a general reading of a range of seminal texts in the study of technology including Mumford (1991), Ellul (1964), Schiller (1981), Mander (1978), Robins and Webster (1989) and Dreyfus (1992), as well as the more exhaustive (and exhausting) review of government reports (e.g. Industry Canada, 1994 for a key example in the Canadian context). The central point that many of the critical analysts of technology are quick to point out is that technology, tools and technics are *never* neutral. Indeed, critical discussions of technology implicate an entire range of psychological, social and political issues. Starr (1995) has put it this way:

> Because computers are simultaneously communication media and product, objects of analysis and infrastructure for analysis, intimate and formal, they form good occasions to study a variety of basic processes: the development of material culture, the formation of practice-based networks, the fallibility of language, the relationship between power and infrastructure. Where they model work processes and facilitate them, they are a mirror of those processes, as in systems and requirements analysis; where they simplify or reify informal and local understandings, they are a house of mirrors for both designers and users. (Star, 1995:6-7)

The two broad approaches can be broken into technocratic and critical-historical orientations. The first approach presents a cropped and fragmented historical analysis and fails to consider different standpoints in relation to technologies. The result is a massive reification of technologies, turning them into autonomous and active social element in themselves. From

this perspective, technologies appear as spontaneous discoveries and not expressions continuous with underlying sets of social relations. Often the technology is given a positive or neutral casting. Take for example, Attewell's position on computing and computer literacy in which he seeks to neutralize computer technology as separate from broader social and political relations.

> ... it is sad in some ways that computers have provided the occasion for such confrontation, because the discussion has subsequently become clouded. The focus on computing displaces and disguises what is in essence a dispute over values and political or educational philosophy. (Attewell, 1989:36-7)

As in Attewell, typically there is an attempt to separate technology on the one hand, from its uses and its inherently value-laden character on the other.

We should remember that in everyday life the roots of this less critical approach to technology depend on the type of intricate and expansive network of private media that weave, as Edwards (1995) puts it, "a dense and energetic fabric of signifying forms" which include,

> ...not only the fantastic high-tech futures of science fiction, but also the visions that guide public policy and science in a world of very-large-scale integrated circuits (Haraway, 1985). Computers were the enigmatic objects of profound hopes and hatreds even before their invention during the Second World War. They have always been as much symbols as practical devices: 'giant brains', standards of precision, signs of scientific values, evidence of omnipotence. Ideas about artificial intelligence, a networked society where computers instantaneously handle calculation, communication and control, and the view of the human brain as a biological computer are now commonplaces. We can make sense of the material roles of computers as tools only when we simultaneously grasp their roles as cultural metaphor. (Edwards, 1995:69)

More elaborate political economic formulations of this technocratic approach can be found, for example, in the work of Daniel Bell (1973). While technologies must be seen as both an expression of social relations as well as partial determinant of them, more often than not under this approach technology comes to take on a kind of autonomous, creative, deterministic role which in turn gives rise to exaggerated notions such as the modern "knowledge workers" (Bell, 1973) in the post-industrial age (further popularized in Naisbitt, 1982). Toffler's (1980) suggestion that technology *leads* societal change goes the final step

by reversing subject/object relations.[1] From here, hordes of writers take the obvious final step: the design of better strategies for human organizations to keep up with technology. This naturalizing approach to technology offers little, in terms of analytical means, with which to unwrap the alienating and oppressive nature of work and technology. It is this position which Noble and others directly refute in their mapping of the historical power relations of the computer age.

The critical-historical approach, on the other hand, focuses on social relations and the function that technologies serve in a given society. Technologies take on "values" in relation to the purposes to which we apply them and tend to have cemented in them a history of these social relations. While not particularly critical of technological development per se, Zuboff (1988), for example, outlines how in organizational contexts management preferences for technologies that allow work intensification and the shedding of labour first and foremost, play an important role in what forms of technologies get used and further developed. Writers critical of current political economic relations of technology such as Robins and Webster (1989), Cockshott and Cottrell (1993), Hakken (1993), and Lee (1997) offer attempts to analyse information technologies and computing in terms of the broader social context. One of the most relevant critical discussions of technology in terms of a social relational view is provided in Hacker (1991):

Hacker: You know that one definition by Marx that makes so much sense, that work could be an act of human freedom and expression of human creativity. Because work then sounds like play and it sounds like having block parties and it sounds like people getting together and enjoying - doesn't matter if they're building a house or damming a river, maybe. And *technology is the way we organize energy and materials to get work done.* I don't have a feeling that people [are advocating] "hands off" nature. But it's the "gentle touch" that would be more pleasurable, I think, for both.

Smith: I hadn't really thought of technology in that way before. I suppose technology has come to have a thoroughly bad name.

Hacker: Yeah, yeah.

Smith: So to see technology as it could be, as embedded in really human relations is kind of surprising. And as enhancing people's capacities to...

Hacker: To be playful!

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[1] It follows this direction that the computer was awarded Time magazine's person of the year at one point.

Smith: To be playful.
Hacker: Yeah, like firecrackers as opposed to gunpowder. (p.202)

Hacker provides a relevant definition of technology which I've highlighted. While She underplays the way historical social relations of a technology are, in effect, cemented in it through its history of design, we nonetheless see that specific technologies take on their meanings and subsequent effects in specific contexts and use.

The position I take builds from the Vygotskian notion of tool-mediation (Vygotsky, 1978) which is another form of the critical-historical approaches to technology. This notion of tool-mediation is expressed in the neo-Vygotskian literature by a variety of authors including Cole (e.g. 1996; Cole and Griffin, 1980), Engeström (1987) as well as Lave and Wenger (1991), but shows some similarity to the approach of Latour (1986; 1988; 1994) as well. Another critical theorist of technology, Mike Cooley, begins from grounded observation of design practice among engineers. Noting how this practice is inextricably linked to the social context in which it is situated, Cooley comments,

> It is therefore, obvious that the major contradiction can only be resolved when a change in the ownership of the means of production takes place. Much less obvious, however, is whether there exists a contradiction (non-antagonistic) between science and technology in their present form and the very essence of humanity. It is quite conceivable that our scientific methodology, and in particular our designing methodology, has been distorted by the social forces that give rise to its development. The question, therefore, must arise whether the problems of scientific development and technological change, which are primarily due to the nature of our class-divided society, can be solved solely by changing the economic base of that society... It must be of political concern to them to establish whether Western technology can be simply applied to a socialist society...(Cooley, 1982:74)

A critical tool-mediation approach provides a basis to understand how technologies (tool/artifacts of any kind) mediate ongoing contingencies of activity, and express historical relations of their production and usages.

> Tool mediation is a way of transmitting cultural knowledge. Tools and culturally developed ways of using tools shape the external activity of individuals and through the process of internalization influence the nature of mental processes (internal activity). The role of tools is not limited to transmission of operational aspects of human interaction with the world. As Latour (1993) emphasized, tools also shape the

> goals of the people who use the tools. There are implicit goals that usually are "built into" the tools by their developers [and the context of their development]... The values and goals intended by their developers can influence users who may not even be aware of these influences. This is obvious in the case of some computer games but might be true with respect to other kinds of applications, too; for example, the style of communication via e-mail can be influenced by the nature of this medium, or a database format can influence the way people differentiate between important and less important facts. (Kaptelin, 1996:53-54)

Other excellent critical research on technology, for example, can be found in the feminist approach of Cynthia Cockburn (1985; 1992). At the same time, tool-mediated approaches are no guarantee of a critical perspective toward technology. Writers such as Nardi (1996; and a variety of writers in her edited collection[2]), Bødker (1990), and Bannon (1991) operate explicitly from a "tool-mediated" perspective but provide only limited critical observations on how practices are situated in broad relations of social power and capital accumulation.

5.3 Common Sense and Perspectives on Computer Technology

In his Selections from the Prison Notebooks (1971) Gramsci defines common sense as "[that] incoherent set of generally held assumptions and beliefs common to any given society" (p.323). He goes on to indicate that,

> [this] does not mean that there are not truths in common sense. It means rather that common sense is an ambiguous, contradictory and multiform concept... (Gramsci 1971:423)

This research is concerned with working-class computer learning practices but must deal with more general issues of class-perspectives toward technologies which play a role in shaping the overall structure and meaning of activity (Leont'ev, 1978). The concept of common sense is particularly relevant to an understanding of people's dispositions toward computers.

The work of Hakken (1993) provides a useful starting point, in his study of working-class computer learning in England, for penetrating of the superficial, common-sensed veneer of computer learning activity from a specifically class-based perspective. Using open-ended interviewing and community ethnographies, Hakken outlines this specific form of working-class common sense. For example, women workers in a local adult education technology

[2]Indeed, Nardi (1996) in her introduction to this edited collection goes so far as to make her first acknowledgement in the production of the manuscript, not any people, but the Internet as a sentient being in itself.

program below explain specifically that their concern for technology springs from a concern for jobs, not getting left behind, as well as a sense of attraction to the "modern". These understandings compose a kind of contradictory but unified complex that, in fact, reflects the contradictory character of gendered, working-class life in capitalist society generally.

> I've just got one question. Will computers make people redundant?
>
> I can't take it all in [it's doing things]... and you can't see it doing any of those things. If only I could see t'bus going to there, and picking it up, and moving it. If you're younger, you accept things.
>
> Men seem to make out better with tech... women feel daft.
>
> Progress in one way is very good, but in another, not very nice when people don't have a job.
>
> I thought the computer had a brain... I saw it on television falling in love with the operator.
>
> We've got to do computers. You read it, that these are the jobs of the future... You either keep abreast or you get left behind. (all from Hakken, 1993:14-20)

Careful consideration of these quotes points to an interesting range of feelings and observations, that taken as a whole express the character of working people's desires and fears in their lives as men or women, old versus young people, consumers, job applicants and so on. Particularly pronounced is the fear of how technology will affect their working lives which is fuelled by partial mystifications and a lack of information. Hakken summarizes as follows:

> Indeed, computerization had become an important symbol, both of political doubt and of the kinds of change processes that must be dealt with for the doubt to be overcome. Politically as well as linguistically, the working class in Sheffield is of two minds about computerization. One mind-set sees it primarily as a threat, to be avoided where possible, if only by structuring personal consciousness. The other mind-set approaches computerization positively, as a new means to accomplish accepted goals. Often both mind-sets were held by the same person. (Hakken, 1993:23)

In my interview data we can see the same type of class relations interwoven in the discussion of a technology. Take for example, this range of quotes:

> That's progress. You can't stand in the way of progress, anyhow. (R6)
>
> Your whole life is going to revolve around computers... Computers Wow! Personally, I'd just as soon do without them but I know that they're coming. (R50)
>
> Technology you know to me it's a funny word. The future, they say the future is on technology, new technology for the future. They're trying to design new things, come up with new things I guess that's what technology is, inventing things. (R7)
>
> It's going to be it in the future. (R12)
>
> They run everything now, you have to have it, you know there is no way you can be in any type of technical business without one. You know it's into everything, every home, somehow your connected with it. (R19)

We see that many of the same themes that Hakken (1993) identifies emerge more or less directly from the context of the workplace and labour market. Within both sets of comments we see a persistent contradiction between a future that, while not necessarily preferred, is nevertheless described as inevitable. Contradictory elements of a class common sense emerge in their clearest form however when people begin to talk of concrete practices. This example provides a glimpse at the type of duality that exists in working-class perspectives on technology.

R: God, you can't live today and be computer illiterate, you're out in left-field if you don't have any knowledge. I don't really want to have to learn it but.
I: Do you use a computer at work then?
R: No I don't use one there. We don't really need one.
I: So will you buy a home computer then?
R: Probably not. (R38)

A contradictory "common sense" as Gramsci describes it should not be dismissed as some form of false consciousness. It is a reflection of contradictory positions in the cultural life and information flows in real communities and real workplaces in advanced capitalist society. Indeed, this common sense is actively produced in specific contexts particularly as people enter into ongoing relations in which they must sell their labour-power in order to live.

5.4 Working-Class Technological Common Sense Rooted in the Workplace, Labour Market and Home

Now let's briefly consider a more extended excerpt from the interview data where, again, we can more clearly see a point of transition from the dominant discourse of technological progress to the descriptions of the concrete lives of working people. This auto parts worker outlines a number of central points observed from his position in a batch-processing production system for a large trans-national corporation. At 35 he has been working at the plant for ten years, over which time he has seen various changes to machinery and work organization.

I: Would say that the technology in the workplace has made things better, worse, or hasn't changed things all that much?

R: I'd probably say for the better, it makes them stay competitive, it makes them competitive with other companies, because I think Ford and Chrysler like to see the new machines with the computer control, like CNC programme type machines brought into the plant, it takes away that human error.

I: Is there any down side to it that you can see?

R: Not that I can see. [lengthy pause] Well, I don't know if you've noticed the one line this week, they've just put in a new robot on the line, they have a new robot on the roll threader... like where I work there's one guy on the hollow mill, one guy on the threader, on the line one guy runs the hollow mill, and the robot takes it up and runs it on the threader, so they have one guy basically running two machines.... [and] the operators aren't doing, we're doing maybe minor adjustments, we're not doing any programming, basically they bring a job in, they proof it all out for a month or so, and set the programme up so basically it runs itself...

I: How would you define "technology"?

R: First thing that comes to mind is probably computers, computers and control, probably new ideas, advanced ideas type of thing, new ways of thinking maybe. Technology is changing things and I would say not just industry but the world in general, things are changing so fast these days now with the information highway they're talking about, things are changing so fast. And a lot of the newer machines seem to have glass enclosures, it seems just the machines they build now a days seem to be more thought out than years ago, with the way they made machines. Like on the valve linc oil used to be dripping from the ceiling because of all the oil in the air, or if you ever get a chance to walk by the big drill-press machine look above that.... I wouldn't say it's getting rid of the drudgery, and leaving us with more time, the company doesn't want to hear about that. They like to see the guys work all shift type of thing, they don't want to see you with more time on your hands in the plant. (R1)

What this worker's extended, open-ended description provides us is a kind of map of the

system of interests, relevancies and key contexts of experience from which working-class perspectives on computer technologies emerge. One way to understand the inter-weaving of dominant and subordinate standpoints operating within a working-class common sense on technology is to pay close attention to the syntactic use of the first person and the "we" as opposed to the "them" and "they" in accounts such as this. R1's opening line, for example, indicates how the "I" takes on the interests and concerns of "them," and how the CNC machines are granted active status in the sentence ("it takes away that human error") and his own actions are both objectified and denigrated (as "human error"). If we take seriously the connection between language, forms of discourse and consciousness, we should recognize the importance of managerial/worker relations in the formation of perspectives on computers. In this case, we can see that positive notions of technological progress are interwoven with less positive observations as comments turn to specific concrete arrangements, job descriptions and software programming on the shopfloor.

We've already seen that a working-class perspective on computer technology seems to include reflections on one's position in the labour market as a wage-earner. However, the degree to which these comments reflect a necessary linkage between this position in a labour market and forms of computer learning is expressed more clearly by this custodial worker. Working for an employer who is actively engaging in a process of contracting out services to outside providers (non-unionized for lower wages, benefits, etc.), this woman talks of another "world" of secure employment, better paying work and the connection of this world to computer technology.

> There are some layoffs coming and that, you know. So I'm on the list, what happens to me when there is a layoff coming up and so where do I go? And when you're on your own and you have three kids to support, so, two now but, you know, where do you go if you don't have your education or you don't pick up something? And by just staying there and learning housekeeping stuff like cleaning, you're not learning anything else unless you go out and learn computer, or learn how the other world is running, you know, unless you get yourself involved in something outside the workplace. (R3)

Or, consider this auto parts worker who, having worked for the company for 17 years, despite having successfully completed highschool and a portion of a college diploma, makes a fairly

straight-forward connection between his employment situation and his knowledge of computers. Interestingly, as you will see later, this same worker outlines the narrow simplicity of workplace technologies, and the ease with which one can quickly master them.

> I feel if I don't get some kind of knowledge of it I'm going to be handicapped like not being able to write. That's like the thing, if I don't figure out how to work this I'm going to be sitting there and not know what to do and everyone else is just going by. Can't move on, you know you're stuck in one spot. (R19)

Beyond the apparent contradictions, these are not merely casual comments but one's charged with strong emotions. As I was to find out in the course of this research, computer technology, almost across the board, actually provides the means for many workers to discuss some of the deepest fears, hopes and desires for their lives and the lives of their family. Indeed, these concerns extend particularly to the household where young children are involved. Here an auto assembly worker uses some humour to draw a virtual straight-line connection between computer literacy, a declining manufacturing base in the context of free-trade agreements, and the needs of their children.

I: Do you think kids should be learning more about computers in school?
R: Yes! Definitely, because that's where the future's going to be.
I: How so?
R: Well, as far as manual labour, manual labour's gonna be Mexico. 'Manuel Labour' is gonna be Mexico. [laughter]... Anyways. No, the technology of today are gonna be doin' away with manual labour. Instead, they're gonna go all high tech. You're gonna be able to do everything from the computer. That's where the future's going to... I know one of the guys in our department actually, he's dead, dead, dead broke but he's got a good computer system because it's good for the kids. (R5)

One source of Ontario-based, large-scale survey research that can provide additional insight into the set of beliefs and perspectives highlighted above comes from a massive study conducted in the early 1990's by a national trade union. The Communications, Energy and Paperworkers Union of Canada's Technology Adjustment Research Programme project (Garcia-Orgales, 1992) carried out an extensive survey of 1,068 of its members, and issues of computerization and technological change were seen to be central to feelings of insecurity in terms of personal employment, uncertainty around the viability of the workplace. Over 75%

of respondents claimed to "feel insecure about the future of the firm or plant".[3] In this context, computer-based learning was selected as the most important current and future interest. A theory of computer learning, particularly one aimed at seeking to understand class relations, that does not grasp this general level of motive and the shaping effect it has on ongoing practices cannot, in turn, grasp even the most elementary notions of differential learning opportunities, perspectives, and modes of participation.

5.5 The Active Production of a Working-Class Technological Common Sense in Everyday Practice

As we saw in the previous section, notions of "inevitability" and "progress" are important elements of the dominant discourse and technocratic theoretical approaches to computer technology. I've begun to argue that these elements are interwoven with more concrete and contradictory everyday life-experiences in the perspectives and dispositions of working-class people and produce a general *working-class technological common sense*. Contradictory elements of this common sense include the fact that although computers apparently created wealth and were good for society generally, technological change often accompanied job loss, created new hazards, and increased the level of boredom and alienation in the workplace. Furthermore, that knowledge and skills in computers which are actually necessary for manufacturing work (thought to be the means by which one find and keeps a job) were, in fact, relatively simple to acquire.

One of the most important ways that this common sense was expressed in actual practical activity was in the learning activities associated with family life. Not all the views of respondents were doom and gloom, but instead displayed a kind of pragmatic acceptance and quiet resilience in the face of social forces seemingly beyond their scope of influence. While some workers viewed the computer revolution as an opportunity for class mobility, most viewed computer learning as associated with a necessary means of achieving some level of basic economic stability. Both perspectives led to the extension of computer-based

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[3] Indeed the vast majority of these rank-and-file workers cited international trade policies such as the North American Free Trade agreement as central to this insecurity. This further accentuates the degree to which political economic factors play an important role in the everyday consciousness and framing of activities. This general finding, as we'll see, is closely linked with, among other activities, an interest in computer learning.

activities to children in the home.

We've seen the organization of the logic, assumptions, central concerns, and standpoints from which these perspectives emerge. However, this excerpt provides an important iteration of how the dominant perspectives on technology are infused into working-class technological common sense actively through the employer and mass media. Sitting down in the basement of the home of this auto parts worker (R1 in excerpt below)and his partner (R2 in excerpt; who works part-time for the post-office sorting mail) the conversation focussed on how people get the information they have about computers. The excerpt begins when the partner mentions a guest speaker his company had brought into the auto parts plant to speak to the workers about technology.

R2: [to R] Who's that Mr. Smith at work, that you saw with Company and he had these cards and he said/

R1: OH, Dr. Jones? Oh, God! Alright. He's from Toronto, okay? This guy is - calls himself a cyborg, alright? Okay? He was a guest speaker at the Company's quarterly report [for the employees]. And he's got artificial lenses in his eyes; he's got a valve in his heart; he's got a knee replacement; he's got a hip replacement. Oh, he had 3 or 4 other things.

I: Little, like [a robot]/

R1: Yeah. That's why he called himself a cyborg, okay? And he, his thinking was if you have a computer and you don't have a modem, okay, it's only a piece of junk sittin' in the corner because of the vastness of knowledge that's capable out there now. Every computer should be on the modem. Every kid should know how to use a modem - and he was talkin' to kids. He says, "You adults", he says, "You eh"

I: You're already into that.

R1: If you want to learn more, you will learn, but children need it now. That's when to start 'em on it. Like just for..

I: Okay. So this, how long ago was this that you heard this guy [Dr. Jones] talk? Did he talk to the - did you read about it, or did you talk to him, or did you see him present/

R1: Oh, we had a quarterly meeting where he/

R2: He was there first as a/

R1: He was there in person, and he was a guest speaker.

I: Oh, so all employees?

R1: Yeah.

I: And, what - did that have an effect on you gettin' even deeper into it [computers], or more/

R1: Yeah. About different things and stuff like that, about the technology of it, eh?....

R2: Well, even that TV advertisement, Candice Bergen, she puts the thing in, call an

> accountant. And it's an automatic thing and it goes right through to an accountant because from the voice and it just goes to the thing and just dials without her having to punch in the number or remember the number... That's technology! (R4a/b)

Together, these people outline the kind of resources, experiences and contexts on which working-class perspectives on technology are typically based. The important point to understand, however, is that these specific "resources and contexts" are actively created and emerge directly from a market logic and attempts at greater control over workers in the labour process and beyond by corporate interests both in the manufacturing plant and within mass media. We also see a process of conflation in which a variety of forms of "technology" (i.e. what is new, what is the latest, what is mysterious) are brought together under a more general notion and orientation towards things "technological". Specific to the quote above, on the one hand, we see active attempts of the company to educate workers (and their children) in how to think about and to engage with computer technologies; and, on the other hand, we see the powerful role played by commercial media. Both types of influence over a working-class technological common sense were quite common among interviewees in this research.

This form of cultural domination, despite the vast resources that support it, is not absolute. Working people engage in concrete activities which undercut many of the dominant assumptions, as one women worker put it, "a computer will not fix your sink" (R41), to form the kind of contradictory mix of information and beliefs which Gramsci suggests in his original definition of common sense perspectives. These breaks from the dominant discourse are rooted in the mundane, taken-for-granted experiences of everyday life.[4] A more sustained discussion of a type of alternative viewpoint can be found in this excerpt from an interview with another auto parts worker (R1 in excerpt below) and his

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[4] Dominant discourses are *not*, it must be emphasized, somehow separate from actual, everyday activity but are also achieved practically. The difference between the two types of practices lies in the extent that activities are integrated with more general sets of social relations. Dominant discourses are integrated and thus help to integrate the practices (which correspond with their logic) into a network of extra-local social (e.g. market) relations. Breaks from dominant discourses and the social practices with which they correspond are less integrated with more general sets of social relations beyond localities such as the home, the neighbourhood or the industrial workplace for example. Though they may, in fact, be essential for the achievement of these "dominant networks," nevertheless as they do not find point of articulation in a shared "public sphere" (Negt and Kluge, 1993) they tend to become "taken-for-granted" and invisible, even to the participant.

partner (R2 in excerpt below). It begins with an explanation of the difficulties of industrial wage-labour, and ends, to my mind *triumphantly*, with a claim that re-centres the object of social life in community relations. Again, we see a process in which people actively engage with a dominant discourse and, in the course of this engagement, actually reveal the contradictory nature of this discourse by drawing on their own class standpoint in practice. The excerpt begins with a comment the auto parts worker makes in response to the types of technological changes occurring in his plant.

R1: I gotta sort of be a little realistic too, how long is my bullshit job going to stay there? It's hard to say how long before they push that work out into a different company someplace.

R2: People have been saying for years that they're going to have robots doing the, making cars and that, and everybody else is going to be standing on the street, nobody going to buy the cars because the robots aren't getting paid okay, well that's technology. It's hard on people, you can talk about it anyway you want, but that's been said for thirty years now, you know, and it's just getting worse and worse, and worse. I don't understand a lot of things, like even this whole country. Imagine, like these people from the Prime Minister right on down, every politician was brought up, well I would say almost everyone of them was brought up in a well-to-do family, and they've never known what it's like to scrounge. They haven't a clue how the rest of us are living. What the hell do I want to be on the, the cyber-net for, or whatever the hell you want to call it. I want to get out of my house get into my little truck and go to the grocery store, and the hardware store and the drug store and all this garbage and I want to say hi to people. I do! (R17a/b)

This excerpt outlines a whole array of class-relations that undergird virtually every discussion of technology contained in these interview data. These discussions provide a platform from which to investigate a whole social world, life trajectories, origins, desires for stable community life and so on, figured in their specific class forms.

5.6 Summary

This basic presentation of data sketched in some detail the character of the background knowledge, experiences and concerns that working people find inextricably bound to notions of computer technology and computer-based activity. As neo-Vygotskians have argued, the background motives and goals of activity systems are inseparable dimensions of any specific learning practice. This portrait of a working-class technological common sense, itself a relatively unselfconsciously learned body of content-centred

dispositions, is essential to the understanding of the practices we explore in the remaining chapters.

I began this chapter with a discussion of both the current "technological revolution" and the economic restructuring in Canada and North America. I proceeded to situated the emergence of computer technology with a brief historical look at its origins in the military-industrial complex. This discussion culminated in an outline of basic approaches to technology which situated the neo-Vygotskian "tool-mediated" approach as having the potential to integrate broad, critical, historical perspectives on technology with social relational analyses of ongoing learning practices.

I discussed these working-class technological perspectives using Gramsci's notion of a contradictory "common sense". The analysis of respondents' perspectives on technologies and their reasons for entering into computer learning presented above illustrate the dimensions of a "working-class technological common sense". This common sense was a complex weave of dominant discourses which were actively produced in both the mass media and the workplace, and anxieties about computer technologies rooted in ongoing experiences of working-class life. The experiences that gave rise to this common sense were not idiosyncratic, but were continuous with the logic of capital accumulation and labour processes.

This chapter provides a grounded resource with which to understand the concept of working-class learning habitus in relation to computer technology, but also suggests a way of understanding what neo-Vygotskians call the goals and motive-structure of activity systems. While I'll continue to add detail to the conception of computer learning habitus as I proceed with analyses in following chapters, from this chapter we learn specific information about people's general disposition toward computer learning (as contradictory and compelling) and how it is rooted in their participation in a number of key spheres of activity.

It was in reflection on actual practice that people's oppositional perspectives were elaborated. This complex of issues, perspectives and experiences all contributed to the interviewees' shared sense of computer technology as a particular type of challenge and as a, more or less, essential interest for those wishing to establish secure employment (either for

themselves or for their children's future participation in the labour market). The experience of wage-labour, one of the most basic sources of a working-class habitus, provides a particular type of introduction to and interest in technology for respondents.

Chapter 6
Social Relational Approaches to Learning in Interaction Analysis: Two Case Studies of Computer Learning

Neo-Vygotskian scholarship offers a type of middle-range theory. It is a not a paradigmatic theory, but one which ideally should articulate with other conceptual and methodological tools to fully realize its considerable potential. I've already suggested a need to discuss the concepts of "frames", "keying" and "habitus" in order to make explicit the dialectic of structure and agency within computer learning practices in the everyday, but in this chapter I offer a grounded micro-analysis which helps provide important background knowledge for understanding the types of tacit, tool-mediated, and social processes that are largely assumed in discussions of learning. The presumption I make with this chapter is that learning practice must not only be macro-contextualized, but micro-contextualized as well in order to be fully understood.

This chapter involves two case studies. The first one focuses on how people interact with each other and computer-artifacts in the course of computer learning. Ironically, while I've made much of the formal-learning and pedagogical tendencies of dominant theories of learning, in the first case study I analyse a video recording of two workers learning in a Labour Education Centre computer lab. Despite taking place in this specific institutional setting, the study focuses primarily on periods of relatively independent, self-directed work and provides several important general insights into how people learn computers together. In general terms we see, in "real-time", moment-by-moment rather than retrospectively described, how learning understood as a social relational concept is actively accomplishment, and how conventional notions of expert/novice or pedagogical relations are not definitive of a learning process. Such simple features of this physical landscape as access/control over the keyboard/mouse, viewability of the screen, the arrangement and movement of chairs, computer tables, and the positioning of people's bodies are all elements of the sequentially organized, tool-mediated orchestration.

The second case study deals with the work-based learning process, hardware, software and the organizational contexts of computing. It provides a view of the structuring of

ongoing practice in which the worker is an active agent yet situated in an institutional context that does not actually encourage learning. I briefly trace the political economic dimensions of this structuring affect. Capitalist accumulation and labour processes can be seen to directly shape opportunities and modes of participation with co-workers and the hardware/software itself. Workers struggle to (and often do) achieve local goals (*both* those of the workplace and their own) in the face of largely extra-local imperatives of capitalist accumulation within a large trans-national corporation. While not a manufacturing setting, this case study provides a detailed example of how software and organizational contexts do affect the way that computer learning is accomplished in the course of micro-interaction, and demonstrates the importance of tool and organizational mediation.

I make use of EM/CA traditions and the neo-Vygotskian analysis of "tool-mediated" practice, and both parts of this chapter owe an important debt to Suchman's Plans and Situated Actions: The Problem of Human/Machine Communication (1987). This piece of work offers an important starting point for my analysis, particularly its clarity and grounded analysis of actual computer-mediated interaction which so often can degenerate (much more than, say, pencil-mediated interaction) into mystified accounts. Suchman takes a critical look at Artificial Intelligence (AI) research seeking to demonstrate how the human-technology interface is an ongoing, moment-by-moment production. In so doing she offers an excellent example of the constitution of technology in activity and the possibility for radically new assessments of computer expertise and learning as locally accomplished participation.

> ...consider "communication" between a person and a machine in terms of the nature of their respective situations.... In the case considered here, we can assume that the situation of the user comprises pre-conceptions about the nature of the machine and the operations required to use it, combined with moment by moment interpretations of evidence found in and through the actual course of its use. The situation of the machine or expert help system, in contrast, is constituted by a plan for the use of the machine, written by the designer and implemented as the program that determines the machine's behaviour, and sensors that register changes to the machine's state, including some changes produced by the user's actions." (Suchman, 1987:118-19)

Suchman's work, though now over a decade old, has cleared fresh space for an understanding of computer-mediated interaction in which the technology is subject to specific

institutionalized macro-forces.

> A primary objective of such systems is to infer the user's knowledge and misconceptions about the system by observing her actions, rather than relying on either error conditions or explicit requests for help. To appreciate the requirements of this objective, one has simply to imagine those occasions where an expert, watching a novice engaged in some activity, would be moved to intercede. (Suchman, 1987:181)

As benign as such interaction may sound, and indeed may appear when considering the use of either personal computer, photocopier expert help systems and so on - the analysis nonetheless produces openings for an understanding of the troublesome character of computer-mediated interaction and the role of power-relations *in situ*. Suchman affirms at the level of locally contingent interaction,

> ... as long as machine actions are determined by stipulated conditions, machine interaction with the world, and with people in particular, will be limited to the intentions of designers and their ability to anticipate and constrain the user's actions. (Suchman, 1987:189)

Locally produced activity is nonetheless subject to extra-local systems of activity (in this case software design; the interests of capital, etc.). These kind of considerations inform the type of neo-Vygotskian goal and motive-structure which I refer to throughout this research, and were an aided me in my ability to more fully understand exactly how it is that activity is produced and reproduced. "[I]ntentions of designers", or the "requirements of the objective" all point to extra-local relations that reach into the specific local settings and micro-interaction to play an important role in the reproduction of computer-mediated activity. If, as neo-Vygotskians argue, learning is defined by changing patterns of participation in activity, CA and micro-interactional analyses with their ability to explicate a variety of tacit practices and "subordinate tracks" (Goffman, 1974) of the interaction order can make an important contribution toward a deeper understanding of how learning is both actively achieved and structured.

6.1 PART 1: A Micro-Analytic Approach to Computer Learning at a Labour Education Centre

In this case study, I draw on a CA approach to explore the concept of computer learning. I specifically want to show how, firstly, learning must be understood as a

collective, moment-by-moment accomplishment limited or enabled predominantly by social procedures (rather than internalized, individualistic, cognitive ones) and a specific social-historical context (rather than a universalized one). Indeed, ethnomethodologist Carolyn Baker comments that EM/CA cannot typically deal with learning understood in conventional terms.

> "Learning" as conventionally used is, I think, a gloss for a lot of invisible and inaudible processes, so there is not much that EM/CA can say about that.[1]

Following this basic EM/CA orientation I appeal only to those warranted 'facts' recoverable directly from the data as they are also items which are available, moment-by-moment, to the participants themselves. Observable actions that can be seen to be sequentially organized are important for this type of micro-analysis. Heritage explains,

> [T]he task of theory will not be to determine what some set of social circumstances and events consist of in advance of the actors' actions, and then to evaluate and explain the latter in terms of their rational and/or normatively determined characteristics. Rather it will be to directly analyse the construction and recognition of these circumstances and events as they are played out 'frame by frame' through the actors' actions. Second, the construction and recognition of developing events by actors will, in some way, be 'methodical' if only because human action is, in general, intelligible and orderly. The task is possible because the order is there. (Heritage, 1984:36)

The social structure of activity is the participants' own accomplishment together. Focussing strictly on that information which is available to participants is an important starting point in an effort to problematise explanations of learning that rely on internalized and individualized cognition. Problematising these explanations is, in turn, a means to broaden how we think of learning so that issues of tacit processes and social differentiation in everyday practice can be more fully understood.

Though I do comment on the semantic and syntactic organization of interaction, I focus primarily on sequential analysis of the interaction between two worker/learners: "Larry" and "Roger". My analysis focuses on features that may be unique to, on the one hand, a conception of learning in the everyday, and, on the other, the specifically computer-

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[1]Personal correspondence, April 19th, 1998.

mediated dimensions of this learning. The analysis in this case study revolves around a transcript of interaction made from these worker's participation together in a computer lab run by a Labour Education Centre in Toronto, Canada. For the purposes of accessibility for an non-CA audience I've simplified the transcript considerably.[2] I've left out the detailed timing of silences, not indicated the production of inflections in speech, not signalled overlapping speech, and omitted a variety of other items important for the coordination of activity often included in traditional CA transcripts. In place of these, I've substituted my own commentary on body movements, pause-length, gaze-direction and so on.

Before proceeding however I want to briefly note some general features of the CA approach. CA requires careful attention to the minutiae of communicative interaction. As such, the substantive content is *not* the object of analysis. Rather, semantic and syntactic analysis, under this approach, only become relevant in the context of the social negotiation and sequencing. As CA theorist Moerman says, "For studying conversation per se, dull materials are best" (1988:68), and in these terms this transcript is of high quality.

This scene was not a typical classroom setting that one might find in formal schooling. As the facilitator in the session explained, at the Education Centre the belief was that workers are willing and able to organize and carry out much of their own learning. "Less traditionally structured classes"[3] and a respect for the self-directed adult learner were the watch-words for pedagogical practice at the Centre. Practically speaking, this meant that after a brief presentation to the participants, students worked on their own to make their way through a basic list of the particular computer software functions. Thus after the initial presentation, students were left to spontaneously form into informal groups and discuss issues of mutual interest as they learned.

The transcript itself (Figure 6.1) accounts for approximately 40 speaker changes. As sizable as that is for a CA analysis - even more unusual is that it accounts for a duration of interaction that runs approximately 30 minutes. My use of such an extended period suggests

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[2]I've generally followed the basic guidelines which Psathas and Anderson (1990) have established regarding CA transcript preparation.

[3]Interview with the instructor.

(and argues) that this 30 minute stretch is (more or less) a single segment of interaction/conversation.

Figure 6.1: Computer Learning Transcript

```
1     R:    [looking at L's screen then turning body to L's computer]
2           Uhhh, excuse me Paul.
3     L:    What's that?
4     R:    Could you tell me how can I go to the, uhhh, merging.  To
5           merge one? [pointing to his screen; L looking away from
6           his screen to R's]
7     L:    You finished the typing right?
8     R:    Yeah [pause] Should I go to the 'tools' [moving mouse
9           pointer to menu; pull down menu]
10    L:    That's a good one.
11    R:    Then go to merge? [moving through menu highlighting
12          selection]
13    L:    [pointing to R's screen] Why don't you go straight to
14          merge, [R highlighting a 'non-merge' option] nnnnn,
15    L:    Why don't you try that merge there. I'd try that,
16          [pointing to R's screen; R highlighting 'merge' option]
17          yeah merge/
18    R:    Merge. yeah [R clicking on merge selection; R's computer
19          jumps to new screen]
20    L:    Let's see what happens.
21    R:    There?
22    L:    Yep
23    R:    And click on the thing?
24    L:    Yeah click on that yeah, then it's going to get merge
25          one, yeah, you highlight it
26    R:    The one [R's screen changes]
27    L:    The second one, okay, then select [pause] and nowwww
28          [pause] now what?
29    R:    Did it merge it?
30    L:    No, uhhhh
31    R:    Try this and trying to merge it? [pointing to R's screen]
32    L:    Is it done?  I don't think so.  Didn't do the stuff
33          putting one and two together?  Oh I'm not sure/ [turning
34          to face/shoulders to his own screen] Shhhh(it), Wow
35    R:    But is not the correct way?
36    L:    What's that? [turning to R]
37    R:    It's not correct?
38    L:    This is not the right way? [L turns to look for
39          facilitator]
40    R:    Yeah [pause]  Third, third [L turns to face R's screen]
41    L:    [turns to look for the facilitator] Joe, we're kind of
42          stuck here eh?
43          [Joe is busy with others, looks at them and waves 'in a
44          moment', long pause each look back their screens.  both
45          R and L start to work on their own computers; R checking
46          through menus, L typing at keyboard; later R begins to
47          type as well]
```

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48    L:    You got somewhere yet? [no initiation by R, L still
49          looking at his own screen however]
50    R:    No, not yet. [long pause, each begin working at their own
51          screens; L seeming to have problems and searching menu
52          items] [pause]
53          [L turns head/body towards R's screen and slides his
54          chair toward R while beginning to speak]
55    L:    So you get it.
56    R:    Yeah
57    L:    So okay you, uh, after you uh finish typing did you find
58          out what to do?
59    R:    Not yet.
60    L:    [L doing 'looking frustrated', rubbing his face; both R
61          and L turn to look at L's screen; L folds his arms] You
62          know.  It's the same process we did yesterday when we
63          were [inaudible].
64    R:    I think you should go toooooo
65    L:    Tools?
66    R:    Uh
67    L:    You think so?  I don't remember.  What did you do
68          yesterday? [full pause] Tools, so what?
69    R:    [moving mouse pointer to menu, highlighting 'merge'
70          command] Merge?
71    L:    /Merge.  You think so?  What about this?  Insert
72          [inaudible].
73    R:    Find [inaudible].
74    L:    Think so? [long pause, each working at own screen]
75    R:    No [inaudible], repeat.
76    L:    Yeah. [long pause, each working at own screen; L gets up
77          walks across room to look at another student's screen and
78          initiates a conversation]
```

As I argue below, the data warrants this characterization (as a single strip of activity) for a number of reasons. First, there is obviously a continuity of topic that is both typical of a single segment of interaction and often seen in educational settings.[4] The participants, true to the purpose and given structure of the computer lab are focussed on a particular "business-at-hand" (Boden and Zimmerman, 1993): figuring out the 'merge' function of a word-processing software. Of course, as a preliminary justification, this in itself doesn't establish much in regards to "learning" as people can continue conversations about a single topic while still being seen to be engaged in separate interactions (days, weeks, etc. apart). Second however, I argue that there is in fact only *one* legitimate 'opening' sequence (a summons-answer or 'pre-

[4] I say "education" is only a very good possibility here because, while other contextual, sequential, syntactic features suggest the interaction as understandable as "educational" - I could imagine other institutional settings such as work which would also work to fix or maintain a continuity of topic. Indeed, Zimmerman and Boden (1993) discuss briefly this notion of "monotopical" interactions (p.15) in a similar way.

question' adjacency pair, lines 1-3) which occurs.

The discussion below centres around analysing and making explicit the tacit dimensions of computer learning in the everyday. I make explicit how "learning in the everyday" is distinguishable from both formalized, conventional pedagogy such as that described in McHoul (1978) and Sinclair and Coulthard (1975) on the one hand, and "informal conversation" as first outlined in Sacks, Schegloff and Jefferson (1974; Sacks and Schegloff, 1974) on the other. Individual modes of participation shift (i.e. there is movement from a peripheral to a fuller tool-mediated participation), but this changing participation is largely a collective achievement without the pedagogical structuring of institutional relations[5]. To argue this convincingly, I need to demonstrate that Larry and Roger accomplish a kind of topic continuity which is very different from the topic fitting, and topic changes associated with "conversation". At the same time, I suggest how a sustained orientation to a specific form of "practice" (i.e. knowledge/skill form) represents a relationship to fuller participation in the activity system. Secondly, and this is particularly important in undermining conventional notions of learning as simply information processing in the context of expert/novice relationships, I need to demonstrate that unlike turn-taking in formal classroom settings (McHoul, 1978), control over the interaction does not reside predominantly in the hands of one participant but changes over the course of the interaction. The analysis I offer details the tacit interactional machinery that are the true "bricks and mortar" of both self-conscious and un-self-conscious learning.

6.2 Openings and Closings or Suspensions and Re-engagements

An "opening" as understood by CA researchers is a sequence that sets in motion a particular frame of activity. This frame of activity can obviously take many particular forms from those specific to emergency call-taking or asking for directions, to those peculiar to making a phone-call to a close friend. In each case, basic formats of opening/closing are observable. The openings in this computer learning frame can be seen to have features which

[5]It has, of course, been pointed out to me that there is a figural presence of the "pedagogue" in this strip of interaction. Larry and Roger can even, at one point, be seen to interrupt their orchestration and make a pitch for help from the expert. My focus, however, is on the machinery of interaction and turn-taking that does not involve the facilitator, but is a focussed tool-mediated effort by Larry and Roger themselves to build their knowledge.

centre around an easily recognizable, formalized, initial opening and less standard subsequent ones which I argue are, in fact, not "openings" at all, but rather re-engagement after periods of "suspension".[6] The following is a line by line introductory examination of some of these features as they are available in the transcript of interaction itself (figure 6.1).

(the 'typical' opening sequence)

Lines 1-2: Roger performs an opening/summons-answer speech act (first pair part (FPP) of an adjacency-pair (AP))

Line 3: Larry responds (second pair part (SPP) of AP)

(attempted 'closing'/suspension by Larry)

Lines 33-34: Larry provides an informative ("Oh, I'm not sure") in conjunction with a head and shoulder turn towards his own screen - which acts as a pre-closing/suspension which then ends in an attempt at a closing/suspension where Larry lowers his voice (saying "Shhh[it], Wow") as if talking to himself (only) while appearing to be very engaged in the content of his screen.

(some troubles with failed closing/suspension)

Line 35: Either unaware or unwilling to accept the closing attempt, Roger initiates another FPP and with this we see that Roger closing/suspension was unsuccessful. At the same time however, while we can (as I've suggested) impute that Larry's actions in Lines 33-34 were an attempt at closing/suspension - this is *not* a EM/CA style claim (but rather a traditional interpretive analysis). Rather, EM/CA in this situation awaits confirmation through an analysis of what sequentially follows.

Line 36: This line provides a strong warrant now for the suggestion of a (failed) attempt at a closing/suspension on lines 33-34 as Larry responds to Rogers FPP (line 36) in the same manner as in the very first opening AP sequence (lines 1-3). Larry uses a SPP to an opening sequence because he (mistakenly) believed himself to have closed or suspended the interaction.

Lines 38-39: Upon seeing that his closing/suspension has failed, Larry attempts to reiterate

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[6]Concise explanations of the differences are important for the analysis. Building from the survey of CA concepts carried out in Nofsinger (1991), briefly, the general term used in traditional CA is "silences" but not all silences as placement largely determines meaning. Other specifications are made as follows:

Lapse: at transition relevant place (TRP), i.e. where there would normally be a speaker change, no one talks.

Gaps: at a TRP usually brief, 1 second or less, space before a speaker self-selects. It is important though that the gap is not related to any person (because it is when no one has been selected as the next speaker).

Pause: a silence when no one speaks at a TRP and the speaker elects to continue, or when someone is just distracted not at a TRP, or when a selected speaker takes a moment to respond, i.e.

> As participants, we often treat pauses differently from gaps. We may attribute uncertainty or impending disagreement... to a selected next speaker's pause, for example, when we would not make such attributions to a speaker self-selecting after a gap. (Sacks et al. 1978:10)

his closing in two recognizable ways here: 1) with an insertion sequence of his own (a FFP/question as opposed to a response which would normally be expected in a question-answer AP); and 2) by physically turning to look for the facilitator signalling his rejection of Rogers FFP/question on line 35 and 37. In addition, Roger in fact relinquishes his attempts at initiating a question/answer AP by providing the SPP of Larry's "insertion"-question (on line 38). Roger, in need of help, completes Larry's FPP (insertion-question) from line 38; provides a substantial pause signalling transition-relevance, shakily repeats "Third, third" finally capturing a gestural response from Larry (with a turn of his head). Larry's calling over of the facilitator "Joe" is also an important part of Larry's attempt to successfully suspend/close the interaction. It is worthwhile noting here that, at this point, we cannot be sure whether this is a true "closing" or merely some sort of "suspension" of ongoing interaction. We still cannot recover from the data whether Larry wants to end the conversation completely or merely suspend it somewhat until they have better equipped to handle the problem.

Line 41-42: In a final effort to succeed in closing/suspending. Larry looks for the facilitator once again, calling out "we're kind of stuck here eh?" This is in fact our first clue that Larry is not wanting to truly close the interaction but perhaps merely suspend it. While it is still possible that Larry is merely being polite and truly intends to end the conversation - the use of "we're" is very suggestive that, in fact, the engagement with Roger will remain relevant.

Beyond the basic analysis of the machinery of learning-interaction, it is useful to note that Larry seems to have to work quite hard at trying to suspend interaction, but that even at the height of his resistance to Roger's insistence (and/or lack of awareness) in maintaining the interaction (which included his fairly dramatic body posturing and a turn away from Roger at line 34) - Larry demonstrates some collaborative inclinations (the head turn on line 40; the selection of "we" on line 41). At this point however, it may be a little premature to characterize Larry's 'graciousness' as a collaborative inclination as it could just as well be old-fashion politeness. In any case, after a snappy beginning (lines 1-27), a failed initial attempt to help (lines 28-33), and concentrated attempt at some sort of suspension of interaction (lines 34-47) - the strip of interaction seems to have been put on hold.

After this segment, both learners focus their attentions on typing up full texts on which to actually use the merge function (lines 44-47) suspending interaction (lines 53-54) for approximately seven and half minutes. If one of the key discussions in this part of the chapter is whether or not the major silences or lapses represent *closed out* interaction or

merely *suspensions* of a type of extended process of participation/learning in the everyday then, ironically, some weak support for the latter might be Roger's relative inattention to Larry's closing attempts. Under a conventional CA approach, we have no way of recovering Roger and Larry's intentions or expectations directly from the data as a matter of "real-time" sequential accomplishment[7], however we might expect that if Larry and Roger were typically involved in interactions with extended periods of (ambiguous) suspension that getting one's attempt at suspension adhered to by others would be more difficult to do (i.e. it would be taken less seriously). If the mode of interaction we are encountering is full of stops and starts, extended silences, and what would otherwise be understood as lapses or discontinuations, then closing under these conditions, short of exiting the room, might be expected to be a somewhat unusual and/or difficult accomplishment. One might expect that in light of ambiguity more than typical signalling might be required, and this is indeed what may be happening. Further below I suggest another factor that may figure into this level of difficulty (which relates to the nature of the computer/artifact and material context), but at any rate, here is yet another, albeit tenuous warrant, for suggesting that this interaction may be seen as continuous strip of action though containing stops and starts or suspensions.

After approximately 7 and half minutes, Larry stops his typing and can be seen in the video data to begin using his mouse to check pull-down menus, at which time he attempts a sort of "re-engagement" with Roger. Importantly, there is *no* opening/summons-acknowledge sequence (such as the one Roger performed in the opening lines of the transcript).

("re-opening")

Lines 48-49: Larry, having completed his own typing work, now initiates an AP/question, but *without* turning his head or shoulders. There is no opening/summons such as on lines 1-3. This fact is further confirmed by Roger's substantive answer

[7]It does us no good when we are trying to understand matters of sequential, socially contingent interaction as a moment-by-moment accomplishment to simply ask Larry or Roger their intentions after the fact. After the fact, they would have access to information which in the course of interaction might not have been available to them (sequentially) at the time. In addition, as I've indicated my interest is in a fine-grained analysis, and although we produce the type of micro-order, what Goffman called an interaction order, in skilled ways each and everyday we are typically unconscious of "how" we do it. In this second sense, it does us no good to simply ask Larry or Roger about their intentions in issues of nuanced interaction. Finally, as I noted in chapter two, there is the tendency to use canonical descriptions (pat narratives) of events that tends to structure accounts discursively.

(line 50) rather than mere acknowledgment of Larry's summons, answer.

Line 53-54: Larry, having experienced some serious problems trying to merge his type-written materials (lines 51-52), now must obtain serious verbal and visual information and decides to turns head, shoulder, and chair towards Roger and his work space.

After the longest silence (7:42 minutes) of the 30 minute sequence - Larry merely picks up with the FPP of a question-answer sequence (albeit a fairly general one). Indeed, Larry even fails to orient his line of sight, shoulders or body towards Roger initially. Thus in combination with these observations and the focussed topic continuity (i.e. the merge function), I suggest that the closings are, in fact, "suspensions" and that the "openings" (other than the initial one) are not real openings at all, but something I'll call "re-engagements".

6.3 Issues of Computer-Mediated Learning and Silences

Beside being a feature of this informal learning process, I think it can be said that a good part of the ambiguities arising around the issue of silences, lapses, suspensions are due to the nature of computer-artifact in context. Both during these lengthy silences and within the course of interaction, the computer (with its designed attributes) can be seen to play a significant role which, to a degree, modifies the interaction. Lengthy silences (which account for the time during suspended interaction) are filled with various 'merge'-related computer activities in which Larry and Roger interact with the artifact but which are, at the same time, part of the interaction with each other. Throughout these periods both can be seen to be actively typing and exploring the software (while the video cannot make out what's being typed, we can clearly see the activation of pull-down menus, sometimes in quick succession, which signal that the learners are doing 'looking for answers from the computer'). Given this, I suggest that a suspension of a continuous social interaction between Larry and Roger is not a suspension of interaction per se. At the same time, we could imagine if Larry or Roger stopped working at the 'merge' function (with the computer) that this would affect the topic continuity that is so important to maintain the specific 'three-way' (human-computer-human) mode of mutual participation they do.

During the course of interaction however, the computer also plays a more problematic

role as a *quasi-participant* (see Suchman, 1987; Latour, 1987; 1994[8]). The computer complicates conversation considerably adding ambiguities which relate to the specifically "educational" or "learning" context of the interaction. The example of this artifact-as-participant dynamic is detectable in lines 11-19 for example. Here, Larry and Roger must not only maintain the interaction and successful question-answer sequences, but Roger's responses to Larry's directives are signalled both verbally and physically through Roger's actions which are mediated by the computer screen-text (using the mouse). This is a form of computer-mediated interaction, in that the participants communicate orally and with direct gestures while also providing responses through the medium of computer screen changes (via the mouse/keyboard). In fact, the computer provides additional resources with which to respond to the FPP of the adjacency pair sequences. However the computer screen as a response is difficult to use. This communicative resource as an 'utterance' in the interaction is ambiguous, (of course) primarily, but not strictly, because Larry and Roger *are* novices. As one participant asks a question of the other, and the other is engaged in some screen-action that is ambiguously ongoing, being either independent of the interaction (i.e. the persons actions are not part of the sequence of interaction with the co-learner) or genuinely interactive (i.e. used as a computer-meditated response to the other participant). Problems quite reasonably ensue. Take for example lines 67-76 where Larry's attempts to elicit a meaningful second pair part (which may have come in the form of Roger's on-screen actions rather than in the form of a conventional direct verbal response). My suggestion here is that this is another reason why extended silences are tolerated in this form of interaction. The computer artifact's involvement in the process of communicative action can be ambiguous (even amongst skilled users). Simply put, I believe the data suggest several additional layers of complexity to interaction which are directly attributable to both the "learning" context (e.g. participants need to learn a language of computer-mediated interaction as well as actively produce this interaction) and the computer-mediation of face-to-face interaction (e.g. the

[8]Latour's (1987; 1994) actor-network theory suggests that tools and people must be understood as co-participants of networks of activity. Engeström (1999:11) has also suggested this the work of Latour as parallelling that of Activty Theory in some ways.

ambiguities of a "third" participant, i.e. the machine).

6.4 "Educational" Contexts, Topic Continuity and Control of Turn-Taking

According to McHoul (1978), in pedagogically organized learning (e.g. in a classroom) the instructor has primary control over turn-taking, and in Chapter 3 I outlined how these forms of pedagogically organized learning exercise a type of hegemony over peoples' perception of how legitimate learning is in fact defined. This, I argue, has important implications for understanding relations of social class in learning. In a closer look at how formalized learning is organized we see that the instructor has many options (which accounts for some of the variability of pedagogically organized learning setting). McHoul outlines how the instructor can self-select, select-next-speaker, or initiate a bidding for next turn sequence and so on. As Heap (1991) tells us, this is an accepted, even desirable, part of interaction in a formal education setting. In this case study, however, I am interested to identify the ways that these computer learning relations can be demonstrated to represent a fundamental break with pedagogy and expert/novice relations of learning altogether. The critical question in this regard thus becomes, does the more expert participant in the learning merely take on the role of the instructor (as controller of turn-taking) and reproduce the pedagogical relations McHoul describes? Or, can this analysis contribute to envisioning learning that is organized by collective relations, non-hierarchically?

Though it is not immediately apparent from a traditional CA analysis of the transcript the context *is* educational. This statement however, referring back to my discussion of topic/resource confusion in Chapter 2, is not merely an operationalization and nor is it a simple gloss. Rather, the assertion is based upon some recoverable aspects of the data that in combination make the claim warranted. While this may seem like common sense as they are in a type of classroom, even if we suspend our cultural understandings of what a classroom is (i.e. bracket the setting), we can still begin to make warrantable claims about how this is an educational setting. First, there is a continuity of the topic (the 'merge' function) throughout

the 30 minute transcript[9] and, in fact, the entire two hour class, despite frequent suspensions of interaction (amongst Larry and Roger) and the introduction, or at least the figural presence, of an additional participant (e.g. "Joe" the facilitator). However, we can also show that elements of the broader context are a legitimate sequential element of the interaction as well. In other words, we can see that the participants' actions are oriented to the identity of the institution by virtue of their prompt, mutual arrival (at 10am), the (otherwise peculiar) authority granted a person who has appeared to the group and given suggestions as to their activities over the next few hours (the facilitator), and so on. These considerations are what Mehan (1993), attempting to smooth the rougher edges of "radical situationalism", calls "distal influences" on interaction (p.87). These features of the context mark the interaction as some specific variation of a conversational speech act exchange system which we can understand as encouraging changing forms of participation in the frame of activity, i.e. to be learning-based.[10]

There are some further points to be made in regard to this interaction being, even more specifically, beyond the formal, pedagogical, expert-led biases of learning (as discussed in Chapter 3). Again, avoiding the pitfalls of once-only, fixed-choice methods of "process-product research" (Mishler, 1986; Heap, 1991), it is the sequential data that suggests this distinction. As I've noted, according to McHoul (1978), formal classroom interaction is teacher-led, or more specifically turn-allocation is overwhelmingly teacher-controlled. And, in fact, in the first major segment of interaction analysed (roughly lines 1-34), we see what could be understood as a type of expert-led learning - the "expert" having control over turn-

[9]This topic continuity is one indicator that the interaction is different from "everyday conversation" which, according to Sacks, Schegloff and Jefferson (1974) typical includes topic changes (as well as a range of topic introduction sequences and the need for topic 'fitting' efforts (Schegloff and Jefferson,1974:243) and so on).

[10]One notable absence that is typical of classroom interaction according to the literature yet only weakly present in these data is the evaluative function that paid-instructors must carry out. Even in the most pedagogical-like portion (lines 1-35) of the entire transcript, while there are some basic evaluative utterances by Larry, particularly line 10, "That's a good one" - it is clear that there is no overall structure of "lecturing, asking question accepting feelings, praising, encouraging, using student ideas, giving directions, criticizing and justifying authority" (Heap, 1991:23) typical of instructional formats. In other words, there is a general absence of institutional demands of one person
accomplishing the evaluation of another in informal education interaction.

taking. Larry appears to be the more knowledgeable participant who is in the position to impart knowledge and skill to Roger. As would be consistent with a pedagogical interaction according to McHoul (1978), it is only Larry who seems to use 'self-selection' in turn allocation (i.e. chooses himself to speak next in lines 27-28 and 32-33). Roger (apparently in the 'novice' role) must make the initial summons request (line 1-2) followed by question FPP's. Larry on the other hand remains in control over speaker selection, providing the only informative statements or 'informatives,' i.e. formulating what will happen next (line 24). Furthermore, it is only Larry who issues directive statements or 'directives,' i.e. direct instructions (lines 13 through 20).

However, understanding the 30 minute segment together as a continuous, complex string of interaction (section 6.2 above), we see that this expert/novice relationship understood in terms of control over turn-taking, use of directives, and so on becomes blurred, and thus control, expertise and conventional notions of learning become problematised. By line 48, for example, Larry has become the questioner and is seeking the help of Roger. Roger is much less sure of himself than Larry in the opening segment, but he nonetheless becomes positioned (sequentially in terms of the organization of turn-taking) as the expert (i.e. the answerer of questions), even providing (albeit weak) directives (line 64 and perhaps line 73[11]). Combining the pronounced topic continuity with the shifting patterns of control over turn-allocation, this interactional system seems to display features of *both* pedagogically organized *and* conversational speech exchange systems.

Reconnecting with issues raised in Chapter 4, we see that producing, repairing, proceeding with social interaction, self-consciously *and* tacitly, is how most changes in modes of participation, i.e. learning, occur. Understanding this process is part of the micro-contextualization of computer learning. This process is full of ambiguity, contingencies, *seen but unnoticed* rhythms of interaction, and active decision-making by skilled participants (no

[11]It is very difficult to recover the sense of what Roger is getting at in lines 64, 73 and 75. While 64 seems to be something of a directive as it has little connection to the immediately preceding utterance by Larry - it could be a continuation of Roger's answer on line 59. The use of the pronoun in "I think you should go toooooo" (line 64) adds to the ambiguity. Lines 73 and 75 are even worse. It is very possible some or all of these 3 examples are responses to the computer (i.e. the response to Roger's own screen actions) which would be another example of the complexity and contingency of human-computer-human, collective interaction.

matter how novice they happen to be). Changing control over turn-allocation and topic continuity are central to understanding how learning is accomplished. In this sense we are all "expert" learners. Specifically, it should be clear that these sequences demonstrate a mutual construction of the Zone of Proximal Development (ZPD). While pedagogical and expert-led notions of learning and specifically "learning transfer" are typically assumed as central to learning projects, and while the conclusions we can draw from this short strip of talk are modest, Larry and Roger demonstrate that the tool-mediated interactions of two novices can produce "learning".

We can also specifically recognized how the computer is implicated as it too is a type of participant in activity (following Suchman, 1987; Smith and Whalen, 1994; Latour, 1987; 1994). As I discussed in Chapter 5, in neo-Vygotskian traditions this notion is perhaps most fully developed in the ongoing work of Michael Cole who has dealt explicitly with the notion of "tool-mediated" activity for over two decades. Recently he summarized,

> One of the central tenets of the cultural-historical school is that the process of the historical development of human behaviour and the process of biological evolution do not coincide; one is not a continuation of the other. Rather, each of these processes is governed by its own laws. The key to this difference is to be found in the concept of an artifact, a material object that has been modified by human beings as a means of regulating their interactions with the world and each other. Artifacts carry within them [adaptions] of an earlier time... and combine the ideal and the material, such that in coming to adopt the artifacts provided by their culture, human beings simultaneously adopt the symbolic resources they embody. (Cole, 1999:90)

The computer artifact is perhaps easily understood in this way with its (market specified) designed functions that express the mode of production, distribution and consumption relations from which it arises.

We can reflect on these data in ways that provide important examples of basic neo-Vygotskian concepts. Looking closely at the data, we can talk about the different levels of activity described in Leont'ev's (1978) original formulations of Activity Theory: operation, goal and motive. For example, at the operational level (techniques and skills, typically unconsciously used, which relate to conditions rather than the object or conscious purpose of activity) we see Larry and Roger carrying out skilled interaction in relatively complex forms

of two-way (person-machine), three-way (person to person mediated by machine) and four-way (person to person mediated by machine with facilitator) communication. These are skills at the level of operation that produce learning according to specific conditions by, for example, maintaining interaction, maintaining topic coherence, and so on. In terms of goals, we might say that the 'merge' function and the specific features (mouse clicking, pull-down menus, software designer's use of language, etc.) are most relevant. The motive-structure of the activity, like the level of operations, is somewhat less obvious. Motive-structure is most closely parallelled in the CA tradition, by Mehan's (1993) notion of "distal influences". Motive-structures of activity, while not conventionally apparent in the data nonetheless, make operations and actions possible and provide meaning and direction to the specific practices. Referencing only the sequential accomplishment of the situation, we see that the very first action in the sequence is, in fact, not the "opening" sequence described in lines 1-3 at all, but Larry and Roger's arrival on time at the situation. If we were to extend this sequence of computer learning even further beyond the 30 minute length to, say, a month. We could try to make warrantable claims that actions in this month are in fact part of a single sequence of action. In this case, we would begin to trace the actual "distal influences" and in so doing contextualize action-object relations even those as (seemingly) trivial as the 'merge function' in the context of, for example, the search for employment or the reproduction of social class. In other words, since the need to sell one's labour-power in order to survive (a feature of social class) provides the motive-structure of activity, we would in fact be entering into a class-analysis of activity. Of course, it is always worthwhile to remember that these different levels of activity do not organize themselves. Rather, they are always, more and less self-consciously, inter-subjectively organized by participants in a process that, drawing on Goffman (1974), I've described as framing and keying. Different levels in activity, in fact, also could be described in terms of Goffman's conceptualization of "tracks or channels" of interaction.[12]

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[12]Neo-Vygotskians also suggest the possibility of a similar complex of more and less disattended but simultaneous channels, though it comes in the form of discussions of "tool-mediated" action. Engeström (1999:381-382), for example, outlines four basic types of artifacts:

i) what artifacts: used to identify and describe objects;

> ...during the occurrence of any activity framed in a particular way one is likely to find another flow of other activity that is systematically disattended and treated as out of frame, something not to be given any concern or attention... the main track carrying the story line was associated with a disattended track, the two tracks playing simultaneously... In doings involving joint participation, there is to be found a stream of signs which is itself excluded from the content of the activity but which serves as a means of regulating it, bounding, articulating, and qualifying its various components and phases. (Goffman, 1974:210)

We can see Larry and Roger, while consciously focussed on the 'merge' function, actively produce interaction that is disattended. For example, Larry and Roger's head and shoulder-turning, the management of the sequential, syntactic and semantic flow of interaction, is understood in Goffman's terms as serving a "directional" function which is extremely important to the development of more conscious goal-oriented interests.[13]

Returning to central themes of the thesis introduced at the outset, we can see that this is another of the "distal influences" and connects the ongoing, active and skilled management of local interaction with broader material relations, decisions, distribution of resources, and so on. With this fine-grained analysis, we can hopefully begin to see the types of social interaction to which concepts such as Lave and Wenger's (1991) legitimate peripheral participation and Leont'ev's (1978) activity system actually refer.

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ii) how artifacts: used to guide and direct processes and procedures on within or between objects;
iii) why artifacts: used to diagnose and explain the properties and behaviour of objects;
iv) where to artifacts: used to envision the future state or potential development of objects, including institution and social systems.

[13]Goffman's wonderful example of the barking dog makes the case for directionality (as well as the importance of sequence in interaction):

> Thus, at an outdoor political rally a dog barking at random can often be disattended more or less effectively; but if the dog happens to chime in so that its bark can be taken as a comment upon something said, the chime occurring precisely at a response juncture in the saying, it will be hard indeed to manage the difficulty. Laughter or its suppression can become general. (1974:214-215)

In addition, there are also matters that are not merely disattended but actually unavailable to Larry and Roger. These are what Goffman calls "evidentiary boundaries" or "back stage activity": "actions occurring before and after the scene or behind it that are relevant to it and at the same time (in likelihood) incompatible with it.

6.5 PART II: Accomplishing Organizational Sequences of Action: A Case Study of Computer-Mediated Activity in an Auto Parts Purchasing Office

This second part of the chapter deals with the "underlife"[14] of clerical work in a purchasing department of an auto parts factory (Ontario, Canada) by focussing on the interaction between worker, computer and organization. Studies of labour process, organizations and workplace learning have some relevance to this case study, particularly the work of Kusterer (1978) on the skill of apparently "unskilled" workers. His analysis parallels the argument I make here in terms of a basic problematization of skill and how those skills are acquired (i.e. learning). Other work such at that of Darrah (1996) provides further information on the sometimes contentious context of workplace learning. Organizational studies theorists, in general, however have been much less interested in either learning or the standpoint of workers. We can see that these authors have generally discussed the issue of workers' practices in terms of employee recalcitrance to be overcome in favour of management prerogatives (see Collinson, 1994 for an overview). While Labour Process theorists (e.g. Jerimer, Knight and Nord, 1994; Lucia and Stewart, 1997) have contributed to an understanding of the cultural life of work which recognizes worker resistance, we are still saddled with either, an underlying affirmation of the capitalist accumulation process or an overly determined, mechanical conceptualization of workers resisting the organizational imperatives of capital.

While I don't conduct a situated ethnomethodolgical analysis in the traditional sense, I *do* make use of a type of organizational ethnomethodology which highlights how workers actively deal with a computer systems software called "Oracle". The analysis makes use of a series of in-depth interviews with a female clerical worker whom I'll call "Gwen". Over the

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[14]This notion of the informal dimension of organizational life has affinity with Goffman's analysis in Asylums (1961) in which he also refers to as a series of "secondary adjustments" (1961), i.e.

> ... defining these as any habitual arrangement by which a member of an organization employs unauthorized means, or obtains unauthorized ends, or both, thus getting around the organization's assumptions.... In terms of a formal organization as a social establishment, the corresponding shift would be from an individual's secondary adjustment to the full set of such adjustments that all the members of the organization severally and collectively sustain. These practices together comprise what can be called the *underlife* of the institution... (Goffman, 1961:189, 199 author's emphasis)

course of several months I met with Gwen to discuss the role of the computer systems software in her working life. We discussed these issues using a set of computer screen-texts, involved in Gwen's daily work activity, printed onto sheets of paper. These print-outs helped her (and I) in the task of describing what she could not say in so many words. It was a description of the inner life and tacit knowledge production of the clerical work that she had come to know very well over her 15 years in that department . All in all, not including numerous phone-calls and e-mails for clarification, our interviews spanned approximately 6 hours of recorded conversation as we peered over the print-outs over cups of coffee at her kitchen table.

Reflecting on these data, I make several claims, the most basic of which, following Smith and Whalen (1994), is that computer software screen-texts can be understood as an important 'constituent' of workplace structure that workers negotiate on an everyday basis in a form of computer-mediated activity. This claim involves understanding computer systems as not only specific tools of production (in this case accounting/purchasing records) but as tools for the production of organizations themselves. At the same time, I argue that despite the apparently heightened level of managerial control vis-à-vis computerized technology, workers are still required to activate and use these technologies and thus, however narrowly circumscribed, do exercise forms of agency, creativity and control. Finally, I suggest that software designs work in coordinated fashion with the more general organizational norms and sanctions to enact the needs of capital in the daily lives of workers. I offer a detailed analysis of a specific example of the shaping of work practices in terms of an *organizational sequence of action.* Inherent in (the formal and informal variations of) these sequences are requirements and opportunities for changing participation from the standpoint of the worker. It is important to point out, however, that beyond the initial training period and outside very narrow limits, changing modes of participation are largely antithetical to the vision of control and standardization that capital, through Oracle, attempts to assert.

6.6 Making Use of a "Texts-in-Action" Approach to Understand Computer Learning

There are a variety of ways to approach this topic at the micro-level, but a relatively novel one can be found in the work of Smith (1990), Mellinger (1992), Smith and Whalen (1994) and a small group of others. The defining feature of these studies is that each tries to understand 'texts' - including computerized 'screen-texts' - as playing a key role in the (re)production of specific organizational relations.

> Analysis of the talk-text-talk sequence shows the text in action and as integral to the coordination of the sequence and the ordering of the component sequences of talk. However this is not sufficient to establish our claim to describe the sequence as 'organizational'. This is established as we demonstrate the standardization of recipient design in the officially required (and in part technically constrained by the software) descriptive syntax in which call-takers are trained and into which they translate the caller's vernacular. (Smith and Whalen, 1994:29)

A key element of these studies is their expanded view of the concept of text, textuality and inter-textuality. A basic description of these is found in Smith and Whalen (1994) where the authors insist on two key dimensions. On one hand, the text refers to a physically sensed "materiality" (e.g. pages in a book; an application form; a specific screen-text of a computerized system). On the other hand, texts also involve social and interactional elements in terms of the process of 'signification' (see for example the explanation in Barthes, 1977). Texts, like other tools, are created within a specific set of historical, social relations, but texts must be 'activated' through the course of an active social relationship (i.e. they must be read). One explanation of the social character of texts that seems to fit particularly well could be use to describe a clerical worker as follows:

> a reader whose reading is contingent on her own 'inscription' within historical, social and political situations. Textuality thus absorbs both the subject and object of study, effacing the distinction between the two. (Jones, 1995:642)

It is this expanded notion of the power of the text that opens up the possibility of viewing computers as a meaningful (social and material) constituent within everyday practices of particular workers in a workplace.

Explicating the active and social relational dimensions of texts is the basis of what

Smith and Whalen (1994) call a "texts-in-action" approach. In their paper, the authors deal with an emergency call centre's "call for service" organizational sequence of action. Smith and Whalen demonstrate several important points that are relevant to this paper. First,

> [t]he iterative capacity of the text, particularly the printed and now the electronic, text, is foundational to contemporary forms of large-scale organization... (1994:6)

Second, as constituents to an organizational sequence of action,

> ...the technically formalized and iterable text enables coordination of activities across time and space, many times over, and with varying personnel. (1994:9)

These points alone suggest the essential work that texts do for the modern workplace. However of even greater interest here, as the authors go on to describe, these texts serve a "regulatory" function in such a way as to actively represent a particular organizational rationale or "agenda".

> Thus the face sheet functions as a textual idealization of a public safety agency's organizational agenda. The form and any associated 'additional details" structure or organize concrete sequences of action so as to realize that agenda... Through their use an organizational order is locally achieved. (1994:16)

In the case of the trans-national corporation the "agenda" is oriented to capital accumulation and labour processes in which purchasing and accounting information from dispersed international worksites are centrally and automatically integrated through an integrated computer systems network.

The notion of human-computer-organizational interaction, or analysis of the role of screen-texts in terms of organizational sequences of action is similar to the concept of activity in the sense that it attempts to integrate participants, tools and social context in a single unit of analysis. However, whereas the "text-in-action" approach offers a workable empirical program of inquiry into interaction, it says nothing about how this analysis relates to issues of learning per se. Neo-Vygotskian perspectives on learning as a changing modes of participation in activity systems involving tool-mediation (of which textually-mediated practices are an example) provide this learning perspective.

6.7 Context of the Case Study

The auto parts factory in this study is part of a group of auto parts plants located throughout Southern Ontario (Canada) and North-Eastern United States which are owned by a large and diversified trans-national corporation. With the need for capital investment and expansion[15], the company has been engaged in an ongoing process of increasing its technical rationalization and centralization of operations, communications and financial data.

> Among the systematization of management record keeping were new technologies of accounting. The "rational capitalistic establishment" is one with capital accounting. It is an establishment which "determines its income yielding power by calculation according to the methods of modern bookkeeping... Transformed accounting technologies contribute to the transformation of the social organization of capital from the individual to the corporate form... (Smith, 1996:179)

In the purchasing department of this auto parts factory, the company has inserted a new "accounting technology" which is inter-linked (online) with the company's other auto parts plants in the group. Indeed, one of the important dimensions that Gwen returns to again and again in describing the daily problems of her work is the conflict that arises as a central authority attempts to maintain and extend rational accounting to the increasingly distant realities of a larger and larger number of local sites of auto parts production.

The organizational sequence of action of interest here is the *"Purchase Order (PO) sequence"*. This sequence defines a segment of the labour process through which the plant orders and receives the materials it needs to maintain production. Much of Gwen's paid work day consists of producing versions of this sequence using the Oracle computer systems software, in effect successfully responding to the software's series of screens through the course of the work day, i.e. "The empty fields of the computer text are questions insistently seeking response" (Smith and Whalen, 1994:11). Gwen's role is to translate the needs of production into a series of contracts which gets the specific material to the plant. In keeping

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[15]The need for ever increasing capital expansion is well document by many political economists, but for the original in the sense I wish to use the concept, of course, see Marx, Capital, vol. 1. With a different focus which is particularly useful here, Weber outlines an aspect of this process with his analysis around the "iron cage" metaphor. Weber's conceptual developments around bureaucracy and also the essence of "the rational capitalistic establishment" (i.e. the financial accounting structure) (Mommsen, 1989; Smith, 1996; Holton, 1996) provide important background to the organizational elements examined in this paper.

with the tenor of Suchman's (1987) and Latour's (1987; 1994) discussion of technology as kind of participant in interaction, Oracle's role in this process is multifaceted. In basic terms, it is the computer software that, once the necessary information is entered, produces and stores centrally all the pertinent transaction information. However, it is important to note that while the addition of the "Oracle" computerized accounting/purchasing system to Gwen's office is new, the PO organizational sequence of action is not.

Over the 15 years Gwen has worked at the factory, the PO sequence has undergone steady development. This began with the use of standardized, manual, type-written paper-forms (duplicated and stored in physical form[16]), followed by "display writer" word-processed and printed-out paper-forms (duplicated and stored in physical form), then "WordPerfect" processed and printed-out paper-forms (5 part form duplicated and stored in physical form), and now today using the Oracle computer system.

The basic elements of the current PO organizational sequence of action can be describe as follows. The sequence is initiated by a production or maintenance need (say, the need for more steel or a broken machine part) which a purchasing agent responds to by filling out a Requisition to Purchase form. This form initiates the production and recording of a PO electronic record within the Oracle computer system, and also a hard-copy "PO Agreement" contract (a 8.5" x 11" purchase contract). This PO Agreement is sent via courier to the vendor company who will supply the requested item(s) to the auto parts plant. The vendor company acknowledges the "Purchase Order Agreement" by sending back a copy of the PO agreement and then ships the requested item(s). Upon receiving the item(s) at the auto parts plant, a "Packing Slip" which accompanies the item(s) displaying a packing slip number and other information is forwarded through internal company mail to Gwen to be entered into the electronic record. This completes the basic PO organizational sequence of action.[17] It is

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[16]By citing that the various information is "stored in physical form" I am indicating that storage in this form is the primary method of maintaining/retrieving/using these financial records.

[17]It might be helpful to clarify the differences among these three closely related terms before proceeding.
Purchase Order Organizational Sequence of Action -- refers to the entire set of organizational, work, conversational, inter-textual relations that are a part of this sequence of action.
Purchase Order Electronic Record -- refers to the complete electronic represented and magnetically stored

impossible for a contract and payment to be issued to a supplier without a PO number. However, another important aspect of the initiation of the production of a PO electronic record is the fact that the Oracle system issues it a unique "PO Number" which tracks (inter-textually, through time and space) the purchase allowing for greater centralized surveillance and control over the process.

Before proceeding any further into the minutiae of this aspect of clerical work I think it is important to 'hear' Gwen introduce her relationship with the Oracle screen-texts in terms of her typical work day in this interview exchange.

I: When you come in for the day, do you basically know what to do or does your supervisor have to tell you what to do or/
G: No, barely ever.
I: So basically you design your day based on requisition forms that are in the basket, or any that are handed to you that day/
G: Yep, packing slips that come in, yeah, so it all just kind of flows.

Requisition forms, packing slips, drawings, drawing letters, confirmation forms - all texts within the PO organizational sequence of action "just flow". Her daily paid work is ordered through these texts and their relationship with the structure (control, surveillance) of the workplace. It is a form of authoritarian computer/organizationally-mediated, and specifically text-mediated, activity in which Gwen, co-workers and the computerized system begin another day of work *together*.

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record of information on that transaction which may include a history of transactions with that supplier on that item if the order is an ongoing or "blanket" order. But in any case contains a great deal of information referring to such things as currency rates, taxation codes, shipping instructions, authorization(s), all supporting text reference numbers, as well as quantity, delivery dates, item descriptions, etc.

Purchase Order Agreement -- refers to an 8.5" x 11" piece of paper that is produced from the PO electronic record within the Oracle system and is sent to the supplier as an call to purchase an item(s).

Requisition to Purchase -- refers to a traditional, non-computerized form that is filled by hand by a buyer and passed onto G in many ways initiating a PO organizational sequence of action.

There are other organizational texts, records, etc. referred to occasionally in this paper that are also essential 'sub-texts' or 'sub-documents' within the PO organizational sequence of action including drawings of items, various standardized letters (ex. a "drawing letter" -- introducing drawings to the supplier), etc.

6.8 Screen-texts and Organizational Sequences of Action: Contradictory Local/Extra-local Relations

One of the central achievements of texts, as Smith points out, is their ability to "suture the extra-local... to the local actualities of our necessarily embodied lives" (1994:6-7). However, what needs to made explicit is the role that advanced capitalist accumulation and labour processes play as a source of contradiction in this text-mediated activity. The relationship between the local and extra-local relations of capital production is a daily, ongoing source of a kind of mundane struggle in the workplace. This is a struggle in which the extra-local financial base structure of the corporation attempts, particularly through the use of its communication technology, to gain more immediate and ongoing access/control over localized information, and ultimately financial and production processes.

To begin to understand the contradiction between the local and extra-local as played out through the screen-texts of the Oracle system within the activity system (and the process of computer learning), a comparison can be made between the previous "Five Part Form" method and the Oracle method of accomplishing the PO organizational sequence of action.

G: Well it takes a lot longer. As far as my job or the person who enters the purchase orders [into Oracle], it takes a lot more time, but if you look at the pluses it is definitely worth it... It takes nothing. You just zip them through quick, but it's when there's a change. It can take you hours to do a simple thing, where in the past it just took you no time at all. You could just type another order and have the same number on it, whereas this there is so many things you can't change [in Oracle]. So it definitely is a lot more cumbersome to the purchasing department.
I: It's made your job more, but it's made somebody else's less though?
G: Oh yeah.
I: Whose?
G: I think for finance it's easier, like more automatic. Like again, I think it all boils down to the data, having that database is the big benefit.

The change that Gwen describes is centred around Oracle's ability to apparently 'demand' (as one of its structural/design features) the extra-localization of all information pertinent to the financial base structure of the corporation before proceeding with the organizational sequence of action. Below, Gwen's comments describe her vague but nevertheless very real sense of the difference that she now feels with the use of the Oracle system. Clearly, the change

involves a further sense of 'dis-embodiment' of her daily work.

> Before with the Five Part form it[18] was done by hand... It was just like typing on one piece of paper, and you saw it altogether and you could see it, what it looked liked.

Notice here and in all of Gwen's descriptions of the "Five Part Form" that Gwen never grants the 'form' the status of active subject in her descriptions. Though essentially the old paper-text/forms and computer screen-texts both give rise to tool-mediated activity, the form is not considered an active participant in the workplace in the same way that computerized system appears to be, and nor does the paper-text seem to bring into play the weight of organizational rules and requirements to the same degree. Gwen describes that the type of work arrangement that Oracle attempts to organize does not seem to allow the clerk-typist to visualize her work in the PO organizational sequence of action. She continues,

> It would have been interesting to see what all this, what a puny little thing it comes to... because you'd think you'd get this mountain of information, but you get this 8 and half by eleven [piece of paper, i.e. the Purchase Order Agreement] with just a report on it.

Among the differences between the Oracle-generated screen-texts and paper-texts is the additional removal of 'traces' of the worker, local production, and control by the localized constituents. In the Five Part Form days, not only was there the specific knowledge and skills needed for the production of the report, but there was also, in the final instance, the physical location of the hard-copy forms, i.e. localized filing. This was spoken about by Gwen as a particularly significant aspect of the earlier "Five Part Form" PO organizational sequence of action.

I: How big of deal is it to have to go searching through things for packing slips or whatever/ like is that a pretty big deal?
G: Oh, it is.
I: Do people get a little panicky?
G: They used to come down and they'd be looking for things, whereas now they can look at it on the screen.
I: So now there's a little bit more control? [for management]
G: I think so, yes. It's all there [on-line]. It's so easy. And how easy is it for someone to

[18]Notice here and in all of G's descriptions of the "5 part form", G never grants the 'form' the status of an active subject.

> take out a purchase order and mis-file it, and then you can't find it. Or someone's got it on their desk and two, it was always, fine, if it was last year it was right there in your office, but for the year before it was upstairs and after that it was across the road [another office of the plant] after the last seven years/ over in the archives.

The existence of information in hard-copy form as the primary method of record keeping clearly had the tendency to contribute to localized control. This localization (understood by the extra-local base of the trans-national corporation as a general 'lack of control') meant that information had to be mediated by local workers to a far greater degree. This local mediation came in the form of more face-to-face contact and cooperation amongst workers in different departments.

I: So was there was more face-to-face stuff with finance then [with the 5 part form]?
G: I think so. We'd be up their digging through their files a lot whereas now we can look at it here [in Oracle screens]. The same thing with them. They used to be down at month end, and I used to call it 'Oh, they're fluddering'. They used to have to come down and just dig through our files. Looking for packing slips.
I: So it would be the equivalent of them trying to solve all the "bombed-out" ones?
G: Yeah. They'd have invoices without packing slips. Now they can look to see if there was a packing slip [on Oracle] whereas before they used to have to come down and find the PO and the slip.

While Gwen reiterates the notion that work and information was once organized in the local setting, she goes on to introduce a key part of Oracle's control/surveillance - the *"bomb-out"*.

The bomb-out is part of an important new vernacular in the office since the introduction of Oracle, and has been a necessary component of the development of new patterns of participation in activity. The bomb-out gains its particular importance and its particular meaning in the lives of Gwen and her co-workers due to their particular standpoint as workers. Whereas the bomb-out is a means of control for management, it is a source of problems for workers. It refers to an instance in which Oracle has detected that the PO organizational sequence of action has been broken in some way. Below, Gwen describes a typical bomb-out with special reference to the Oracle system as an active constituent within the process. In this particular case, the price of a supplier's goods varies with the number of units actually purchased. As mentioned above, the Oracle system in the case of ongoing or "blanket" order maintains or "tracks" the history of an item's purchase from a particular

company.

> Like say if you would have a price for a minimum quantity of say 5,000 pieces and another price for 10,000 pieces. When the shipment comes in and it's received, it [Oracle] tries to interface but it doesn't know which one to go to, so it [Oracle screen-text] will say 'Ambiguous price or location', on the Interface Report. As far as the "SRI" [the computerized shipping, receiving and inventory system] - the shipment will be received into inventory and it'll show in inventory but it won't come through to Oracle, the accounting side, because it [Oracle] won't know. It'll keep going 'Oh, where can I [interface]?' It doesn't know which one to go to. And the receiver doesn't know - they just receive it. So it would just go 'Boing. Boing. Boing ['bouncing' between choices unable to make a decision]', and then the bomb-out comes out on the Interface Report.

As we noted a few pages ago, we again see the syntactic positioning of Oracle (versus the Five Part Form) in Gwen's description. Here and in most instances throughout the data, Gwen grants Oracle an active, subject status in the work sequences. Gwen goes on to outline how Oracle interfaces with the shipping department computer system, and that when Oracle finds ambiguous information it records the problem PO number in an "Interface Report" (an electronic record) that is then printed out daily for management. In this way the Oracle system can monitor workers automatically through its command of an enormous data base of information which the workers themsevles create.

6.9 Formal Organizational Sequences of Action and Informal Variations: Alternative Standpoints and Discretionary Learning

Thus far I have described the top-down dynamics of the trans-national company and its computerized control system as they appear in a local purchasing department office from the standpoint of a clerical worker. Indeed, as it is throughout this research, issues of standpoint are paramount in understanding what's going on. For example, while I didn't interview mangers in the purchasing department in this case study, we could speculate that their accounts of interaction, the goals of activity, and even the motive-structure of activity are understood in a different way. From Gwen's standpoint, the computer system uses Interface Reports and the bomb-out in order to control and consistently reproduce particular dimensions of her work. However, technical control of this kind is rarely, if ever, complete. In the world of everyday practice, workers regularly respond to attempts at control,

sometimes as in the case of Gwen, if only to do the best job they can. These forms of variations highlight an important tension or contradiction within the activity system. Whatever the reason, whatever the outcome (hyper-exploitation, nervous exhaustion, promotion, etc.), these practices do not, in any simple way, merely ratify or reproduce the dominant logic of the organization. Rather they are clerical-worker/participants' interpretations, their own reasons, and their own methods of actively and socially accomplishing this logic from their own standpoint. Workers, such as Gwen, create spaces for themselves to exercise their own creativity and skills according to an alternative and practical logic. Importantly, it is at this point (and not within the scope of the dominant formalized logic of the organizational sequences of action) that we see that "learning" as changing participation in activity systems is made possible. These relations are made explicit in a careful examination of a specific type of localized variations of the PO organizational sequence of action.

I have chosen to use the term "informal variations" to describe these worker-led organizational sequences in order to show that they parallel the formal process (which is always a skeleton of actual processes) and lie buried just below its surface.

> Like I'm saying this, but *you're not suppose to do it this way*, the "req" [requisition form] should be in your hand, but hey, they need it right now but to get they'd have to get approvals and phone whoever. But instead they say 'We need this. Could I have a purchase order' So you don't have the req in your hand and *we're not suppose to give you a purchase order number without a requisition number* [and the accompanying information, ex. prices, item codes, etc.]. They'll have that req form [incomplete] in their hand and it'll have a req number on it and I'm giving them the purchase order number and they will write it down on that req form and I type the req number on my purchase order [on-screen]. So you can begin to track it that way [the bomb-out due to incomplete information, i.e. there is only a requisition number and an issued PO number contained in the PO electronic record]. But usually by the time that would come up [on the interface report] you'd have the req on your desk and it could be entered and that would be done.

In addition, Gwen describes another typical instance when the purchasing, finance/accounting and shipping department workers collude to over-step the system altogether thereby developing another informal variation in the organizational sequence of action.

> So the packing slip will come in the back-door and *not in agreement with Oracle*, but

> it's the only way we can do it [given the constraints of local production reality]... Shipping will code the packing slip and send it up to accounting and they do their charging that way because there's no way to do it with Oracle. Well you could do it, but then again it would be a PO for a box of band-aids, so it's good for some things but for others it's not.

It begins to become quite clear that there is a inherent contradiction in the activity system. It is ultimately driven by a logic of capitalist accumulation realized in the specific case of the individual's operations, goals and motives. As neo-Vygotskians such as Engeström (1987; 1992; 1996; 1999) suggest, these political economic dimensions are inextricably related to even the most micro-oriented, un-self-conscious operations, and I argue infuse computer-based learning in the everyday such as this with class-relations. Workers like Gwen constantly must (re)produce systematic variations to the organizational sequences demanded by the company through Oracle. Here Gwen describes the regularity in which localized workers produce these variations.

I: How often does this whole *back-way* happen?
G: *This backwards way happens all the time. Always. I would say about 80% of PO's are done that way.*
I: Why don't they [management] want it to go that way?
G: I don't know - I guess they do [laughing]! It's just that everyone is/ Like they [production workers] are working on a machine and something breaks down. They don't have time to say, 'Oh I've got to write out this piece of paper and take it to purchasing and purchasing will have to place the order, and first I have to run around and get all the signatures on it.'

Competing logics of production coexist. One logic emanates from the bureaucratic, extra-local demands of a large trans-national corporation in pursuit of capital accumulation and ever-increasing rational control. Another logic emanates from localized choices of workers attempting to do the best and most satisfying job they can by exercising creativity and initiating new patterns of relationships in order to make a living.

6.10 "*No Ace, No Face, No Trump*": Key Input Fields and Organizational Sequences of Action

Another way of understanding the role of computerized texts systems in the context of computer-organizational mediation in human activity is to focus on the role of two key input

fields which appear in the PO electronic record. While we can imagine the computer system or screen-texts as participants in ongoing interaction - for Gwen this "conversation" is actually carried out through interaction with specific on-screen input fields. We can also see that issues of social standpoint are important to understanding the meaning and structure of the activity. By this I mean that the Oracle system has its *own* "key fields". These are data fields through which management manages worker's activities either by automatic reports from Oracle or through old-fashion manual surveillance (i.e. manually checking the contents of the electronic files). These are the fields through which break-downs in the formal sequence of action are meant to be signalled. For example, an "incomplete" record message appearing in the "status" field (see appendix for a copy of this screen-text) indicates that one of Oracle's "key fields" has been improperly dealt with. Oracle will display an "ambiguous statement" message in the lower dialogue field if the input information does not match a series of authorized answers. If a PO electronic record remains "incomplete" and/or "ambiguous" for the length of a working day - a line is entered in the daily Interface report (see appendix) quoting the specific PO numbers leading management directly to the source of the problem who, from management's perspective, is a worker like Gwen. Through functions like this, Oracle monitors Gwen's work day (as the perfect, tireless snitch) and issues a report to her supervisor through the use of key field statements which are generated automatically.

Alternatively, the two fields which were central to Gwen's description of top-down versus bottom-up organizational control were the "PO number" and "description" fields. In the case of the PO Number field, this is not at all surprising as it is this field that acts as the chief "gate-keeper/watch-dog" (means of tracing the sequence) of the company's prescribed PO organizational sequence of action. In fact, even with Oracle's ability to structure and monitor as we've seen described, a PO can be initiated even if the requisition forms are absent, the items desired for purchase are undisclosed, even if the price or the payment date remains undisclosed to the system. With very little information other than the PO Number, the process can (temporarily at least) proceed. One can proceed, as Gwen says, "no ace, no

face, no trump"[19], or in other words with virtually no information in hand. The sequence can still be initiated (vendor products can in fact be received and put to use) as long as a the Oracle system has issued an PO number into the various electronic locations within the company's system. From Oracle's perspective, should this information remain undisclosed for more than 24 hours, it can simply issue an item on the Interface Report at which point more traditional types of discipline can take place. Gwen explains that the issuing of a PO number and the initiation of a specific organizational sequence of action, though easily done with only the poke of a computer key or two, is not to be taken lightly.

> ...*there's no way on earth that you can change that record* [the PO Electronic Record]. You have to cancel that order and give it a new number, which is a royal pain because it's that number that tracks the whole thing. It's gone to the supplier. It's quoted on their paper work. It's come through to the plant. So you have to make sure that when you issue a new PO number you have to change it everywhere.... *There's just not the room for error where before [with the 5 Part Form] it was so easy to correct.* You don't do your purchase orders over because the big thing is that you do not want to have to issue a new PO number because that just creates problems, like until everyone gets it straight... so you go to all this trouble to avoid cancelling and reorganizing a purchase order.

Herein, at the level of these informal variations of the formal organizational sequences of action, is where Gwen exercises here discretionary engagement with Oracle in the collusion with a network of co-workers, engineers, secretarial staff at supplier company's, and so on. It is in fact here where Gwen (et al.) produce the opportunity for changing participation in a community of practice, i.e. learning, in the context of the workplace. However, this mode of participation is structured in a number of ways beyond the software design of Oracle itself. Here we see Gwen's reflection on "learning" followed by concrete descriptions of some of the factors that influence it.

G: And it's on the job that you learn all the little things that are behind the scenes. It's not just copy typing, you gotta recognize that that's not the right account number, or you recognize that name.
I: You recognize names and faces when you see the PO number?
G: That's right.

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[19]"No ace, no face, no trump" is a saying used to describe an instance in a card game called Euchre when players have no high scoring cards in their hand.

I: And I guess you need to know who to phone and know the person at the supplier too, so it's a whole network.
G: Yeah it is....
I: So how would you go about handling problems or if you didn't know something?
G: Probably a co-workers who've been through the same training and are basically doing the same things as you. Then maybe ask the consultant whose been there, then maybe this Marie who's suppose to know a lot. Not the buyers and the purchasing agents and the supervisor, phfft [snorts] You won't get anything from them.
I: This may seem like a silly question, but how's your desk area laid out? Like is it easy to contact your co-workers?
G: Well if I was asking my supervisor, it would be easy, I have easy contact with him. I can just turn my chair and call into him. But I'd have to get up and go around to talk to somebody else.
I: So there's like cubicles.
G: Yeah, I'd have to get up and go around to the cubicle.
I: So that's not the best thing. It would almost be good to take down the cubicles.
G: No. [pausing] Because there's all that going on. Or just on the phone.
I: Co-workers?
G: Well the consultant upstairs, but I guess if you're right in the middle of something you don't want to have to stop and send an e-mail or something. You want an answer right then. And there will be, I'm sure you need to keep a set of notes, which I had been doing, and we still haven't had our meeting, but they said anything we perceive to be a problem write it down. What's happening with this, what's happening with this. We're suppose to just get together and talk about it.
I: When do you get a chance to talk with these people [co-workers]? Do you take lunches together?
G: Just in bits and pieces. There's just time, you get talking something and you'll bring it up "And what do you think about that?" and then someone else will come in and put their two cents in. We're all pretty close, and if a problem comes up "How the heck is this going to work?" And they try to relate it to what they do. [the family cat jumps up on the table and we pause] We'll have a golf tournament a couple times a year, and a Christmas party and we get together. There's one girl I'd say is really a friend but I like everybody. There's nine of us there in our cubicles.

She describes not just the control and discipline capabilities of the company's computerized system, but the way that features such as workplace design (arrangements of cubicles so that contact with co-workers is difficult whereas surveillance by the manager whose office is directly behind her is not). Christmas parties and golf tournaments aside, despite this tight control/surveillance Gwen and co-workers find (indeed create) "bits and pieces" of time in order to talk, exchange information and learn. In his review of office computerization, work-

station and organizational design Fiske comments,

> We have developed computers into precise machines for control. Their capacity to produce detailed knowledge about the physical or social worlds and thereby to extend our power over them is not my main concern here. I am concerned more with their power to know their users. Sharon Dannon has provided us with a revealing example of this power being applied to the individual whom it knows and therefore produces. The point of control is a print-out of the day's work of one of the 350 employees, almost all of them women, in Trans World Airline's reservation centre. The computer works "externally" to allocate customers to seats and "internally" to monitor its operators. In this tiny fragment of working life we can trace the macro power systems of individuation and knowledge which Foucault diagnoses as the prerequisites of a modern society. (Fiske, 1993:71)

While I see gaps in the apparently seamless exercise of power and control in the office, Fiske's comments help us understand that the features Gwen struggles with are not idiosyncratic but designed, systematic elements of capitalist workplace.

It can also be noted that the PO Number field, although it appears as a regular user input field on the screen, is in fact one of only a small number of input fields authorized to be used only by Oracle (workers cannot access these fields; the others being the "status" and "dialogue" fields[20]). The Status and dialogue fields act as direct but temporary links between Oracle's requirements and the worker's actions often issuing direct orders to the worker. It is through the use of these fields that the corporate organization, the Oracle system and the PO organizational sequence of action specifically, are accomplished within the boundaries of capital's economic rationale.

Besides those fields which are the strict domain of Oracle, however, another category of fields is that which Oracle leaves unmonitored and unrestricted, and which are the domain of the worker. The most important field of this kind in the purchasing office is the "description" field. The "description field" can be seen to be closely aligned with needs of the local production plant, if not the workers themselves. While it is not a "key field" in Oracle's terms, it is key from Gwen's standpoint. It is the field that allows localized, informal

[20]The "dialogue" field is not a named field on the screen-text. It is the lower-most field on the screen-text (lower-most white-space) and appears on virtually all of Oracle's work screens.

variations of the organizational sequence to be created by the workers.[21] It is the description field that allows Gwen (not Oracle) to "track the order". In the following description of how Gwen uses the description field, there are a number of things going on. Beyond the description of the informal variation, there is also Gwen's reluctance to privilege her own local achievement of the organizational sequence of action through the description field. She insists, despite the evidence she provides, that her role in a creative accomplishment of the variation is relatively insignificant.[22]

G: I put in the requisition number [into the Description field]. That would be to track it back to a person. I'd put the requisitioner's name say, 'Bob from engineering is ordering this and the date'. And very often, I know it's not suppose to work this way, but we'll receive a packing slip and it might not have a purchase order number on it, but they're suppose to and we're working on that, but you could bring up all the orders from say X vendor and match it and track it back to all the information... Or, say you get a package with a purchase order number and you key in that purchase order number and it'll say down in here [pointing to Status field] 'incomplete'. I have nothing from them [the person requesting the item(s)]. The day I gave out that purchase order number [initiating a sub-formal variation of the PO organizational sequence of action] I never received anything to allow me to enter it into the system [causing a bomb-out]. So then I'll say[23], 'Oh yeah, but that was Bob who asked me to enter this!'. So then I can phone them [the local requisitioner] and say 'Hey, where's that req!'

I: I'm interested because it seems like such a key field when things don't go right?

G: Yeah, well but really, it's of no use to getting the paper work processed and to allow

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[21]It is used in a way not unlike the "optional fields" and "ancillary" texts that Smith and Whalen (1994) describe in their case study.

[22]The data indicates that Gwen's perspective at this point is closely aligned with that of management. Despite her own descriptions, Gwen consistently hesitates to see the Oracle system as anything other than the "best", "most efficient" way to organize her activities. Gwen had a great deal of difficulty envisioning her work in ways other than the formal, authorized way.

I: How would you describe yourself as an employee?

G: You mean like conscientious and that kind of stuff?

I: Sure.

G: Yeah. Faithful, conscientious, dependable, umm, like I will always go a step further, you know. Like I would never just say, 'I'm sorry. I don't know.' I think I am a very good employee.

I: Would you say you were a loyal employee?

G: Very/ And I think I have a bit too much guilt. I always feel guilty if work is piling up and stuff.

[23]Here G, interestingly, mocks-up a dialogue with the Oracle system.

you to receive. It's just [pause] that [the sub-formal variation[24]] would be the main reason that we would use it.

I: No, but if something comes in and things aren't matching up then you can go to that Description field and you can make things match up right?

G: Well, if somehow I can get a requisition number or say the packing slip came in saying 'Attention: Bob'. And that's all I had. I could go into the Vendor field. Query on the vendor. Like say if it's X company, and bring them up [a list of all the PO electronic records that involved X company] and then say, 'Yeah, that was Bob' and then eventually figure it all out. It's just for us. For ourselves [clerical workers].

Beyond automatic monitoring of Gwen's work, there is also, as I've indicated, more traditional 'manual' surveillance that specifically includes the monitoring of the Description field by supervisors (as Oracle's monitoring does not).

> Like also when it [the PO Electronic Record] goes to accounting for approval... They're really not interested [in what goes in the Description field], although the other day I put something in there for my own, 'So and so needs the invoice by year end'. Well, it went up to accounting and [her manager] called me back and he said 'You can't put that in there.' [Gwen replied] 'But it's just for my own information.' [her manager said] 'Yeah, but if an auditor came in and saw that it would trigger' [Gwen replied] 'Oh, yeah.' So they don't/ So it can't always be used for what you think.

Clearly, Oracle plays a major role in the reproduction of capitalist relations of production in the local office, plant, and indeed across trans-national corporation, but also provides a type of interactive context (its software design in conjunction with the social organization of the workplace, economy, etc.) in which Gwen learns. Gwen tells us plainly that her day "just flows" with little or no direct supervision. Instead of direct managerial discipline, her work day is structured based upon the corporate logic embodied in specific fields, screen-texts, and design features of Oracle. Key fields, then, are the actual sites in which competing logics clash, and formal and informal organizational sequences of action meet. Before concluding, let us briefly put this into perspective using a comparative example. If these production relations were to be reproduced on a traditional auto assembly line, our imaginary auto workers would be removing over "80%" of the cars, fixing them manually (contacting suppliers for missing parts, establishing their own relations with

[24]Recall from above that the sub-formal variation accounts for "about 80% of the PO's" according to Gwen.

suppliers, etc.) and then returning the cars to the line so that they roll off the back end of the line in what appears to be a technically controlled and rationalized process. Quite literally, Gwen and co-workers create their own systems of information flow, knowledge and skill. The clerical workers like Gwen collude in their own monitoring and discipline by directing their considerable energy, dedication and creativity towards maintaining auto parts production. To do this, these workers must generate interactive "space" in which they exercise their own discretion that is not formally made available by the company. Finding time in "bits and pieces" to informally work with other clerical staff as well as engineering and maintenance departments in order to bypass Oracle is the "space" in which the majority of their computer learning actually takes place.

6.11 Summary of Case Studies

This chapter has attempted to cover a good deal of ground, and its function in relation to the thesis is an important one as it provides the backdrop - or *micro-contextualization* - for the interpretation of interview and survey materials that cannot provide access to the same level of tacit, interactive structures which these case studies reveal directly. I've indicated the limits of these particular cases pointing to, in the first case, the fact that the interaction takes place in a more formalized learning setting, and in the second case, by recognizing the fact that the interaction takes place amongst clerical as opposed to the industrial workers. Despite these differences, I argue that the model of conscious and tacit learning interaction they outline, the specific problematization of expert/novice relations they demonstrate, and the class-based structures they make explicit have enormous relevance to the conceptualization of computer learning in the rest of the analysis. While these are obviously not the only useful ways to approach the concept of learning, these methods of sequential analysis offer a powerful way of taking a close look at - *and generating strongly warrantable claims about* - the nature of computer learning and tacit knowledge and skill production in the everyday. Furthermore, both methods resist a collapse at the micro-level towards internalized, psycho-physical explanations of learning premised on the notion of the autonomous individual. Both methods make explicit how the individual agent is an active, skilled decision maker, but inseparably situated within a broader tool-mediated, political economic and historically

specific activity.

I've also suggested several difficulties that may be specific to computer-mediated activity in particular. In the first case study, the computer-mediated nature of interaction, the status of the participants as mutually 'novice' to one another, the physical lay-out of the stations (i.e. mouse inaccessible to both participants), all add considerable complexity to our analysis of interaction and learning. In the second case study, these challenges are contextualize further by drawing on the attempts of a clerical worker to play her role in an organizational sequence of action where informal variations of the workers' own making actually provide the opportunity for changing participation and hence learning. I suggest, in fact, that periodic reflection back to the types of learning interaction outlined in this chapter will help provide a sound footing for understanding data provided in other chapters.

This chapter presented a model of computer learning that also helps make visible some of the class dimensions of this activity. For example, my brief discussion in the first case study of extending the sequences of action suggests a way of recognizing the broader context of micro-interaction. The notion of "distal influences" was suggested as a way of seeing that people's relationship to the labour market as wage-earners (rather than owners of capital) actually plays a role in this micro-interaction by producing the co-presence of one another (the very *first* "action" in any sequential interaction) at the Labour Education Centre. Likewise, Gwen's relationship to Oracle software also suggests a working-class standpoint in human-computer-organization interaction. The second case study demonstrates how historical relations of design and development of software are translated into activity in the capitalist workplace vis-à-vis tool-mediated labour. This tool-mediation pre-figures particular uses and social relations as well as particular standpoints in these uses and relations. Oracle clearly does not stand over the work of senior managers in the same way it does Gwen and her co-workers. More specifically, the experience of Oracle described in Gwen's activity is class-based in the sense that information fields organize her actions in order to turn her labour power into a profitable element of the capitalist labour process. The informal organizational sequences of Gwen and co-workers are not only essential for the profitable functioning of Oracle and the purchasing department generally, but offer the means

by which she learns in the course of work despite Oracle. This contradiction is linked to the inherent contradictions of capitalist labour process that must, somehow, balance the need to enforce discipline, intensify work and monitor workers with the need to profit from creative abilities of workers to problem-solve together. As we saw, though the idea of Oracle suggests the perfect corporate panopticon, this prospect appears to be neither possible nor productive for the corporation.

Chapter 7
Tool-Mediated Participatory Networks Amongst Working-Class Computer Learners

Overwhelmingly in the open-ended interviews of this research when people talked about computer learning they focussed on practices that took place outside the classroom. Only in certain instances, which we'll examine, did people indicate that they participated in institutionalized, course-based learning. When it was mentioned, it was placed at the periphery of computer learning interests, efforts and practice. In other words, while interviewees may have dabbled in a class or two in the workplace or a course in the local high school or college, their computer learning emerged from and was firmly rooted in less formalized learning in their everyday practices. As I interviewed people, sorted and analysed data and began to understand emergent themes it became clear the degree to which this everyday learning activity was not understandable as isolated lessons. Rather, this learning was *embedded* in other activity. It was the result of the *intersections* and *overlapping* spheres of activity of which only moments in an ongoing stream of practice could be seized upon in interview discussion directly. My discussion of a working-class technological common-sense in Chapter 5 was meant to provide considerable background to our understanding of the interrelation of key spheres of activity by outlining a general motive-structure of computer-based activity. In this chapter, I argue that we cannot meaningfully understand practices separate from these overall motive-structures of activity.

Leont'ev defines the relationship between action or practice, goals and motives in activity as follows:

> Action is that goal-directed process not engendered by the goal alone but by the motive of the activity as a whole, which the given action realizes. For example, I go to the library. This is an action; like every action it is directed to a determined, concrete, direct goal ("to arrive at the library"). And this goal in itself engenders my action. I go to the library because I am looking for something I need in the study of literature. This motive causes me to set myself the given goal and to carry out the corresponding action. Under other circumstances the same motive might have evoked entirely different actions; for instance, I might have gone not to the library but to my friend who has the literature I need. How is the direct goal of the action recognized? In order that I might recognize it, I must of course realize its relation to the motive of

> the activity. In order to study literature, it is necessary to go to the library. Thus that which occupies in activity the structural place of the goal of some kind of personal action must necessarily appear to the subject (be reflected by him *[sic]*) in its relation to the motive of his activity, and this means that it must be recognized... In other words, in order that the perceived content be recognized, it is necessary that it occupy the structural place of a direct goal of action in the subject's activity, and thus that it appear in a corresponding relation to the motive of this activity.... Thus when we are dealing with any activity - for example, learning - very little of what is perceived by the subject, and without which the carrying out of activity is impossible, is also actually recognized by him. In spite of what is apparent, what is actually recognized is only that which enters into the activity as a subject of one or another action that is carried out as its direct goal. (Leont'ev, 1978:152-155)

Shifts in practice, new opportunities for discovery and changing forms of participation are what define learning. Here I also argue that these shifts are partially driven by articulating spheres of activity, as well as, mediation by the computer itself, and that these dimensions of activity cannot be understood in isolation from each other. In other words, while practice is structured by a broader motive-structure it is also driven by conditions, problems, issues and challenges, or local contradictions, posed by the computer-artifact and other conditions of practice in the local setting. While I'll talk about the concept of contradiction in terms of broader historical and political economic dimensions in Chapter 11, here I focus on the way people organize their computer learning in (multiple) local settings.

Perhaps, the most significant issue for our developing understanding of the relationship between social class and computer learning, however, concerns the durable patterns and ways that working-class people actively engage in these forms of computer-mediated activity. Specifically, we can see that these activities are *collective* in character. People in these interviews described well-defined, integrated networks of computer learning. In describing the practices of working-class computer learners we can begin by reflecting on the notion of "rich relations" of learning as described in Lave and Wenger's theory of "Situated Learning":

> Rich relations among community members of all sorts, their activities and artifacts... all are implicated in processes of increasing participation and knowledgeability. (Lave and Wenger, 1991:84)

While it is the core argument of the neo-Vygotskian perspective that it is impossible to learn

without at least the figural presence of social relations (e.g. such as those solidified in a book, language, concepts, or other tool-object), amongst interviewees these networks were durable, collective social organizations which I suggest may be specific to a working-class standpoint and learning habitus. In analysing these learning networks, I suggest that they represent a type of, not simply group-based but *group-oriented*, activity which I've termed "solidaristic". While group membership, *shared* experiences and language are essential elements of these groups, these networks are also communities of *difference*. I argue that it is the difference amongst group members that in fact provide the opportunity for a type of mutual, co-learning. Difference is, as Lave and Wenger (1991) have also argued, a "resource" to be exploited for learning rather than a problem to be avoided.

The overall tendency to emphasize, prefer and to rely on learning in everyday life rather than learning that is formally structured is a part of a working-class learning habitus. Furthermore, while people from all social groups partake in learning in the everyday, the relationship between this more informal learning and formally structured learning amongst subordinate groups such as the working class is rooted in an oppositional perspective. This working-class computer learning is defined by practice that begins from a subordinated class position which *confines* creative transformative openings to *interstitial* spaces beginning first in school, through the combination of discipline and class-cultural bias working-class people experience, and later in the regulation of the workplace even in working people's relative subordination in consumer markets. This mode of collective action is a response to the objective fact that the vast majority of working-people must actively rely on each other, whether formally (e.g. labour unions) or informally (e.g. buddy-systems in the workplace, family supports, learning networks such as I describe here) if they are to realize any significant elements of control in their lives.

Of course, summarizing the major themes pales in comparison to the living complexity, structure and agency, and simultaneity of concrete life. So as a way of providing a grounded introduction to many of the central themes of the chapter, we can consider the

case of one 53 year old chemical worker I'll call "Jackie".[1] In her learning life-history we find out that Jackie is a worker, wife, mother, grandmother, musician and participant in separate communities of relationships ranging from her local union to her local bar. These are spheres of activity that overlap to provide a rich texture to her learning life, with different activities running, like separate threads of a densely woven fabric, simultaneously through her life. She has, in fact, worked in factories, first at a steel mill and now a chemical plant, for virtually all her adult life. In Jackie's set of interviews we also find out that her daughters are viewed as particularly important to both her and her partner's computer learning. Jackie talks about how she would like to use the computer to obtain and store her music for example, but it is her working-life and family-life, in particular, which overlap in terms of computer learning practices where we most clearly see the interests and the broader purposes that shape the overall activity. One of Jackie's daughters graduated high school and has worked ever since at a bank, while the other daughter, after working a series of part-time and short-term secretarial jobs, has actually begun working in the office at the chemical plant. These jobs have provided both daughters considerable work-based computer experience. Both daughters live nearby and visit frequently. Jackie cherishes the time she can spend with her grandchildren for example, but these visits also provide, as she tells us, for countless opportunities for discussion of one of her most serious learning interests, namely computers. Interwoven with family get-togethers, often the whole group is engaged in computer learning and discussion of computers on an ongoing basis.

Similar to the findings discussed in Chapter 5, everyone in the family takes computer learning very seriously. According to Jackie, they all feel that it is vitally important for their working lives as a primary means to develop some job security, open up opportunity for advancement, as well as to understand what they see as important changes in their workplaces. While this begins to provide important information on the overall motive-structure of working-class computer learning as emerging from and concerned about paid work relations, below Jackie also provides us with a description of how she prefers to learn -

[1] See earlier quotations from R12, for example, those found in section 4.1 of Chapter 4 for further context to important elements of "Jackie's" life.

actively, hands-on, and amongst family members. It is an active, participative learning process within which she can carry out her own practice in the presence of her daughter, who if Jackie had her way would be participating along side her in a type of parallel co-learning arrangement that is somewhat different from a traditional pedagogical model. Sorting out the vision of ideal learning relations that Jackie describes is made somewhat more difficult by the language itself. Jackie, for example, struggles with the use of the term "myself" - clearly there is a self-consciousness involved in the learning but we cannot make meaning out of the learning if limited to the activities of the individual. "Hands-on" is also an important dimensions of many of the descriptions of working-class learning in this research. It suggests a type of practical-critical engagement that is part of attempts to background overtly "intellectual" content (which is nonetheless present). My suggestion in this research is that these elements and themes are all part of practices which un-self-consciously help sustain the type of "interstitial" and "solidaristic" networks that working people rely on most.

R: I used the computer a lot at the steel mill when I was working in stores... So the kids wanted to know what I wanted for Christmas one year, so the kids bought it for me [a computer]. So I worked at it a little bit and [my daughter] had this WordPerfect on it. And she's got the booklet and she showed me how to do it because she knows how to do it. [My partner] has to do it on his job too, and he has things to do at home too so he said `We've got to sit down and we've got to learn how to do it, more often than what we do'... What I would really like to have is *two computers where I'm doing this one and she's doing that one* and I could actually learn.

I: That would be ideal wouldn't it.

R: It would be, or else I'm going to have to sit down and she's got the book and she'll say do this and that, and I could learn from that point of view as long as I'm *doin' it myself.* If she shows me what to do, what she's DONE, I haven't learned anything. All I've done is watched her. I need to do it myself. That's how I like learning, by doing it myself. I think you can learn a lot better and learn a lot faster by doing it yourself, rather than have somebody showing you all the time and not being physically able to get involved and do it.

I: I think it actually helps your memory a lot more.

R: I think it does, that's what I'm saying. It helps you to remember things a lot more by actually doing it than watching somebody else do it all the time and trying to remember it. You can probably learn the stuff in half the time if you do it yourself...

I: So learning by observing and then doing.

R: Yeah, and doing it as you go a long. But a lot of the times when I'm learning something, they'll show you what to do, and I'll say `do you mind if I do it because I learn faster by doing it myself' and I prefer to do it rather than watch.. (R12)

Below I'll present more elaborate excerpts, but this strip of talk is meant to simply introduce, in a grounded way, several key themes that we will return to in greater depth. Jackie remarks, "We've got to sit down and we've got to learn how to do it, more often than what we do." Again, this sense of urgency that positions her family's computer-based practice points to the type of contexts outlined in Chapter 5. Jackie's insistence on the "we" in her approach to learning is also notable. Despite comments on computer operations in her work and needs that arise there, practices that she thinks of as learning are clearly rooted in collective relations, in this example, around the home. At the same time, learning is an active social process, and Jackie tries to describe how she opposes simply being passively fed information, watching others, or even reading information in a book. As Lave and Wenger describe in their theory of learning, "there is very little observable teaching, the more basic phenomenon is learning." (Lave and Wenger, 1991:92). Indeed, Jackie tries to describe a type of ideal participatory computer learning with her daughter that serves a double purpose in the sense that it meets important economic needs but which is also part of enjoying her family life. The computer learning that people in this research undertake is not fully understandable if separated from family relations, work relations, and community relations of various kinds. In specific contexts such as Jackie's, relations in each sphere play a role in the meaning and structure of the computer learning practices that fellow musicians, co-workers, friends and family undertake which overlap and inform one another over time.

7.1 Tool-Mediated Practice

Before entering into discussions of the complexity of working-class computer network formation and development, it is important that I outline the character of the more basic tool-mediated practices that people described. I refer to the notion of narrowly construed contradictions that posed problems and challenges in terms of the immediate conditions of computer learning. The in-depth micro-analysis provided in part one of Chapter 6, in fact, was an example of these types of computer-based contradictions of the immediate conditions of interactive practice. At the same time, while important, the social context of the case study in Chapter 6 tells us little about the type of working-class computer learning in the everyday we wish to focus on in this chapter. For everyday learning in less

formal learning settings, established relations with an existing social group or network are very important. These social connections are an example of what Lave and Wenger (1991) call "peripheral" participation. Indeed, participation with a group helped establish interests in specific content and goals. It is the unique challenges of establishing meaningful peripherality for subordinate groups that leads to the unique habitus and forms of practice. In the case of working-class computer learning networks these groups also drew on their shared common sense about the relevancy of computer learning topics.

One of the most interesting features of the excerpt below is how it is so difficult to "learn" without some kind of social network. It is the absence of these social relations that, as absurd as it sounds, explains this interviewee's description of how *not knowing* is a barrier to learning. Indeed, the "1-800" number below is so important to this person because it establishes a basic form of peripherality or social relations from which to begin. The 1-800 help line is, of course, 'purchased' peripherality which involves a significant set of relations which play a structuring role in activity. More importantly for this specific section however is how we can see that problems encountered in the course of using the computer play a role in pushing the learner's computer-mediated practice towards new skill and knowledge, as well as specific forms of participation with others.

R: ... and I originally bought a clone and thought that I could just bring home and install it and have everything up and running and it wouldn't be any problem. Well *one of the problems because, well I basically knew nothing*, I thought I knew something but I basically knew nothing and fact was I got the computer home and one thing was there wasn't an "Intel chip" inside. So it wasn't compatible with half of the software I had. Well it would be compatible if you knew how to configure it all, you'd have to do some work with your autoexecbat, your configsys files and stuff. I mean it was way above and beyond me, I had *no idea of what the salesman was talking about.* I took the computer back to the store and he was telling me 'Well you gotta do this you gotta do this.' I just said forget it this is not my cup of tea. This wasn't what I was in here for, so I bought the "Compaq". I bought the Compaq and with the Compaq came the *1-800 help line*, so now you had computer that when you brought it home all I did was plugged it in, turned it on. It was self-loaded. You didn't even have to load a diskette and after about 2 hours you were online. Now that was great. There was no real problems from the start but *my two boys* were on it a lot and we started running into *problems*, deleted programs, mainly deleted programs, and *system would fail* a few times. Also had some *problems* with the fax-modem a few times, the phone and different things came up and probably within the first few months I phoned that 1-800

help line and *from that* I started to learn DOS....

I: Okay, starting say tomorrow, if you wanted to learn more about, say if all of a sudden you developed an interest in the Internet or whatever how might you go about learning more about it?

R: Well, hmm, lets put it this way, *I don't want to use the Internet as an example because*, instead let's say it was like this Excel, okay? I usually, the way I go about things is I try them and if I have the interest then, but it's fairly new to me too, like basically, I just got the computer and I've got used to the computer *now you're talking about adding software that I don't know about, so that's a little bit new.* I haven't really done too much of that, Excel is my only experience with that and I usually just dabble in it myself. But, the best example I could have for you is when I first bought the computer, we went on the Compuserve... I was very disappointed in it, so in other words I went in and I tried it and 'What do I have here? What's the big deal?' *Now I know* Compuserve is are on the Internet, *so it's different*, but at the time I was disappointed. (R16)

Focussing on this interviewee's discussion of the Internet we see that the broader relevance of specific goal-directed learning must be established for learning to proceed. Things that are "a little bit new" are not necessarily seen as relevant. When the interviewee says "Now I know", we can ask ourselves how, exactly, the topic came to be "different" in this way? Relevance is accomplished as we'll see below by engagement with stable collective networks that emerge from already existing relationships in various spheres of activity. Systems of relevance, however, are class differentiated. For working-class computer learners in this research, computer learning is inextricably linked with overlapping activity systems experienced from a specific standpoint. Specific forms of participation provide the relevance for specific conscious, goal-directed learning. The numerous "problems" that arise are a function of intersecting spheres of activity (e.g. computer learning activity and family life with his "two boys"). Furthermore, relations between these overlapping spheres of activity are *not* typically subject to discretionary organization, efficient arrangement and scheduling that is easily controlled by the working-class learner. This is because in virtually every sphere of activity other than the home, participation is regulated by interests other than their own. People's participation must accommodate these other interests, work around them, find spaces within them and so on.

The interviewee above also says he doesn't think the "Internet" provides a good

example of how he would go about learning something new *because he hasn't yet completed this learning*. This supports the important claim that learning is a moment-by-moment accomplishment that when discussed in concrete specific ways, particularly outside of institutionalized relations of learning, is a constantly negotiated, rather than a rationally pre-planned, process of social participation. Once in contact with the appropriate source of information or experience, information processing, individual internalization and learning transfer is unproblematic. While problems with the artifacts themselves also drive shifting participation as changing conditions of goal-directed practice - learning, as we see in these and other data, includes the entire class differentiated processes that produce these patterns of contact.

Examples of similar types of home-based learning are common in the interview data. Overlapping spheres of activity are also talked about in this brief example. We see how problems with the artifact itself produce opportunities to learn. Here we see the computer activity of an auto worker and his high school aged son whose time together also doubles, as seen with Jackie and her daughters in the introduction, as a family interrelation. They learn collectively in ways similar to the pair of computer learners in part one of Chapter 6, building knowledge cooperatively, together.

R: He [his son] learnt it on his own, a lot of it. I'm surprised the stuff that he can do, you know. I showed him a bit of things, and both together, we solved a *lot of problems* together. So we sit beside each other and/
I: That sounds like kind of nice activity, actually.
R: Yeah. It is nice. Like that e-mail thing *problem* I was telling you about, you know, *we're both sitting there and we're shakin' our heads*, you know. (R5)

Tool-mediation in these activities poses a set of problems, a type of contradiction at the level of the learning conditions, that pulls learners into changing forms of practice and participation. The relevance of the specific forms of tool-mediation (e.g. the Internet or e-mail software themselves), as one of the conditions of this activity, is predicated by the conscious goal, but this goal is also partially established in the situation itself through the participants social interaction with each other.

These types of learning relations are not limited to the family. Take for example

another common computer learning activity that, in fact, does not involve a home-computer. It is the type of peripheral activity that interviewees typically inserted into their descriptions of how and where they carried out their computer learning. It emphasizes that computer learning is often a part of broader, everyday community relations.

> I'm pretty good mechanically, the only thing that's starting to confuse me a little bit is these new cars with the computer in them. I've been having a little trouble with this one [truck] but between me and the guy next door we been, he's sort of a mechanic too... (R17a)

This is a type of tool-mediated contradiction that arises as a condition of truck-maintenance in the context of neighbourhood life. The specific computer-based problem again helps pull the interaction along. A type of computer-mediated learning occurs that is incidental to the primary frame of activity which may be related to community life.

Many interviewees described similar scenes of computer-learning taking place within broad community relationships. In these descriptions we can begin to visualize the kind of community patterns of working-class life (where basic material stability still exists) described by Raymond Williams. These patterns provide a basis for participation that is generalized across learning practices, particularly where the lives of working people are more stable, organized and secure.

> There is a distinct working-class way of life, which I for one value - not only because I was bred in it, for I now, in certain respects, live differently. I think this way of life, with its emphasizes of neighbourhood, mutual obligation, and common betterment, as expressed in the great working-class political and industrial institutions, is in fact the best basis for any future [society]... A dying culture, and ignorant masses, are not what I have known and see. (Williams, 1993:93 in McIlroy and Westwood)

Working-class computer learning as I've tried to introduce thus far is the product of articulating spheres of activity that co-exist and interrelate with one another. At the same time, I've begun to argue that the shape of this learning has a specific character rooted in elements of mutuality and collective, group-orientations within developed and more or less stable working-class communities, though it is certainly true that this stability is under continual attack by trans-national capital and global restructuring. This level of group-oriented mutuality is demonstrated throughout the diverse, interspersed practices that

interviewees described. Comments about interrelations with neighbours, co-workers and so on peppered the ongoing talk about people's overall experiences with computers. Describing his relations with novice computer learners from his workplace in a way that was typical in this research, this auto worker tells us,

> I had people coming in, wanting to have a look at it, eh? Like a couple of guys wanted to come over. They say, 'Well I was thinking about buyin one', I says, 'Instead of buying it, just come over!' (R5)

7.2 Solidaristic Networks of Computer Learning

As I discussed in the introduction, the systems of computer learning that were apparent in these interviews could be described as something more than simply social relational processes of learning. These activity systems were based in non-institutionalized learning and demonstrated a type of group-oriented perspective that I call solidaristic. I concluded the preceding section with a comment from Raymond Williams and added a final brief quotation (R5) that seemed to apply the basic ideas of mutual obligation and shared interests to the practices of computer learning specifically. One of the basic correlates of these types of mutualistic relationships is the notion of group sacrifice. An orientation to the collective, rather than strictly the individual, good. Earlier in one excerpt a worker suggested that buying a computer can be difficult without some sort of informational support, and, in fact, the speed at which the consumer market in home computers changes is another example of how the artifact itself can seem to drive shifts in knowledge and practice. As these working-class computer learners tend to rely on their own networks of friends, co-workers and neighbours, it inevitably means learning from mistakes and also that at least one member of the group must make them.

R: You need to do your homework before you even go into a "Future Shop", or a "Brick", or something, because they will try to sell you everything. The salesmen will try to sell you something that's either outdated or whatever, or something's that really low end, okay? Like I went in knowing what I want because I read about it, I talked to guys about it, and everything. Joe had bought his machine, my buddy there Joe, he had bought his machine just before I did, so he let me know an awful lot about it, see? So that way, when I went to Future Shop, if they're trying to tell me, you know, "Well, you should get this." No, no. Because I know this. You know what I mean? Yeah. And I think anybody goes in there blind, you're gonna get taken.

I: You're gonna have to upgrade in a little while. And that's happened, especially the first guy in the group?

R: The first guy in the group is usually gonna have to change. He's gonna have to be taken, so that everybody else can be okay (laughter). Basically, he's a sacrifice. (R5)

When learners think in group-oriented ways, knowledge and experiences are collectivized more readily. This excerpt represents a level of group-oriented activity that, while not always working out for a specific individuals at any one time, does tend to serve the group well. The opportunity to compensate group members fairly in these circumstances through sharing of resources, equipment, software and information, however, seems to make these risks for individual members worthwhile.

Now I want to expand the discussion of working-class networks of computer learning by focussing with some depth on an auto worker that spoke concretely, at some length about how he and his co-learners carry out their computer learning. This auto worker (R16), who I'll call "Steve", is 36 years old and, like many of the industrial workers I interviewed, has become a computer enthusiast in recent years. Steve is married and has two young boys who use the computer frequently. After completing his highschool diploma, Steve went to work at a large auto assembly plant and has worked there for 17 years. He has changed jobs within the plant a number of times. Indeed, this process of shuffling from job to job was part of the motivation for his interest in computers in the first place. His interest in computers also seems to reflect a fairly developed working-class "technological common-sense" as discussed previously in Chapter 5. I visited Steve at his home in the late afternoon just after his two boys had returned from school yet before his wife, herself studying at the local college in order to re-train (in computers), had arrived. We sat down at his kitchen table for our interview with the kids running in and out for food while playing games on the computer that was set up in the next room. The interview itself was an active demonstration of how computer activity, family care (and now research participation) ran together with Steve answering questions from me and his kids about the computer.

After discussing Steve's general experiences in terms of learning and education, I asked him about his computer practices. At the beginning of the excerpt he describes the types of problems with the computer itself which I discussed in previous section, that

produced the conditions that required ongoing computer learning but were not necessarily part of the broader purpose or structure of the activity. The highlighted portions below focus on the constant interplay between talking and trying, and emphasize the development of learning as an ongoing process of collective discovery. This social participation itself produces what is, in fact, to be learned. Expert practice in this description is a moving target that no single member of the group or network of learners that Steve is involved with 'possesses' alone. The practices and modes of participation shift within a spiral set of relationships that proceeds through talking and trying, trying and then returning to talk some more. There is a palpable intensity to his engagement in this computer practice that seems to come through even in the written text. It is a level of excitement that is difficult to fathom were we not to have explored the roots of the working-class technological common sense. There is also a type of dialectic of self and group-orientation that emerges. Throughout, however, there is a type of interactive dependence on group membership.

I: What are some of the resources you draw on? You have a 1-800 number you draw on but you haven't drawn on that too much?

R: Basically in the first 2 months I drew on it, but they weren't even actually my own problems, a lot of cases, it was, I had fax problems so I was dealing with them a lot with that, that was part of the machine.

I: So it really died down after a couple of months.

R: After my fax problems, in fact they ended up coming out with a whole brand new fax program.

I: Okay, what are some of the other ways you solve problems, I mean other than just by yourself, thinking it out, do you talk to people?

R: Co-workers. *Co-workers give you ideas but they give ideas but you come home and try*, but you still have to answer those questions that they don't tell you and you think, 'Ah geeze what am I going to do here, what am I going to do here?' Basically, like for instance I have a problem right now, when I re-loaded everything, my MS-Backup in windows isn't working but my MS-Backup in DOS is working. Okay so it comes up and its telling me in the system, in e-file, I'm missing one line. Device equals MS-DOS path, it doesn't matter. But it's just one path that's missing, so I got in the system in e-file and I put the line in that I felt it was looking for and then windows wouldn't even start up. So, that's how I learn. I just try, I go in *I try and do what they say and it didn't work so I had to back into the system* and take the line out and I was able to go back into windows, but in this case I haven't fixed the problem, so tonight I try and, I'll do it again, I'll try, like I think its maybe the, when it comes to a path or something like that your just guessing right you try different paths to see if they work but if I can't do it after an hour, I'll just phone 1-800 help because that's a software

problem I feel.

I: Yeah, like there is a user-friendly thing that should be involved in what they sell. Do some of these co-workers have anybody like an expert?

R: *Guys who we talk to at work we're all the same.* We're all the same guys who took the DOS level 1 and 2. Guys have *different interests* though, one guy is real big on the Internet, one guy is real big on reading, he reads everything possible about computers, so you got a mixture of guys there. Guys who'll try anything. (R16)

The statement that "we're all the same" with "different interests" points toward the importance of differences within the group that I mentioned earlier. His practices alone are not only social in terms of the social relations inherent in the computer artifact itself, but cannot be fully understood in isolation from a process in which he talks to co-workers and tries out the advice given (as they in turn do the same thing).

Steve goes on to outline more features of this participatory network. Below we get a clearer picture of the skills and knowledge that interviewees like Steve value, but most importantly we see a type of fluid, open-access to a durable network of relationships. This is a core feature of the learning practice described by many interviewees. We also see that this network emerged from and is rooted in patterns that characterize the strongly collective, unionized shopfloor culture at his workplace.

I: Do you have any general observations about how you learn the computer, like do you favour one kind of way of solving problems, just in a general?

R: Myself, if I was to talk from the way the group is, myself I'm rough: I go in; I go deep; I get myself into trouble a lot; I cause a lot of problems, but I don't mind it I like trying to fix it. I like trying to fool with the DOS programs or the batch files or the autoexecbat or all that stuff. That doesn't bother me, but it has caused a lot of problems too so, but I don't mind doing it. There's another guy at work, if you were to interview him, he reads and reads and reads everything before he'll do one thing, *and even after as a group we talk about what just happened*, he would be very leery of trying anything or doing it, like when we installed the autoexecbat that'd give you either games or normal, basically he was using a boot disk, well *we said* it's the same thing as a boot disk but *we had to convince him* and he had to go home and *read* about it. You know it's one of those things where he eventually did it but it took him 6 times as long as everyone else. Then we have other guys who, they won't do anything unless they've *talked to some computer genius*. You know they'll go out and find someone who's a real computer genius.

I: Like a buddy or/

R: Usually there's someone at work who really knows his stuff and they'll go and say well this is what *we plan on* doing what do you think? And they'll get the idea.

> There's a couple of us who are willing to go muck around and but it's cost us a few times. (R16)

There is a significant degree to which the line between individual and collective dimensions of activity are blurred in the ongoing process of participation. This is what I referred to as a self/group dialectic. Differences amongst group members such as preferences for doing one's learning through "reading" (which was relatively unique amongst interviewees[2]) or the need to consult someone outside the group who was considered a "computer genius" are both framed in the context of group activity marked by such phrases as "we had to convince..." or "we plan on...". Notably, the "computer genius" is talked about as a resource rather than a guide or leader (who would take on greater control over what was done and how); a resource only selectively used; and, a resource used in the context of the established network.

7.3 Differences as Resources in Learning and the Construction of Peripherality in Computer Learning Networks

In the focussed look at one set of auto workers' activities we saw an interplay between similarities and differences, and the importance of the group for establishing peripherality and even getting started with one's computer learning in the first place. The similarities amongst group members seemed to refer to a general interest in computers and technology connected to many of the issues of class standpoint and common sense discussed in Chapter 5. The workplace, in this context, is pivotal. The differences were rooted in more specific interests including software, hardware, and uses such as the Internet. This mixture of similarity and difference in expertise and interests composes what Lave and Wenger refer to as "resources" of a community of practice (1991:117). It is a dimension of learning that traditional forms of pedagogy and schooling largely treat as a threat to the curricular process, accountability and evaluation within credential production. In this section we examine another interviewee with some depth. "James", 44 years old, works in an auto parts factory. Like Steve, James was also involved in a kind of computer learning network that was

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[2]This is not to say that interviews necessarily had low reading abilities (which was not investigated), but rather that, as many people said, they did not prefer to learn this way. Exceptions to this will be noted later on as well in the context of differences as group resources in working-class computer learning.

connected to his workplace. At his home, the downstairs is littered with spare computers, sets of disks, and spare computer parts. He describes the same type of solidaristic learning network, that we saw above with Steve. In the following series of extended excerpts James outlines how differences function in these learning networks as people experience life changes, 'network' with others, and, in general, experience the unexpected effects of overlapping spheres of activity. Perhaps more than in the example of Steve however, we see how computer learning from a working-class standpoint seems to operate in the "interstitial" spaces of the workplace and even, in a sense, the consumer market as members of the network circulate copied software, exchange hardware, help with system configurations and do repairs for each other cooperatively. In terms of our discussion of differences within the group, we see that it is used as a resource for all members, and that the mistakes of members are especially important experiences made available to others. I interviewed James together with his wife "Lisa" (R2 in excerpt below). We pick up Jame's talk just after I've shared my own computer problems and inquired into how he became recognized as something of a computer expert in his workplace.

R: Like one of the other guys I work with, Gerry... 'Well,' he says, 'I'm looking to buy a new one. What should I buy?'
I: So he came to you?
R: Yeah. And like all these guys at work. Well, I bought a computer and I say, 'If you ever buy a computer, come to me before you buy one.' Because *here I am, I got a unit that's not expandable.*
R2: And *we learned too,* like/
R: So I learned right off the bat what to and what not to buy. Because here I am, I want to put a 486 card in. Not available. I can only go 16 megs of RAM because one's on the motherboard permanent, and one's in a clip... I had my ex-wife's computer a couple of days [trying to fix it], and then I end up I couldn't straighten it out, so I took it to Gerry, and he straightened it out. So he fixed it all up.
I: *But he kind of learned from you, though I thought?*
R: *Yeah.*
R2: *But he went by because you were saying he started after, but you'd be going to him about stuff after while too.*
R: Yeah.
R2: Like he started to learn.
R: Within six months to a year. But, see, *he's a reader.*
R2: He's teaching himself.
I: Yeah.

R: He's a reader. He loves to read. I don't like to read.
I: Oh. So he has that as an extra resource?
R2: Like the manuals and that to learn.
I: Okay.
R: See, that's the difference in a lot of people, some read and some don't. I'm not a reader...
I: So this Gerry guy has taken to some of these books, like he kind of looks through them?
R: Oh, he's passed me like a hundred miles an hour because I'll go in here and I'll go to work and I'll say, 'Gerry, I couldn't get this to run.' 'Alright. Well, you gotta go in and you gotta do this and this and this and change your config sys file so that this'll run, okay? Or else, you gotta. Oh here! Here's a boot disk'. Like we go through all this stuff together at work. I've got disks in my locker and so does he. And then there's Ross.
I: Ross?
R: He's self-taught, too. And his is like a computer that started out like yours.
I: Yeah?
R: His brother got him a panel and the next thing you know he's got three hard drives in it and/
I: Oh. So he's really/
R: It's all, but it's a 40 meg hard drive stacked and then the other one isn't stacked and another one's only for games and it's all just bits and pieces that they've put together over the years. He's totally self-taught. He bought a IBM. It's IBM-clone or something like that... Here he is, he's sittin' here and he's got nothing to do. He's bored. He sittin' -- he lives alone, eh?. So he buys another one. But he didn't just buy a whole computer. He went and well, gotta have a board first. Then he bought a box. And then he bought a sound card, and he built it all himself with no computer knowledge before at all.
I: And would he be over here a lot kind of just askin' stuff?
R: He did a lot of the, like, the programming and that, he got a lot of it from me, and he got a lot of it from guys where he works. But then, there's like 25 guys that he works with that are all into computers, too. So they say, 'Go buy this one here or take a look at this one here', And then, 'Come on over to my place tonight and look at this and look at that'. And so on. He started right from scratch and did everything right up to the total program of everything worked perfectly. (R4a/b)

James outlines how his work relations overlap with his home computer learning, and that with the additional contact with a neighbour he is actually benefiting from learning networks at a different workplace altogether. As in other excerpts, the dialectic of self/group is at play in this account as well. James makes claims about self-taught learning that, he explains, must still be understood as a mix of individual practices in the context of contact with a supportive

and durable learning network. Exchange of hardware repairs, peripheral involvement with the neighbour (also an industrial worker) who builds his own computer is also part of the mutual learning and exchange process. James also outlines how ebbs and flows in people's lives play a role[3] in the group's learning and how 'teacher' and 'learner' (as with James and his co-worker Gerry) often switch roles. Both in the above excerpt and the ones that follow, James outlines how differences in expertise, interests and material resources such as 'free-time'[4] within the network help drive changing knowledgibilty and James's mode of participation with others. In the most basic terms, James moves from novice to expert, yet this is a living set of relationships: the ebb and flow of complex intersections of activities, different learning methods (e.g. reading versus trial and error) can sometimes reverse these roles. Thus what Lave and Wenger refer to as a "centripetal" force (1991:122) of changing participation and passage from newcomer to old-timer is not linear or absolute, particularly when the field of "mature practice" itself is perpetually changing. After passing me a package of neatly tied disks (which he had ready for another learning network member) to use myself and share with others, James went on to comment:

R: They want a thousand bucks for a program? No way.
I: Yeah?
R: Okay. If they want to sell that program, bring the price down and sell a million of them.
I: If it's gonna be up so high, yeah.
R: You know. See, because there are companies out here, they throw this old stuff out...
I: So you just keep your ears open and everybody else keeps ears open, pass things around, copy, work things out?
R: Yeah.
I: A network. Is it a fairly small group of people?
R: It's monstrous.
I: And it's all kind of between people, and somebody else would have some buddies/
R: Alright, here's an example, okay, since I bought computer, I got a lot of help from Robert. So you start at the top of the tree. Robert got me into it, alright? Then Kevin's got one. Alright. Well, Kevin's illiterate, alright? But he bought a computer anyways, so that his wife and kids could use it. So Kevin. Then Gerry, okay? And

[3]The neighbour whose family has left him and who now lives alone has extra time on his hands.

[4]Indeed, as we'll see in Chapter 10, the notion of 'free-time' expresses the intersection of a whole range of social and material resources that not all segments society or even of the working-class have equal access to.

Chuck. It's all at the same time. And then, who else? Ross, alright? So there's five... Well, they've all spurred one or two. Let's say, Gerry says, 'Well, my brother was gonna look for a computer'. Well [we help him out]. They're Internet surfing all the time eh? And they're into this stuff and they're on the modems every day, and they're gettin' all the Bulletin Boards and that.

I: So it just grows and everybody probably will have a buddy in the next couple of years that's gonna want something?

R: That's right. Like now, Paul around the corner, he's got one and that. So there's another one there.
(R4a)

The working-class computer learning network that James describes is expansive, and provides a significant forum for the interconnection of different specific computer-mediated activity systems. As a basic Vygotskian observation, we can see that the inter-connections between people actually drive the learning that people do.

In looking back into how he got started, James recalls that he drew on a friend at the factory. This excerpt begins with James's description of overcoming an initial fear of technology. He then describes how he and his friend learned about computers using the telephone.

R: Other people were afraid to try it. But after awhile with the computer, I wasn't afraid to do nothin' on it, because I knew damn well there's my own personal expert out there that can help me fix it.

I: And the expert was your buddy, right?

R: Yeah. Robert, yeah.

I: Now if you didn't have a buddy like that, you think you would have been/

R: Maybe not. Maybe not as/

I: As bold?

R: As, yeah, as bold. Yeah... It takes balls, because you're gettin' in there and you go, 'Geez. Should I do that?' And so I would say, 'Hey, Robert, am I doin' this right?' And go for it, yeah. 'Alrighty!', and then, he'd just hang up, eh? *He didn't even say good bye or nothing*. He'd just hang up and that, because he knew damn well I'd be phonin' him back again, you know?

I: That's right.

R2: (laughter)

I: Save you a bit on the phone bill whatever he could.

R: Yeah. Yeah. (R4a)

Interestingly, James directs our attention to the type of "suspensions" of interaction that were discussed at length in the micro-analysis provided in part one of Chapter 6. While not all

activity needs to be self-consciously understood as or keyed as "learning" for shifts in participation to occur, when activity is keyed *as learning* different interactional rules would seem to apply.[5] As we saw in Chapter 6, keying an activity as "learning" can alter the mode of participation in significant ways. That a person needn't "say good bye or nothing", for example, signals that a frame of activity has been keyed in a relatively specific way. James also describes the role of stable networks of relationships in the production of what Lave and Wenger (1991) refer to as "legitimate peripherality". It is only by access to a group or existing sets of stable relationships that, according to interviewees like James, errors and potentially costly mistakes that render equipment unusable, can be made part of a correctable practice. This peripherality is thus achieved socially but has important material effects for the working-class computer learner.

> At the same time, productive peripherality requires less demands on time, effort, and responsibility for work than for full participants. A newcomer's tasks are short and simple, the costs of errors are small, the apprentice has little responsibility for the activity as a whole. A newcomer's tasks tend to be positioned at the ends of branches of work processes, rather than in the middle of linked segments. (Lave and Wenger, 1991:110)

While Lave and Wenger's discussion refers to apprenticeship programs, their insights are helpful here. For James, peripherality as a learner is produced from individual friendships and the ability to sustain solidaristic networks amongst a conglomerate of neighbours, friends and co-workers.

7.4 Goal-Direction and Motive-Structure of Computer-Based Activity

In Chapter 4 as well as in the opening quotation of this chapter from Leont'ev (1978), we discover a basic apparatus for making visible the way that people's learning must be understood in a broad social relational way. But more than simply calling attention to how so-called 'social factors' affect learning (as educational theorists have done for decades) neo-Vygotskian analysis suggested that unconscious, conscious and broadly contextualized practice should all be considered within a single unit of analysis. Leont'ev's concept of

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[5]Since most social interaction people engage in is tacitly accomplished, we can say that most forms of shifting participation and hence learning are likewise tacit in nature.

activity suggests the importance of understanding an interplay between conscious and less conscious or tacit dimensions of activity. Goal-directed actions are conscious whereas operations and motives are less so. Yet, the explanation provided by Leont'ev is a highly structural one where we are asked to assume many of the social processes involved as people actually manage each of the different dimensions of activity in the complexity of the real world. In looking at how computer learning and social class are produced together, the data above confirmed the relevance of a basic type of neo-Vygotskian perspective, while also suggesting several complicating features that may require this basic analysis to continue to expand (as it has done over the years). One of these complicating features concerns the issue of intersecting spheres of activity.

To talk once more about overlapping activities, we can see how the issue emerges by looking at some brief comments by an auto parts worker I'll call "Sean". He has not yet undertaken much in the way of conscious, goal-directed computer learning, but like others he shows an underlying perspective towards technology that emerges from his work and his concern for his son's's future ability to get a job. Sean tells me that at 40 years old he has spent half his life working in the factory and he is clearly concerned about his abilities to get another job should he be laid off or ever need to move to a job on the shopfloor that requires extensive computer use. As Sean discusses computers at his workplace and the need for computer skills for the labour market, there is a mix of concern and a kind of glum acceptance. At other times, he seems excited about the possibilities of new technology. More importantly for this section, however, we see the character of peripheral participation which is punctuated by unplanned moments of learning that were not recognized as "learning" at the time they occurred. The coherence that Sean's account provides for these otherwise dispersed instances is not merely useful for discussing them in the interview setting however, it is a technique that seems to be applied to actual computer-based practice as well, and seems especially important to people as they attempt to draw on experiences broken up amongst a variety of settings as we've seen with working-class computer learners. The relevance of these concerns becomes apparent as we examine the sketch Sean provides of the way he would proceed to learn about computers provided below. It is premised on the

articulation of multiple networks of relationships rooted in other goal-directed activities altogether.

I: Do you get any information from TV or/

R: Yeah, actually a *radio program* on the e-line or what do they call it, e-mail and all that stuff, all through your computer now, how you go about it and you sort of when you *driving along* oh yeah well I'll write that down, that's how I pick up.

I: So if you happen to hear something on, you'll sort of perk your ears up?

R: Even the *television* has that, I'll be *flicking through*, especially when that new system came out "Windows", I was taping it off the television and it was like 'Oh Geeze! I didn't realize computers could do that. That would be really neat.' They all offer learning programs on television and TV Ontario... [But] it's something that probably in the next two years I'll get something depending how far my little boy is into it, because and I think the *wife* has a little bit of knowledge about it so, because she has to work a little bit with computers because she's in banking. And we'll probably use *friends*, because we have close friends who have just gotten into it so.

I: So how will you use friends?

R: Well they'll come over and give us an idea on how to use it and I would think that *one of us* would eventually maybe take some kind of *little course* to learn how to run the thing. Because I have no knowledge of them at all.

I: Are these neighbours or/

R: Our best friends.

I: Probably get them to help you pick out a system too?

R: Yeah.

I: Anybody else you would ask about stuff?

R: Probably mostly *friends* who are into it, because all of our friends actually have them now, my *brother* just got into it this year and each *one of them are taking night school courses* to learn more about how to operate and get full use out of what computers offer... Oh yeah, actually whats-his-name, that *guy at work*, Smith. I would definitely talk to him. And he just went into it not that long ago, I can remember him talking about it at work... What I think is for myself, I have to get over the fear of them, and then I, they're probably easy I think, well look it, there is so much here and what do I do? See I haven't attempted it, just those things at work, I've tried to avoid it because I don't want to ah, actually, I think I'm hoping that *little Jimmy [his son]* learns it and he can teach me. (R19)

The complexity of this "computer learning" focussed activity is very different from the types of activity systems Leont'ev uses as examples (e.g. the 'primitive hunters' or his own attempt to learn by visiting a friend or a library; see my discussion of these in Chapter 4). Rather, the motive-structure of activity and the goal-directed practice in the cases of working-class computer learning are made from a complicated interweaving of multiple activity systems.

The character of the life experience of subordinate groups such as the working-class, by its very nature, tends to be more fragmentary and broken up by institutional life governed by interests not their own. Driving in his truck listening to his radio or flicking through the television stations Sean happens across elements that he may attends but which are not part of his goal-directed practices. Sean outlines a network of separate relationships ranging from extended family, friends, his partner's workplace experiences, "little courses", and his own co-workers. Sean describes diverse sets of people whose roles, goals or framing of activity are very different from each other, yet which all seem to provide a useful component to his computer learning practices.

Leont'ev's primitive hunters appear to operate in a world in which all other frames of activity cease while the hunters collectively hunt. Likewise, in Chapter 6 we see institutional relations that largely pre-structure and sustain certain goals of activity. We do not encounter the need to understand the negotiation amongst competing goals in a dense weave of activity systems, themselves a moving, lived actuality. Throughout this chapter we see how different activity systems with different goals and motive-structures overlap and affect one another. We also see that in most of these different systems computer learning is embedded at what Leont'ev or Engeström might call the operational level of activity. It is perhaps a necessary condition but nonetheless only coincidental to the focus of what's consciously going on. Part of the complexity of this learning emerges from the fact that we are focussed on non-institutionalized learning in people's everyday lives. Learning that can be broken into many different pieces. "Activity" as a concept brings a vast array of components into our scope of understanding what *learning* is. But while "activity" provides us with a foundation to understand the inter-connectedness of different levels of the learning process, it does not tell us much about how people actively 're-arrange' these levels and produce meaning and pattern out of activity.

Framing and keying may seem, at first glance, to make these practices seem even more complex. However when we look closely we see frame analysis as a way of making greater sense of this overlapping set of operations, goals, motive-structures and activity systems. As introduced from the outset, Goffman's frame-analysis suggests that various

frames, for example, of family activity, neighbourly activity, labouring activity, recreational activity and so on, each carry with them a set of roles and patterned relations that help us accomplish their orderliness in everyday life. One of Goffman's real contributions, however, was to show how people's presentation of self, team-work and the organization of frames of activity into primary and subordinate tracks are an inter-subjective process of coordination. In Goffman's presentation we see an emphasis on the role of the *active* subject. Though there is clear patterned structure, there is just as clearly, according to Goffman, opportunities for individual and collective agency as well. Specific to the multiple spheres of activity seen above, we see that, although computer-mediated practices play a part in each of the separate spheres, each activity system is organized around goals or primary frames that make this computer-mediation part of the less self-conscious, operational level of activity. These are what Goffman might call a subordinate track of interaction. The immediate contribution of Goffman is that these subordinated tracks of computer-mediated practice can be brought to the foreground (into the structural position of "goal" to use Leont'ev's terms) through the social process of keying existing frames of activity. Just as we saw Goffman describe *fighting* being keyed into *play*, or *courses* in guerilla warfare on the brink of being keyed into *real* guerilla warfare in Chapter 4, in this chapter we see that different activity systems can be keyed to accentuate the role of computers and computer-mediation. Triggering the specific occasions and reasons for such re-keying is, for the most part, partially pre-figured in discussions of working-class technological common sense where we examined the basic experiences with technology. However, the interview encounter itself also serves as an occasion for this keying of past and future activity.[6]

One of the main differences between this research and the research of many others in the neo-Vygotskian tradition such as Engeström (1987; 1992) and Lave and Wenger (1991), is the object of the investigation and the challenges it demands of a conceptual apparatus.

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[6]Of course, the keying that takes place in the course of a research interview will in all likelihood have very few lasting effects on the interviewee's organization of conscious. At the same time, in this research with the chemical workers the types of discussions that arose in the interviewees were presented back to the local union and some lasting effects were seen in the way people understood and organized themselves collectively around their learning activity.

The work of Engeström on work processes, learning and expertise in the court system and medical consultations (1992; 1996; 1999), or the work of Lave and Wenger (1991) on tailors, mid-wives, quarter-masters, for example, focus on a relatively discrete set of activities which are either institutionally or occupationally bound and thus pre-structured in many ways.[7] There is an order provided by these settings which makes it unnecessary to seriously press beyond the basic framework that Leont'ev originally proposed. More specific to computer-mediated practice, neo-Vygotskians such as Nardi (1996), for example, have generally not sought to deal with "the messy, intractable world beyond the laboratory, beyond the human-machine dyad" (Nardi, 1996:3)[8]. Alternatively, I've sought to investigate computer learning activity of a specific group which, because of the character of this group, runs across the neat boundaries of institutions or occupational settings in a highly fragmented way. Working-class people talk about their computer learning as cutting across work, home, classroom and community settings where their discretion is challenged typically. This has posed an interesting set of problems for the basic neo-Vygotskian framework.

7.5 Summary

In Practical Reason: On the theory of action (1998), Bourdieu poses several questions that relate to the closing discussion in section 7.4.

> Does a human behaviour really always have as an end, that is, as a goal, the result which is the end, in the sense of conclusion, or term, of that behaviour? I think not. What is, therefore, this very strange relationship to the social or natural world in which agents aim at certain ends without posing them as such?... Ordinary analyses of temporal experience confuse two relationships to the future or the past which Husserl clearly distinguishes with Ideen: the relationship to the future that might be called a project, and which poses the future as future, that is, as a possible constituted as such, thus as possibly happening or not, is opposed to the relationship to the future that he

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[7] While only conversant with the type of neo-Vygotskian perspective I've described in this research, writers such as Orr (1996) on photocopier repair workers, or Goodwin and Goodwin (1995) on airport workers also fall into the trend to which I'm referring. There are examples which break with the tendency to some varying degree (e.g. Engeström, Engeström and Kärkkäinen, 1995), yet on the whole in neo-Vygotsky literature as I've defined it, it remains extremely rare to see the focus on general class, gender or racialized relations that span virtually every institutional context in modern society taken up in the way I've attempted here.

[8] In this regard, the work of Holland et al. (1998) on "identities in practice" and the work of Lave (1988) on mathematics are examples of neo-Vygotskian research, that skirt across multiple sites, more closely parallels this research.

> calls protension or pre-perceptive anticipation, a relationship to a future that is not a future, to a future that is almost present... In fact, these pre-perceptive anticipations, a sort of practical induction based on previous experience, are not given to a pure subject, a universal transcendental consciousness. They are the fact of the habitus as a feel for the game. (Bourdieu, 1998:80-82)

These comments point toward the type of challenge that the concept of activity has already partially met. Neo-Vygotskian approaches describe learning as activity composed of practices that are goal-directed "projects" but which are also interlinked with the types of operational and tacit elements that Bourdieu refers to as "practical induction". Bourdieu goes on to cite the necessary relationship these forms of patterned practice have with differentiated, previous experience that suggests the need for a concept like "habitus".

In the closing section I also put forth an initial formulation that is part of what I called, in the introductory chapter, the "secondary project" of the research. That is, it refers to the dialectical relationship of structure and agency in micro and more macro settings in real learning activity. Specifically, I focussed on how people play an active, inter-subjective role in negotiating less conscious elements of computer learning within a diverse array of broader, primary, goal-directed frames of activity through keying. I've sought to introduce this clarification to the neo-Vygotskian framework when I suggest that a narrow interpretation of Leont'ev's formula tends to be highly structural. When compared to the practices we can read through to in the interview data, we see how, in virtually every excerpt, activity systems overlap with each other and computer learning is often embedded in activity framed in other ways. I claimed these examples present more complex situations than those bound to a single institutional setting or occupational group.

Looking back to the first sections of this chapter and reflecting back specifically to my earlier discussion of class habitus and frame analysis, a specific vision of working-class computer learning has begun to emerge. A vast array of practices that may be more or less self-consciously carried out and specific learning contexts have been identified as relevant. The neo-Vygotskian concept of tool-mediation helped to make explicit how practice is shaped by interaction with the computer artifact itself, but more specifically how various problems and breakdowns can be understood as a contradiction at the level of conditions of

practice that pushes people to shift their forms of participation and gain skills and knowledgibilty. This chapter has also provided an empirically-grounded account of computer learning that moves beyond the tendencies collectively described in Chapter 3 as Capitalist Learning Hegemony (CLH). If learning is seen as a social relational concept in which specific peoples' practices are embedded in more general societal relations, warranted claims of computer learning as a differentiated and differentiating form of class practice can be made.

We learned that there are specific patterns of practice and participation that working-class people produce, and that these patterns are rooted in class relations. People engaged in solidaristic networks of computer learning depended on durable group-oriented formations to produce their activity. In these networks people drew on differences in skills, interests, resources and methods in a fluid set of roles and relations that were frequently re-arranged. Teachers became learners, novices surpassed experts in some areas but remained novices in terms of other interests. Some network members favoured trial-and-error, some conversations with the "computer genius" outside the group, while others preferred to read. It must be emphasized that these seemed to be loose preferences only and not hard and fast rules. People drew on differences between members as a shared group resource. One person's preference for reading was a resource for others who preferred hands-on practice and vice versa. Within these processes there was what I referred to as a dialectic of self and group in which individual practice construed as "self-teaching" transformed group participation and group participation fed individual practice.

The analysis outlined the complexity of working-class computer learning activity in everyday, non-institutionalized settings of learning. These are the places where interviewees could most easily realize greater discretion and greater possibility for creative activity. Necessarily, it seems, this process involves a patchwork of different opportunities, many of which appear in the home (where people exercise the most control), but which also appear in the workplace and community. Together with dispositions toward solidaristic networking, these skills, abilities and dispositions toward interstitial learning partially define a working-class learning habitus.

Chapter 8
Understanding Working-Class Standpoints in Computer Learning

While issues of standpoint inform virtually every aspect of this research beginning with the definition of social class I provided at the outset, in this short chapter I want to recognize themes that explicitly emphasize the most conscious and formally developed expressions of class standpoints in the context of learning habitus and computer learning specifically. One of the most underdeveloped dimensions of neo-Vygotskian literature is its understanding of learning in the "messy, intractable" world of the everyday as it concerns issues of social standpoints.

Engeström (e.g. 1987; 1999) has referred to the notion of standpoint in terms of "multi-voicedness" in which multiple points of views, traditions and interests are developed in activity systems. However neither Engeström nor most other neo-Vygotskians (e.g. Davydov, 1988; Lave and Wenger, 1991; Nardi et al., 1996; etc.) have convincingly demonstrated how issues of standpoint penetrate *all* levels of activity from micro-interaction to the major social divisions of society such as gender, race and class. A more extensively developed consideration of issues of standpoint in existing neo-Vygotskian literature (again, broadly conceived) is found, for example, in the work of Holland and collaborators. The work of Holland and Reeves (1996) and Holland et al. (1998) offers a constructive clarification to the ambiguity of standpoint in much neo-Vygotskian research. In Holland and Reeve (1996) the authors offer a solidly elaborated example of how conflicting standpoints are produced in an activity system. And, in a later collection of essays, Holland et al (1998) add a great deal of depth to the notion of the production of social identities in practice which further develops on the theme.

> A person engaged in social life, a person involved in an activity or practice, is presumed to have a perspective. One looks at the world from the angle of what one is trying to do. Postmodernists and feminists also attend to perspective, especially to the perspectives that come from being treated according to broad social divisions such as gender, race, class, ethnicity, and sexual orientation. Persons look at the world from the positions into which they are persistently cast. Another type of placement is at least as important as narrativized or discursive placement: positioning by access to

> space, to associates, to activities and to genres... Perspectives are tied to a sense of entitlement or disentitlement to the particular spaces, relationships, activities, and forms of expression that together make up indices of identity. (Holland et al., 1998:44)

"Perspectives" or what I've referred to as "standpoints" offer a means of understanding the class-differentiated character of interviewee's accounts of computer learning practices, and by identifying differentiated practices we can see how local production of everyday computer-mediated activity is part of the broader social, political and economic world. People enter into participation not as universal agents but differentiated subjects. There is a recognition that people bring a coherent set of basic dispositions, preferences, comportment, skills, tastes and knowledges, i.e. class-habitus, to bear. They cannot participate in anything and in anyway they chose, and Holland et al. (1998) emphasize the importance of one's "angle" or "take on activity" (p.44) as a means of participation as well as identity formation.

One of the first writers to offer an explicit and sustained examination of the "proletarian standpoint" was Georg Lukács. His seminal work in the area, History and Class Consciousness (1971) helps us to understand how it is that different class standpoints in activity co-exist in concrete social activity which he refers to here as "specific categories of mediation":

> But this does not prevent the specific categories of mediation by means of which both classes raise this immediacy to the level of consciousness, by means of which the merely immediate reality becomes for both the authentically objective reality, from being fundamentally different, thanks to the different position occupied by the two classes within the 'same' [social] process. (Lukács, 1971:150)

One version of this basic argument was vital to our understanding of how a basic working-class position could be expressed in a variety concrete ways (as unemployment, service sector work, forms of non-standard work, and even unionized industrial work). This realization made the study of certain segments of the working-class, such as the industrial working-class, relevant to the working-class in general (Chapter 2). Conversely, we can also apply Lukács's observation to "categories of mediation" such as computer learning in such a way as to reveal the way that what appear to be similar activities (e.g. learning amongst the working and capitalist classes) are nevertheless different for people operating from different social

standpoints. In both cases, the focus is on the underlying sets of social relations that give concrete activity its specific meaning, course of development and so on. Lukács's analysis emphasizes that the reality of people's everyday social existence is, in its immediacy, 'the same' for both proletariat and bourgeoisie. Of course, class-standpoints and class learning habitus play an important role in expressing these underlying social relations and help explain the specific ways in which differential forms of participation, the differential outcomes and projected goals, and the different framing of computer learning activities are produced in the actual practice.

Class-standpoints in activity, however must be understood as *actively* produced by real social agents - actual people with the capability to act and react in the social world - rather than, as is suggested in Lukács's work, merely produced by generalized, structural dynamics of capitalist political economy. Though people are continually faced with forces of history that appear to stand over them, these forces are always produced, reproduced, and/or confronted actively in real, sensuous human activity. Lukács's rhetorical flourishes regarding "free action of the proletariat itself" (1971:209) do not provide a convincing expression of these active dimensions.

Lukács's essay "Reification and the Consciousness of the Proletariat" (1971) has provided inspiration for a range of contemporary theories which deal with social standpoints, most notably the group of writers typically identified with Marxist-Feminist standpoint theory. However, to use the term Marxist-Feminist standpoint theory, is to partially invent a level of coherence that is not entirely warranted (Smith, 1997a). Though generally recognized to have been initiated by several key essays beginning with Smith (1974) and Hartsock (1983), this grouping of writers is not monolithic. The degree of commonality that is warranted, according to Harding (1986), is based on shared foundations in historical materialist analysis and, adds Smith (1987) the influence of the women's movement. Furthermore each perspective in the grouping offers an explicitly politicized, counter-hegemonic dimension with an appreciation for the relevance of social constructivism and the importance of peoples everyday experience. Marxist-Feminist standpoint theory can be understood as a type of "technical theoretical device" (Hartsock, 1997:370) that helps to

make explicit the power-relations in society. As Collins describes it, theories of standpoint refers to "a common location within hierarchical power relations that creates groups" (1997:376). Smith, working from with some different interests in mind, focuses on how "experience", like the kind described in the interviews in this research, can be used as a "method of discovering the social" from particular perspectives (1997a:392):

> I have argued that ruling relations become visible from a standpoint located in an embodied subject situated in the everyday/everynight actualities of her own life and engaged in the particularlizing work that organizes her consciousness. It is from here that the extra-local organization of the ruling relations becomes visible; it is from here that the project of investigating them and their characteristic forms of objectification and standardization as people's local practices can be conceived. (1997b:128)

Thus for Smith, a theory of standpoint is not primarily a "device" nor is it the basis for knowledge claims in conventional sociological terms. Rather, it provides the starting point for a program of inquiry that draws on everyday experience to bring to the fore the means by which the social structure is brought into being through the concerting of people's situated practices.

The following sections reflect on the most conscious, and in some cases formally organized, expressions of class standpoint beginning first with an examination of how social relations and working-class standpoints expressed and developed in the industrial workplace are continuous with computer learning projects that operate within and beyond this setting. Second, I examine how the most formally organized expression of working-class standpoint, the trade union, affects computer learning processes in terms of the relationship between learning in the everyday and institutionalized, course-based learning. And, finally, I draw on interviews that are the most conscious expressions of how class standpoints affect learning which includes a brief look at the computer learning amongst a mini-sample of upper-class elites and corporate executives.

8.1 Perspectives and Practices of Working-Class Computer Learning as Continuous with Class-Life

The following excerpt was taken from an interview with a 50 year old woman who was a machine-operator in a electronics parts manufacturing plant. Much of this interview

focussed on recent changes in her plant as management had introduced several new computerized machines onto the shopfloor. As one of the most senior workers and a lead-hand in her department, co-workers often came to this woman with questions on exactly how the new machines would affect the workplace. She explained that co-workers often asked her whether work would become more strenuous, whether it might be more safe or dangerous, whether these new machines might add to the yearly bonus they sometimes received when production quotas exceeded expectations, and most importantly, she said, whether any of them would lose their jobs as more of these computerized machines were introduced. In the interview I asked her about her general impressions about this new technology and whether these new machines brought about changes for the better or the worse. Her answers help to show how beginning from people's own standpoint offers a means to build a critique of existing technological common sense. This plant is a non-unionized operation, and this worker is no class-conscious radical. Her wage is a secondary income, the job pays only a few dollars above the minimum wage and she tells me she isn't very interested in what goes on in her workplace anyways. Nevertheless, even under these conditions we can begin to trace class standpoints in relation to computer activity. After beginning with a claim about the overall positive effects of computer technology, this woman proceeds to slowly problematised these apparently positive effects as the exchange continues.

R: [technology has changed things] for the *better*, like we talk about *more product* going out the door, and *less people* doing it.
I: Now why's that for the better then?
R: Well it's not for the better of the people, but it is I guess for the company.[pause]
I: It must be better for the people somehow. How do you think it might be better? How's it all connect? I'm just trying to get your own words on it. How is better or how's it worse?
R: Well like I said, I think it's better for the *dollars for the company.*
I: But you say not so much for the people?
R: Well no, not if they're *losing they're job.*
I: Well you guys have kept employment pretty stable eh?
R: Yeah we have, we're lucky.
I: But you sense that other places aren't so lucky?
R: No, I don't think they are.
I: Hmm [long pause]
R: I guess when you think about it in the plant, technology is taking away jobs. [pause]

Man's out smarting himself, losing his own jobs because of it...

I: Do you think computers and technology offer a chance to create new wealth?
R: Yes I think so because you can put more product out again.
I: And so the *wages would go up* with your company doing better?
R: Well it should but *not at our place* we haven't had a raise in a while.
I: Have your wages been frozen for a little while then?
g: Yes a wage freeze, but like I said we're lucky we never had a layoff so that says something.
I: So when you say it does create more wealth you mean...
R: Well if you can be more efficient it has to create new wealth.
I: For the company?
R: Yes it has to.
I: But not as much for the workers?
R: Well like right now with the wage freeze on and like [the manager] says the money that they're making they're putting back into the plant to buy these new machines, so I would think they must be making money to have a credit line to get the new equipment.
I: So do you a sense that it will come around to higher wages then if the company gains a competitive.
R: I would think it would, yes.
I: Do you have good faith in that?
R: Well, I think may is the end of our fiscal year and they're going to look at that and see what [pause] everyone's hoping.
I: Do you have pretty strong workplace association or union then?
R: No.
I: Who does the negotiating for you then?
R: Nobody, they just give it to us. (R6)

It was the movement of discussion toward the realm of actual practice, sometimes brought into consciousness in the course of the interview itself, that the actualities of people's experience were able to be thought about to reveal the material, class relations people were actively engaged in. We can see how her own standpoint provides means of generating an alternative perspective on technology and labour processes in her workplace.

The industrial workplace offers one of the most tangible and conscious representations of class-based practices and class standpoints in daily activity. With the worker (R6) above we see that this standpoint produces a contradictory view of the nature of work and computer technology generally. However people's standpoint in the industrial workplace also directly affects their computer learning. In an interview with this chemical

worker who also was his department's union steward, we see that the social organization of the labour process, in fact, encourages non-work related computer learning. Routinization and alienation accentuated by so-called "idiot-proof" computer technology is a direct expression of how and why working-class standpoints in the workplace and in people's computer learning practices are actively produced.

R: I didn't really get any formal training in it at all.
I: So where did you do most of your learning?
R: Well, *back corners* [laughs] midnight shift, that sort of thing, just playing around with it.
I: So there's a computer sitting there and you just sort of
R: Yeah, *it's either that or do work, it's a little more interesting* so
I: It's a change then?
R: Yeah, yeah
I: Other guys do the same thing I hear.
R: But like I say, I don't get into the DOS or anything, but some of the guys are just phenomenal, but like the light at the end of the tunnel is a better game you know what I mean. The games don't interest me at all... But it's actually a big problem because like I have guys complaining to me [as a shop steward] about these guys playing the games, and I'll tell them mind your own fucking business, but you know what do you do you can't go to management, it's a difficult position to be in... [but] as soon as management sees us playing around on our spare time with these computers and games and stuff, we're going to have supervisors start to crack down.
I: So you'd sit down and eventually over the course of each day you'd learn. Can you put a time estimate on that then?
R: [laughing and putting his hand over the tape recorder] The company's not going to find out about this?
I: [laughing] No, no, it's anonymous
R: No, I'm only joking.
I: It's that much then eh?
R: Yeah, I would say 80 hours over the last year maybe, at the terminal.
I: Split up into little 10 and 15 minute chunks
R: Or hours depending what shift you're on, if you're on midnights you can sort of hide a way for a few hours, yeah.
I: That's a good amount of time eh, it's better than any course? (R18a)

Computer learning practices of workers take place within a context shaped by capitalist relations of production, and specifically one's position within those relations. The types of routinization and alienation in this workplace is not class-neutral, but is instead a common, class-specific experience (Hamper, 1991). It is experience generated from a working-class

standpoint in activity, but actually contributes to the further entrenchment of this standpoint in the workplace and beyond. In the workplace, alienated and distracted workers spending their time playing computer games, provide greater justification for management to remove further control and creative functions from workers' hands resulting in even greater alienation, and so on. Class experience such as these also contribute to the establishment of elements of the working-class learning habitus we discussed in the previous chapter, again, further solidifying class differentiated practice.

These types of class experiences are not limited to the workplace but rather tend to spill into more elaborated computer activities. This auto worker, for example, describes how the need to find creative outlets in the context of work translates directly into interests and activities.

I: Did you buy a computer before you had any knowledge of it or/
R: No, no I had limited knowledge at work so.
I: Tell me about that.
R: Okay so at work we have, not particular to my job, but we have a computer which runs a machine and of course it's just a basic, it has its own program, the computer has its own program, but in the background it has windows. So that was my first experience. You could get out of the program that ran the machine and you could go and you could get into windows and there was just a basic windows program, and at work with that, well we got ourselves in trouble a few times. And with that, you know guys would come around and different guys would have different limited experience in trying to fix the computer whenever we screwed it up, and basically that's how I got interested in it. Of course, you talk more and more with the guys because you fool around with it more and the next thing you know I bought one. (R19)

One of the unique features of contemporary computer technology is in fact the type of convergence between home and workplace computers that the above excerpt describes. Practices such as this one reiterate the importance of working lives to learning that goes on in the rest of people's lives. Other workers expressed their experiences in the industrial workplace as equally important.

Below an auto parts worker outlines how he first came to be introduced to computers and the important effect they came to have on his future learning. Again, we see how experience expresses a particular standpoint in activity. Similar to the concerns expressed by

the woman at the outset of this chapter (R6), in this case, we see a standpoint in which computer technology forms the basis of vast and important changes in one's day-to-day life.

I: Did you go to school to pick up any of this computer knowledge?
R: No. I'm just grade 11 education. But the biggest thing was the robot on number 5 press came in and it had a computer.
I: What year was that?
R: It's been 7 years, 6 or 7 years. And so every time we walked down there, it was all, *'Gee! This is the way it's going. Everything is going this way'*, you know, and so when I got there I said, 'I don't know nothing about computers. I don't know nothing about robots.' So there was always one guy that was there permanent anyways and then, the one day I'm there all by myself, there's no other person there, so I had to learn it. So the electrician says, 'Okay. You gotta do this to do this to do that to do that.' And he wrote everything down on a piece of paper, and he says, 'You keep it.' It's still in my locker, you know.... [But] I look at the amazement of the stuff in the factory. Like I walk up there and I'm like, 'Oh, yeah! Geez! That's simple. When you think about it, it's simple.' If you go look at it. Okay, take for example, my robot complex that I worked down there, the number 14. When it first came in, the first week it came in, I'm lookin' at it and, 'Glory Geez! What am I gettin' into? Just give me my job!' You know, and then I started, 'Well, how's this work?' And then, pushing the buttons and, 'Oh! Okay! Boy, that's easy.' And then, I move on to the next one: ka-choo, ka-choo, ka-choo, 'Oh, yeah! Oh, that's really easy!' You know? And then move on to the next one. The next robot set-up, because there's like your loader, your roll, the reducer roll that makes the steel thinner, then a robot picks it up and bends it and puts it in the thing and puts it in the press and then the press forges it and the robot picks it up and moves it over and so each process all the way along, there's basically 7 robots that do the work there. (R4a)

The idea that "This is the way it's going", in this context, is itself an expression of class relations. The pull for this worker to get involved in computer learning is the pull of the activity system of the workplace in which learning about computer technologies is not really a free choice, but rather one that is compelled by powerful forces. It is in this context that, from a working-class standpoint, computer technologies seem to inspire strong, goal-directed behaviours. This same worker continues on to describe how this has affected his views about child rearing. Speaking about his daughter:

> I took Kristine into the plant one day at work, and I says, "See this? *It's all computers". I says, "You gotta have it".* Well, Kristine says, "Well, I don't really like doing computer stuff". And I said, "Kristine, here you are". She's ten years old, and I says, "There it is. *You've gotta know this stuff.*" (R4a)

8.2 Organized Expressions of Working-Class Standpoints in Computer Learning Activity: The Relationship Between Courses, Learning Networks and Trade Unions

Effects of one's class standpoint in activity is not limited to simply individual or informalized group practices. It can also be expressed through formally organized institutional frameworks such as those provided by the trade union movement. If we understand, as Smith (1997b) suggests, ruling relations such as those revolving around social class become visible from the standpoint of one's actual everyday practices, then it seems like a reasonable next step to suggest that social organizations that provide these standpoints and everyday practices a forum to be spoken, shared, developed and acted upon will produce the sites in which they are expressed most clearly. Computer-mediated activity rooted in trade union life is therefore another way of demonstrating how class relations and working-class standpoints are interwoven with computer learning. In this section, I briefly examine the effect that trade union culture has on people's learning methods and preferences, but first let's examine a more general example of how trade union life and computer activity are related.

In this interview, I got a chance to sit down with a local trade union president where he outlined how important, in his mind, computers were for the functioning of his union local. A relatively young man of 32, he talked specifically about how people in today's busy world had very little time to be involved in their union local, and how technology might be a way of helping manage this conflict.

> You don't get people coming out for like meetings, even when it concerns them. They'll come out like when it's a bargaining meeting or a voting meeting, but past that not many people are interested in it at all, that's why I've been trying to get this BBS up because if you have a modem that's one of the ways you can start exchanging ideas, because people will sign on not just to talk about you and stuff, but I'm going to make it interesting. I'm going to make so that they'll be files that you can download, educational files, children files, children's games, games, maybe some on-line games, but it's a way, and they'll be discussion groups, you know there'll be a political one and a union one and an industry one, and if you have a modem and you have a computer you can get in on it and that's one way of people exchanging ideas.... It's really about building a sense of community and a union culture... We've also talked about making computers for cheap now, a mother board is under a hundred dollars now, it is fairly quick, it is not speedy but it would get you access, and a 60 dollar thing and a couple cards, that's another thing I don't have time for. (R10)

Trade unions arise and take on their structure, interests and methods as a direct response to the character of capitalism with which they are faced. Unions typically represent a kind of countervailing force to capital through their representation of the interests of waged labour. They express an organized working-class standpoint in broad frames of activity including ongoing, organized representation of workers in the workplace, bargaining, political processes beyond the workplace and so on. Activities emerging from these organizations, like the computer activities suggested in the comments of the worker above, express a working-class standpoint in terms of the forms of planning, organization and practice which this perspective both inspires and requires. Indeed, we see described a specific activity systems whose broader motive-structure is situated within relations that are at least partially antagonistic toward the basic logic of capital accumulation.

We can also ask exactly how this formalized expression of a class standpoint actually affects computer learning practices in other ways. To do this, let's consider a comparison amongst unionized and non-unionized industrial workers in terms of their experiences and the outcomes of this experience. First, let's briefly reflect on the some large-scale educational data from Ontario (Canada). In a special run on the survey data provided in Livingstone, Hart and Davie's 11th OISE Provincial Survey (1997) we can gain a basic appreciation for some differences in learning between these two groups generally. To begin with, it is useful to point out that amongst both groups computer learning is the most popular learning interest. This is supportive of many of my earlier claims about how working-class standpoints can affect people's interest in computer technology. However, when we compare the effect of union membership among industrial workers in Ontario we see that there are statistically significant differences in terms of the rate of computer literacy. We see that unionized workers have a 41% computer literacy rate compared to just 28% among the non-unionized industrial workers. I have also suggested that from a working-class standpoint, learning that occurs outside of formal institutional learning is particularly important. Total weekly hours spent on learning outside of organized courses also differed between the two groups. Unionized industrial workers reported an average of 13.6 hours per week of informal learning whereas non-unionized workers reported only 11.6 hours per week.

What is perhaps more clear however is the way that unionized and non-unionized groups organize and carry out their learning practice and the material resources on which they're able to draw. These data indicate that unionized industrial workers in Ontario are almost twice as likely to take part in an adult/continuing education course (27% participation amongst unionized workers; 16% for non-unionized workers; statistically significant). Furthermore, when continuing education courses were utilized unionized workers involved a much broader scope of educational institutions. Finally, unionized workers were far less likely to bear sole financial burden of this non-formal learning. There is the suggestions that collective action in the form of trade unionism has important positive effects on the computer learning process in a number of different ways.

At this point, of course, we are unsure what these numbers actually mean in terms of practices. How are these material resources utilized exactly? How are formalized courses related to the everyday computer learning that takes place outside of these courses in the home, community and workplace? This thesis has sought to shed light on these issues directly. To understand these aggregate data more deeply, we can turn to two sub-sets of interviewees and examine unionized versus non-unionized computer learners head-to-head. In order to do this, I focus on the situation of two workplaces as well as the activities of specific networks of workers from each site. The plants themselves are both in the automotive sector, are of comparable size, and are both located in Canada's industrial heart-land (Southern Ontario). In fact, both plants are located in the same city.

Briefly, the unionized workplace belongs to one of the North American "Big-Three" group of auto assembly plants[1] and as such is organized under one of Canada's largest and most developed trade unions, the Canadian Auto Workers (CAW). The CAW is arguably one of Canada's most advanced industrial union in regards to its membership learning/education programming which is demonstrated in a number of identifiable ways ranging from the union's leading-edge push towards Paid Education Leave (PEL), to the development of its large Family Education Centre. One of the most important features of this

[1]Big Three' is a North American term referring to the Chrysler, Ford and General Motors Auto Manufacturing Corporations.

progressive unionism is its attention to negotiating collective agreements that pay ample attention to the need for workers to have a say in their workplace and beyond about education and training. Indeed, one of Canada's leading labour educator, D'Arcy Martin (in Gordon and Cooke, 1998), describes the CAW's commitment to education and training as "the most developed" of all the unions in the Canada.[2]

The other workplace is a large non-unionized auto parts manufacturer. There is a company association (unconnected to any outside bargaining agent) which has a type of employment contract registered with the Provincial Labour Relations Board. Both belong to large international conglomerate parent companies and are of comparable size. However, the non-unionized plant contains none of the educational provisions of the unionized plant and is silent on any form of union involvement in issues of training and education. As far as actual production processes, both plants produce and assemble various automobiles/auto parts, and both workplaces have substantial computerization.[3] The employment requirements of the two plants are also similar, each making use of a Canadian high school diploma (grade 12) as an entry level requirement over the last decade.

The comparative look at the workers in each plant are rooted in interviews and time spent with interviewees we've heard from earlier - R16 and R4a - however this time with a focus on the different effects of their union versus non-union status on the learning the do in informal networks of co-workers. For the sake of adding both a human face and further depth to the analysis I'll again refer to them, as I did in the preceding chapter, as "Steve" and "James" respectively. Steve is in his mid-thirties. He has worked for this same employer since "they released me from high school" at the age of 18 years with his grade 12 high school diploma. He has worked primarily on the assembly line at the plant, but recently transferred off the line to a job sampling parts. James is in his early forties and operates a

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[2]A report on the fall 1996 contract negotiations between the CAW and General Motors states the following:

> This agreement marks a break-through in training. The new Training Fund and the Training Review Committee expands the opportunity for training and learning and recognizes the union's role in the development and implementation of training programs. (1996:6)

[3]This can be contrasted with the other auto parts plant in this research.

computerized press at the non-unionized auto parts plant. Before coming to the auto parts factory (where he's been for 11 years), James worked in a variety of jobs including truck maintenance and plastics manufacturing. James went to work at the age of 16 after he completed his grade 11 year in high school and partially completed an auto mechanics apprenticeship programme.

As you might be able to recall from above and earlier chapters, Steve (R16) and James (R4a), both claim that their computer learning interests took root initially in the workplace itself with the introduction of technologies on to the shopfloor. The points to be made here are that, firstly, the workplace and increasing computerization of production play a central role in further learning. As I observed earlier, changes in the workplace appear to provide powerful compulsion towards participation and learning despite their structural resistance to these experiences among workers. Second, in both cases, informal activity and unsanctioned access/use of computers were central to starting broader computer activity, though in the non-unionized plant much of this was done in greater isolation (workers have less freedom of movement; stiffer penalties for not tending machines; and, few options to appeal unfair treatment). This structure of participation is also rooted in the physical lay-out of the plant which contributes to the scope of opportunities for social participation, and hence learning, in the workplace. In the unionized workplace Steve describes how his informal learning was based, in the first place, on hanging around another worker's work-station where he was joined regularly by his fellow workers (quoted earlier):

> ... You could get out of the program that ran the machine and you could go and you could get into windows and there was just a basic windows program, and at work with that, well we got ourselves in trouble a few times. And with that, you know guys would come around and different guys would have different limited experience in trying to fix the computer whenever we screwed it up, and basically that's how I got interested in it... (Steve)

In contrast, James describes arriving at his first computerized work station in the plant saying to himself (quoted earlier):

> ... 'I don't know nothing about computers. I don't know nothing about robots.' So there was always one guy that was there permanent anyways and then, the one day I'm there all by myself, there's no other person there, so I had to learn it... (James)

Following these initial workplace-based learning experiences, both men began their own computer learning participation that expanded well beyond the factory gates and which developed into the types of diverse, solidaristic networks described in Chapter 7.

Clearly, both sets of computer activities are being carried on in earnest utilizing a variety of resources/tools, and fuelled by everyday relations and collective problem solving. Importantly, Steve with his previous experience in the union-negotiated workplace courses does what the typical factory worker (statistically) usually doesn't - he decides to attend a local college course on computers. James, on the other hand continues to stay away from courses.[4] While both efforts have been underway for comparable amounts of time, Steve and his group of unionized workers decide to reach out from their network to engage in more formalize courses *together*. None of the co-worker computer learners that James describes, nor within any of the non-unionized workplace interviews, had actually undertaken school-based computer learning. Steve actually described how the experience of obtaining formal training in the workplace (by drawing on rights earned through collective bargaining) helped him and co-workers reach out to incorporate formalized courses in their computer learning network. James and his computer learning group(s) while having no access to paid computer training in the workplace did have access to the local community college, and yet never entertained the notion of attending.

Martin, notes the importance of informal traditions of learning amongst the organized working-class.

> The lessons of collective action by workers have traditionally been learned on the job and in the streets. By contesting management rights in the workplace, by withdrawing labour power in a strike, by joining allies in political action, union activists continue to develop their knowledge, confidence and skills. Any non-formal, structured education programs remain, even today, secondary to the learning that members gain through voluntary engagement in action. (in Gordon and Cooke, 1998)

What this quote from Martin is intended to direct our attention towards is the fact that for subordinate groups such as the working-class critical learning that begins from their own

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[4]It is has been pointed out that in addition to the effect of unionization which partially supports the statistical differences already outlined above, the difference between the Steve and James in terms of formal schooling achievement (1 year difference) may also play a role.

standpoint in social organizations tends to take place informally, in the interstitial spaces of formal institutional life. The suggestion I make here is that the mode of participation emerging from workplace relations as it is experienced from a particular working-class standpoint plays an important role in the character of the computer learning practices generally. In this example, we see how attitudes and dispositions arising from experiences in the workplace, but embodied in the individuals discussed in this section, play a role in ongoing practice. Specifically, we can see that factory workers in a unionized workplace seem to experience work-based computer learning differently. Unionized workers, at least those in unions that pay attention to worker education and training issues, appear to develop a slightly different attitude towards more formalized learning. They actively bargain with employers over these matters, and they (in the case of the CAW) allocate significant resources to it within their union. Unionized workers come to see formalized learning as a type of activity that they can usefully engage in, and this seems to affect their general approach to learning. We see that material constraints can be mediated by the countervailing action of the trade union. We get a sense that the kind of general oppositional perspective to formalized learning is re-directed toward a more specific opposition to the individualized and credentialized activities of these institutions. The recognition of these types of dynamic differences in working people's orientation to learning is vital for an appreciation of how people, even those operating from subordinated standpoints, play an active role in the production of their own learning and lives.

8.3 Class Standpoints, Class Differences and Computer Learning

Class standpoints make a difference in people's learning. They are the means through which people enter into participation with others in specific social contexts. It is beginning from, as Smith says, the "actualities" of people's everyday lives that their consciousness is organized in terms of a technological common sense, and that specific methods, interests and dispositions toward learning (i.e. class habitus) are developed. We saw in the previous chapter, for example, how working people's computer learning tended involve group-oriented learning in solidaristic networks. We also saw that there was a tendency, if not an actual preference for, computer learning in spaces where people could exercise the greatest control

and creativity in participation, which outside the home, tended to be the interstitial spaces of formal organizations. However how real are these apparent class differences? Do people's conscious perspectives, orientations and practices actually differ across social class?

If learning is defined as a process of shifting participation in activity, then the factors that affect how we participate, both conflictually and cooperatively, with each other determine the possibilities of learning. In earlier chapters, I discussed the use of framing and keying as a means to understand how it is that the active, conscious human agent makes constrained choices in the (re)production of activity. Standpoint is discussed by Goffman, in a sense, in terms of his notion of "casting". Casting parallels the notions of "perspective" used by neo-Vygotskians discussed at the outset. Neither concepts, however, emerge from an interest to draw attention to the broader social significance of these perspectives/castings. Casting fits with the framing and keying concepts that have already proved helpful where, in Chapter 7, we saw how Goffman's notion of primary and subordinate tracks help us understand the relationship between what neo-Vygotskians call operations, actions and motives in activity. Framing, keying of frames and the casting that people in coordination make available to each other can be thought of as important features of one's mode of participation and hence learning.

Frames/keyings of activity prefigure a range of basic castings or standpoints through which people can participate. Did interviewees consciously key their activities in class terms as a class struggle of some kind? Did they understand their own practices in these terms? Keying an activity in class terms would point to people re-arranging the subordinate and more primary tracks of interaction in such a way as to develop a more conscious, goal-oriented appreciation of their own class standpoint in practice. In such instances of class-based keyings (i.e. class consciousness), coordinated practices that weren't viewed in class terms suddenly move to the fore, yet seem to have been present all the time. As we saw at the opening of section 8.1 (with interviewee R6) people's consciousness of their standpoint in activity and their keying of frames of activity in class terms varied. The woman worker (R6) could be seen to partially re-key the discussions surrounding the introduction of new technology onto the shopfloor revealing an alternative standpoint in this activity that formed

the basis for a (potential) opposition perspective on her workplace technology. For other workers, however, a keying of activities in class terms was not as ambiguous or under-developed.

In discussions with this chemical worker, for example, much talk revolved around his company's "Quality"[5] program which had come under scrutiny by workers. He discusses a type of standpoint in work processes which sees workers and managers not in opposition to on another but as cooperating equals. This standpoint would provide the possibility for realizing new modes of participation and information sharing in the plant in a process of keying the frame of work activity as a "teamwork". However, this fellow claims the actual patterns of production do not support this keying and that the new "associate" standpoint offered by management is not relevant.

> Well they started calling us associates and then the reality set in and people started saying wait a minute, how can we be associates - 'Don't we have to work together, don't we have to work as a team?' So if we're not really a team, then you're the employer and I'm the employee, and that's why I said to you earlier that it took a bit for me to get it through my head, but if we were really worker-driven then we wouldn't have any middle-mangers - they'd be gone by now. I've been there 5 years and they're still there. (R61)

The same worker then continues to say how this type of standpoint generates a more conscious, goal-directed oppositional practices in terms of learning itself:

> What I find is that amongst the bunch of us [co-workers] here we'd be willing to help one another outside of work or on the job - we'd be more than willing to help one another. I have skills that maybe Frank doesn't have. Frank has knowledge that maybe I don't have. We draw on each other... but when it comes to the workplace and management and if you are being resisted for the knowledge you have - you're not going to give any to them!... But all of a sudden I know that my neighbour or a friend or a co-worker has the knowledge then you can draw on it. Because, they're going to give it to you more willingly than if I was wearing the badge that says "Manager" or the [supervisor's] blue-coat... That's just how we do things and this is what I try to do as well. (R61)

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[5]The term "associate" is part of an integrated workplace reorganization system based on the Japanese Quality and subsequent Total Quality Management (TQM) system (see Parker and Slaughter, 1992). It is directed towards encouraging employees to feel like partners in the business operation but for our purposes here can be seen to be part of a framing and keying exercise that is resisted by workers.

This excerpt expresses explicit working-class self-identification and suggests the role it has on ongoing learning practices and a general learning habitus. We must read through it to the type of actual practices it suggests, but we see that, based on the class experience of the workplace, specific methods and preferences for learning emerge that shape people's participation in ongoing frames of activity. Essential to actually achieving this process is a framing/keying of the interaction, both within the group of co-workers and in relation to the supervisors and managers who are excluded.

Another way of making visible a working-class standpoint in learning activity and learning habitus is by explicitly comparing large-scale survey data that reflects dispositions in regard to learning methods. In looking at the NALL Canadian Survey of Informal Learning survey data base we see some statistically significant differences. To understand these differences we must recognize that the type of informal, interstitial practices that we've already seen outlined represent a dependence on cooperative, group-oriented activity. Relations in this context are not established by any formal contractual or institutional authority. Table 8.1 indicates that the methods by which working-class respondents carry out their learning activity are statistically different from those of the dominant (capitalist) class group. In these responses we are not privy to a view of the actual practices to which they refer, nor can we clarify them by asking for examples as we can in interviews. Nevertheless we see some important class differences. As we move from left to right over the columns we also move, in general terms, from individualized and more formalized relations to learning relations that are less formalized and more collective in character. What we see is a trend that has statistical significance and suggests that the working-class grouping favours the less formalized and the more collective forms of learning. Indeed, this same data also revealed that where the working-class exercises the most discretionary control over their learning (i.e. in their own home), self-estimates of time spent in informal learning activities of all kinds was almost double that of the capitalist group (6.14 hours/week versus 3.5 hours/week).[6]

[6]Question on survey: "Thinking about all the informal learning you did in the last year that is related to all your household tasks or house work type activities, how many hours did this amount to in a typical week?"; n in sample responding to question equals 491.

Table 8.1: Preference for Methods of Learning Across Social Classes

Class Group	Work out on own	Professional Paid Expert	Friend/Family or Co-worker	Network Group-led
Capitalist Group	75%	10%	9%	7%
Working-Class Group	60%	7%	15%	18%
N	182	182	182	182

Note: Pearson Chi-Square 0.002; Likelihood Ratio 0.001.

Although amongst both groups self-directed learning appears dominant, as we saw in the previous chapter, people seem to describe this self-direction in one breath but clarify that it was done in connection with others in the next. Therefore, without even having to go into the inherent social nature of tools, languages and resources involved in this apparent self-direction, these statements can be understood as reflecting a self/group dialectic and are not to be taken strictly at face value.

Finally, in reflecting on class standpoints and different ways of making visible class difference consider, the type of informal, everyday learning revealed amongst the capitalist class mini-sample in this research (see appendix B for characteristics of these interviewees). A mini-sample such as this has, of course, less explanatory power than larger samples. It becomes useful really only in the context of the kind of dialogic, research triangulation that multiple methodologies and comparisons provide. This mini-sample of self-described "upper class" respondents are all either currently engaged in top management positions in large corporations, in most cases with significant ownership interests as well, or have been brought up in an upper class household where the household head had significant corporate holdings.

Amongst these respondents there were descriptions of extensive "learning" going on that was not done in any classroom. However this was not necessarily the same type of

"interstitial" learning we saw amongst the working-class respondents. This capitalist-class informal learning was *supported* by the institutional structures rather than *hidden* in its gaps. This owner/partner in a large corporate law firm (C4), for example, describes how he schedules time at the end of the day to meet with fellow partners in a car ride home at the end of the day. This he can apply directly to his work and his life's work as a lawyer/owner. This is consciously organized, goal-oriented activity, but it sits in a fundamentally different relationship to the type of learning that goes on in the "back corners" of the factory amongst working-class interviewees for example. It is, for one thing, "scheduled" learning. These are also activities that are immediately aligned with (rather than tangential or in opposition to) the purposes of the institutions that provide their shape.

In terms of computer learning, we do not see the sense of urgency to learn that seems to accompany the working-class interviewees. He (C4) self-amusingly describes himself as a computer "virgin". He adds that perhaps his interest to learn computers may emerge when he can turn his attention towards better "organizing his stamp collection". The material constraints of a dual existence, in terms of work-time vs. free-time, are not relevant to him, nor are the issues of daily reproduction of his own labour power: "the modern phenomenon of the male housekeeper is somewhat strange to me...".

On the subject of social class and experiences in schooling C4 remarks that he thoroughly enjoyed his residence at a prestigious private school in Canada. Other interviewees in the mini-sample respond in a similar way. Before completing her law degree and graduate studies in Art History at Cambridge, interviewee C1 "absolutely loved school" so much so that she decided, like some sort of upper-crust cultural missionary, to returned to teach in the public school system to help "immigrant" and "ethnic" students rise above their class and "become part of the mainstream" with careful attention to "better manners", etiquette and dress.

Now consider comments from this senior vice president of a large insurance company who I'll call "Conrad". When asked about the learning he does in the course of his day his response is as follows:

R: I mean, a lot of it has to be during the day because that's when *the resources are*

available, but a lot of it, we'll *rely on reports that are done [by employees]*. As I say, we've got a *very cooperative network*, so what can happen is I may contact somebody in Tennessee who's worked on an account similar. Maybe they've looked at a smoke detector account before, or can point me in the direction of somebody that has. And that's a case of saying, 'Okay. *Send me the information you've got*'. So, obviously, there're not enough hours in the day, so a lot of it is bring it home, read it, underline what's important, develop it yourself, and then all of a sudden, you're the authority.... And, as I say, *I've got a staff here*, so everybody's got a specialty so they share that information, and then when somethin' comes up, I'll go to that person and say, 'Okay, where's the stuff on this?'

I: And, okay. Is there any other types of learning activities that have helped you? Perhaps by working with, you've already talked about networking with your staff. I'm just thinking in terms of learning with other people, perhaps friends or neighbours or?

R: *Not to any great degree*. I mean, you know, the people that I know are in business for themselves, I'm always asking them what kind of, how they handle certain things. Like, you know, if somebody is fired from a job, they can either accept the terms of departure or they can sue you, so I'm working on the account that's had a problem with employees being terminated and suing employers. So if I'm working on something like that, I might pick the brains of, you know, some people I know who are in business for themselves and ask them, "How do you terminate people if you have to do that?" I've got friends who are lawyers and I'll ask them from their side, do they get involved in this very often. You know, so, I mean, I'm always, you don't just talk about the weather and going on holidays, you know, like you tend to talk business with these people... (C3)

There is a remarkably different landscape of learning being described here where, on the one hand, a whole staff ("cooperative networks" paid to write reports and provide information) are present to support Conrad in his work and learning. On the other hand, beyond the workplace, there are communities of business owners and lawyers each with something to add to your learning in the course of "talking business". If we wish to understand learning as shifting participation in a broad forms of activity, then we must include people's objective relations in social as well as material terms. The capitalist-class interviewees, including Conrad, are positioned in a world of social and material relations very differently indeed. At the most basic level, the pattern of their shifting participation is supported by vast resources, paid assistants as well as like-minded lawyers and corporate leaders.

Similar to interviewee C4 discussed above, for Conrad there is minimal expertise or interest in computers. He explains,

I: How about your computer? Do you spend any time/
R: Don't touch it. I'm computer illiterate.
I: Are you?
R: Yeah.
I: I'm surprised.
R: ... Well we did away with telephone messages, the little pink slips, your messages and everything were put on the screen. In the States, we have a number of the major computer companies, like Microsoft is a client of ours, IBM is a client of ours, and they've won awards for programming and this sort of thing and we have a network that we built in the States... I'm sure I'll be rolling into computer stuff and learning that sometime. (C3)

The lack of urgency about understanding computers is clear. In fact, the only meaningful connection to computers Conrad has comes through his company's business with computer companies.

In earlier chapters, I discussed the general view that working-class interviewee's had of themselves as learners. These descriptions varied but generally suggested interviewee's sense of un-used potential, disconnection from schooling, and in some cases strong negative feelings. In contrast, this upper-management respondent describes himself as a learner and his future learning as follows:

> I've achieved a level of where I think I have maximized my talents, but what my function is now is to go out and get more transactions. (C5)

Like the others quoted above, his informal learning flows in an unbroken web of paid relationships with staff, and typically proceeds onto the golf courses, tennis courts and over fine dining on where he networks with other corporate lawyers and business leaders.

I: So you find in your life you're constantly networking with folks, whether it be over your meals or/
R: Playing golf.
I: Playing golf, playing tennis.
R: Yeah. I think an integral part of a lawyer's life is constantly networking, calling people.
I: And, I guess/
R: Discussing different things, initiating things, helping the clients discover opportunities... Next Wednesday, I'm having lunch with the owner of a good-size printing company, and we're meeting to discuss possible acquisitions to build up his business, looking for smaller companies where perhaps the owner is ready to retire. That's frequently the sort of thing I do. And it may or may not result in further

activity. (C5)

These processes are comparable to the activities of working-class respondents to the extent that important learning practices are carried out beyond a formalized classroom setting. At the same time, we see several important differences if the scope of our concept of learning is expanded in terms of the concept of activity. First, the capitalist-class interviewees show a very different level of (discretionary) integration in work activities themselves. Indeed, this has to do with the character of a class learning habitus in many ways. Upper-class respondents do not sneak away from their duties in order to learn in the workplace, nor are they drawn toward unsanctioned activity because of "idiot-proof" workplace technologies. Unlike the working-class learners, the informal learning of these capitalists-class interviewees is *not* interstitial in any way, but rather entirely *integrated* within the legitimated and celebrated strategies of the business organization. The network of learning takes place as a strategic part of the legitimated participation in business life. The "informal" networks of contacts are either, on the one hand, paid support staff or, on the other hand, business clients with whom the exchange of information is itself a relatively normal and accepted part of client/firm relations. There is no need for the type of "solidaristic", group-oriented dimensions seen in Chapter 7. Rather these networks are formalized by existing legal contract, the promise of future business collaboration, or wages paid to staff.

In Marxist terms, at the most basic level, alienation is a function of capitalist life for all concerned (worker and capitalist). At the same time, however, one group (capitalists) finds itself at home within this alienation and strengthened in the course of its own development. *Their* efforts returns to *their* own control.

> The property-owning class and the class of the proletariat represent the same human self-alienation. But the former feels at home in this self-alienation and feels itself confirmed by it; it recognizes alienation as its own instrument and in it possesses the semblance of a human existence. The latter feels itself destroyed by this alienation and sees in it its own impotence and the reality of a inhuman existence" (Marx Capital v.3, 1992:324)

To return once again to Lukács (1971), the capitalist's own economic practice "necessarily appears as an activity (albeit this activity is objectively an illusion), in which effects emanate

from himself" (p.166). The working-class group, on the other hand, cannot sustain this "illusion". Their learning emerges from and, as we'll discuss in Chapter 11, is largely destined for *re-insertion* into a necessarily exploitative economic system.

In addition, the attitude towards computer technologies that capitalist-class interviewees seem to share was also informative. None in the group described themselves as computer literate. Indeed, with the exception of C4 quoted above, computer technology in relation to their own practice took on a trivial character (e.g. for a stamp collection) and we see none of the same strong orientations and feelings as wee did amongst working-class learners. Here we again see, comparatively this time, that there is, in fact, a working-class standpoint expressed in the type of technological mystifications and common sense outlined earlier.

8.4 Summary

In this chapter I tried to use several fairly discrete analyses to examine the notion of working-class standpoint in computer learning with greater focus and depth than has been done in other Chapters. I've focussed on the ways that local perspectives are actually part of broader coordination of a system of social class. I've suggested that the original work of Georg Lukács and in particular various Marxist-Feminist theories of standpoint have much to offer.

The themes brought out in the sections above are the most consciously and formally developed expressions of class standpoints. These are the different organizational contexts and practices in which one's standpoint generates a conscious sense of "class difference"; and, where formally organized vehicles of working-class interests such as the trade union can be seen to affect learning in general and computer learning specifically. These class differences in regards to computer learning activity are brought to fore in direct comparison to the capitalist-class group, as well as in a brief analysis of large-scale survey data.

Specifically, we saw how class standpoints in computer learning are expressed when direct representation of these standpoints, in the industrial workplace for example, play a leading role in how and why computer-mediated activity is carried out. The interviewees describe is deeply rooted in alienating class-relations of technologically in the capitalist

workplace. Jame's (respondent R4a) message to his little daughter at the close of section 8.1 is an explicit reminder of the power these experiences have to organize consciousness and future learning activity amongst the working-class.

We also saw examples of how computer-mediated practices that are taken up within the activities of trade unions also express a type of formally organized working-class standpoint. The interests, organizational needs and participatory structure of the trade union local in the example I discussed mediated what and why people learn computers. The young local union president strategizes on ways to get people to come together through computers; ways to have membership involvement in negotiations with the company increased through the use of the computer; and, sought to find ways that information can be shared amongst workers to create less alienating work, and stronger union culture using computers. In the same section, we also saw how participation in trade unions affect the way people go about their computer learning. We saw some illustrations from the interview data that showed how unions help solidaristic networks expand their scope of operation to make use of more formalized learning, and reflecting on large-scale data we saw that in Ontario (Canada) statistically significant effects of unionization on peoples computer learning were evident. We saw how one union local actively opposed the term "associate" in order to represent their own framing of workplace relationships. This expressed an oppositional class perspective which was then expanded into a disposition for solidaristic networks of learning amongst co-workers which were overtly class-based.

Taken together these very different ways of exploring class standpoint offer a significant elaboration on the themes developed in both previous and following chapters. They offer a number of different empirical arguments that claim the relevance of social class for our understanding of adult learning in general and computer learning activity specifically.

Chapter 9
Orality, Computer Learning and Social Class

The central focus of this chapter is the role of verbal interaction or orality in the production of working-class of computer learning practice. I show how talk grounds group membership or "identities-in-practice" (Holland et al. 1998), and offers a means through which people shift their mode of participation with each other, and hence learn. I explain how Orr's notion of the "war story" is an important tool in the development, storage and transmission of computer skills/knowledge, and I describe how technical languages are partially appropriated by working-class learners who use what are called "gap closing" procedures (Lave and Wenger, 1991; Orr, 1996). In opening section, however, I want to discuss how talk, specifically non-pedagogical sequences such as those analysed in Chapter 6, is an important general feature of participation and computer learning among the interviewees in this research.

In conceptualizing learning as activity and participatory networks we cannot ignore the central role of oral communication (Middleton, 1996). This is what is generally referred to as "orality" (Ong, 1977) or oral culture. One of the most provocative examples of the relationship between oral culture, learning and technology understood in the context of a participatory network is Julian Orr's Talking about Machines: An ethnography of a modern job (1996). Orr analyses the collective, mostly informal, constitution of working knowledge in occupation-based, technologically-mediated activity, and the role of language in it. This chapter presents a similar analysis in terms of working-class computing. Orr develops upon the emerging tradition of Situated Learning (Lave and Wenger, 1991)[1] by claiming that technical knowledge is a collectively produced and diffuse resource which depends, primarily, on the operation of oral traditions within specific (i.e. cultural) groups. His suggestion is that the workers produce oral "texts" for themselves which serve to organize,

[1]Orr's work is neo-Vygotskian to the degree it is influenced by the Situated Learning theory of Lave and Wenger (1991). It is less clear the degree to which Orr actually develops his work on Vygotskian principles directly.

produce and transform the practice of individuals and the group in relation to, but largely outside of, the formal organization of paid work.

Specifically, Orr analyses the working and learning lives of photocopy repair people. His method is participatory. He carries out his studies through participation in "repair school", "field visits" and formal meetings, as well as the less formal interactions of "down-time" including lunch-hours, coffee-breaks, and so on. Orr also reflects briefly on the work of Suchman (1987). His use of Suchman's argument that "plans" and other cognitive features of human behaviour are rooted in social and material practice that is accomplished socially, moment-by-moment allows him to find significance in the seemingly mundane conversations that characterize so much of the knowledge production process for photocopy repair people.

Orr also digs into the complexity of the conflictual relations of the workplace itself and draws on the argument made by Kusterer in his now classic Know-how on the Job (1978). The generation of resistance to forces such as managerial-led workplace reorganization vis-à-vis informal knowledge production amongst so-called 'unskilled' workers is seen as a particular expression of the oral culture that Orr explores. For example, we see how photocopier repair work must battle the material organization of the labour process such as isolation (i.e. repair people typically go on-site to do repairs alone). Orr outlines how narratives, stories, sayings and oral culture that participants generate serves the function of maintaining a community within and sometimes despite the structures (of time and space) that make up the particular labour process.

However, Orr's attempt to understand the structures of participation amongst these workers is limited to occupational form only. Unlike other critiques of Orr's work (e.g. Lynch, 1998; Pinch, 1998), my concern revolves around the narrowly framed vision of the purposes, practices and dynamics of work in class terms. Principally Orr attributes constraining structures in the work process to bureaucratic dimensions of large-scale organizations and the sometimes dubious practices of middle management. The interest in the 'informal' is constructed as separate from (rather than mutually constituted in relation to) the core structures of authority, the imperatives of the capital accumulation, and historical development of organizations and technologies. Important features of the social organization

of everyday practice that might otherwise help us understand specific social standpoints in everyday practice are set aside. In the analysis that I've undertaken, the facts that "employers do affect the way their employees work" or that "wage work is problematic in a mature capitalist economy" (p.152) are not matters that can be set aside but, as we saw in part two of Chapter 6, must be seen as integral to, in fact partially constitutive of, people's learning practices. Orr's treatment of management's attempts at 'codification' (p.107-108), his optimism about the impossibility of repair work to be "proletarianized" (p.151-52), and the importance of workers' ability to "get the job done" (p.2-5) as essential protection against this proletarianization all suggest the need to explore the situation more deeply. For example, Orr does not register the alienating conditions that workers, in fact, are actively seeking to counter through many of their most creative forms of practices (p.161).

Orr's work, nevertheless, is instructive here for several reasons. First, it is an engaged look at workers' learning practice at the level of interaction. Second, Orr's analysis problematizes conventional accounts of learning and knowledge production, and constructs a detailed empirical analysis that does not separate learning from the ongoing production of frames of activity. Orr highlights the importance of these shifts below:

> Interactions among groups of workers are part of the activities [that] may be necessary for the work but which are not encompassed in the normal use of the term. The fact that work is commonly done by a group of workers together is only sometimes acknowledged in the literature, and the usual presence of such a community has not entered into the definition of work. We are left, then, with a possible conflict between work as doing, as practice, and work as activities explicitly described or prescribed in the relationship of employment. (Orr, 1996:10)

Orr's recognition that there is practice that helps define an activity but which at the same time goes largely unrecognized within it (even by members themselves) also parallels the interest of this research to better understand the tacit dimensions of activity.

Orr's analysis builds on the notion introduced by Lave and Wenger (1991) that we can identify both *'talking within'* and *'talking about'* practices as essential features of learning. Briefly, 'talking within' practice includes operations such as the exchange of information necessary for the progress of the strip of practice itself in the course of its production. This was the type of "talk" focussed on most in part one of Chapter 6 where the two computer

learners carry out talk that is, in fact, barely decipherable when separated from the production of their practices moment-by-moment. 'Talking about', on the other hand, includes verbal activity such as story-telling, the production of "community lore" and so on, which seems to define broader and more durable dimensions of activity including social standpoints. Lave and Wenger (1991) describe these two types of orality as follows:

> Inside the shared practice, both forms of talk fulfil specific functions: engaging, focussing, and shifting attention, bring about coordination, etc., on the one hand; and supporting communal forms of memory and reflection, as well as signalling membership on the other. (1991:109)

These procedures ("engaging, focussing...") are the actual work of accomplishing coordinated practice. They are the actual interactive, contingent practices of learning itself. Thus Orr's work compliments the Situated Learning approach of Lave and Wenger by examining more closely the forms of talk that define participation and movement within communities of practice.

When we talk of oral culture, however, we cannot ignore the particular historical period, the social divisions and power-relations that characterize it, or the important relationship that orality has with written literacy in this context. Focussing on the early development of the capitalist epoch specifically, Ong (1982) notes the connection between the emergence of clock-time and the move from a primarily oral to a primarily written culture as a vital element of the period. Likewise, Lash and Urry (1994) outline how dominant forms of nineteenth-century culture in Western Europe were rooted in written literacy. Together these authors document the enormous growth in cheap books and the number of daily newspapers (doubling every 15 years or so), the general growth of time-keeping records, and the widespread documentation of citizens (registration of births, deaths, marriages, travel, and later of the passport) in this period. In other words, they provide an analysis of the growth of a documentary and "scriptural" (Fiske, 1993) society which provides the defining backdrop for the relationship between orality and capitalist society generally.

At the same time, however, we mustn't overestimate the domination of these written texts and scriptural practices. As E.P. Thompson (1963) demonstrated in his seminal work on the emergence of working-class cultural life in 18th and 19th century England, oral culture

co-existed, as it does today, with written culture through the residue of earlier cultural forms (e.g. song, story-telling), and the cooperative efforts of working-class literates who were a resource for fellow workers. Quoting a description of working-class community life in West Riding (U.K.) in the 1820's for example, Thompson tells us:

> Very few of the working people can read well enough to read a newspaper; although papers are taken (and read aloud) at the blacksmith's, the barber's and several public houses. Much of the news still comes by way of broadsheet vendors and street singers. (Thompson, 1963:447) [West Riding (U.K.) Community life of the 1820's]

Indeed, another relevant entry point to this discussion of the relationship between oral culture and social class can be figured in the work of Negt and Kluge (1993). In Public Sphere and Experience: Toward an Analysis of the Bourgeois and Proletarian Public Sphere, the authors (1993) link the production of experience with the need for a public sphere that makes proletarian experience comprehensible, and implicate the role of oral as well as written communication for the development of proletarian standpoint.. They suggest that "[g]enuine experience is torn into two parts that are, in class terms, opposed to one another" (p.18). Thinking, the authors emphasize, is a "'discussion' carried out not only in the imagination, but on a social scale" (p.23).

Writing on life in the trade union movement in Canada, Martin (1995) outlines another dimension of oral culture that seems to relate closely with the working-class learning habitus discussed primarily in earlier chapters. Here Martin describes, as a labour educator, the importance of gaining acceptance in the type of networks that I've described as informal, group-oriented and solidaristic. He talks about his relationship with a local union member named "Jim":

> ... Jim was respected among his fellow workers and that he had afterwards spoken positively about me and the union on the floor of the plant. In the informal logic of that local union, my word was now good. I was inside the network of trust. This meant I had room to be fully myself and that I could call for a certain openness among the people I dealt with. Mistakes could be forgiven, misunderstandings straightened out... (1995:36)

Martin goes on to outline the traditional relationship between written and oral culture in trade unions.

> Part of the reason that the wider public knows so little about unions is that so little of the internal wisdom is written down.... On paper, union input tends to be precise and defensive; in verbal communications, off the record, unionists are more eloquent and spontaneous. (Martin, 1995:39-40)

Cultural Studies theorist John Fiske (1993) also discusses the power relationships that infuse oral culture. According to Fiske, people operating from subordinate standpoints can and do exercise a type of countervailing control in terms of oral expression. He goes to indicate that linguistic practice itself does not simply guarantee an open opportunity for subordinate groups because language itself plays an important role in reproducing existing social patterns.

> ...particular expressions evade the power of language to "speak" its subjects and are instances of people's ability to speak for and of themselves. It is tempting to suggest that the most materially deprived social formations, who materially possess fewest things [will] accord proportionately greater significance to linguistic practice and creativity, for language is always available to everyone. [However] it is not, of course, equally available... The language that a society develops is always inscribed with the interests of that society's power-bloc... [D]ominant culture is scriptural, for scripture is where the power to represent is most effective, and popular culture is oral, for orality is the means by which subordinate histories and identities are maintained and circulated. Orality participates in ways of knowing that are different from those of literacy. (Fiske, 1993:211-212)

Power relations saturate the material, social and linguistic organization of activity. In this chapter, I discuss issues of orality in working-class learning and analyse several specific devices to demonstrate how various types of linguistic practice are central to participation and how they express a particular standpoint in activity.

9.1 The Connection Between Orality & Computer Learning

In one of the encounters within the community of photocopier repair people Orr outlines the interaction within repair teams and identifies the importance of collective, local production of knowledge and the role of talk in it. Below, he describes the comments of one repair person ("Frank") indicating the difficulty workers experience in exchanging and developing knowledge and skill when they lack an ongoing foundation of shared daily experiences and opportunity for oral exchange. Information, knowledge of the situation, skill in the local environment, and so on, are not easily transferable when limited to formal meetings and presentations.

> Frank's comments... are reflections on the social distribution of knowledge and how it is accomplished. His comments about team meetings address the same issue among the technicians. It is particularly striking that he feels the lack of comparable experience makes it difficult for the other teams to understand what his team has learned, so they cannot take advantage of his team's experience. Implicit in this are the technicians' assumptions that their skills are not learned in school but from each other, and that the meaning of their talk about their skills is not obvious outside the context in which they were developed. (Orr, 1996:60)

Orr's point is that the situation is problematic not simply because of a lack of opportunity to obtain information from each other, but that it is the opportunity to participate with each other on an ongoing basis beyond the formalized classroom or meeting that is key. Orr develops the concepts of narrative types (e.g. "celebration of identity and community"; "consultation among members"; "problem diagnoses"; "war stories"; etc.) which further elaborate on the 'talking about'/'talking within' concepts. He also develops the notion of discourse groupings (e.g. "social" versus "experiential and existential") as a means of sorting out context and projected goals/motives of activity systems. These concepts are important here because through them we can better appreciate and make visible the complexity and coordination of the everyday cultural practices of computer learning described in worker interviews.

The computer learning practices that workers described in my research were shaped by material structures of their lives which helped shape patterns of interaction and participation. Central to this was access to talk with others experiencing the same concerns, interests, social contexts and standpoint within these sets of relations. The comments of this chemical worker, for example, were typical. At 35, this man already has worked in a variety of industrial settings as well as driven truck, and tried his luck at small business, but has just recently become employed at the chemical plant. He's only been at the plant for a year and he works the night-shift where, as he describes, supervision is more relaxed and co-workers tend to be able to get together and talk more often. He describes the community of computer learning practice rooted in the industrial workplace, and the role of oral culture.

R: The 8 year old knows more about it than I do so, actually [his partner], she works a lot with computers. She actually knows a lot about it, and my boy can go into her office and open that computer up and get it going... He takes computers in school so that's

why I feel I gotta get one at home....

I: Do you do any talking to anybody about it?

R: Oh yeah, *that's the natural conversation every night in the smoke shack* [a storage building in the back of the shipping yard where workers take their breaks]. Because so many guys have gotten them and every night, *they just talk about computers, talk about computers*. I pretty well got everything listed that I want in a computer. I'm still not up on all my *terminology* and everything, but my biggest thing about is it's good for my little boy. He'll have his games on it but, you know the unfortunate thing about it at work is all they do talk about it are the games.

I: These guys sound like they're pretty into it, they know all the ins and outs.

R: Surprisingly yeah. We got one guy there man, you look at him and you would never say he was good at computers but he's probably one of the best guys there. He's got this long hair. He drives a Harley. It's great!

I: So how do they learn this stuff? They don't seem to go to school for it?

R: I don't know. We got one guy there, started the same time as me at the plant and he's really crack on the computer. But far as I know, *no training, just picking up from each other* type of thing you know. Lending out and all this stuff. I had an older computer here and a couple of weeks ago I brought it over to my buddy from work to see if we could get some stuff into it, so far not much.

I: But for you, do you think you might be able to pick up some skills in case you need to change jobs?

R: Definitely. (R50)

This worker is a self-described novice. We see the world of learning and interaction that this worker encounters nightly, and can begin to figure the kind of routines through which he and other workers make their time to learn. We can read through the account and make visible the social organization of the daily/nightly practices. We see again, how interaction and learning for workers is partially structured by the rules of work and management rights.[2] In addition to the regulation of movement around the plant, we shouldn't underestimate the fact that the industrial workplace is noisy and hot, full of grime and fumes, and physically dangerous. As much as many modern industrial facilities have improved, these are still features of daily life which at the same time can make learning more difficult.

As discussed in the previous chapter, we also see another example of the integration of multiple spheres of activity, in this case, the interviewee's own learning/participation (in community and workplace), the learning of his little boy at school, and the learning of the

[2]Another feature of this structuring, as outlined in the second part of Chapter 6, are the built in hardware and software features and design routes taken (see discussion of Noble in Chapter 5).

little boy and household partner at the partner's work, and so on, and we can see illustrated how the different perspectives on technology relate to oral culture, activity and "membership" in the group. We also see that an interest in purchasing a home computer is not taken lightly. It is a substantial purchase for most workers, there are risks of redundancy that make the potential cost even higher and require extra learning in itself, but by drawing on each other, as the above worker has done, old machines can sometimes be upgraded or at least good decisions on new machines can be made at the outset.[3]

Perhaps more important at this point is the description of the physical centre of the workplace-based informal computer learning community of practice, namely the "smoke shack". Workers can sit on the sidelines of conversation (as beginners) and listen-in, perhaps make a connection to have a computer repaired, pick up information and gain exposure to terminology. We see R50 describe how co-workers actively solve ongoing technical problems, share resources, and exchange stories of these activities. Drawing on Orr's terms, we see examples of the different narrative types, i.e.

a) Expressions of identities and community, e.g. the discussion of the "Harley" man; the discussion of the liveliness of the "smoke shack". R50 seems to take delight in the broken stereotypes of people who learn about computers without training, and computer expertise in the form of long-haired, motorcycle driving chemical worker.
b) Consultation among members and problem diagnoses, e.g. sharing information on hardware, the latest soft-ware; physical upgrading of computer.
c) War stories, e.g. the story of conflict in the consumer role when purchasing a computer.

It is important that we note in each of the above examples of narrative types that, in fact, there is no machine physically involved in the interaction yet "learning" about computers is still going on. This highlights the relevance of Lave and Wenger's (1991) distinction between "talking within" practice and "talking about" practice. Once again, we see an important distinction that most survey-based computer access/use research fails to consider: that a significant computer learning is done *without* a computer present. A interviewee like R50, for example, might have difficulty in detailing the amount of time he has spent learning

[3]See more extensive discussion of this in Chapter 10 where I outline the material structures of computer use and access in working-class households.

computers as it is so diffuse and integrated within a range of practices, and he would probably not register as an active computer learner in large-scale surveys, though clearly he is.

Another important function of oral culture in working-class computer learning was its central role in the coordination of learning resources and opportunities. In these data, talk was the most important form of learning interaction (as opposed to reading a book, television, etc.) and rivalled, in many cases, use of computer itself on the basis of time spent talking about or talking within the course of computer-mediated practice. Here an auto worker describes a feature of oral culture and outlines the range of artifact/resources typically involved in these computer learning practices. He begins by discussing the different information resources he uses to learn computers.

> To get information, *I fax, I e-mail.* I've e-mailed the Toronto Sun. I wanted to find out about a certain program on the market called SoftRam. Actually, I *told my buddy* at work - you know because [the buddy] wasn't on the Internet, he was *going through me* - that I e-mailed the *newspaper*. This was about a month-and-a-half ago. The guys at work kept asking me, 'Did you get an answer yet?' I said, 'No. They're probably so busy.' So I figured, well, I had written it off. I even went to the guys, I says, 'I don't expect anything anymore. I really don't. So, you know, if you ask me, you know, I'm just gonna keep saying I've written them off.' (R5)

Viewed as a network of learners, we see how information is shared and developed more fully. Even the question itself (about the software) was generated in the context of group interests and discussion. Information from newspapers, e-mails, faxes, and other sources are woven together and discussed within an active oral culture rooted principally in the workplace. Resources of individual members of the network, such as a private Internet account come to be collectivized resources. They are shared amongst group members based on some sense of mutuality and commitment which depend upon membership within the group.

9.2 Talking for Participation

Orr's work outlines how "[n]arrative forms a primary element of practice" (1996:2) in the knowledge production process amongst photocopier repair people. We've seen how oral culture is an important dimension of computer-learning activity generally, however here I want to discuss why this might be so. Amongst these interviewees, oral culture is the primary

means of sharing, and in fact producing, experience. Oral culture plays a major role in making practices coherent and in organizing people's consciousness which in turn produces knowledge and understanding of practice. Focussing on a group of specific people, Orr comments:

> To preserve the understandings they create from such situations, the technicians pool their knowledge. They share what they know, telling each other about new fixes they have found or strange new problems they have encountered. When they have been working on each other's machines, they tell what they have done and what the machine needs. Given that they all work on each other's machines, there is no incentive to keep information private and every reason to see that the other technicians have all relevant knowledge. (Orr, 1996:160)

Orr outlines how the possibility of incentives and disincentives for engaging in certain forms of participation are conditioned by the basic structures of paid work amongst the photocopy repair people, and emphasize the fact that organizational structures of work are also the organizational structures for learning. In the workplace in particular, a capitalist *labour* process is also a capitalist *learning* process. The computer learning I've investigated amongst the working-class interviewees is not related to the workplace in the same way that photocopier repair work is.[4] The computer learning per se is largely incidental to the labour process and only plays a part in people's overall computer learning activity. Nevertheless, language - and specifically a specialized technical language - is required for participation. A major problem that must be overcome when learning is rooted in the interstitial realms of institutional life and does not revolve around written sources, expert sources or classrooms is finding a way to deal with exclusive, technical languages computer learning tends to require.

Building on the account offered by the auto worker (R5) above, we can see the type of role that language plays in his learning. It is a fundamental element of the problem solving process, for example, in the case of electronic mail software. He outlines, even in his attempt to talk to me in the interview, the need to come to grips with a new language in order to

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[4]Of course, the role of computers in the lives of clerical workers is different again. Most clerical workers had very low interest in pursuing computing for computing sake in the same way the manufacturing workers (male and female) seemed to. If there is a gendered structure to a technological perspective as, for example, Hacker (1990) and Cockburn (1985) suggest (and there seems to be though it is not highlighted particularly well in this research), it appears to be mediated by occupation.

continue to engage in active group learning process, and then he describes trying to solve a problem *without* drawing on his computer-learning network.

R: I knew I was on the right track, but, you see, I didn't know what the system actually used to retrieve the mail, so that's where I was making my mistake. *I just didn't know the words that they used.* And the guys they would tell me, "Yeah, they're keeping it simple. Just put 'mail'.

I: So it's almost learning a little language, eh?

R: Well, basically. Yeah, you have to know what the, like if I would have actually either e-mailed somebody and told him, "What's your, you know, *whatever the thing is called?*" He could have told me right off the bat, but I was trying without asking him plus *I didn't know what to say.* And I did try it without asking him. And I couldn't get it and I was trying this and trying that, so when I talked to him, okay, then I asked. Well, it would be fine if it was cut and dried.

I: Yeah. Or somebody telling you.

R: Yeah. So I talked to Chris about that. Well, not that one about the sending. We figured it out before because, again, he's the one that told me about it. And that's how we figured it out: we're playing like that. So, actually, I sent a message to myself to see if it worked.

I: Oh, yeah. Sure. So to see if it comes back.

R: Yeah, you see. So that's one thing that we figured out. There's still a lot of things I haven't figured out, because, you know, *no manuals or nothing*, so it's kind of hard. (R5)

Interspersed in the account, we see assorted allusions to the mutual relations in activity, e.g. "that's how *we* figured it out: *we're* playing like that" (R5), and the highly interactive nature of these activity systems generally. The auto parts worker "James" (R4a) discussed earlier, outlines the importance of language to his learning in a different way. Like most interviewees who owned a home computer, it was at the computer store that the importance of language in computer learning, specifically 'talking about' computers, was made clear. James discusses how his workplace injury actually opened up the opportunity to pursue an emerging interest he and co-workers had begun to express.

> Well, anyways, I was sitting around here and I had nothin' to do, and I said, 'Well, maybe we should buy a computer.' And then one day and my wife says, 'We'll go looking and ask.' So one day I just went and I hopped in the car and I was on crutches and right away went into Hamilton and I looked at this store and that store and *they're talking* RAM and ROM and, you know, mega-bytes, and all this kind of stuff, and mega-hertz, and *I didn't know what the hell they were talking about.* (R4a)

Phrases like "What's your, you know, whatever the thing is called?" (R5) or not knowing "what the hell they were talking about" (R4a), demonstrate how fundamental orality is for computer learning practice amongst these interviewees.

Another feature of the use of technical languages within computer learning activity that was common amongst interviewees was the dissolution of a technical problem into one more easily understood (and solvable) through the use of analogy or metaphor. These devices aided "gap-closing" procedures (Lave, 1988) and expanded understanding of abstract, technical issues. Lave's (1988) discussion of how grocery shoppers use a series of gap-closing procedures to transform problems of pure arithmetic into ones that can be solved parallels the practices of the computer learners in this research. Amongst interviewees, such procedures were required to come to grips with technical language, and in turn allowed continued engagement in learning and participation in activity in new, more advanced ways. Interviewees used these procedures in comparing how different programs ran on different machines. They used the performance of software (something immediately available to one's sense in terms of timing, visuals, colours, sound, and so on) on particular hardware as one means of discussing and coming to grips with more abstract technical issues of processor speed and frequencies, monitor type, the distinctions between different sound and video cards, and so on. However, this type of comparative process is not done individually but in groups that share software often and continually re-engage to 'talk about' computers in places like the "smoke-shack". Technical problems are dissolved into a form more available for the group's shared understanding which was developed outside any formal training, legitimate expert and so on. James, for example, uses this type of gap-closing procedure when he dissolves a technical definition of a video card into the differentiated performance of a computer game.

> For me to, well, okay, ummm. Do you know "Links Golf Course" [software]? For me to run it on my computer takes about a minute to draw the picture. Jack's runs it in ten seconds. These computers are perfectly graphic, eh? They're much faster and better -- that's a better video cards now than I had. (R4a)

Ongoing, shifting participation in computer-mediated practice depends on the ability of people to produce interaction with each other. In the context of the specific working-class

learning habitus which disposes people toward certain approaches to learning activity largely outside classrooms, we see that coming to grips with exclusive technical languages is a central challenge to ongoing participation. Procedures such as "gap-closing" are useful but rely on shared experiences as well as stable and familiar group interaction.

9.3 Crashes, Blue-Prints and Rip-Offs: Oral Artifacts and Situated Computer Learning

Lave and Wenger draw on the work of Jordan (1989) on the collaborative knowledge production process in midwifery to discuss the relationship between oral culture and learning. They draw attention to the functions of oral artifacts or "stories":

> What happens is that as difficulties of one kind or another develop, stories of similar cases are offered up by the attendants [at the birthing], all of whom, it should be remembered, are experts, having themselves given birth. In the ways in which these stories are treated, elaborated, ignored, taken up, characterized as typical and so on, the collaborative work of deciding on the present case is done.... These stories, then, are packages of situated knowledge... To acquire a store of appropriate stories and, even more importantly, to know what are appropriate occasions for telling them, is then part of what it means to become a midwife. (Lave and Wenger 1991:108)

Similarly, in Orr's work the notion of a "war story", the creation of a coherent description of a troubled machine, is an important element of the collectively produced discourse of practice that is at the same time a means of knowledge storage and transmission. Such stories are the primary means through which knowledge can be seen as a socially distributed resource diffused through an oral culture. These oral artifacts are, in Orr's words, "the medium through which [worker/learners] preserve their hard-won knowledge" (p.148). Story telling is a means of boasting and idle amusement, themselves a means of finding and producing "membership" and a (subject) position from which to enter interaction in the particular frame of activity. The stories that are told define and re-define the values and norms of the group. And, story-telling is also a means of knowledge storage, transmission and development. In the context of photocopier repair people Orr tells us,

> Each episode of machine repair is built on shared knowledge of earlier successes and failures, and the stories that the technicians tell circulate that knowledge. The stories also celebrate the technicians' mastery of the complex and sometimes obscure interaction between technicians, customers, and machines, while acknowledging the

contingent and temporary nature of their success. (Orr, 1996:2)

The narratives of interviewees in this research dealt with computer learning but also served to express experience of everyday class life. To understand how stories express and in turn help to produce class life, take this example of a story which I encountered in several different sets of interviews. It is a story that seems to express a shared consciousness amongst workers of a form of workplace re-organization that have swept across North America over the last decade and a half called "Lean Production".[5] In this re-organization strategy company's capitalize on a growing reserve army of unemployed to demand even greater work intensification and rationalization. It is told to me in response to a question about the role of computer learning in getting and keeping a decent job. It attempts to explain why there seem to be so many unemployed workers while at the same time those employed are being over-worked.

R: The only way I can tell you to honestly understand that whole concept that I said was, on Saturday mornings there used to be a cartoon, and it was about a *shoe factory*, and the cobbler was cobbling away and the mice would come in and make the fucking shoes and then they go through the whole thing. It's a cartoon, but it's saying exactly what is happening today, and so the little cobbler has to move out of his little corner store, no bigger than a barber shop, and he's got the big building and the car and everybody's making money, but sooner or later that all has to crash, but the reason we're working overtime is sort of that way. The bottom line is that they do not want to hire people because they've got to pay the benefits and everything else, but they need more... [and] the worst they ever brought in was this just-in-time.

I: Tell me about that.

R: 'Just-in-time almost'? It means that you're supposed to have the parts when you're supposed to get the parts and we never get the parts when we're supposed to, so and they won't put any on skids to make a day's supply ahead of time. They just run exactly what they need so then when... (R17a)

This narrative presents a great deal of information about relatively complex and contradictory relationships, perspectives, and feelings that describe the production process from a working-class standpoint (i.e. the "mice"). The interviewee also uses this as a device to integrate more specific topics including subordination in the labour process, unemployment and excessive

[5]See Moody (1997) for a recent discussion of this process from the standpoint of workers.

overtime, and even what he calls "just-in-time almost"[6] production methods in an industrial workplace. The story is a device which has as its core a class message but which can be supplemented with other specific information. A chemical worker (R48a) remarked on the same cartoon to dispute the way that management wishes to view workers and management as a team. The same core, class message is supplemented by particular local issues through the use of a story as a tool for expressing standpoint, exchanging information and learning.

In terms of computer learning specifically, it was striking that across different interviewees and different factories, homes, and so on, very similar stories emerged that revolved around buying, using and expressing membership and identity through computer-mediated orality. Like the mice in the shoe factory story above, these narratives functioned, first, to transmit knowledge and experience within (and between articulating) activity systems, and second, to mark a particular standpoint in the social world of computer-mediated consumption, distribution and production processes. As an example of the first type of story we have the computer *"crash"*: a narrative on some infamous collapse of a group member's computer system. However, as Orr and others emphasize, it is as much the context of the telling, i.e. the place it holds in situated interaction, as it is the facts themselves that defines meaning and function as a linguistic device. I asked this auto worker what kind of computer learning he was engaged in and how he preferred to learn and, like other interviewees, he launched into an example of battling a "crash" to explain his practices generally.

R: ...this week, or I'd say the last month, I loaded my computer up so much, I kept on putting software in, software in, software in and I ran into a problem. It was running so slow because there was so much in there that I felt I could fix it. I installed some new software and the system got slower, then I installed Windows 95 and then the system crashed. Actually when you phoned, I had formatted my hard drive and I've now just installed the basics again and I'm right back to the beginning.

I: Did you lose some things?

R: I lost everything. Basically, I've got a 420 hard drive and I was up to 400. To get

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[6]"Just-in-Time" (JIT) production is an integral part of the Japanese-inspired "Quality" (see Wood, 1989; Robertson and Wareham, 1987 for a critical discussion), and as it was to be developed into the "Total Quality Management", production process. It reduces inventory overhead costs, attempts to integrate a firm with its suppliers, and make it easier to change production specifications. Thus reference to JIT is an expression of a complex model of industrial production.

Windows in, I had to dump 100. Actually I was just working on it, I think I got about 350 or 340 open right now. All I have in there is just Windows, Microsoft Works, Quicken.

I: So what are your plans?

R: Well I'm basically going to run on CD rom now I think, like for the kids games, instead of loading them all into the computer on the hard-drive I'm going to switch to just a CD Rom as a new method, keep them all stored on CD Rom. I actually have two CD's and they total about 40 games on the two CDs. Different ones, educational or little fun games you know, where you can shoot and blast everyone. Other then that I'm not going to bother loading this stuff on anymore. Because I made up a menu and I also made up a autoexecbat where you could go and you could run a normal autoexecbat or you could make a games autoexecbat so it was like a boot system and they would go games and it would launch itself and it would boot itself up and it would come up with all the games and you would just pick from the games so, it ran good for a bit but like I said I almost crashed the system. (R16)

This "crash" story was the means of discussing this interviewee's learning and current knowledge, as well as my means of learning about his practice. This was a story he not only told to me but one which he used in conversation with others to discuss the features and functions of his hard and soft-ware. The story itself, specifically placed in various interaction, becomes a tool in the learning process. The practice is type of trial and error approach, but one that is in fact well supported through his network of co-workers, family relations including his wife's range of contacts and experiences. This fellow had even developed an online connection, exchanging e-mails with one of his wife's school teachers who was a computer enthusiast. More importantly, however, the story summarizes the knowledge and experience the interviewee has developed in computer-mediated practice. It is perhaps more than coincidence that a co-worker (of R16's) in expressing how he learns about computers and why he enjoys the process refers to this particular "crash" explicitly. I asked him if he enjoyed computers and why, and this was his explanation.

R: Oh, yeah. I enjoy it. I really enjoy it now. At the beginning I was very terrified of computers. But, you know, after awhile you get more comfortable with it. That's how you learn. Talking with the guys, like I say. I talked a lot to Steve about it. Did you hear Steve crashed his machine.

I: Yeah? Recently?...

R: Oh yeah, it was a real mess... (R5)

A description of the problems follows, and we get an actual example of the use of a war

story. The story, a form of 'talking about' computers, is a linguistic device that captures and expresses computer-based problems and practices even without the presence of a computer.

Another device closely related to the war story yet different in some ways involves the use of analogy. The one that appeared to be the most popular amongst interviewees was the comparison of computer programming language and computer architecture and protocols to the blue-prints and physical lay-out of a house. As Orr documented amongst the photocopier repair people: "a failed diagnosis is a failure to construct an adequate account of the problem" (1996:123). Analogies such as the "blue-print" serve the purpose of shifting the context of the problem towards more recognizable forms of practice, the vision of rooms in home, with which the learner is more immediately familiar. This is yet another form of a "gap-closing" procedure that is socially organized as a form of oral tool-mediation. I asked this interviewee how he first learned about computer programming language when it seems to difficult to even begin to understand without some sort of course or manual.

R: The way I was taught was: There's a computer; now you turn it on. That's like just coming in your back door of your house and you turn the key to come in your back door. First of all, you have to open it. Alright, so you turn it on. Alright. Now the doors open and you're there. There's the room, alright? Now if you want to proceed into that room, okay, well, you want to go in the kitchen - that's through your BIOS into your DOS base, okay? So you want to go into your DOS say. Then from your DOS, oh, you want to go into the bathroom, but the bathroom is, say, a spreadsheet like Quicken. For an example, okay? So the door's locked. You can't get in there, so you gotta know the key to Quicken. Okay? And around and then you come back out, you have to close the door behind you and exit that to go to the dining room, to the living room, to the bedroom. Okay? Then to come downstairs to the basement, to go to the laundry room to whatever. Like that's the way I was taught. Like you said, 'Now, hey, but you gotta know the key to get in.'

I: You solve the problems as they come up that way?

R: Yeah. But now the key is no good, so you have to make a new key, right? Or something like that. And it just keep adding to it, alright? And then you've moved into a new neighbourhood. It's just a road map and that. *That's how Rick told me*, "Okay. That's the easiest terminology". He said, "Okay, when you go in your house, now you've gotta have the key to get in. That's turning it on. That's you're in the door. Then each room has its own key and you have to know that key to get into that room and how to change from the bedroom to the bathroom without going through the living room, the dining room, and down the hall. So it's all just using keys... *That's how I learn.* (R4a)

We see a type of analogy that acts as a means for participation with the technology, with an exclusive technical language, and ultimately with a group of co-learners. Like the story, these analogies are an expandable (e.g. now "you've moved into a new neighbourhood"), living oral artifact. As the worker said above, "you just keep adding to it". They are also tailored to the specific context of the co-learners.

Another key 'war story' I encountered in these interview data dealt with the topic of purchasing a home computer. It is the type of story that I'll call the "rip-off". It emerges from the nexus of working-class technological common-sense, class learning habitus, the fears and anxieties of keeping/getting a job, limited financial resources and so on. These concerns and dispositions are then thrust into the logic of commissioned sales people, technical languages and questionable honesty in the local computer shop. In virtually every interview a story of the need for networks and 'trusted' informal information sources in the context of home computer purchasing was mentioned. This experience was, in fact, often the core 'goal-orientation' (as in the conscious object of activity) of the computer learning in its initial phases. This computer novice who we heard from earlier in the chapter describes how the help of his friends and co-workers in the "smoke shack" would be needed to avoid being ripped off at a computer store.

I: So some guys would be able to steer you a little bit about buying a computer or/
R: Yeah, for my needs. Like we got one guy there who just got a computer and what he got is way too much for me. He got his programmed in Austin, Texas somewhere. He went into it big time.
I: So they can get pretty pricey eh?
R: Yeah, he paid about $5800 for his, the one I'm looking at is about 22, 23 grand.
I: I got a computer and I paid about $1100. You ever think of cost in terms of updating?
R: That's what I'm doing, I went to the Future Shop and I talked to guys and you know they have to make a sale, that's their job, and we almost bought a certain one and got ripped off, but *then I said no, let's just buy what Ron told us.* So I said to the sales guy write everything down that this computer can do and I brought it back and went to work that night, and some different guys took a look at it. Now do I really need this, you know, what do I need a fax for? I don't need fax. I don't need voice. Why would I need voice on mine? You know stuff like that, you know, 'Don't get the computer updated to 16 megs'. So I'm still pretty dense about computers but I'm learning. (R50)

Although people used these networks to save money, these were not only instrumental

expressions of social relationships aimed at saving a buck. In the context of the telling, this and other stories were expressions of social connection, mutuality and opportunity to learn translated into oral artifact and circulated in social networks. These collective responses express a culturally conditioned reaction to persistent material constraints experienced from a working-class standpoint. They express elements of the working-class technological common sense in which anxious and sometimes fearful learners (fearing not computers themselves but rather how they seem to stand over their lives) with limited resources (often buying computers on a monthly payment system) are forced to face uncertainties in the computer store. These experiences, to the degree they express coordinated social patterns, organize consciousness and are entered into contradictory forms of embodiment such as described by terms like 'common sense' and 'habitus'.

9.4 Talking, Participation and Membership in Working-Class Computer Learning Networks

Lave and Wenger (1991) claim that participation and 'movement' toward more skilled practice includes one's "increasing sense of identity as master practitioner" (1991:111).[7] Indeed, they argue that,

> ...from the perspective we have developed here, learning and a sense of identity are inseparable: they are aspects of the same phenomenon.... This idea of identity/membership is strongly tied to a conception of motivation. If the person is both member of a community and agent of activity, the concept of the person closely links meaning and action in the world. (Lave and Wenger, 1991:115, 122)

Lave and Wenger's (1991) as well as Holland et al's (1998) discussion of "identity formation" among non-drinking alcoholics helps us to understand the intersection between communities of practice, oral cultures and identities-in-practice. Building on the work of Vygotsky as well as Bakhtin, the analysis offered by Holland et al. does not separate an abstracted notion of identities and subject positions from their production in the course of ongoing material and linguistic practice. Reviewing basic Vygotskian principles, they comment,

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[7]The development of "identity" or personality was central to the original Vygotskian project in terms of child development. Leont'ev's discussion of personality is more general and as such more useful for in relation to notions of adult identity formation in the learning process as discussed by Lave and Wenger (1991).

> In the ordinary development sequence proposed by the socio-historical approach, the child first interacts. the sign in concert with others. The interaction of the sign, for the child, is part of a behavioural sequence that may have no meaning in and of itself. It is likely that relations of identities are borne in a similar way, in what phenomenologists used to call the natural attitude, the uninterrupted flow of everyday life. The meaning of actions remains transparent or taken for granted in the natural attitude, and response follows as a matter of course. The formation of identity in this posture is a byproduct of doing, of imitation and correction, and is profoundly embodied. (Holland et al, 1998:138)

The authors go on to say,

> the cultural figurings of selves, identities, and the figured worlds that constitute the horizon of their meaning against which they operate, are collective products. One can significantly re-orient one's own behaviour, and can even participate in the creation of new figured worlds and their possibilities for new selves, but one can engage in such play *only as part of a collective*. One can never inhabit a world without at least the figural presence of others, of a social history in person. The space of authoring, of self-fashioning, remains a social and cultural space, no matter how intimately held it may become. And, it remains, more often than not, a contested space, a space of struggle. (my emphasis; Holland et al, 1998:282)

Learning and the production of identity are integral to one another. They are essential, inherent components of activity, and cannot be meaningfully understood, Holland et al. point out, as individualistic enterprises. Though it is clear that, people retain individual, subjective feelings and orientations, it is only in the social expression of them that they take on their meaning. Understanding how we participate with others (i.e. how we learn), then, must include the process in which our identities as participants are formed and reformed.

In these interview data, the basic "learning identities" that people produced and used to produce their ongoing activity were what I've been calling a class learning habitus. As we've seen in previous chapters, these general forms of identities-in-practice (Holland et al, 1998) were at times vague, but nevertheless detectable. One surprisingly common expression of standpoint and identity, however, actually involves a common narrative which expresses class standpoints in relation to a company and its support for employees' computer learning. It was a form of 'talking about' computers and a "war story" which celebrates a type of identity by constructing workers as reasonable people who have practical solutions to workplace problems. At the same time, the story expresses the fact that workers continue to

be caught in hierarchical relations of the workplace in which management is, in the end, described as largely unreasonable and unthinking. As one auto parts worker explained to me:

> So this leads me back to the conversation me and you had at the plant. Why don't the company when they get rid of their computers upstairs, put them so the guys at work can bring them home, and I asked the supervisor about that and he said that what they do with those computers is send them to the shipping docks. Like that's where they go, because the environment is so bad there, with the dust and the dirt and the grime that they wear out very quickly, so when the get too worn-out upstairs, they move them out there to save themselves a little bit of money. So he says to me, 'No, they're not going to give the computers away for a ridiculous price to the employees.' He says, 'I can't even get one. I've been trying to talk them into getting me one so I could have it at home and I could do a majority of my work at home, but they do not want to do that.' He even told them he'd pay for it, so he could do some work at home. I even put it in the suggestion box, tried to get it but the company won't even go for it. (R17a)

What is clear within the structure of this story is that in the context of computer learning and worker's desire to upgrade their skills, the company is portrayed as adversarial and short-sighted. Other interviewees, in other workplaces told remarkably similar stories about how workers wish to become more computer literate by partnering with the company yet the company refuses. In an unrecorded conversation with another worker, I was told a detailed story of how management would rather see the computers in the garbage bin than given to the worker. The story used rich imagery of how workers at the plant would love to purchase the company's second-hand computers but that instead these machines would be thrown out. It emphasizes a clash of values, interests and perspectives. The story is punctuated, I remember noting, with the description of the second hand computers in the trash with an 'iron bar smashed through the screen'. In a recorded interview, yet another worker, this time at a chemical factory, explains a version of the story this way:

> We tried to tell the company that workers will learn stuff together on their own at home, so why don't the company offer us rebates on home computers we buy, because what you'd be doing would be beneficial for them too right, and it's that much less training that they have to do, but they said no. See their general attitude is that they're trying to run something but they want to put the responsibility for it on the worker. (R30)

This story captures and expresses a standpoint that is stored and transmitted orally amongst

working people which expresses relationships of social class, and contributes to the ongoing production of identities-in-practice as well as class relations in the context of people's overall computer learning practice.

The stories that circulate amongst these learning networks can be seen to deliver more than simple information and make technical languages decipherable, they circulate and contribute to the development of a sense of the social world and one's place in it. They express positions in spheres of production, which are based on low levels of discretionary control and a type of adversarial relationship to management which is muted at times and more pronounced at others. These stories express a position in the sphere of consumption as with the need to carefully consider the purchase of a home-computer, and to deal with "crashes" alone and within the informal network. And, these stories express a position in a competitive labour market and relatively insecure employment. In general, they are a tool for learning, and offer a computer-based narrative on the contradictions and symbolic struggles inherent in working-class life in technologically advanced, capitalist society.

9.5 Summary

In this chapter I examined the unique role of orality in the process of computer learning. Julian Orr's work (1996) served as a point of departure from which we examined the various dimensions of narrative in the practices that interviewees described. Lave and Wenger's (1991) notions of "talking about" and "talking within" learning practice are developed in Orr where we see discussion of three types of narratives: those dealing with identity and community; those dealing with consultation and problem diagnosis; and, a form of story-telling Orr called "war stories". Each of these were seen to describe types of oral culture that were fundamental to the functioning of computer-mediated activities.

Specifically, we saw that computer learning in the everyday goes on in a variety of spheres of activity in *absence* of an actual computer. We saw oral communication as the central, coordinating resource for interviewees' learning, and I outlined the types of collaborative oral artifacts people produce and use to learn. Specific "war stories" such as the "computer crash" were examined, as was the use of analogies such as the "blue-print" which parallelled Lave's (1988) notion of a "gap-closing" procedure. However, orality was more

than simply a means for transmitting information, it also contributed to the formation of group "membership" and identity which served to ground ongoing learning networks and the modes of sharing and mutuality on which they are based. Not just anybody could drop into the network of workers talking computers and enjoying their break in the various "smoke shacks" described by interviewees. These elements of group membership (tight group membership and informal, mutualistic relations of learning) were, I suggested, a part of a working-class learning habitus.

More generally, working-class dimensions of these oral learning practices were expressed in the many of the narratives and "war stories" themselves. Building on the arguments presented in earlier chapters, the specific forms of oral transmission and storage of computer skill and knowledge appear to be elements of a working-class learning habitus. Oral cultures are never neutral, but rather are always produced from particular social standpoints. Specific linguistic devices and artifacts express meaning that highlights specific relationships and helps to further develop certain activities, such as computer learning, as well as specific perspectives and dispositions.

Chapter 10
The Material Structures of Working-Class Computer Learning

Moving beyond a focus on the function of a basic set of cognitive-physical features of the human body, Vygotsky taught us that learning practice occurs wherever there is socio-cultural participation. At the same time, however, we've seen that this does not mean that everyone participates in the same way, from the same standpoint, or with an equal degree of discretion. In this context we can see that *"learning opportunities"* can be understood as a complex issue with social, historical and material determinants. In adult education literature the body of work that is devoted to the notion of structures of opportunity is known as Participation in Adult Education (PAE) research. This research has produced one of the most stable dynamics in educational social science to date, namely, the *"them who has - gets"* phenomenon. Those who already have access to learning and education tend to get greater access over time. Beginning with turn-of-the-century scholarship including The 1919 Report (1919/1980) in the U.K., this research literature has told us that the structure of adult learning is consistently and closely related to social class. Courtney summarizes the literature this way:

> Those who have not completed high school and those who occupy manual, blue-collar occupations are far less likely to be represented among the ranks of the educationally participating. It is a phenomenon whose socio-economic structure has hardly altered since the first systematic surveys documented the relationship in the late 1920's. (Courtney 1992:5)[1]

In the majority of PAE research however learning is conceptualized narrowly. To date, there has been little empirically-grounded adult learning research interested in the structures of participation and opportunity for learning outside of classrooms where the interviewees in this research do so much of their learning.

Below, I discuss the material structures of the computer learning that working people

[1]Recent large-scale survey (Livingstone, 1999) of adult informal learning in Canada has suggested that this gap may be closing somewhat. However whether this closing is related to changes in actual practices, or related to changing conceptualization of learning (conceiving of learning more broadly) is unclear at this time.

carry out in their everyday lives. Practice, as I've used it throughout the research, is defined as what the body does as it moves through space and time. However, it is virtually meaningless in itself. These bodies encounters and depends on tools which, from the standpoint of subordinate groups such as the working-class, are not typically suited to their needs directly, and in fact emerge from social relations that are historically antagonistic to them. To begin to envision the factors I want to consider here, consider a typical scene of the working-class computer learning that I've described so far in this research. It is a scene in which people congregate at various times in a person's basement in order to exchange software, repair hardware and build customized computers vis-à-vis a loose network which has arisen from relations on the factory floor or the neighbourhood. These learning encounters often involve a computer (and the surplus funds to purchase it; the space keep it; the space to work at it), the electricity to keep the computer running, the time needed to partake in the activity outside the time needed to reproduce one's own labour power and to sell one's labour power, and so on. Each and every one of these features express resources of time, money, space and human energy, and are constituted in patterned ways in relations of production, the wages it may or may not pay, in the division of labour in the home, as well as in the broader political economy. In addition, the specific ways resources are used, the way they are organized, the purposes towards which they are directed, and the myriad of choices bound up in them are generated not by a general, universalized subject, but a person who operates from a specific social standpoint in the world.

Issues of material access and use of computer technology have been linked to issues of socio-economic differences in a variety of ways. Expanding our consideration of access and usage of computers globally we see how these technologies are linked with a variety of differences in people's social and material power. Hariharan, for example, tells us that India (with a population larger than North, Central, South America and the Caribbean combined) lies on the brink of a "digital abyss" in which over 95% of its population could not use computer (even if they could attain access) as no operating systems are available in their language. More than two-thirds of the world has never made a phone call and, that "MicroSoft's Windows operating system is available only in 30 of the 6,000 languages that

exist in the world" (Hariharan, 1999:3). In the US, Quik tells us that in term of computer access and use we are seeing a clear "racial divide" as well.

> Among high-school and college students, 73% of white students interviewed in a new study had a computer at home - just 32% of black students had one. Even when just looking at households with incomes below $40,000/yr, whites are still twice as likely as blacks to own a computer. Nielsen Media Research interviewed 5,813 randomly selected people from December 1996 through January 1997. White students are six times as likely to find alternative ways to access the Internet if they do not own a computer... [N]ot only do we have a problem with the status of technology in schools, but it's also a problem in our communities. (Quik, 1998:B10)

Closer to home in Canada, Livingstone (1997) outlines that,

> There is now a danger of a new technocratic elite being generated by the greater access to home computers by kids in affluent families... [K]ids from the most affluent families are generally about twice as likely to have home access and be adept computer users as those from the poorest families. (p.107)

In these examples we can see that the social organization of society and specifically the coordination of social life that produces its major social divisions plays a serious role in material access to computers, the development of software as well as the process of computer learning itself.

While not all the forces that affect working-class computer activity are material, it is the basic material structures of this activity that are the focus of this chapter. These material structures relate directly to a more critical formulation of "learning opportunities". By material structures I refer to those factors that shape the possibilities of working-class computer-mediated practice by regulating people's basic material resources including their time, space and physical energies. To do this I examine such themes as the political economic structure of the working-class household, its relationship to gender relations, declining wage levels and the rise of the dual income in working-class homes as features of computer-based practices. I also examine issues of home computer ownership and an important report in the Canadian context by Nakhaie and Pike (1998). Finally, I point to the art of "making do" which seems to elude so much of the computer access/usage literature, and helps us understand how people work within structures of class society.

10.1 The Structure of Time, Space and Human Energy in Home-based Computer Learning

The class-based distribution of time, space and human energy for computer learning depends on access to decent wages, affordable housing, and child-care. Computer learning can also be related to the organization of paid-work that expands or narrows discretionary experience and participation in the workplace. The computer-mediated labour process can make it easy to use a computer, but at the same time hard to actually engage in computer learning.

In her studies of working-class households in the United States, Worlds of Pain (1973) and then with her follow up book Families on the Fault Line (1994), Lillian Rubin draws a connection between the decline in real wages and the rise of the dual income household with the distribution of discretionary time for women in the last quarter century. Her analysis highlights the constraints imposed on working-class households. Likewise in this research, it was working-class women that shouldered the brunt of these constraints. It was common, particularly among the working women, to hear descriptions of just how difficult it was to find available space in the day for any sort of discretionary activity. In this interview, for example, an auto parts worker talks about the way her typical day is structured. She must battle with her partner in the home for help with household work. She must squeeze in time late at night when everyone else has gone to bed to study for her exams, and if she should wish to do some extra reading, she fits it into the bus ride to and from the factory.

> I read anything and everything: popular mechanics, biographies, and trash. I like to read... I have a really *cramped time*, so many things I love to do, but *I have the children*, I get up at 5:00, don't get home until 5:00, so by the time supper's cooked, and I've played with kids, and get 8 hours sleep--I'm really *squeezed for time*. I have to *read on the bus*. [But] what do you say is learning? Outside a formal course? I do all kinds of things with the kids... [For women] to continue our education in the evening is such an inconvenience for everyone - *we're suffering with guilt, the children are sick, he's not a great caregiver*. I'm wondering if he's looking after the little one with a fever. I'm *studying for exams*. *No cooperation* from my partner... For a lot of women, they need that support from a partner, or if they have workplace training, especially workplace training, if workplaces would just squeeze some time in and allow the employee's to learn, or *take a day off and allow them to learn*, or have

> more options for Saturday trainings, it would be a great help. Especially for women. (R58)

The "especially for women" comment is an important message that this and other women workers discussed in this research. The material structure of "free-time" amongst interviewee's was heavily *gendered.* The comments above reiterate how important it is to generate time for workers to learn and enter into meaningful participatory relation with others.

In terms of computer learning specifically, we can see that these same issues (i.e. the structures of time and space imposed by the organization of work, wages, the household, and so on) are also important. This female chemical worker describes the way that working-class life in and outside the factory overlap. She describes how she cannot get involved in many extra workplace functions such as training or trade union activities because of cramped home/work time. At 53 years old, she also seems to suggests that issues of age play some sort of role in available opportunity to obtain more rewarding and more secure work. None of us are "getting any younger" of course but from her standpoint as a working-class woman this translates into issues of opportunities which lead directly to discussions of computer learning.

> Basically I just go to work and do my 8 hours work, help out as much as I can, do my job and come home. I don't normally get involved in too much extra because I don't really have the time. Since I been with the company I'm *not getting any younger...* We're all going to have to [learn computers]. Maybe I'll have to update it I don't know. I know I need to get a printer, but the rest of the stuff, I mean, I have the screen, I have the keyboard. Everything is there, it just depends on how much more I need to do. I should really sit down and do it, but then *I can't sit down and relax and do something if there's something more important that I have to do.* Like if I had a lot of *housework* to do or if I felt I had *bills to pay* that's *more important to me that sitting at the computer* because once I get my bills paid up, my *mind is at ease* I can go do it. (R12)

Paying the bills, doing the housework and in some sense having one's mind at ease are essential components of engaged participation in activity. For working-class women they are also a function of specific gendered relations of the household and workplace. This woman office worker, in fact the office worker profiled in part two of Chapter 6, cites similar issues.

She reiterates the responsibility that women must typically take on for household work including caring for elderly parents on the one hand and grandchildren on the other. Together there is little opportunity for discretionary participation in computer learning. It is a stark contrast to the type of working-class networks, what we now must associate largely with working-class males, described earlier.

R: It's just I *don't have any free time*. I don't think I would use [the computer].
I: Even now with your kids grown?
R: It's hard to believe isn't it. I don't know.
I: What takes up your free time?
R: I don't know. I get frustrated about it. It's just that I've always got, well, with *my mother being very old and not well*, I have to go over there a lot. And then there's *my daughter and her kids*. When I have free time, I like to help out there. And, my *husband's mother*, 'Oh Jesus, we really need to have her over'. Like stuff like that. Maybe I don't manage my time properly. Or you are just *tired when you come home*. That's number one, whereas you know years ago I *wasn't so tired, when I was younger*. That must be what it is because I had no problem, work, three kids, my grandmother was in a home and I went there almost every night. There was no problem. (R13a)

Another female worker describes how she is very interested in computer courses at work in order to "upgrade" and perhaps move into more secure work of some kind. Like the woman quoted above, with primary responsibility for housework, her mind is not at ease until this is done and so learning about computers in the narrow gaps available in her day is made difficult. She goes on to outline, how the need to structure work and home life in a working family keeps her and her husband apart.

I: Anything you'd be interested in taking courses in at your work?
R: Computer courses. Still thinking about it, but with the little one, and husband working every other weekend, it's difficult. An upgrade course or something.... [But] you're working to pay the bills. I look after daughter in the day, then my husband comes home and looks after her. I don't see my husband except every other weekend. Talk to him on the phone. Maybe that's why it's lasted so long [laughs]! When you're busy, it's impossible. Like right now, for me, no way. I could probably do it, but then there's certain things in the house that wouldn't get done. And I'm the type of person that has to have everything just organized! I can't leave it, I'll go bananas. (R42)

The comments of these female workers reveal the degree to which gender, interwoven with class standpoints, play an important role in the material structure of discretionary time

generally and in terms of computer learning practice specifically. Among male interviewees this tight weave of gender and class might not seem as strikingly apparent though it is nevertheless present (though viewed from a different standpoint in gender relations). Men did not typically cite resources, time, space and energy as a structuring factor in their learning in the same way as working-class women. Indeed, we must understand how the discretionary, solidaristic computer learning networks that men engaged in are partially a reverse image of the computer learning life of the working-class woman. For many of the male respondents, their free-time for computing in the neighbourhood and home was largely assumed. It simply appeared, seemingly, out of thin-air rather than being a product of a specific household division of labour. It may also be the case that a large part of the reason that working-class women have such a difficult time engaging in computer learning is that, stemming from the type of constraints they experience on their discretionary time, they have little opportunity to build the type of networks described in earlier chapters. This would be a more specific way of understanding how material constraints translate into patterns of learning opportunity and achievement. These gendered dimensions dove-tail with the class features of work, wages, careers, and so on, to produce a distinct gendered class standpoint within everyday computer learning practice.

In their powerful and diverse examinations of the interlocking character of capitalism and patriarchy, Marxist-Feminists (e.g. Firestone, 1971; Sargent, 1981; Smith, 1985) outline how gender and class life provide interlocking support for one another[2] and indeed cement a type of hyper-exploitation within gendered-class relations. The material distributions of time, space and energy, more often than not, produce some possibilities for discretionary time in the home for working-class men while producing far fewer openings for working-class women.

It is also important to note that a combination of constraints is unique to, not merely gendered class standpoints but specific ethnic and racialized standpoints as well. Indeed, in

[2]E.g. "The family wage cemented the partnership between patriarchy and capital. Despite women's increased labor force participation, particularly rapid since World War II, the family wage is still, we argue, the cornerstone of the present sexual division of labor - in which women are primarily responsible for housework and men primarily for wage work." (Hartmann, 1981:25)

Sawchuk (1999a; also see Livingstone and Sawchuk, forthcoming) I outlined how race standpoints can also play an important role in learning practices and the material structure of opportunity. In that paper, I focussed on how relations of language, loosely coupled with ethnicity, structured everyday practice in the workplace, shared people's participation and advancement at the workplace, and how this in turn affects resources outside of paid-work, contributed to a racially segmented internal labour market, and so on. It was particularly interesting to note that the workplace I examined in Sawchuk (1999a) was multi-lingual on the shopfloor (where at least 8 different first-languages were spoken) but not in the executive offices, company literature, official shopfloor communications and so on. Workers often gained functional literacy in a variety of languages by working side by side with one another, but english was imposed as the "language of production" (1999a: 136-7). The relations of language at work as well as the dual labour market effects in which minorities become concentrated in particular sectors and occupational enclaves were important, inter-related features of the material structure of working-class life and learning activity. I continued on to describe the character of the intersection of these racial standpoints with gendered and class standpoints specifically. Together this interlocking set of social differences produced a structure of opportunity for discretionary participation. While I confine my analysis primarily to class standpoints in this research, it is clear that the full investigation of the inter-section of multiple standpoints in activity provides room for future development of historical materialist analyses that look at the structure of learning life in an even broader context.

10.2 The Structuring Effects of Home Computer Ownership

Home computer ownership is *an* (not the only) important element of the material structure of working-class computer activity. Issues of private ownership of home computers depend upon an entire range of social relations which involve the distribution of material resources. Material structures are implicated in social class and computer use in an important article by Nakhaie and Pike (1998) which analyses Statistics Canada's General Social Survey data. The authors note that the upper-classes tend to experience greater educational success and that,

> ...educational advantage translates into higher economic resources and cultural capital

> which ensures a higher rate of computer access and use. This finding is consistent with Bourdieu and his colleagues' view that education is a measure of cultural capital and that those with higher cultural capital are more likely to adopt the new technology and to integrate it in their strategy of reproduction. (1998:443)

Similar to the PAE literature discussed at the outset, the authors suggest a 'them who has - gets' (1998:446) dynamic. They go further to comment on the computer learning experiences of the working-class:

> ...some may have attended schools where computer facilities were limited; many would also not use computers on the job, and hence be less disposed to have them at home, especially since there would be no work-related connection. And of course, for those on limited incomes, there is always the question of the sheer cost barrier of buying and running a home computer. (1998:442-443)

Nakhaie and Pike (1998) report statistically significant correlations between computer access, class origins and educational attainment as well as statistically significant correlations between home computer use, education attainment and occupation type (blue versus white collar[3]).

Nakhaie and Pike (1998) go on to suggest that these findings confirm Bourdieu's notion of class reproduction by drawing on a model of cultural capital accumulation. You can recall that I was careful in Chapter 4 to separate Bourdieu's "existential analytics" from his less satisfactory discussions of the character of cultural, educational and economic capital in fields of practice. Nakhaie and Pike's formulations unfortunately make use of some of the latter, weaker claims Bourdieu makes about the production of class life. While Nakhaie and Pike have presented an important 'snap-shot' of the social landscape in regard to the distribution of computer access/use, it is only a snap-shot and says little about actual practices, the meanings that subjects themselves make of their practice, or beyond the relatively crude measures (education, income, etc.), the functioning of the various social standpoints that shape these practices in action. The social variables such as educational attainment, occupation, social origin are such rough approximations that without important

[3]Though citing a Bourdieuian influence, their model of class appears to be based on some variation of a Weberian/Giddens conceptualization (e.g. they fail to separate intellectuals from office workers from petty bourgeoisie, executive classes, etc.; their income cut off unfortunately fails to resolve this issue).

clarification they are as likely to mislead as to inform. For example, Nakhaie and Pike (1998) make much of the different access/use levels amongst respondents but construct a general model of access/use strictly around private use of home computers. In this research, while home computers are an important component of working-class computing they are certainly not the only way people learn about computers. As we've seen already, computer learning is not confined to any single sphere, but overlaps and is actively integrated across the boundaries of different home, community and workplace. Even more novel to conventional computer access/use literature, we have also seen that a good deal of learning goes on without a computer present as a process of peripheral participation through the use of oral artifacts, linguistic devices and interstitial congregations in people's basements, the workplace and so on. Within any one "snap shot" of time, far greater proportions of working-class people who may be learning about computers at the workplace or in home and community networks do not register in these types of conventional statistical analyses. Indeed, studies such as these express a type of private ownership bias which ignores the complexity of real working-class practices in which people continue to make use of less formalized learning and unsanctioned, coincidental and diffuse contact with computer technologies. Surely, home computer ownership reflects an important dimension of computer learning. However, just as formal learning cannot be made to 'stand in for' the phenomenon of learning as a whole, access/usage defined by private ownership cannot be substituted for access/usage generally. Nakhaie and Pike's model of computer-mediated social capital is a simplified version of social reproduction that describes only a single dimension of class life. Similar to Bourdieu's own work, it tends to ignore contingencies, subordinate creativity and resistance.

Briefly, in my own analysis of the NALL Canadian Survey of Informal Learning data base I attempted to parallel some of the analyses of Nakhaie and Pike (1998).[4] Table 10.1 summarizes basic comparisons with statistical significance test results. What we see confirms some of the basic observations made by Nakhaie and Pike (1998). While the class

[4]SPSS formula devised for this purpose was based primarily on occupational classification, ownership elements. See discussion in Livingstone and Mangan (1996).

groupings I use are differently focussed than those offered by Nakhaie an Pike[5], there are some very clear, systematic class difference effects in computer practice in which home computers are directly involved.

Table 10.1: Informal/Formal Learning, Computing, Technology and Class in the Home

Survey Question	Capitalist Class Group	Working-Class Group	N
Do you Use a Computer at Home*	71%	48%	610
Do you Use the Internet from Home*	66%	48%	354
Learned Anything about Computers or Computing Un-related to Paid Work*	77%	55%	395

*significant to or beyond 0.001 level

While use of a computer at home is often provided for by the companies that the capitalist class either manages and/or owns, for working-class respondents home computer use more often *requires* private ownership of the computer. Whatever the underlying relations, however, there is a clear class difference in computer use at home.

Looking beneath the surface of these statistics however we see that different class practices play a role in bringing about the statistical differences seen above. What becomes clear in the interviews is that working-class people who attempt to act alone or within existing formal education and training structures in the workplace and community find it extremely difficult to obtain levels of computer experience comparable to those of upper-class and professional people. In this interview with a female custodial worker we see exactly how narrow the official pathways for learning actually are from the standpoint of working-class people. We also see how, in conjunction with the effects of lower access to

[5]See explanation of how these groups were formed already provided in Chapter 8 (following Table 8.1).

privately owned computers, the types of class patterns of computer learning are reproduced.

> More or less I was taking computer in a first basic course like, you know, and it was once a week. And they would just show us how the computer was run, how a disk is put in and things like that, you know. And then you would just go home and the next day, he would show you something else. *Unless you had a computer at home, you couldn't really do much.* So the most you could do was to look forward for the next time and learning something else. And *I've done that for two years* on the computer. So I figured that I needed the two years because the first year, you couldn't, like *myself*, I couldn't pick it up fast enough, you know. But then in the second year, it was okay. Because it's OK through *the union* to suggest courses, but if the employer doesn't support it, they won't give the employee the hours to sign up for it. Because if the *boss feels* it's okay and will help me then, okay, it will help me. But if the *boss says* it's off limits, then that *supervisor will say* I can't do it. And you're not going to go after work, on the weekends, then *you're stuck* staying with the work they're doing. (R20)

This quote focuses on the role of the home computer, but reiterates many of the themes we've discussed already including the role of management rights, unionization, unsanctioned informal learning on the job, the material constraints of the gendered dimension of household labour, and even the role of job design. The worker indicates a need for a home computer she cannot afford, and she talks about how, on their own, the countervailing effects of unions cannot overcome the negative effects of management and supervisory control to open up greater opportunity for computer-mediated participation. This describes a major, class-based material structure of participation. This, however, is a portrait of a person who is attempting to build her computer skills and knowledge using the official pathways offered a worker who is operating outside of a stable collective network of some kind. As we've seen in Chapter 7, it is in a developed, solidaristic network that this class-based distributive logic of material resources can be effectively countered. Thus those who don't have access to the type of stable, solidaristic networks are particularly subject to the type of class differentials outlined in table 10.1 as well as the table immediately below.

This same dynamic can also be seen in terms of the data presented in table 10.2. The table describes the reasons for not participating in formalized courses generally and details the class effects that are produced when individual working-class people attempt to operate under the dominant, conventional systems of training, education and learning. Here again we

see strong class-based differences in quantitative form that confirm the type of qualitative analysis provided by the in-depth interviewing.

Table 10.2: Reasons for Not Taking Formalized Courses Across Social Classes

	Inconvenient Time/Places	No Affordable Child-Care	Too Expensive
Capitalist Group	33%	0%	22%
Working-Class Group	58%	12%	47%
N	182	182	178

Note: All difference Statistically Significant to the 0.001 level.

As we see in the table, different amounts of time and money do seem to have a class effect on learners, at least in terms of formal courses. All differences between the groups are statistically significant. Indeed, if we recognize that women still seem to have primary responsibilities for home and child care the scores in the second column would partially reflect the extreme difficulties unique to many working-class women. It is only through a careful concerting of openings and collectivization of resources that the most organized segments of the working-class can generate the time, space and energy necessary to subvert this basic class pattern of computer access and use.

Affording a home computer is also mediated by a fear of technological obsolescence which also reflects a particular position in a field of material resources. Insecurity in the workplace, constant downward pressure on wages, lower compensations overall, and so on, make this concern more unique to segments of the working-class. Isolated from collective networks, this can be seen to immobilize workers and leave them with the type of vulnerable

"you're stuck" outlook expressed in the comments of the custodial worker (R20) above. As people moved past this initial immobilization, the feelings of vulnerability (the objective class relationship from a working-class standpoint) sometimes drew people into greater contact with others and specifically into the types of computer networks we've seen described. In any case, most workers took the prospect of purchasing a home computer very seriously. The purchase of a home computer was planned for and extensively discussed across multiple spheres and groups. It is another major part of the initial form of peripheral participation in computer learning that doesn't involve a computer at all. This auto parts worker outlines the basic issues involved.

I: You know that idea that you always have to upgrade? Does that worry you?
R: Yeah that's a *big worry* because, I think that well yeah I'm going to put out about $3000 on a machine and will it be useful in one year? Like everything changes so drastically now, or has that big change finished because if I bought 5 years ago, that computer would be *useless for today's software*, that's what happened to so many people. They couldn't use it. Is that going to happen anymore?... That's where you have to ask so many people which one to buy... If you screwed up it's a bit of a problem. (R19)

The home computer, afterall, is a commodity and the relations of commodity production/consumption in this market sets a pattern of participation which involves frequent cycles of obsolescence. Planning and action in this field of consumption (of home-computer commodities) provides the scene in which class-based material structures shape and limit possibilities for computer learning in some ways.

Another interesting feature of the material structure of home-based computer learning activities examined in this research involves the centres of activity systems. To begin to examine this issue more closely we can reflect on the Situated Learning perspective. Lave and Wenger (1991), for example, spend a good deal of time discussing the notion of "mature practice" as the "centripetal" centre of activity systems which tend to have "reproductive cycles".

> Legitimate peripheral participation moves in a centripetal direction, motivated by its location in a field of mature practice. It is motivated by the growing use value of participation, and by newcomers' desires to become full practitioners. Communities of practice have histories and developmental cycles, and reproduce themselves in such

> a way that the transformation of newcomers into old-timers becomes unremarkably integral to the practice. (1991:122)

When we move beyond a strict focus on the institutional and occupational settings and discuss subordinate class-standpoints in everyday life, we see that material factors play a significant role in constituting "centres" of computing activity. The formal institutions and occupational structure of learners' activity in Lave and Wenger's (1991) analyses produce a distribution of space and resources which limit and control practice. In such contexts specific forms of legitimated, "mature practice" can appear to be the epi-centre of participation as the marshalling of material resources of space, time and human energy are taken as given. However, moving into the spheres of activity where there is greater subordinate group control - for example in the interstitial spaces within the workplace and in the home - there is less stability of an identifiable "mature practice" and the marshalling of material resources becomes more visible. In these cases, the centre of practice becomes rooted to space, time and energy, at least as much as it is rooted in specific knowledge forms, skills and interests. Examining the computer learning amongst these working-class participants in this research we see that it is difficult to locate a centripetal centre based upon the notion of mature practice. Activity takes place across several sites, involves varying levels of control by the participants themselves, and incorporates multiple sets of relations, interests and skills. Never mind the fact that the very nature of rapid change in the home-computer technologies and software assures that "experts" must continually be learning at least some new skills, it was the material resources, cycles in family life, and effective negotiation of institutional life that become central factors in shifting participation in activity. Interviewees were quick to point towards some computer experts they came into contact with who might represent the kind of mature practice which studies of situated learning tend to identify as the centre of communities of practice, but people were equally quick to point out that this adeptness in knowledge and skill were equally dependent on the ability to manage the distribution of material resources. In other words, if there are 'centres' to the working-class activity systems, instead of being characterized strictly by mature practice, they are just as likely rooted in the skills and collective production of discretionary spaces, availability/times, energy, and other

material resources.

As the most tangible representations of these material 'centres', we see in the interview data and ethnographic notes that some specific member's basement tended to serve as the centripetal axis around which learning network life seemed to revolve. While these were not necessarily the homes of the most skilled, mature practitioners - they were key members in the activity system who had the time, space, energy and interest necessary to play a leading role in continuity and coordination of practices over time. Indeed, in my research I came across several of these people and places. In these places, we would typically discover several, more or less obsolete computers in various states of disassembly (e.g. one or two belonging to the resident, the others dropped off for examination), stacks of copied disks, a comfortable well-worn couch, kids busily searching the Internet or blasting space invaders, all mixed with strong odour of the hockey-equipment laid out to dry on the concrete floor, the building supplies for the basement renovation, and stocked shelves of jarred, home-preserved tomatoes and the like. It was also in these centres that we would find, for example, some of the last remaining vestiges of functioning Bulletin Board Systems (BBS's). In fact, in this research there were three active local BBS up and running.[6] All three were run out of the basement/centre of the "lead" computer learner.

To clarify briefly, BBS's are a type of "pre-Internet" forum, or what we might call an "Intra-net", for discussion and online computer-based interaction. Their central difference from today's Internet is that, whereas the Internet depends on somewhat larger scale, commercial servers that require a reasonable client base and significant capital - BBS systems could be run out of, for example, someone's basement. Since the "server" was small-scale and local, and since long-distance telephone charges applied, the participants tended to be local, issues tended to be community-focussed and so on. One auto worker commented in response to my research in this area, "Man, were they fun! The people you conversed with were part of the local community, and that made a difference." According to Jeff Taylor[7] one

[6] An auto parts worker (R4a), an auto assembly worker (R46) as well as a telecommunications worker who was not part of the core industrial respondents (R10).

[7] Personal communication (April 9, 1999).

of Canada's leading computer-based, distance education / labour education specialists, the Canadian Union of Public Employees' world renowned "Solinet", one of the world's very first labour online forums, began as a cross between a community-based BBS and the system we now know as the Internet. Solinet sat on a server that you had to dial into, but you could get to it from any city in Canada through a local phone call to what was called Datapac. Solinet's purpose and effect was to create a specifically union-based electronic communications forum, and it was quite successful. Today, BBS's still exist in isolated pockets of activity and function as discussion groups or listserves, but typically have a much less central function to computer-based communication. Importantly for my focus in this chapter, that the hardware to work a BBS is much less expensive contributed to the level of access, context, pattern of participation and use of the systems. These BBS's are in fact an expression of local interests kept alive, largely by informal computer learners, in what is now a commercially dominated online world.

Of course, more often than not working-class people must do things on the cheap. These refer to creative ways to open up opportunities and provide space for creative action in fields of power and patterns of resource distribution that do not favour them. In terms of home computer access and use, working people often need to find the most cost effective and expandable computer, and it is not unusual for them to work with used parts and borrowed or shared software, and so on. And, this is, as we've seen, the focus of much working-class computer learning. This material dimension draws the 'centre' of computer learning activity systems towards the sites where these material resources are concerted and most stable. Subverting private consumption conventions, for example, these auto workers tend to share resources in order to *"make do"*, though this is not without its problems and in the end the price of some software may still be too high. One auto worker explains it this way.

> Well we *exchange stuff*, like we bought SoftRam together, it was only $40, so it ended up being $10 each, and we talk about buying different things but the problem is that, well I find with the group, that you got guys who are scared to put some things in, some guys who want to put it in no problem. Guys try things out and they say, 'Here you want to try it?' But as far as good, expensive software in our group, no one buys it in our group, we all buy all the cheap stuff. (R16)

Like the other contexts and expressions of material structuring of computer learning practice, home computer ownership is not a 'force' acting on a passive subject. Many of the interviewees in this research actively attempted to creatively respond to the types of inequitable patterns that the statistical overviews describe. These interviewees shared resources, found ways to make do, and worked with what was available. There is of course an expansive literature on this art of "making do" amongst industrial workers, though it has not to date focussed on issues of learning per se. In terms of industrial workers on the shopfloor we see accounts of these types of activities as far back as Roy (1952; 1958; etc.) and the famous Hawthorne experiments of Elton Mayo (see Landsberger, 1958) but more recently would include interesting work by a diverse bunch such as Kusterer (1978), Burawoy (1979), Hamper (1992) and Sprouse (1995). This process of making do is a form of resistance and thought of in this way is also well documented amongst labour process theorists, industrial sociologists and organizational studies writers.

In the realm of computer learning practice and home computer ownership, the interviewees in this research typically described making use of a variety of resources to creatively respond to and partially overcome basic material constraints. As we've seen mentioned in previous interviews, one of the most basic means of managing the material constraints of home computer ownership for people involved unsanctioned use of workplace computers. While computer-mediated work is structured to keep people on their work-related tasks, workers would appropriate work-time and equipment for their own use. This chemical worker describes how this type of appropriation of workplace resources has in fact delayed his purchasing a home computer. On the shopfloor of the plant the computer systems are designed for recording and regulating the production of chemicals. In the background of the company production software, however, is a general operating system which allows workers to make alternative uses of the technology.

R: Well this is kind of the thing that I've *dragging my heels* about because, like there's nothing at home that I could have that I don't *already have at work*, and I get paid to do it, you know what I mean, so and if I want to do anything I'll do it there instead of at home.

R: .... the *expense* of it that's one thing though.

I: Yeah the monthly charges.

R: Not only that but I'd *have to buy a decent system* to do it. Like [his partner] has been hounding me, that we have to get a decent system and get on the Internet. (R18a)

This example shows the intersection of different spheres of activity in which the material structures of home computing overlap with the organizational structures of the industrial workplace. This computer activity is undertaken outside the bounds of the formal organization of production and contributes to computer learning in a general and significant way. Practices such as this were extremely common according to interviewees, and they point to a major weakness in most survey methodologies that attempt to grasp the range of computer activity that are actually occurring amongst subordinate groups.

10.3 Structure and Resistance within Computer Learning at Work

The last portion of the above section straddles the line between issues of material structures shaping home computer ownership and the creative activities that working people undertake in their workplace to gain greater access and use of company computers. As I've tried to indicate in earlier chapters, managerial control over work-space accounts for the arrangement of key resources and opportunities for working-class computer learners. These organizational dynamics are, in turn, rooted in the historical development of means of production which are expressed by the dynamics of capital accumulation and the capitalist labour process: changing forms of technologies; inter-capitalist competition; antagonistic relations of production vis-a-vis the nature of surplus value; and, the tendency toward falling average rate of profit (Marx, 1867/1990). To delve deeper into the material structuring effects of the capitalist workplace on workers' computer learning practices, however we need to understand how these generalized historical dynamics are expressed in actual daily practice.

In the workplace the sanctioned access to computers is structured by the prerogatives of management to organize job descriptions, choose work-station designs and technologies, to define skill requirements, advancement, and so on. However, since these prerogatives outline the modes of participation in the workplace, they can also be understood as dimensions of the material structure of computer learning as well. The neo-Vygotskian approach to learning is helpful for highlighting how organizational features of the workplace

are integral and definitive of the learning process. Before moving on to a discussion of ways that working people learn computers in the workplace, I want to briefly discuss the structure of formalized training opportunities.

A general view of the class dimensions of formalized computer training in the workplace and its relationship to the more informally organized computer learning is available in table 10.3 below. Again, drawing on the NALL Canadian Survey of Informal Learning data base, we can see that many important class differences exist. The table summarizes basic comparisons with statistically significant test results.

Table 10.3: Informal/Course Learning, Computing, Technology and Class for Paid Work

Survey Question	Capitalist Class Group	Working-Class Group	N
INFORMAL LEARNING			
Learned about Computers for Paid Work*	84%	53%	594
Learned about other new Technologies/Equipment for Paid Work*	60%	43%	594
Learned other Technical Skills for Paid Work	26%	33%	352
COURSE LEARNING			
Taken any Computer Courses for Paid Work*	48%	25%	596
Taken any Courses on New Technologies for Paid Work**	40%	28%	568

*significant to or beyond 0.001 level
**significant to 0.003 level

In terms of the consciously-directed, informal learning portion, we find statistically significant differences in favour of the capitalist class grouping across the different activities. As the questions become more general (learning technical skills) we see the loss of statistical

significance with a slight edge to the working-class group. In terms of the formal course learning questions (lower half of table), we see that the capitalist class grouping tends to get more opportunity for computer courses in the workplace with a slightly lower difference in terms of opportunity for courses on new technologies at work in general. We see a general description of the structure of workplace opportunity in both informally organized learning and course learning which favours the capitalist or upper class group.

As we take a closer look at the character of sanctioned, formalized opportunities for learning in the workplace what we see from a working-class standpoint is a largely rhetorical commitment by companies toward computer training. As workers indicated, this inflated talk about new forms of training and the creation of a high skill and high value-added workplace did not necessarily translate into new organizational forms, or work techniques. One auto parts worker commented, "They don't want to teach us too much, just enough so we know what's going on in our area." (R58). Far more often, workers described the existence of old fashion scientific management along with a management-centred and hierarchical distribution of knowledge, information and control. Another line worker in a auto parts factory describes, in her broken english, the nature of the modern day factory from her perspective.

I: Do you get to see the whole process?
R: Not really, I don't see everything. The parts come through, little pieces of plastic go into the machine. [The company] have a lot of experienced people, engineers, *they know lots of stuff*... But when you *work here all the time you don't see that much*... You learn more when you see more. When you have to watch where you work, you don't think so much because you have to think about what you are doing....
I: Did anyone ever try to transfer into other areas, or do people tend to stay in their own areas?
R: Some people moved from [job to job]. Not the working people, but the higher people. They switch around from one plant to another. *They see the whole works.* (R65)

Workers described how they must battle for the opportunity to "learn more" which includes bargaining for computer training.

Another auto parts worker outlines the relationship between formal training opportunities, chances to make some sort of career advancement in the workplace, and the fact that even when computer courses are available they are sometimes not of much direct use

when the functions of computer technology in the workplace are so narrowly defined. The excerpt begins with a question about how training and workplace advancement relate to each other.

I: What about other opportunities to advance at work?
R: Occasionally they post for supervisor or H & S [health and safety coordinator], but you need qualifications. But you can't upgrade in that because a lot of times you're just too tired...
I: Any other courses or learning opportunities?
R: There are a few computer courses. But there is no real need to follow it up and use it.
I: Can anyone take them?
R: We need permission forms from our supervisor. I took the courses because they wanted safety reps to generate work orders. That's how I got permission to take the course. But I never really used the training... There is also computer training for using the terminals in your own department area. It shows the raw materials, what's been added already, and what's needed. It is an inventory. Most people do it but it's set up in a very simple way. (R55)

The narrowly defined job category and the equally narrow functions of much shopfloor computer technology produce a type of material and organizational structure in the workplace that severely limits the possibility of computer learning for workers. Specific systems of sanctioned computer access/use in the workplace are created and enforced by workplace rules. Although in theory the "knowledge worker" (Bell, 1973) of the 21st century needs to have access to hands-on experience to develop their creative capacities, the imperatives of managerial control appear to influence work in the opposite direction where we see computers on the shopfloor that are made to be "idiot proof".

The material expressions of the general dynamics of capitalism can also be understood in terms of computer learning opportunities by examining the design of work stations. It is often the physical lay-out of the workplace that controls participation, experience and learning. This is what Fiske (below) refers to as 'horizontal interaction'. Drawing on an article by Dannon on TWA airline call centre workers (1990), he outlines the effects of job design on control over time and space in workers' lives. He discusses work station design and workplace technology in the context of the control over time and space, and the reproduction of relations of power in the workplace.

The first operation of power is always to enclose its territory, within which to

> concentrate rather than to dissipate its energies. Enclosure entails separation, not just the separation of the enclosure from the rest of the system (which is actually an insertion into it), but, more importantly, the separation of the individuals who have been enclosed.... Individuated control requires stations which are open to monitoring from above and closed off horizontally. Each station is designed to encourage desired behaviour and discourage what is prohibited by making it visible. The more completely the body's behaviour is monitored, evaluated and recorded, the finer the control over it. But behaviour takes place in time as well as space. TWA's computer logs every moment of work and non-work between SIT and SOT (Sign In Time and Sign Out Time). The non-work times are categorized into the legitimate (meal breaks) and illegitimate (toilet breaks or a personal phone call) and each are computed precisely. At the end of the day, the human supervisor rates them against an unspecified norm... (Fiske, 1993:72-72)

An expanded approach to learning brings into focus the fact that the control of movement and horizontal communications as described by Fiske is not mere context of learning but is an inherent dimension of the activity system itself. At the same time however, people are not simply nodes in vertical and horizontal systems of power relations. They think and act in these contexts, sometimes recreating hierarchical relationships of power but at other times acting in tangential or oppositional ways. In other words, what is still missing from accounts of workplace structures such as this is a discussion of the active subject.

Identifying active human engagement in workplace relations can sometimes be difficult to do. Indeed, it is often only the marked deviations from normal patterns that seem to confirm the existence of conscious social agents. Using a fine-grained micro-analysis in part two of Chapter 6, however, we saw creative deviations that in the end simply recreated the existing organizational structure. However, in the interview data workers described ways that computer-mediated learning can sometimes operate in opposition to these structures.

One way of understanding the interplay between the practices of the powerful and those of the subordinate in terms of the everyday practices is outlined in the work of Michel de Certeau. In his books Culture in the Plural (1997) and particularly in his earlier book The Practice of Everyday Life (1984), Michel de Certeau discusses the different types of bottom-up and top-down practices of power relations. He uses the concepts of tactical versus strategic practices which are distinct in the ways that they make use of the material resources of time and space. According to Certeau, strategic practices are those of 'strong'. These

practices allow the powerful to formally control space: they monitor, they exercise 'rights' (e.g. of management and private property), they "produce, tabulate and impose" upon time and space. We saw examples of this type of orientation in terms of the learning lives of upper class interviewees in Chapter 8. Tactical practices on the other hand are those of the 'weak', and occur more or less within the basic parameters set by the powerful. In the context of the workplace in particular, the heart of tactical practice according to Certeau is "*la perruque*":

> *La perruque* [the 'wig'] is the worker's own work disguised as work for his employer. It differs from pilfering in that nothing of material value is stolen. It differs from absenteeism in that the worker is officially on the job. La perruque may be as simple a matter as a secretary's writing a love letter on "company time" or as complex as a cabinetmaker's "borrowing" a lathe to make a piece of furniture for his living room... Accused of stealing or turning material to his own ends and using the machines for his own profit, the worker who indulges in la perruque actually diverts time (not goods, since he uses only scraps) from the factory for work that is free, creative, and precisely not directed towards profit... whose sole purpose is to signify his own capabilities through his work and to confirm this solidarity with other workers or his family through spending his time in this way... The actual order of things is precisely what "popular" tactics turn to their own ends, without any illusion that it will change any time soon. (Certeau, 1984:25-26)

Similar types of activities were found amongst interviewee's networks in the workplace. Time-off one's job (e.g. in order to fiddle with the computer at another worker's station) had to be produced in opposition to management work rules and was relegated to the gaps in surveillance and workplace discipline. These were the principal opportunities for participation with co-workers and creative engagement with the computers. These gaps are actively and creatively produced in response to workplace rules. One example is provided below. An auto parts worker outlines the collective efforts amongst co-workers to learn more about computers in the workplace. He emphasizes, among other things, the fact that important features of computer learning sometimes do *not* involve computers directly. In these instances, computer-mediated practice is not the central goal of the activity or at least is not the only goal of the activity. The excerpt below begins with a discussion about the introduction of computers onto the shopfloor and the potential for managerial control. The interviewee goes on to describe forms of subversion, collectively accomplished, that offer a

counter valence to this control which opens up opportunities in the material structure of the workplace for greater computer-mediated exploration of computer systems.

I: Pretty much computers are getting involve now at the plant eh?
R: Oh yeah on the floor even now, well the ADM machine, you know where they cut off the bars at the back of the plant? Well you see I've got my own *PIN [identification] number*, if you're an operator you have to learn how to enter the material, so you have to enter that into the company computer that a bundle of steel has gone into production and how many pieces you've cut off.
I: So it's automatic inventory?
R: Yeah, like when I cut it I have to tell them it's been cut.
I: Pin number eh, you can't just plug it in.
R: No.
I: Does that kind of strike you as/
R: So no one else can use it.
I: Oh so nobody can screw around with it.
R: Yeah.
I: So they know exactly who's doing what they can really get an overview of what
R: Yeah and when I punch it in the time comes up, like when I go in the next day I come in and it tells me the last time you used it was at 9:05 and what part number I entered and how much of it, so *it keeps track of everything going through the plant.* Everything is done on computer now. Where when I first started there, there was a ton of paper work, now it's just on the screen and that's it.
I: Boy management can really know what's going on.
R: Oh *they know everything now.*
I: Does that kind of strike you somehow?
R: Well *like anything else you get together and learn how to manipulate it* so they can't find stuff. Somebody is always there to manipulate.
I: People will always figure something out.
R: Oh yeah. Actually some of the people on the floor that do have *[supervisor's] PIN numbers* have been able to get into the computers and have been able to get into the *forbidden* zones of the computer. See our numbers will only allow us so far, if you don't know the *access codes*. So, *we've gone into the foreman's office and found codes* and figured out where they lead to, and so we can go in and look around... We got one guy, I won't name names, and he can go right into personnel files, which is kind of shocking to me, our absenteeism reports, everything. He can pull it all out, and he has *no training at all* [laughing] he *doesn't even own a computer*, he just figured it out on his own at work. He fiddles around all the time between just punching away and *watching over the foreman's shoulder...* (R19)

The types of control over time and space that Fiske (1993) outlined amongst the TWA call centre workers can be traced in the auto parts factory as well. There is a dialectic of

resistance and control in even the most electronically advanced labour processes. We saw this amongst the clerical work described in Chapter 6 and now here on the shopfloor of the auto parts plant. PIN numbers and requirements to log-in offer management a means of monitoring workers, but workers have continued to find ways to penetrate technological systems and disrupt this control. Workers' creative responses to these conditions, how they learn, why they learn, what they're up against in doing this learning, provide a portrait of a major dimension of the material structure of working-class computer practice in the workplace.

Another type of activity that was common in the interview data was a description of how workers use unsanctioned access to company computers to respond to the alienating dimensions that modern industrial work seems to necessarily include. Workers suffering from boredom, faced with computer systems that are supposed to be closed to them, hide computer programs in company system sub-files in order to carry out their own version of *la perruque*. In this interview a relatively new worker to the chemical factory describes how he first learned this type of worker-computing in an aircraft manufacturing plant from co-workers. He now applies this skill and knowledge and passes it onto his new work mates. Again, many of the themes from earlier chapter are re-visited including how problems (i.e. contradictions) with computers themselves push for new forms of knowledge and practice, how many different spheres of activity intersect, and how collective practice in interstitial spaces is a central feature of working-class computer learning.

I: Do you have anybody you can talk to about it, a friend you can call?
R: Used to, I used to work with a guy at the plant where I worked before. We used to just kind of *talk all the time*... He took a company course, so that's *how basically I got into it*, he showed me some stuff. Well before when I was [in highschool] I remember the system back then was different. We used to use the cards, punch cards...
I: What are some of the activities you do on the computer then?
R: Oh well, basically games and in the summer time I usually put all my statistics from my golf on the computer.
I: On a spread sheet or something?
R: No, I got a special program....
I: Do you try to apply it to anything like just farting around at your work now or?
R: Yeah, you know the more you see the system and kind of *hack around* you learn that way eh.

I: Have you learned any programming hacking around at work so far?
R: No, basically I was just reporting the batch and stuff and making the labels and stuff, it's pretty basic, just follow certain procedures, you know for a receipt you press F1.
I: But on your own, on your spare time.
R: Yeah, well it's kinda like *you go in and out of the system, and see what's there, but sometimes they won't let you get access* to some of the stuff.
I: If it was a centralized system I bet it would be really interesting eh?
R: Oh yeah, well I was just fooling around, and [a co-worker] said, 'How long have you been here?' and I say, 'Ah 4 or 6 months.' 'And you know how to go in there? I've been here for 5 years and I don't know how to do that.' I say, 'Ah, it's pretty basic you know.'
I: So do you show them anything?
R: Yeah, yeah. They say, 'Well how do you do this?', and I give a command, go to whatever, and then once you've gotten into DOS it's pretty basic you know. DOS is the operating system and you learn your basic whatever, back-slash, and *I give them wherever all the games are hidden*, and then you get out of there and usually once you're in there [a program or game] they tell you what to do so.
I: So you're showing other workers how to get into these games and things or whatever?
R: Yeah, yeah. You can't really harm anything unless you delete something and you can't really delete anything. You go in and out and you don't harm anything. (R8)

"Making do" is an expression of local practice in the context of systems of power and their expression in practical material forms. It is described by Certeau (1984) but her is grounded in specific class relations. We are talking about the practices that produce what Fiske refers to as "popular knowledges":

> Popular knowledges are localizing ones: they are used in the attempt to gain control over some of the immediate conditions of life. They are also used to make sense of social experience from a subordinated viewpoint and are thus put to work within the construction of identities and social relations. They are, then, formative in the non-material dimensions of locales. Such "weak" knowledges do not represent their producers' interests extensively, but are confined; they do not reach beyond their immediate conditions, but are used to build and control locales. (Fiske, 1993:206)

While only "weak", these forms of subordinate learning processes and the local skills and knowledges that they produce are nonetheless an important dimension of the computer learning that workers undertake. As a response to boredom, routinization and "idiot-proofed" technology workers such as these learn how to hack into machines at the workplace and pass these experiences on to co-workers. At the same time, the workplace imposes disciplinary structures that have many very real material consequences. The workplace and the

technology is physically designed with managerial control in mind. Electronic surveillance, work discipline, as well as narrow job design all are expressions of material structures of the workplace that workers, nevertheless, collectively attempt to learn their way around.

10.5 Summary

In this chapter I began by discussing the notion of "learning opportunity" with a focus on some of the most obvious ways that working-class computer learning is shaped by material structures of practice. In the examples I dealt with, the material structures of practice were experienced and dealt with from a particular class standpoint in ongoing activity in the home, community and workplace.

I briefly outlined the important gendered/class and racialized/class standpoints to identify additional ways that learning practices in the everyday are structured. In considering the structure of household division of labour we saw how it is essential for working-class learners to generate the type of solidaristic networks discussed earlier and how these networks, in fact, tended to be heavily gendered. The portrait of the isolated, and more often than not female worker, is not a particularly positive one in terms of computer learning. It seems it is only in the context of a developed, solidaristic network that the typical class-based distribution patterns and material structure of learning opportunities can be effectively countered by working-class people. It is through a careful concerting of openings and collectivization of resources that the most organized segments of the working-class (mostly unionized, white males) can generate the time, space and energy necessary to subvert basic patterns of social reproduction in terms of computer learning.

I also spent some time focussing on a critical discussion of a large scale survey analysis by Nakhaie and Pike (1998). Here I demonstrated both the importance and limitations of these types of data. What these studies ignore is the creativity and partial resistances to material structures that can be generated from subordinate standpoints. In the final sections, I focussed on computer learning practice in the workplace and demonstrated the roots of material structures of participation in the basic dynamics of capitalist political economy. Far from mere abstractions, issues of managerial control, organizational rationalization, as well as technological, and work station design that emerge directly form

these dynamics, controlled movements of bodies in space and time to provide an important structuring effect within computer learning that was directly linked to issues of social class.

In the end, we see the relevance of an entire range of material structures, experienced from a working-class standpoint, for a full understanding of participation in computer learning practice in the everyday. Each section provides a discussion of how material structures do not simply direct activity, but rather mediate it providing gaps for what Fiske called the creation of "popular knowledges".

Chapter 11
Contradiction and Commodification in Working-Class Computer Learning

The taste of porridge does not tell us who grew the oats. (Marx)

I begin with this quote to emphasize a key theme of this chapter which is that broad sets of coordinating social and historical relations always lie just below the surface of "things". These things can include the many individual practices, seemingly self-contained learning "projects", and so on that we all undertake. In this chapter I want to widen our view of computer learning so that we can see its inherent political economic relations. Understanding commodification and the political economic dimensions of motive-structures in computer-mediated activities prefigures the class dimensions of these activities. Building our understanding of these features makes visible the "historicity" and potentially transformational changes that are resident within activity. Below I draw on the work of Marx to outline how the concept of contradiction helps us see the interrelations between the commodity-form, use-value, exchange-value, fetishization, labour-power and alienation on the one hand, and credentialization, education and learning on the other. I show how these concepts can be applied to computer learning to make the class relations in activity explicit. This analysis traces the connections between various levels of activity and broader capitalist society.

For neo-Vygotskians like Lave and Wenger (1991), Engeström (1987) and others the discussion of different perspectives and change in activity centres around the concept of contradiction which describes a process in which the tensions of any system bring about both small quantitative change as well as occasional qualitative and transformation changes. This approach is the core tool of Marxist analysis according to Ollman (1993) and outlines a method of examining social systems, large and small, as a social process that is in motion. Engeström provides a basic example of how neo-Vygotskians understand the notion of contradiction in this hypothetical case of doctor and patient activity.

> The primary contradiction of activities in capitalist socio-economic formations lives as the inner conflict between exchange value and use value within each element of the

> triangle of activity. A hypothetical work activity of general practitioners is primary medical care may serve as an illustration. The primary contradiction, the dual nature of use value and exchange value, can be found by focussing on any of the elements of the doctor's work activity. For example, instruments of this work include a tremendous variety of medicaments and drugs. But they are not just useful preparations for healing - they are above all commodities with prices, manufactured for a market, advertised and sold for profit. Every doctor faces this contradiction in his *[sic]* daily decision making, in one form or another.
>
> The secondary contradictions are those appearing between the elements. The stiff hierarchical division of labour lagging behind and preventing the possibilities opened by advanced instruments is a typical example....
>
> The tertiary contradiction appears when representatives of culture (e.g. teachers) introduce the object and motive of a culturally more advanced form of the central activity into the dominant form of the central activity....
>
> The quaternary contradictions require that we take into consideration the essential 'neighbour activities' linked with the central activity which is the original object of our study. Quaternary contradiction are those that emerge between the central activity and the neighbouring activity in their interaction. Conflicts and resistances appearing in the course of the 'implementation' of the outcomes of the central activity in the system of the object-activity are a case in point. (Engeström, 1992:20-21)

Others, such as Lave and Wenger (1991) have wished to supplement the core contradiction of the commodity-form with the idea of "continuity and displacement" (p.114) rooted in skill differences between masters and apprentices who struggle to dominate one another for the sake of the community (p.116). Despite differences among these scholars however, there is agreement that activity cannot be meaningfully understood without the notion of contradiction, change and transformation.

In Marxist scholarship the notion of contradiction focuses on the quantitative to qualitative change as "two temporally differentiated moments within the same process" (Ollman, 1993:15).

> ...the incompatible development of different elements within the same relation, which is to say between elements that are also dependent on one another... bring such change and interaction as regards both present and future into a single focus. (Ollman, 1993:15-16)

Perhaps the most important example of the analysis of this type of change in Marx's own work involves the transformation of money (used to exchange for goods and services) into

capital (used to purchase labour-power *and* extract surplus-value). Tension, conflict, and so on are manifestations of contradiction and a process of negation of internal relations acting on each other. In the context of computer learning these changes are seen in interaction with the technology, in the forms of participation an individual undertakes in an activity, the forms of "mature practice" that arise, and the general patterns of participation within groups as a whole. These negations can also be traced to the articulation between different spheres of activity (e.g. computing in the home, workplace, etc.) or within different levels of activity (i.e. operation, goal and motive).

The concept of contradiction cannot be relegated to mere background or historical context. For Marx through to Ilyenkov (1982), Ollman (1993), and for writers such as Leont'ev (1978:11-14), the failure to approach these seemingly broad and political questions leads to a failure to understand the practices which these levels of activity ultimately make meaningful. While many neo-Vygotskians would agree with this assessment on principle, many fail to apply it consistently throughout actual empirical analysis. My suggestion (a dialectical one) is that we must, in effect, broaden our perspective in order to better understand the minute detail of how practices are actually accomplished in the everyday lives of real people. For my own part I've struggled to maintain this kind of macro/micro dialectic. For example, I've discussed how the intersection of major societal divisions of class, race and gender each play an active role in people's computer learning. And, I've tried to make broad features of capitalist political economy visible in activity in terms of mundane, everyday practice.

In Chapter 10 I presented an account of the material dimensions of the social organization behind the computer learning practices which interviewees described. In the closing sections, political economy emerged as an important feature of the analysis as it directly structured activity in the workplace and affected the distribution of material resources beyond work. In this chapter, I want to explore more fully the broader historical materialist dimensions of computer learning practice with an emphasis on the way that processes of commodification reflect contradictory motive-structures of activity. I begin with a discussion of commodification and learning that returns us to the basic principles of contradiction in the

commodity-form in Marx's own work, and then provide a more detailed look at exchange-value and use-value oriented computer activity.

11.1 The Commodification Process and the Commodity Form

While the commodity form and the process of commodification may seem like concepts exterior to learning processes, in this section we see that they describe important dimensions of learning. As much neo-Vygotskian scholarship enthusiastically suggests, the commodity-form is the source of the core contradiction in activity. Lave and Wenger, for example, outline the process of commodification in learning in their comparison of apprenticeship programs, formal testing and credentialization in this way.

> Testing in schools and trade schools (unnecessary in situations of apprenticeship learning) is perhaps the most pervasive and salient example of a way of establishing the exchange value of knowledge. Test taking then becomes a new parasitic practice, the goal of which is to increase the exchange value of learning independently of its use value. (Lave and Wenger, 1991:112)

However, what exactly is meant by the phrase, "way of establishing"? What are its implications? Is it equally applicable to apprenticeship learning, learning outside of apprenticeship programs in the everyday and so on?

While learning as a practice can be commodified as a credential or be used directly with no intention of exchanging it on a market, so too can computers be used in a variety of ways. We've already seen that, according to interviewees, a computer may be implicated in forms of entertainment, relief to boredom, an opportunity to embrace the emotionally-loaded idea of "technology", a tool for community building, a tool for union building, a tool for home finance management, an opportunity for barter, part of a child's education, or it may be central to or merely incidental to activity, and so on. Despite the infinite variation, if we are to take seriously that the commodity form lies at the very heart of any system of activity (within this epoch), each of these examples can be understood in two basic ways: as the realization of use-value and/or the realization of exchange-value.

The analysis of the "commodity" form is a foundational starting point for an understanding of Marx's scholarship. We've also seen that the commodity form is essential for a critical understanding of neo-Vygotskian scholarship. Therefore it makes sense to

briefly review some of Marx's own observations as we begin to develop our understanding of contradictions in computer learning activity. Through this discussion we will be able to more clearly see how commodification is yet another means of understanding class standpoints in learning activities.

In volume one of Capital, Marx describes the different circulation patterns of commodities (C) and money (M). He outlines basic circuits of exchange through which we can understand the two principle motive-structures inherent in capital accumulation and capitalist society as a whole:

> [i]n circulation C-M-C, the money is in the end converted into a commodity which serves as a use-value; it has therefore been spent once and for all. In the inverted form M-C-M, on the contrary, the buyer lays out money in order that, as a seller, he may recover money... The money is not spent it is merely advanced... We have here, therefore, a palpable difference between the circulation of money as capital, and its circulation as mere money.... The path C-M-C proceeds from the extreme constituted by one commodity, and ends with the extreme constituted by another, which falls out of circulation and into consumption. Consumption, the satisfaction of needs, in short use-value, is therefore its final goal. The path M-C-M, however, proceeds from the extreme of money and finally returns to that same extreme. Its driving and motivating force, its determining purpose, is therefore exchange-value. (Marx,1867-68/1990 :249-250; vol.1)

Central to the identity of 'capital' is the difference between the C-M-C versus the M-C-M circuits which depend on the projected plans for either direct use or further exchange. This distinction, in fact, provides the bases for understanding the exchange-value oriented and use-value oriented motive-structures of any number of specific activities. This same logic can be used to understand the identity of learning activity by looking at the projected orientations which ultimately make specific practices meaningful. In terms of learning, we can apply this approach by trying to identify how practices are oriented toward, on the one hand, use-values and the direct satisfaction of individual/collective human needs, or, on the other hand, exchange-values and insertion into a market relation of some kind. What is represented in these formulations are alternative circuits of learning in which objectively similar social practices take on their distinctive relevancy in the broader social and political economic context. This type of explanation provides a basis for drawing a distinction between, for

example, the everyday learning amongst corporate executives seen in Chapter 8, and the everyday learning amongst working-class people. Though the activities are objectively similar in appearance, for the upper-class group the outcome of activity, as Lukàcs described, "returns" to them and takes on a very different political economic character. Examination of motive-structure, broader institutional relations, the social standpoints of participants in objective social relations all provide the bases for identifying the different (use and exchange-value) circuits and hence political economic dimensions of different types of learning.

Credentialization is in some ways the most straightforward case of the realization of a commodity production logic applied to a learning activity. At its core, it revolves around the nature of "labour-power" and the process of commodity fetishism. Labour-power is unique because it is the only commodity whose use-value *is* that it can "produce" exchange-value. All other commodities, bar none, do not have the power to do this. While Engeström (1987; 1996), for example, locates the central contradiction of activity in the commodity form we can be even more specific by locating it in the commodification of labour-power and human activity. Marx was quick to point out that labour-power, which learning might be thought to add "value" to, despite being sold for a price (a wage) and being distributed on a market, is not a commodity because its value does not arise from the calculation of the quantity of labour expended in its production.[1] Rather, it is produced by forms of human activity that are, strictly speaking, outside a capitalist production process. Labour power is produced, for example, by forms of community and household collaboration, forms of technical and social divisions of labour that are fundamentally different from those defining capitalism.[2]

In terms of computer learning specifically, the operation of solidaristic networks are a

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[1]This is one of the roots of the lie of so-called "human capital theory", in fact. If we are to use the concept capital (and imagine relations analogous to those of capitalism) in terms of "human resources", then we must take all that goes with this. In other words, the development of human capital is synonymous with "self-exploitation" if we are to use it in a technically correct manner. Human Capital theory is therefore not adequate on two (related) counts: 1) it ignores the necessarily alienating ramification when applied to oneself; and 2), regardless of its application in any context, commodity forms substitute quantity for quality in a contradictory manner. See Livingstone (1999, Chapter 4) for further discussion.

[2]Of course, these "other" relations of production can also include forms of production that operate along racialized or patriarchal logics.

prime example of exactly how the production of what can sometimes be thought of as a type of labour-power commodity (e.g. computer literacy) is *not* a true commodity as it is produced under the logic of communal, non-surplus-value generating, non-exchange oriented relations. Learners orienting toward exchange-value motive-structures in activity can more easily understand and speak about their learning as a 'thing' like a credential, or a specific event and so on. Education and credentialized learning offer a means of partially capturing and bringing into relations of production, activities previously beyond the logic of commodification and capital. Learning too, under these conditions, can come to stand over people as a product and a "thing" separate from us.

Use-value oriented learning on the other hand is not as easily understood as a thing. C-M-C circuits have none of the requirements of quantifiability seen in the exchange-value circuits. Engagement is not expected to *profit* in the sense of continuously valorizing capital/time invested. It is a process that people do not instrumentalize, and therefore it is a process they are less likely to feel alienated from. It is more easily discussed as participatory, ongoing relations whose purpose is realized in the doing itself. Given the hegemonic discourses of learning, credentials and market-exchanges, these are processes that people typically have trouble describing *as learning* at all. The goal-direction and the motive-structure of activity in these cases is directed toward the direct satisfaction of human needs rather than circuits of interaction and exchange bound for markets.

More specifically, the "M", particularly in the M-C-M circuit, represents a vision of learning that can be "possessed" and controlled as private property. To be exchanged as a commodity and enter into the rationalized calculus of capitalist markets, it must be quantified (e.g. through the measure of time; or in some type of ordinal units such as certificates, diplomas, degrees which can produce the appearance of quantity). Activity projected toward credentials and labour market exchange is modelled after the way that the production of commodities is projected toward further moments of exchange (M-C-M or specifically M-C-M'). The dominant purpose of these processes is to instrumentalize activity for circulation in order to realize the profit made possibly in the appropriation of surplus-value in production (Capital v.1:Chapter 5). When this model is applied to learning activity it requires the active

appropriation of collective social relations of which one is a part oneself. This is, as Marx outlines in the Economic and Philosophic Manuscripts of 1844 (1844/1988), actually process of "self-alienation". People become alienated from their human activity through the sale of their labour-power which, in turn, comes to stand against them as a commodity. In fact not only is the contradiction of the commodity inseparable from the production of activity (Engeström, 1987), but the process of commodification is inseparable from the production of specific class standpoints in activity as well. Each are a part of the identical social historical process.

> [It] cuts him off from his labour power, forcing him to sell it on the market as a commodity, belonging to him. And by selling this, his only commodity, he integrates it (and himself: for his commodity is inseparable from his physical existence) into a specialized process that has been rationalized and mechanised, a process that he discovers already existing, complete and able to function without him and in which he is no more than a cipher reduced to an abstract quantity, a mechanised and rationalised tool [p.166]... The transformation of all objects into commodities, their quantification into fetishistic exchange-values is more than an intensive process affecting the form of every aspect of life in this way... For the capitalist this site of the process means an increase in the quantity of objects for him to deal with in his calculations and speculations. In so far as this process does acquire the semblance of a qualitative character, this goes not further than an aspiration towards the increased rationalization, mechanisation and quantification of the world confronting him.... For the proletariat, however, the 'same' process means its own emergence as a class. (Lukács, 1971:166, 171)

We see that this aspect of commodification, hidden just beneath the surface of learning practices, stamps these practices indelibly with very different political economic dimensions and material consequences for different class groups. Within these distinctions, it becomes clear that activity for use and activity for exchange are fundamentally different and can come to take on different trajectories of development. The meaning of the former is rooted in human relationships. The meaning of the latter, though requiring use-value initially, is ultimately rooted in the context of accumulation, exchange and the expansion of capital in an "endless" degenerative cycle that comes to stand in opposition to working people.

Throughout the preceding chapters we've seen examples of practices that involved the production of both use-values and exchange-values in activity. Within these practices there

are several clues which help us distinguish between the two and identify the process of commodification. These clues would include learning that is instrumentalized and used for purposes other than those which are resident in the activity itself, the quantification of learning, the credentialization and standardization of learning, and, of course, when people openly learn in order to participate in the labour markets, obtain promotions and so on. Research interviews produced many examples which could be used to ground this notion of use and exchange value oriented activity. The comment of this auto worker provides a quick example of how these orientations were involved in people's learning activity. His comments are directed at his explanation of why he undertook a computer course. Understanding the use and exchange-value dimensions of activity allows us to better understand the significance of his statement about credentialized versus non-credentialized learning.

> I'm going to learn something about the computer. I didn't care if I passed the course or not. I was just going there saying, *'If I can pick up a few things, I'm happy.'* I didn't care. It wasn't about credits or nothing, so, you know, that's why I went. (R5)

This worker highlights a dimension of his computer learning that provides an important indication as to the broader structure of the activity as a whole. He highlights that his participation in activity is *not* predominantly shaped by an exchange circuit. Participation is not instrumentalized, but contains its own purpose and satisfies a direct human need. He explains his orientation because he feels it is explicitly *different* from the conventional credentialization purpose of a course.

Another auto worker describes use-value and exchange-value dimensions of computer learning in the context of a discussion about collective bargaining, seniority clauses and credentialization. He comments are directed toward the collective bargaining his union has done with the company over financial support for members to take local college courses. He identifies the basic contradiction of the commodity form when he describes the relations between learning for exchange and learning for the satisfaction of human needs directly. He actually describes how forces of commodification of learning are partially subverted by the union's collective bargaining. He begins with a description of the courses union members can

take that would be paid for by the company, and then explains why the union bargained for such a broad definition of eligible courses.

> You could take dog grooming, any number of courses. And the reason we wanted it that wide is because of our structure, our seniority structure for bidding on job postings and what have you. The truth of the matter, I mean, going out and becoming a *computer whiz*, you might as well do it *for your own gratification* because it's not, unless you go into management, it's not really going to help you a whole lot in the workplace. *Not to be negative on education*, but that's just the reality. So that's why we wanted a wide range [for] people to be able to take *things that interested them*, whether it be wood carving, say dog grooming, whatever, to do it for their own self-gratification. (R63)

This is a coherent and concise explanation of the relations between use-value and exchange-value motive-structures in working-class computer learning. It demonstrates how the process of commodification can be identified within relations of learning and credentialization. The process of becoming a "computer whiz" can take on two quite different meanings as they come under the two basic motive-structures of use-value and exchange-value oriented activities. It can "help you in the workplace" under conventional conditions of the commodification of one's labour, or it can be for your "own gratification". Indeed, the description openly identifies a working-class standpoint in these relations, and represents some of the ways that an organized working-class formation can find ways to manage the process of the commodification of learning. It is important that we also recognize the significance of his comment about not wanting to be "negative on education" as well. The comment, in fact, demonstrates the recognition, as with R5's comments earlier, that more often than not processes of "education" are processes of commodification of knowledge rather than a process oriented primarily to the satisfaction of human needs directly. Having introduced some basic definitions and examples, below I focus on first exchange and then use-value oriented computer learning.

11.2 Exchange-Value Oriented Computer Learning Activity

> I engage in education and training to learn something else and *to make myself more marketable*. [We] really need more training in computers. It is not good enough to have basic knowledge, you have to focus on packages and know them inside out or you are *disqualified before you begin*... I took night courses, typing, computers. I always tried to take something at night to *upgrade my skills*. Now its *terribly*

> *competitive*... [Before] the *social climate* felt healthier. It felt like you had more control and choice -you don't have that feeling now as much. (R37)

> If you're *computer literate* it *means you* should be able to basically *move a lot easier from one job to another job*. You're not doing hands-on work anymore. It's just programming a computer. (R16)

These excerpts from interviews highlight the type of exchange-value orientations and goal-direction of much of the computer activity that workers described in this research. We see people's computer learning focussed on skills "upgrading" and "marketability" (R37), and oriented not to the satisfaction of human needs directly but rather mediated by a market exchange, earning a wage and movement from one job to another. It is this specific commodification motive-structure of activity that forms the dominant, core element of what I described early on as a technological common sense. Indeed, this core element expresses how people are driven toward computer learning often in order to gain or keep a job. It provides an overall impulse towards the generation of computer learning in terms of an exchange-value. At the same time, these impulses toward commodification of computer learning are partially contradicted by people's everyday experiences and by dispositions and preferences which shape activity in terms of the types of learning networks that we've seen amongst the most organized segments of the working-class.

Notions of computer literacy[3] seem particularly prone to be linked with the kind of commodifying tendencies we've seen described above. In the practices of working-class parents in these interviews, we see this connection expressed, for example, in terms of their children's educational needs. Indeed the apparent importance of computers to the world of work, capital accumulation and the labour market has elevated computer literacy, at least in the minds of interviewees, to the level of a *master* literacy rivalling such basic operational skills as math and language. This interviewee, for example, sketches out the important role of computer learning in the selling of oneself on the labour market.

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[3]The definition and content of "computer literacy" has been the subject of debate that I've largely sought to keep separate from the analysis in this research, but see a wonderful, and to my mind still not dated, collection of essays on the different ways of thinking about computer literacy in Social Science Computer Review 7(1), where Robins and Webster attempt to insert a critical voice into the technocratically oriented range of dominant perspectives on the subject.

R: Like when we were growing up we had to learn *math and english* in school, [computer literacy] should almost be the same now. *They should have to learn it.*
I: So it's very important for the future?
R: Oh, it should be a *mandatory* course.
I: And this is directly connected with the job market when they graduate and stuff?
R: Well, I mean people are running around with little lap-tops in their cars, I mean it's just you know, *you can't be without it.* I can't imagine even someone writing a resume for a job without a computer. (R16)

The "mandatory" and essential character of computer literacy is constructed not out of its character as a practice itself, but from its instrumental relationship with capitalist relations generally. The perspective in fact outlines a motive-structure of activity that describes a working-class standpoint in computer activity explicitly. Who is it that *needs* computer literacy? Not everybody. Rather it is meant exclusively for those who must depend for their livelihood on selling their labour-power on a job market.

Other relations of social class and commodification within computer learning are more subtle and derivative. For example, we've seen frequent comments on the use of "computer games" amongst interviewees. How can we understand the processes of personal consumption and entertainment as goal-directed and motive-structured in the context of use and exchange-values? Do computer-mediated practices that are forms of commodity consumption necessarily express and produce class dimensions as well? For Marx, individual consumption of commodities appears to have not been, strictly speaking, a distinctively class process per se.[4] In Capital Volume 1 (1867-68/1967: Chapter 23), for example, Marx outlined two basic types of consumption in capitalist society. The first form was what he called "productive consumption" where workers consume raw materials along with portions of fixed-capital to produce exchange-value in surplus of the capital advanced. The second form was what he called "individual consumption" in which people use their money to satisfy the needs of subsistence as well as other needs to which we could include

[4]Bourdieu (1984) classic work in this area is an exception. In terms of Marx's discussion specifically, see, for example, Capital v.2 (e.g. chapters 1 and 2) in the context of productive capital/consumption and in Theories of Surplus Value. Also note that Marx did little to distinguish between a "need" that is essential for human survival (e.g. shelter, food, etc.) and one that is artificially induced as a type of cultural desire in a particular community.

interests such as the entertainment provided by computer games. Marx's basic distinction between these two forms of consumption can be traced in many of the interviews. Comparing the amount of time he spends "learning computers", for example, this chemical worker describes why the learning that other workers do in playing computer games is different. Do notions of use and exchange-value enter into how and why practice is carried out? Though just a simple example, he relates it to the idea of computer practices that are "value added":

> Yeah well, I just can't, people will spend three times [the amount of time learning about computers] playing bloody games. I just can't see that, there's *no value added.* (R18a)

For this chemical worker, computer games are a form of individual consumption that are not directly incorporated into a process modelling capital accumulation and productive consumption. Playing computer games is a form of consumption activity lacking in the exchange-value oriented motive-structure.

The full relationship between capitalist production, exchange, consumption and social class is not as simple as Marx's basic distinction in Capital suggests. Marxists have outlined how the two forms of consumption should not be thought of as separate activities but rather moments of the reproduction of capitalist society as a whole. While the commodity, even in individual consumption, is put to a use that satisfies a type of human need directly, it is nonetheless part of the repetitive circuit of capitalist accumulation. Thus even individual consumption is implicated in the broader process which ultimately confirms particular class standpoints in the political economic relations of society.

> In every aspect of daily life in which the individual worker imagines himself to be the subject of his own life he finds this to be a illusion that is destroyed by the immediacy of his existence. This forces upon him the knowledge that the most elementary gratification of his needs, his own individual consumption, whether it proceed within the workshop or outside it, whether it be part of the process of reproduction or not, forms therefore an aspect of the production and the reproduction of capital; just as cleaning machinery does, whether it be done while the machinery is working or while it is standing idle... (Lukács, 1971:164)

At the same time, individual consumption is not merely a ratification of the capitalist system,

but presents an opportunity for the activation of the commodity in unexpected ways. For example, we saw how computer games are used in the workplace as well as in the home; however, computer games in the workplace, in fact, provide goal-directed action that requires creative, collective social action and the development and sharing of new knowledge and skills in the workplace. These practices, in turn, lead to the breaking of security features of company computer systems, and generally subverted workplace discipline. Such collective activities build feelings of membership and identities-in-practice that can lead to more conscious, formalized and class-conscious actions such as those seen in Chapter 8. So-called "multi-media" computer systems that attempt to turn the Internet into an interactive commercial forum are, first and foremost, destined for individual consumption though this does not mean that this consumption cannot move beyond the boundaries intended for it.

Though interviewees often mentioned co-workers and children playing computer games, it was not often that workers admitted that they themselves participated in these activities. It is probable, however, that for many working-class computer learners the use of computer games serves what Hakken's (1993) data describes as "escapist" activity. In his study of working-class computing in Northern England, Hakken cites an excerpt from an interview with a worker who explains this dimension of computer activity as follows:

> Q: Do computers change class? Are they seen as a way out of the working class?
> A: They seem to offer an alternative, in my experience at least. Hackers - we call them that, too - seem to come from every level of society. The cult of the home computer is a major thing in all classes. But still, the best selling software is not games of skill but fantasy games, like "Hobby", which is inspired by Tolkien. They're escape, but into fantasy, not out of your social situation. (Hakken, 1993:223)

Certainly, amongst interviewees in my research, issues of escapism, commodification, individual and productive consumption were heavily intertwined. Through a careful analysis, however, these features are discernable as separate identifiable moments of a broader political economic process that ultimately confirms the existence of class dimensions of computer learning.

11.3 Use-Value Oriented Computer Learning Activity: Communities and Social Change

> Revolutionary practice or activity (not to be equated with the particular revolutionary activity of making a revolution) is ordinary day-to-day, hour-to-hour, human (historical) activity... The distinctly human quality of our species is its capacity to practice revolutionary activity, a capacity, as we have said, that is, unfortunately, only sometimes self-consciously manifest. Instead, our ordinary activity (so-called) is non-revolutionary; in fact, it is not activity at all... It is changing the historical totality (or, more accurately, the many totalities). Indeed, this radically non-dualistic dialectic-in-practice is what changing - i.e. activity - is. (Newman and Holzman, 1993:46)

Alternative practices, while not openly resisting domination, can nonetheless express a contradiction within activities. In some cases alternative practices are a self-conscious and active response to contradictions which can be characterized in the terms of Certeau's (1984; 1997) notion of the "tactical". These are subtle forms of practice that occur, for example, in the interstitial spaces of organizations. They represent a resistance to direct incorporation into legitimate institutional relations. These practices are a response to inner contradictions of an activity system brought on by tools themselves, by elements of the social organization of activity, by the inter-relations of several activity systems, and so on. They are always experienced from a specific standpoint in activity.

Use-value as we saw above is necessary for the production of exchange-value (i.e. people don't exchange what they have not found some use for, broadly conceived). At the same time, use-value lies in a contradictory relation to exchange-value within the commodity form. In order to become a commodity, in fact, learning as a broad social activity must be tortuously shaped by powerful institutional relations, principally the modern mass schooling system and the labour market. Learning activity that is not projected toward a process of exchange on a capitalist labour market, whether it is "wood carving or dog-grooming" (see the quote from R63 above), is instead a process that needn't be exploitative. It can instead be an opportunity for mutuality and the direct satisfaction of one's own and one's community's needs.

In Hakken's Computing Myths, Class realities: An ethnography of technology and working people in Sheffield (1993) we find an examination of how working people engaged

with and understood computer technology in their everyday lives. He reports on a highly organized working-class community that produced a range of alternative computing practices, and different modes of computer-mediated learning. The core of the alternative practices revolved around what working-class Sheffielders understood as "socially useful" computing.

> What was distinctive about the Sheffield region was the extent to which people there had pushed for local policies to influence computing [whereas capital did not]. These policies aimed to channel computerization into "socially useful production." That is, they aimed to promote computer use that built on rather than replaced existing worker skills and local economic structures. In part as a consequence of strong worker education institutions, the policies encouraged "community computing" in opposition to "administrative computing". (Hakken, 1993:28)

The subjects in Hakken's work sought to develop specific computer practices in the community that were not oriented toward profit-making but instead sought to meet the needs of community members directly. Hakken comments that in some cases "working class people can bend computing to their own social purposes and thereby participate actively in the creation of computing culture" (1993:79). Examples of countervailing social organization of computer-mediated activity documented by Hakken included: Workers' Study Circles (based in the Scandinavian models); organized groups such as the "Computers for People"; a women's Technology Training Workshop; and, a Community Operations Research Unit which offered technological support for other community groups. Each of these revolved around members' search for a way of using computing to extend democracy, relations of collectivity and community (Hakken, 1993:179-80). What Hakken's research drives home is that there *are* examples of alternative computer-based practice that lie in opposition to alienation, the commodification process, and ultimately capital itself.

Interviewees in my research also expressed alternative use-value orientations in computer practices, though there was little evidence of the kind of formally organized alternative computing groups cited by Hakken. Nevertheless, these computer learning practice went beyond both private consumption and learning which was simply incorporated into a formal credential or labour process directly. These were not "revolutionary" practices, but rather were directed toward building elements of neighbourhood, work- and home-based communities. In the excerpt below we can see a number of examples of how working people

carried out computer-mediated practices that contributed to communities such as the trade union or the informal groups of co-workers on the shopfloor. I begin the excerpt by commenting that I had noticed that the interviewee had produced some (computer generated) documents for his upcoming union meeting. He outlines how he learned his computer skills which reiterates many of the themes discussed in other chapters. He goes on, however, to talk briefly about the activities of another worker at the plant which are relevant for us in this section.

I: I saw in preparation for the *union meeting* I saw your name on the bottom of a chart. Did you *prepare that chart*?
R: Oh, for the union meeting, yeah.
I: So you do some home computing?
R: I have a system at home, we moved a while ago and I haven't unpacked it yet. And I get paid to do it here, so.
I: There's access to a computer here?
R: Oh for sure. I would say about half the membership has some sort of access to computers, like you have to be *authorized to be on the system*, but I mean half of them are almost *computer experts*. There's one guy here on the midnight shift, he's got kind of like a *catering service going for guys in his department*. He keeps it to his buddies, sometimes off-shift fellas. He's very proficient, he's probably more proficient in the computers than I am.
I: Caters to the off-shift? What do you mean?
R: Oh, brings in chocolate bars, coffee, stuff like that, he's got a coffee ern set up and covers his costs.
I: And how does he use the computer?
R: Yeah, he uses it, he's *not suppose to but he has a menu set up on the company system.* We actually approached him, we wanted him to set up social committees for the union, because he is very good at that sort of thing, 50/50 draws, and, well he organizes a party every year for the plant, like a Christmas dance, and he just raises money throughout the year with 50/50 draws and what not, he is just very good that way...
I: Do you know if he has any *formal training in computers?*
R: *No, not to my knowledge*, but I think he started taking correspondence now. I don't know him that well, he works steady midnights. (R18a)

The worker described in the latter portion of the excerpt operates within the interstitial spaces of the workplace - as Certeau might say, tactically - to do what he likes to do most: organize events and activities for friends and co-workers. While this may be seen as an example of petty commodification, the worker caters to cover the cost of coffee and chocolate bars and

saves co-workers' money they'd otherwise spend on over-priced items from the company-run cafeteria. These practices work around the control of the workplace and even the profit-making of the company cafeteria. They are an example of a type of activity that was not uncommon amongst workers interviewed. It is a mundane, everyday activity that while it does not directly oppose the interests of capital or the capitalist process was not aligned with it either. Outside the workplace there were other common examples of computer activity that were not commodified. Interviewees described using computer-based activity to facilitate their children's' local sports leagues, to contribute to local trade union activity, in order to share recipes with friends and neighbours, to share and store music, and so on. These types of activities, as they were inserted into community relations, moved beyond simply individual consumption, and nor were the activities directed toward the production of exchange-value, commodification or waged work. Rather, these computer-mediated activities were oriented toward their own use-value primarily. Though not as formally organized as the Sheffield working-class, they were examples of community-based computing similar to those described by Hakken.

This partner of an auto parts worker outlines another example of computer learning which deviates and in some ways opposes the incorporation of computer-based activity into the commodification and individual consumption processes. In discussions with her about her computer learning she described that she has spent a great deal of time learning about various types of "data base" software. When I asked why, she explained the relationship between this learning and the actual goal of her activity which was to share her passion for movies with friends and co-workers.

R: I have my movie list on the computer... It automatically puts it in alphabetical order and stuff like that then I can put in categories. Like I have cartoons, movies, miscellaneous, music, sports - like I have them in categories, and then I print it up on the printer, so I have my list and when I went to look for a particular ones, see I have the numbers too - so I know where to find that movie.

I: Okay, so like a reference number eh?

R: Yeah, and then for people, like I used to have one [list] I used to take to work with me because people from work would *borrow movies* so they'd ask to see my list so they'd know what movies I'd had - stuff like that.

I: How big is your collection about?

R: Well [the data base program] numbers it, and its up to 900 and - almost a 1000 now.
I: So those are all movies that you have copied?
R: Yeah.
I: That's more than a video store!
R: Yeah, like I have movies, I have documentaries. Like I'm going to do this Beatles anthology thing [6 hour documentary on television]. I'm taping one right now on the radio... And, well I have 3 or 4 people who want me to make copies for them. Usually people call or just drop around and they ask me to tape something for them or they borrow something... I keep a supply of blank tapes here too because you know if there is something on, you don't know about right away and you haven't had a chance to get a tape or something, I always have extra blank tapes here. (R4b)

This is a computer-based, informal, video library system for non-profit community use amongst co-workers, neighbours and family. It is an activity that is mediated by her computer learning, and it lies in partial opposition to the two key principles of the capitalist logic: the domination of market systems over other forms of social relations and the principle of private ownership of property. It is learning which is encapsulated in an activity system that counters, not only the commodification of computer-skills, but even the commodification process of real goods and services. To return to the quote that I drew on to begin this section, use-value oriented activity is what neo-Vygotskians Newman and Holzman (1993) describe as "human historical" activity. These kinds of mundane contributions to communities, as I said, certainly do not seem historical or revolutionary, however they can be seen to operate according to a use-value orientation outside of commodification processes.

11.4 Summary

This chapter has provided a sustained discussion of the political economic dimensions of people's everyday computer learning practices. It argues that computer learning expressed specific social standpoints in the context of use and exchange-value oriented activity. The features I identify above are rooted in the contradiction inherent in the commodity form and hence capitalism itself. The basic recognition of these dynamics and relations of activity are not new to neo-Vygotskian scholarship however they have not been fully elaborated to date.

While use and exchange-values in the commodity form are not, in the concrete, separate features, I've separated them analytically for the purposes of a coherent, detailed examination. I looked at the implications of exchange-value and use-value for our

understanding of learning began with a brief discussion of Marx's own work on commodification. Building from this we saw how the processes of commodification and the orientation towards exchange-values plays a role in computer learning activity. At the same time, we saw how people also participated in computer-mediated activity and computer learning that did not necessarily align with dominant logic of capitalist society. These use-value orientations were instead directed toward the direct satisfaction of individual, family, group and community needs.

Chapter 12
Conclusions, Praxis and Future Research

This research was directed toward making visible the social relations that shape the computer learning practices that people undertake from a working-class standpoint. My interests were to understand the full range of computer learning that working-class people engage in, which I argued was largely obscured by a coherent set of tendencies that ran through conventional adult learning theory. I made use of basic historical materialist and neo-Vygotskian frameworks, I complemented these frameworks with several other concepts such as "common sense" (Gramsci, 1971), "class habitus" (Bourdieu, 1984) and, to some degree, "frame analysis" (Goffman, 1974). Combining these theoretical tools and integrating different levels of micro and macro-analysis, I argued that the computer learning I examined is deeply embedded in relations of advanced capitalism.

12.1 Computer Learning and the Working-Class

> ... individual or collective classification struggles aimed at transforming the categories of perception and appreciation of the social world and, through this the social world itself, are indeed a forgotten dimension of the class struggle. (Bourdieu, 1984:483)

Re-evaluating the notion of adult learning and attempting to understand the complexity of these practices in the everyday was the first step toward making visible the class relations inherent in people's computer learning. The neo-Vygotskian frameworks offered by Leont'ev (1974; 1978), Engeström (1987; 1992; 1999) and Lave and Wenger (Lave, 1988; Lave and Wenger, 1991) provided important starting points for this type of analysis. Drawing on their work we could begin to see how computer learning was mediated by a broad set of social and historical relations. With a careful consideration of social standpoints in activity we were able to understand that computer learning was a differentiated and differentiating form of social practices. In other words, we saw how relations of social class both produced specific forms of computer learning practice and how these practices, in turn, contributed to the reproduction of social class.

Focussing on everyday practices, class standpoints provided the starting point for understanding a specific body of dispositions, preferences and sensibilities in terms of

learning. These dispositions were subject to reformation in practice, emerged from people's position in broad sets of social and material relations, and when fully expressed in materially stable conditions gave rise to spontaneous, mutualistic and democratic forms of working-class community. At the same time, computer learning activity could be seen to be mediated by a highly fragmented, generalized perspective toward technology. Though contradictory, this perspective was dominated by individualized consumption, mystification of technology, exchange-value oriented activity and a process incorporation into capitalist political economy. Both *working-class technological common sense* and *working-class learning habitus* provided useful ways to understand how people played an active role in the accomplishment of computer learning in the everyday. The 'habitus-in-practice' and the kind of technological common sense I described mediated each other in ways that produced the unique class character of computer learning.

Though people make active and conscious choices in their learning practices, we saw that people didn't recreate the world anew at each moment. Instead they were constrained by a variety of historical-material conditions, part of which were specific tools which shaped practices into coordinated activity. Tools connect a whole human history of complex social relations with the ongoing contingency of actual practice. These particular computer learning practices could also be seen as a moment or dimension of a broader working-class life in a technologically advanced capitalist economy.

As I showed throughout the analysis, people were active producers of their own learning. Both the frame analysis and fine-grained sequential analysis were useful mechanisms for discussing the way that learning and consciousness are integrated *and* inter-subjectively negotiated. Though preliminary, frame analysis helped us to understand how it is that people can "key" their practices to rearrange the relations between different levels of activity. Bringing certain tracks of interaction into the foreground and subordinating others all in the context of social interaction.

The interlocking tendencies of dominant approaches to adult learning, that I called Capitalist Learning Hegemony (CLH), could be understood to play a role in the way that "learning" fits in with contemporary capitalist society. It is not a coincidence that

individualization, universalization, formalization of expert/novice relations and credentialization of learning align with the efficient functioning of a labour market, the profitable organization and exploitation of "human capital", and so on. Indeed, I began Chapter 3 with a quote from Karl Marx to signal these very issues. It is precisely these issues that my exposition on commodification, use-value and exchange-value orientations in people's computer learning was meant to highlight.

More specifically, I argued that a "working-class" standpoint is implicit in these computer learning practices based on a range of mutually supportive claims. Steps towards making these claims began in the brief review of selected adult learning theories offered in Chapter 3 and the opening discussion of working-class learning in Chapter 4. However, the analysis is most specific in Chapters 5 through 11.

The analysis of interviewees' perspectives on technology and their reasons for entering into computer learning presented in Chapter 5 demonstrated a specific "working-class technological common sense". This common sense was a complex weave of dominant discourses and contradictory working-class experience. The core of this common sense was actively produced in both the media and in people's own workplaces, and centred around a notion of "technological progress". Interviewees often mystified the relevance of computer technology in their own lives and predicted computer literacy to be the a kind of "master literacy" that workers as well as their children needed to devote serious learning time towards. However, these dominant notions conflicted with many experiences that people had in their own lives. In many cases, what was good for capital, particular at the point of production, diverged from what was good for the waged labourer. Also contradicting the core of this common sense, was the fact that people could develop fairly advanced knowledge and skill in computers with little or no formal training, and that people typically found these skills to be far in advance of any requirements within the actual industrial labour process. While the working-class technological common sense was contradictory and fragmentary, it nonetheless drove the majority of people, with varying degrees of willingness, to enter into specific forms of computer learning.

Chapter 6 outlined how micro-situated computer learning/labour activity also

expresses class dimensions. The detailed analysis of "Larry" and "Roger" learning together in the computer lab demonstrated the kinds of active, everyday capacities that are involved in computer learning activity. The kind of mundane complexity of human-computer interaction was striking. But more importantly, we got a sustained look at the kinds of tacit processes that underlie computer learning generally. This analysis was associated with the claim that people can create knowledge collectively and are not necessarily bound by expert/novice relationships. This claim of collective, social and non-hierarchical (expert/novice) dimensions of learning was, in fact, an important, empirically-based counter-argument to the kinds of dominant tendencies I outlined in the review of adult learning theory in Chapter 3. The dominant tendencies of adult learning theory were seen to underpin class-deficit theorizing that obscures, denies or denigrates much of the learning that working-people do. In this way counter-arguments against this "CLH" were an important part of beginning to make visible the class dimensions of working-class computer learning. In the second part of Chapter 6, we saw an analysis of human-computer-organization interaction in terms of "organizational sequences of action". "Gwen's" (a clerical worker) activity presented even further evidence of class dimensions of computer learning focussed on the workplace. We saw how the design features of the Oracle purchasing department software mediated activity in the capitalist workplace. Oracle clearly did not stand over the work of senior managers in the same way it did Gwen and her co-workers, and in this way pre-figured different class standpoints in computer-mediated activity. Oracle could be seen to be the electronic embodiment of the core dynamics of capital accumulation and labour processes in the micro context. Organizational control clashed with workers attempts to carry out their work in many ways, and in response several "informal" organizational sequences were generated cooperatively, amongst a range of workers. The creation of these alternative sequences, was a means by which workers not only carried out their work efficiently, but shifted their modes of mediated participation. Using a neo-Vygotskian definition of learning it was seen that through these changing forms of participation in activity workers themselves produced that allowed them to learn at work.

Chapter 7 served a more foundational purpose in regards to the analysis of class

dimensions of computer learning. Again building on the neo-Vygotskian framework, in this chapter I introduced several key features of working-class learning habitus as it interacted with the forms of common-sense outlined in Chapter 5. Computer learning took place in a number of settings in which computer-mediation was not always the conscious goal-directed action. This was computer learning in the everyday which took place across intersecting spheres of activity. This in fact reflected dimensions of class life that often had to be organized in the interstitial spaces of other activities, institutional settings and so on, where working-class people exercised only limited control. When sufficient material resources could be organized, solidaristic networks of working-class computer learning emerged in which members displayed a group-oriented perspective. Participants collectivized and drew on each other's differences in interests, skills and preferences of learning style. The centres of these networks tended to be generated around the organization of material resources for participation rather than expertise itself. These specific features of a working-class computer learning habitus could be added to the more general observations in Chapter 4 where we traced a type of disaffected and at times oppositional perspective toward formal education and training that was rooted in class experience.

Chapter 8 was meant to focus on the most conscious and formally organized expressions of class standpoints in computer-mediated learning. I reviewed a number of original, large-scale survey analyses throughout the chapter which also helped to reinforce qualitative observations. I began by establishing the important role that class relations in the workplace play in people's computer learning generally. We also saw how the formalized expression of working-class standpoints and the interests of wage-labour in the form of trade union activity had an important effect on computer learning. Finally I presented a brief analysis of class difference by examining a mini-sample of upper-class interviewees in terms of the practices and perspectives on learning, education and computers.

Chapter 9 expressed class dimensions of computer learning with a focus on how group membership, computer learning and working-class standpoint were mediated by orality and specific oral artifacts. Orality, 'talking about' and 'talking within' computer learning was used to store, transmit and develop computer skills and knowledge in the everyday. Oral

artifacts such as narratives, sayings and analogies expressed interviewees' sense of their own standpoint in relation to computer access and learning in capitalist society, and formed the basis of the storage and transmission of informal knowledge in computer learning networks.

Interviewee's relationship to various material structures and the distribution of time, space and human energy in advanced capitalist society was discussed in Chapter 10. Here too I integrated large-scale survey data to partially support qualitative claims. A working-class standpoint in relation to material structures was seen to shape ongoing computer learning practices. Perhaps one of the most important contributions to the class analysis of computer learning however was the demonstration of the degree to which working-class computer learning was gendered. The division of labour in working-class households - partly conditioned by class relations, partly conditioned by patriarchal relations - structured "free" and "unfree" time for computer learning amongst working-class women. We also saw class differences in terms of home computer ownership. This analysis clarified the observations offered in some recent educational survey analysis of how the capitalist class is reproducing itself through the use of computers. This clarification of how working people learn computers despite the gap in private ownership was extended to the discussion of how workers resist the material and organizational discipline in the workplace tactically to carry out computer-mediated learning.

In the final chapter, we saw a full discussion of the broader motive-structures of computer learning in terms of contradictions of the commodity-form. Use-value, exchange-value, the process of commodification and incorporation into the dynamics of capitalist political economy were defining features of many of the computer learning practices examined. These forms of coordination of people's everyday activity pre-figure specific standpoints, and express class dimensions of computer learning an overarching motive-structure.

These claims are meant to speak to each of the different (operational, goal and motive) levels of activity outlined in the neo-Vygotskian framework, but to do so with specific attention to the inherent class practices that are a part of computer learning. As I indicated from the outset, taken together these inter-locking claims provide a convincing

argument that "learning" is a differentiated and differentiating form of social practice.

12.2 Praxis and Working-Class Computer Learning

> [T]he most important observation to be made about any concrete analysis of the relations of force is the following: that such analyses cannot and must not be ends in themselves... but acquire significance only if they serve to justify a particular practical activity, or initiative of will. They reveal the points of least resistance, at which the force of will can be most fruitfully applied; they suggest immediate tactical operations; they indicate how a campaign of political agitation may best be launched, what language will best be understood... (Gramsci, 1971:185)

In this short section, I want to discuss some of the practical suggestions that this research suggests. A working-class respondent in Hakken (1993) is quoted as follows:

> I see technological development allowing a break up of the working class demoralization. The scene is being set right now, for only socialism is capable of dealing with the silicon chip. (Hakken, 1993:22)

Is it possible for us to take such an optimistic view of computer-based activity in advanced capitalist society in light of this research? Are there points at which, as Gramsci explains, "force of will can be most fruitfully applied" in the realm of working-class computer learning? Is it enough to look for alternative uses for existing technological artifacts? In Chapter 5, I reviewed the work of Sally Hacker (1990) in which she posed a fundamental question: "technology for what?" However, is it reasonable to think we can re-orient the use of "tools" designed and developed under a particular set of antagonistic and exploitative social relationships? The message that this research suggested is that computer artifacts express deeply embedded, hierarchical relations of design and development, and that these relations narrow the transformative potential of most current technologies.

From a working-class perspective, the best hope of gaining socialized control over computer technologies lies in the democratization of the process of research and development (e.g. UTOPIA, 1985; Ehn, 1988; Taylor and Sawchuk, 2000). In many ways, the analysis of the everyday computer-based activities of working-class people confirmed this. We see, for example, that practices of interviewees, couched as the forms of technological common sense, are very seldom able to realize any transformative function. This is particularly the case when people remain isolated as individuals and small groups outside of organized

collective action.

The labour movement offers the principal means by which the collective and democratic impulses figured in the types of solidaristic networks examined in Chapter 7 can be harnessed to affect the relations of design and development of computer technology.[1] These same impulses could also be expressed through the type of organizing that the working-class community in Sheffield (U.K.) were seen to have done in Hakken (1993). Beyond the democratizing of the research and development processes, the labour movement can also play a particularly central role in democratizing the realm of paid work which would reverberate into the other major spheres of activity (home and community) examined. We've seen that experiences in the workplace play an important role in people's perspective toward computer learning, and we've seen that beginning with the development of CNC technologies in the 1940's and 50's, specific computer technologies are an expression of the balance of power and control which is centred in control over economic production.

Another practical use of this research could centre around new approaches to education. Curriculum for such an education would focus on consciousness raising around the dominating and class-biassed conceptions of learning and education, the de-mystification of technological forms, and the transformation of "common sense" into what Gramsci called a more critical "good sense". A frame analysis of how class relations lie 'seen but unnoticed' in people's everyday lives offers a provocative theoretical apparatus that may be of some help. At the same time, working-class groups clearly need to generate discretionary time, energy and space for people so that they can collectively and creatively respond to dynamics of advanced capitalism such as technological change. The labour movement and other organized expressions of subordinate standpoints such as the Women's Movement, various ethnic communities groups, as well as popular education initiatives, social justice groups, and so on, all can play a role in generating and coordinating these basic resources.

Foremost, however, it is appropriate to build on existing modes of activity rather than

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[1]The Women's Movement and various community groups organized around subordinated ethnic standpoints obviously have a role to play as well. Gendered/class and racial/class effects, while not the focus of this research, nevertheless were seen to play a role in the 'dis-organization' of non-white, female working-class groups.

trying to somehow invent new ones. Working people can and do learn together outside of formalized education. These less formalized means of organizing relations of learning, however, are not always the most efficient way to develop specific skills and knowledge. Provided control lay in the hands of subordinate groups themselves, formalized, pedagogically organized learning has a role to play in accentuating the learning that people can do in the everyday. Learning within a critical and stable, participatory community of learners provides the best opportunity for working people to collectively establish alternative working-class perspectives on issues such as computer technology as well as the processes of education and learning themselves.[2]

12.3 Future Directions in the Analysis of Learning Amongst Subordinate Groups

In terms of the further development of a program of inquiry into computer learning, prospects revolve around a point I figured earlier in this chapter regarding the investigation of multiple standpoints in activity. Indeed, the basic neo-Vygotskian framework can, I think, be used to understand the complexities of race, gender and class co-mediation of learning in a variety of settings.

Further development of theoretical concepts for making explicit the social relational dimensions of adult learning is also highly recommended. This would include a more sustained development of the production and transformation of learning habitus in activity. Clearly issues of race and gender provide ways of understanding additional sets of preferences, tastes and dispositions towards particular ways of participating in learning activities.

Finally, it is important to note that interest in learning, lifelong learning and computer-based learning are occurring within a specific historical period. Issues of technology and learning are important terrain beneath which, in Gramsci's terms (1971), more general "organic" forces of power compete (p.178). Critical formulations of learning and

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[2]It would seem, in fact, that an educational model similar to the one outlined in the analysis of the computer learning network amongst unionized auto workers in Chapters 7 and 8, for example, offers the best of both worlds. This model includes active, semi-formal support groups of co-learners which facilitate the sharing and development of expertise from a particular class-perspective which, at the same time, encourages critical, collective access to more formalized educational resources.

technology therefore do have a necessary connection to deeper issues of social justice and political struggle, and have the potential to play an important, progressive role in the class struggles within capitalist society.

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APPENDICES

APPENDIX A: Consent Form and Interview Schedule

A STUDY ON INFORMAL LEARNING AND COMPUTER LITERACY

Dear Subject:

You are being asked to take part in a research study concerning learning and computers. The results of this study are intended to document some of the informal ways that working people deal with computer technology, and to help in the development of more effective educational programmes.

If you agree to participate in the study, you will be asked to talk about how and why you learn about computers, and your general background/personal history.

It is important that you be assured that:

* **You will not be personally identified in any reporting of the results.**
* **You are free to withdraw from the study at any point.**

If you have any questions at any time ask me personally or phone me at (416) 920-5776.

Please sign the consent form at the bottom and give it back to your interviewer.

Thank you very much for your help.

Sincerely,

Peter Sawchuk
Project Leader
Ontario Institute for Studies in Education, Toronto

CONSENT FORM

I agree to participate in the INFORMAL LEARNING AND COMPUTER LITERACY interview under the conditions specified in the above letter including guarenteed anonymity and the right to withdraw at any time.

SIGNATURE _____

Subject number:_____

If you'd like to receive a report on the outcome of this study include a mailing address on the back of this form and one will be sent to you upon completion.

FOCUSSED LIFE HISTORY INTERVIEW #1 --
COMPUTER LEARNING

A) Social Background

1. How old are you?

2. Is there a cultural or ethnic group you identify yourself with? Why?

3. Is there a social class you would say you belong to? Why?

4. What is your schooling?

5. Are you married?
   If married:
   How long have you been together?
   Is there a cultural or ethnic group he/she identifies with?
   Does your partner work outside the home? Job?
   What is your spouse's schooling?

6. Do you have children? Ages? Sex? Schooling?

7. Please tell me what you do (did) for a living?
   themes:
   - job description;
   - job title;
   - job environment.

B) Computer/technology attitudes and computer learning activities. (Specific learning)

1*. Tell me about your computer learning activites.
   - What have you learned about/in computers?
   - How did you learn these things?
   - Why did you choose to learn these things?
   - Was this learning done alone, with others?
   - What are your future plans in terms of computer learning?
   - When/Why did you first become interested in computers?
   - How much time would you say do actually spend on these activities per week?
   - Describe a recent computer activity you have undertaken/took? Problems? Solutions?
   - Have you taken any formal courses in computers? Why/Why not?

2. Would you prefer to learn computer programming, operation or maintenance (all, some, one?

why? how?)

4. Where or from what sources do you get your information, about computers?

5. What are some of the ways you might go about learning more, gaining more experience with computers?

6. Are family members involved in computer activities? Why/Why not? How?

(General thoughts on computers/technology)

7. What are some of your general thoughts on the role of computers in our society? (beliefs, specific knowledge, experiences, etc.)

8. What are some of your general thoughts on the role of technology of all kinds in our society?

9. What are "computer skills" from your experience? What does it mean to be able to use a computer?

10. How would you describe or define "computer literacy?"

11. Where/how/for what purposes do you see computers being used most often?

12. What are some advantages computerized technology offers us in your opinion?

13. What are some disadvantages computerized technology offers us in your opinion?

14. What are some of the different uses of the computer in your mind? (practical, theoretical, general, specific, etc.)

15. Who knows the most about computers, who are computer experts?

16. Are computers hard or easy to learn (in general, personally), why?

17. How much do you think a student learns at school about computers?

18 How much should a student learn about computers?

19. Could there be places, ways of learning computers that you would be better at or more comfortable with?

Thank you very much for your help.

FOCUSSED LIFE HISTORY INTERVIEW #2 --
GENERAL LIFE HISTORY/BACKGROUND

Reflections on first interview? Questions? Comments?

1*. What are some of the main moments or events and people that were significant in shaping who he/she is today? In terms of attitudes towards learning in general/technology?

2. Please tell me about your early years.
- when, where were you born/grow up?
- what are some important memories of growing up?
- how would you describe yourself as a child?
- what do you remember of your experiences at school?
- did you have other interests?
- describe your parent(s).
- memories of relevant economic, political, social events of the time.

3. Please tell me about the period right after you left school?
- job search.
- learning the job.
- living arrangements.
- other social activities.
- learning activities.
- memories of relevant economic, political, social events of the time.

4. What were the next major changes or stages in your life? Describe them?

5. What are your current attitudes towards learning in general? Why?

(Where applicable)

6. Describe your kids. What are your aspirations for them, etc.?

7. What kind of decisions took place with regard to who worked outside the home, having children, housing, etc.

8. Has there been any serious health problems with you or your family?

(General Reflections on Life)

9. Describe any personal philosophy of life, work, family, politics, religion, learning, etc. that you may have.

10. Do you have any thoughts on things that are good or bad with our society in general? How might we enhance or change these things?

11. Do you have any thoughts on how things might be made better in terms of learning/education?

12. How might computers and advanced technology fit into any thoughts you have concerning the good and bad about society in general?

13. Where/when do you get a chance to talk about the sorts of societal issues we've talking about today?

Any questions, comments, etc.

Thank you very much again for your time.

APPENDIX B: Table of Interviewees

ID	Age	Race/Ethnicity*	Sex	Schooling	Class	Household	Occupation
R1	35	Dutch-Canadian	m	grade 12	mc	family1,di	machine operator
R2	--	--	m	grade 12	--	family1	machine operator
R3	49	Italian-Canadian	f	grade 11	wc	single2	housekeeping (lo)
R4a	44	Scottish-Canadian	m	grade 11	mc	family1,di	machine operator
R4b	44	German-Canadian	f	grade 12	mc	family1,di	mail-sorter (pt,ct)
R5	45	French-Canadian	m	grade 12	mc	family2,di	machine operator
R6	50	Canadian	f	grade 11	mc	family3,di	machine operator
R7	51	French-Canadian	m	grade 9	wc	family3,di	CNC Machine operator
R8	34	Filipino-Canadian	m	grade 13	mc	family3,di	machine operator
R9	42	Canadian	m	grade 12	mc	family2,di	shipper
R10	32	Polish-Canadian	m	grade 11	mc	family1,di	technician repair
R11	48	Chinese	f	primary	wc	family2,di	machine operator
R12	53	Canadian	f	grade 12	mc	family2,di	machine operator
R13a	52	French-Canadian	f	grade 12	mc	family2,mi	office clerk
R14b	22	Canadian	f	college	nc	single3,mi	office clerk
R15c	56	Canadian	m	grade 10	mc	family2,mi	warehouse supervisor
R16	36	Canadian	m	grade 12	mc	family1,s	quality technician
R17a	40	Canadian	m	grade 10	wc	family3,di	machine operator
R17b	48	Canadian	f	grade 13	nc	family3,di	driving instructor
R18a	35	Canadian	m	grade 10	mc	family3,di	machine operator
R18b	34	Canadian	f	grade 12	mc	family3,di	office clerk
R19	40	Irish-Canadian	m	grade 13	mc	family1,di	machine operator
R20	44	Italian-Canadian	f	grade 10	wc	single2	housekeeping (lo)
R22	48	Canadian	m	primary	wc	family2	machine operator
R23	27	Canadian	m	grade 12	mc	family1,di	machine operator
R24a	36	Ukranian-Canadian	m	---	wc/mc	family1	union official
R24b	38	Ukranian-Canadian	f	---	wc	family1	housemaker/retail sales
R25	27	Canadian	m	grade 12	wc	single1	machine operator
R26	39	Canadian	m	grade 12	wc	family1,di	machine operator
R27	63	German-Canadian	m	trade	wc	family3	millwright
R28	27	Canadian	f	college	mc	family1,di	receptionist
R29	30	Canadian	m	college	mc	single1	machine operator
R30	37	Canadian/East-Coast	m	grade 10	wc	family1,di	machine operator
R31	42	Canadian	m	college	mc	family3,di	machine operator
R32	43	Canadian	f	college	mc/wc	single1	librarian
R33	34	Canadian	f	BA;BEd	mc	family3,di	office clerk
R35	34	Canadian	m	grade 10	mc	single1	shipper
R37	48	Canadian	f	grade 12	mc	single1	p/t office clerk
R38	58	Canadian	f	college	wc	single1	nurse
R41	63	Jewish-Canadian	f	grade 11	wc/mc	family3,di	office clerk
R42	32	Greek-Canadian	f	grade 12	mc	family1,di	janitor
R43	36	Chinese-Canadian	f	college	wc	family1,di	office clerk
R44	57	Canadian	f	grade 12	wc	single1	office clerk
R45	50	Philipino-Canadian	f	grade 12	lmc	family3,di	technician
R46	43	Canadian	m	grade 12	wc	family1	line-worker

(Table of Interviewees Contintued)

R47	47	Seke-Canadian	m	trade	mc	family2,di	machine operator
R48a	32	Canadian	m	college	mc/wc	family1,di	machine operator
R48b	27	Canadian/Martimer	f	college	mc	family1,di	office clerk
R49	49	Irish-Canadian	m	college	mc	family2,di	machine operator
R50	35	Canadian	m	grade 12	mc/lc	family1,di	machine operator
R51	32	Irish-Scot-Canadian	m	grade 10	wc	family1,di	machine operator
R52	40	Italian-Canadian	m	trade	mc	family1,di	millwright
R53	42	Canadian	f	grade 12	mc	family3,di	machine operator
R54	56	Canadian	m	grade 10	mc	single1	machine operator
R55	48	"Newfie"-Canadian	m	university	mc	family4,di	machine operator
R56a	44	Creole	m	grade 12	wc	family1,di	machine operator
R56b	35	EurAsian-Canadian	f	BA	mc	famil1,di	human resources officer
R57	43	Canadian	m	university	mc	family3,di	machine operator
R58	--	Croatian	m	trade	mc	family2	machine operator
R59	33	Canadian	f	college	mc	family2,di	quality inspector
R60	32	Canadian	f	high school	mc	family2,di	office clerk
R61	39	Canadian	m	grade 10	mc	family2,di	machine operator
R62a	48	Italian-Canadian	f	grade 8	mc	family3,di	material handler
R62b	--	Italian-Canadian	m	grade 10	mc	family3,di	auto mechanic
R63	41	Canadian	m	high school	mc	family2,di	machine operator
R64	--	Canadian	m	high school	wc	family3,di	full-time union official
R65	64	Italian-Canadian	f	primary school	mc	family3,di	machine operator

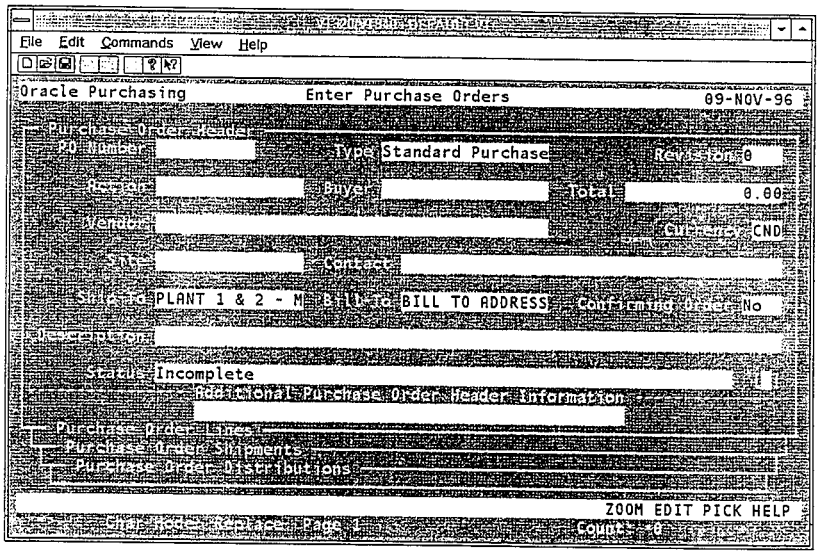
(Upper-Class Mini-Sample)

C1	41	Canadian	f	BA;MA;LLB;BEd	uc	single1	languages Teacher
C2	27	W.A.S.P.	f	BA;MA	uc	single1	museum curator
C3	47	W.A.S.P.	m	B.Comm.;B.Acc	umc	family2	corporate executive
C4	60+	W.A.S.P.	m	LLB	uc	family3	corporate executive
C5	49	refused	m	BA;LLB;BMan.	uc	single1	corporate lawyer

Legend:

*	=	self-described
--	=	refused to answer
mc	=	middle-class
nc	=	insists they are class-less
wc	=	working-class
uc	=	upper-class
umc	=	upper-middle-class
di	=	dual incomes
mi	=	multiple household member incomes
s	=	one partner is full-time student
family1	=	living with partner and young children
family2	=	living with partner and children 15+ years
family3	=	living with partner no children/children gone
family4	=	living with partner and non-child relative(s)
single1	=	living alone
single2	=	living with children only
single3	=	living with non-child relative(s) only
occupation	=	paid-employment, full-time
pt	=	part-time paid-employment
ct	=	contract paid employment (full-time hours periodically)

APPENDIX C: Oracle screen-texts from auto parts plant purchasing department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09-NOV-96
Purchase Order Header
PO Number
Type Standard Purchase
Revision 0
Buyer
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Vendor
Currency CND
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Ship-to PLANT 1 & 2 - M
Bill-to BILL TO ADDRESS
Confirming Order No
Additional Information
Status Incomplete
Additional Purchase Order Header Information
Purchase Order Lines
Purchase Order Shipments
Purchase Order Distributions
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PURCHASE ORDER

331

PURCHASE ORDER NO.	REVISION	PAGE
210712	0	1

THIS PURCHASE ORDER IS IN CANADIAN FUNDS UNLESS OTHERWISE SPECIFIED. THIS INFORMATION MUST APPEAR ON ALL INVOICES, SHIPPING DOCUMENTS, PKGE, AND CORRESPONDENCE

SUPPLIER:

SHIP TO:

BILL TO: P O BOX

CUSTOMER ACCOUNT NO. / SUPPLIER NO.	DATE OF ORDER	REVISED DATE
5381	13-DEC-96	
PAYMENT TERMS	**SHIP VIA**	**F.O.B.**
1% 15, N30		OUR PLANT
FREIGHT TERMS	**REQUESTOR / DELIVER TO**	**SUPPLIER CONTACT / TELEPHONE**

ITEM	PART NUMBER / DESCRIPTION	DELIVERY DATE	QUANTITY	UNIT	UNIT PRICE
	FE-22323				
	FOR HAZARDOUS MATERIALS DOCUMENTATION AND LABELLING IN COMPLIANCE WITH THE ONTARIO OCCUPATIONAL HEALTH AND SAFETY ACT & REGULATIONS.				REQUIRES M.S.D.S.
	GST EXTRA, PST EXEMPT, PST EXEMPT NUMBER: 896410001				
	CONFIRMATION -- DO NOT DUPLICATE				
1	BOWLS PER DWG #12-72042, REV 'BB'	26-DEC-96	1,000	EA	1.50
2	SET-UP CHARGE CONFIRMATION: 12/16/96	26-DEC-96	1	LOT	400.00

ACKNOWLEDGEMENT

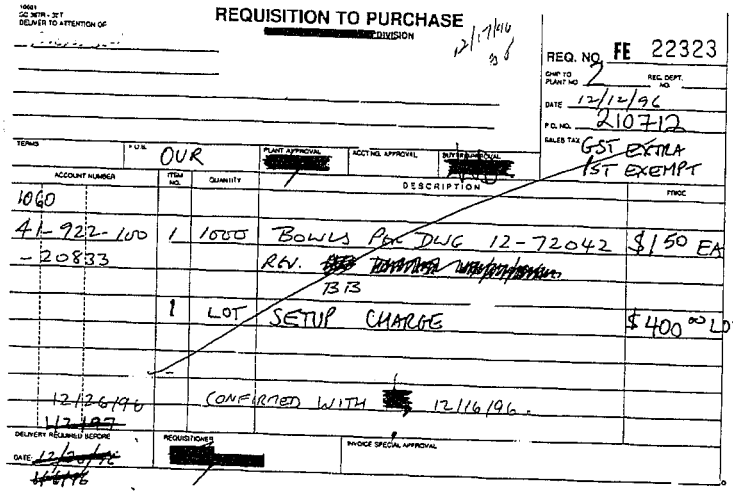
DELIVERY DATE: _____ SUPPLIER SIGNATURE _____

PLEASE RETURN ACKNOWLEDGEMENT TO ABOVE ADDRESS OR FAX TO (905) 641-7322

IMPORTANT: THE INSTRUCTIONS, TERMS & CONDITIONS SET OUT ON THE FACE & ON THE REVERSE SIDE OF THIS ORDER ARE PART OF THIS ORDER & SHALL FORM PART OF THE CONTRACT WHEN THIS ORDER IS ACCEPTED.

( ) ext.

AUTHORIZED SIGNATURE



REQUISITION TO PURCHASE

[redacted] DIVISION

12/7/96

REQ. NO. FE 22323

SHIP TO PLANT NO. 2 REC. DEPT. NO.

DATE 12/12/96

P.O. NO. 210712

SALES TAX GST EXTRA PST EXEMPT

TERMS F.O.B. OUR

PLANT APPROVAL [redacted] ACCTNG. APPROVAL INTERNAL APPROVAL [redacted]

ACCOUNT NUMBER	ITEM NO.	QUANTITY	DESCRIPTION	PRICE
1060				
41-922-100 -20833	1	1000	BOWLS PER DWG 12-72042 REV. ~~[redacted]~~ BB	$1.50 EA
	1	LOT	SETUP CHARGE	$400.00 LOT
			CONFIRMED WITH [redacted] 12/16/96.	

DELIVERY REQUIRED BEFORE 12/26/96 ~~11/1/97~~

DATE ~~12/26/96~~ 11/1/97

REQUISITIONER [redacted]

INVOICE SPECIAL APPROVAL

333

Ltd - [illegible] and [illegible] Division
PO Receiving Interface Report

Date: [illegible] 96 02:04
1

Source mrprecv.	P.O. Number	Loc	Pack Slip, Ctrl. Num	SOC Number	Part Number	Vendor's Ship Date	Transact. Date	TR	Transaction Quantity	UOM	[illegible] Number
96121723	14181	3	000961036,0313007		1231271	29-NOV-96	17-DEC-96	R	1,717.0000	EA	\Ambiguous Location or Price Break
96122023	2396	1	000048480,0109322		1230182	20-DEC-96	20-DEC-96	R	20,527.0000	EA	\Ambiguous Location or Price Break