'DOING CO-OP':

STUDENT PERCEPTIONS OF LEARNING AND WORK

by

Garnet Grosjean

B.Sc., The University of British Columbia, 1975
M.A., The University of British Columbia, 1995

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

in

THE FACULTY OF GRADUATE STUDIES
(Department of Educational Studies)

THE UNIVERSITY OF BRITISH COLUMBIA
NOVEMBER 2000

Your file Votre référence

Our file Notre référence

0-612-61101-9

Canada

Abstract

This study investigates co-op education programs from the students' perspective. It details how their experience of co-op shapes students' perceptions of learning and work; and how, through these perceptions, they ultimately make meaning of their undergraduate experience.

The study focuses on the unique set of social forces and relationships represented in co-op education, and investigates them by means of a nested case study, utilizing a variety of data collection methods. The University of Victoria represents the first level of analysis; the co-op department the second level; four individual co-op programs comprise the third level; and co-op students the fourth level. In addition to consulting the historical and documentary record, I conducted a survey to collect data on co-op students' satisfaction with their programs, and interviewed co-op coordinators, faculty, students, and university administrators. The student interviews were 'in-depth,' exploring methods of recruitment, forms of regulation, effects of learning context, academic implications, and employment outcomes. My purpose was to understand how co-op students develop perceptions of learning and work, and how they use these perceptions to understand their experience.

The study generated five key findings about co-op at UVic: (i) the co-op work term produces a 'co-op effect' that shapes students' perceptions of learning and professional work and profoundly impacts their experience of the co-op program; (ii) the power of the academic context, particularly through the setting and assessment of academic objectives,

mediates co-op students' professional development; (iii) theories of cognition and situated learning indicate that learning is socially constructed in the co-op workplace, and individually constructed in the co-op classroom; (iv) learning and skill development are context-dependent and mediated by individual learning strategies; (v) perceptions formed by co-op students of what constitutes 'learning' and 'work', and of the university's role in the economy and society, can help determine whether universities are fulfilling their mandate of providing relevant higher education.

Based on these findings six general conclusions about co-op can be drawn: 1) co-op education programs are a way that universities can address demands for relevant education; 2) the decision by students to participate in co-op is driven by a desire for specific employment and career outcomes; 3) the work term is a transformative experience around which students base their expectations of the co-op program; 4) participation in co-op enables students to construct meaningful learning through interpretive and experiential interactions with their social environment; 5) professional development of co-op students takes place in the workplace; and 6) co-op education is becoming an élite program.

Recommendations for improvements to the development and delivery of co-op education, for policy and practice and for further research are offered.

Table of Contents

Figures and Tables

Acknowledgements

I feel fortunate to have had the opportunity during this study to work with three scholars whose work I admire, and to have benefited from their unconditional support for my research. First, I wish to acknowledge the guidance and support of my research supervisor, and mentor, Kjell Rubenson. Throughout all stages of this research Kjell provided encouragement, stimulation, guidance and support. He managed to keep me on track when my enthusiasm threatened to take me in other directions. He also had the uncanny ability to ask a seemingly innocent question at the appropriate time to make me reflect more deeply on a concept that I thought I had developed to its full extent. All of this was done in a spirit of collegiality and Swedish good humour.

Donald Fisher was my methods advisor. His guidance in the design of appropriate methodology and data collection procedures for this study, and his spirited questioning has been a constant motivator for me to complete the work. Tom Sork was the third member of my advisory committee. He reinforced me through each stage of the research and encouraged me to stretch and explore different ways of viewing my results and preliminary conclusions.

I thank the administrators, faculty and co-op coordinators at the University of Victoria for facilitating this study and extend deep appreciation to the students who freely shared their experiences so that I might come to understand what it means to 'do co-op.'

I thank my friends and colleagues, both in the department of Educational Studies, and outside the academy for their interest in and assistance with my study. There are many more than I can name here, but in particular, I thank Gong Li Xu for his assistance with the survey results; Abu Bockarie for his good humoured encouragement; Lesley Andres for her advice, encouragement and support; David Coulter for the endless cups of coffee that kept me going during the write-up; Trudy Ramsay for allowing me the use of her apartment so that I might have a quiet refuge to code my data; Jeannie Young for ensuring that I met the various deadlines involved in being a graduate student; Eva Dolan of CHET for being an ally throughout the process.

I would also like to acknowledge the invaluable support of my dissertation study group: Marina Nix, Kandis Ann McLaughlin, and May Yano. Their support during the early stages of my research and insistent probing of my ideas were instrumental in this study taking the form that it has.

Finally, I acknowledge the years of unconditional patience, advice, love, and encouragement from Jan—my partner, friend, and collaborator. Without her continued support this project might not have been completed in such a timely fashion. Her attention to detail, probing questions, and considerable editorial skills are largely responsible for making this account readable.

Dedication

To my mother Emma, for a lifetime of loving support.

(Now you can stop telling your cronies in the seniors' home that
your youngest is still in school!)

To the memory of Pud.

CHAPTER ONE:

INTRODUCTION AND PURPOSE OF THE STUDY

This study is about cooperative education (co-op) at the University of Victoria (UVic),

the third largest co-op provider among Canadian universities. The purpose of the study is

to provide a more complete understanding of the process of co-op education by exploring

students' experience in co-op programs. More specifically, the study focuses on the

unique set of social forces and relationships represented in co-op education in the context

of today's debate on the relevance of higher education.

Introduction

Businesses and workers in industrialized countries are today confronting a dynamic set of

forces that influence their ability to compete globally. Wealth is now derived less from

physical assets than from increasing numbers and types of services. Producers 'add

value' to products and services in the form of customization, shorter delivery time, or

improved quality. Attention and effort are invested in design, whether of physical goods

or the array of services offered in expanding areas such as medical care, education,

entertainment and travel.

A shift thus occurs toward value created through the exploitation of cognitive

resources—ideas and concepts, and away from physical resources and manual labour.

Products and services are increasingly information-intensive. The growing number of

'breakthroughs' in all areas of technology adds to the expanding list of almost wholly

conceptual elements in economic output. These developments increase demand in the

productive sector for a broad spectrum of sophisticated and specialized knowledge.

Similarly, the accelerating pace of technological change affects patterns in the business and financial services sector, where transactions across global networks are conducted almost instantaneously.

The combined forces of globalization and technological innovation are rapidly changing the nature of the labour market and profoundly affecting who has access to employment and how work is carried out. The implementation of advanced technologies in the workplace, restructured management processes, and increased global competition fuel debates about the skills that are needed to meet the spiralling demands of a knowledge-intensive economy. These debates concern relevancy—whether our universities equip graduates with knowledge and skills relevant to labour markets in a knowledge-intensive economy.

As universities attempt to meet the demands of government and industry, they also must satisfy the expectations of students who want jobs commensurate with their education. To address these demands universities are investigating ways of extending the academic curriculum to include experience of the workplace. This has resulted in considerable growth of programs containing a work experience component.

While the power relationship has changed, the relevance debate itself is not new. The importance of education to the economy—its role in wealth creation—has long been understood. Since the 1960s, the link between the two has been explained primarily through human capital theory, which views investments in education and training as

profitable for both the individual and society. The development of human capital is seen as one way that individuals and governments can position themselves for economic prosperity, in the face of global competitive forces (Marginson, 1997).

Reich (1991) argues that advanced Western economies can maintain a high standard of living only by competing within niche markets for customized goods and services. Success in these markets depends on exploiting the skills, knowledge and insights of the nations' 'symbolic analysts' who, unlike routine production and service workers, have the ability to identify, solve, and broker new problems. According to Reich, rich nations are 'getting richer and poor nations poorer' precisely because these types of workers are able to sell their skills, knowledge, and insights in the global labour market. Increasing global demand for these skills creates tremendous opportunities for individuals possessing them. Reich thus contends that social mobility is made possible through investments in education and training. He is not alone in suggesting this.

Economists, politicians, and social scientists have all at one time or another viewed education as a solution to a number of society's challenges. This belief in the power of education to cure society's ills has at times led to unrealistic expectations of what education can achieve on its own. For example, demand-side economists view education as "an investment in human capital that has both direct payoffs to the educated individual as well as external benefits for society as a whole" (Levin & Kelley, 1994, p. 97). For politicians, education policy makers and supply-side economists in particular, education has become a special focus for everything from increased productivity and economic

3

revival to reduced costs for social assistance, and more active political participation by citizens. Human capital theory is well documented in the literature (cf Schultz, 1961; Becker, 1964; 1975; Blaug, 1976; Marginson, 1997) so I will not explore it further here.

On the other hand, social scientists view the role of education from the perspective of *cui bono*-who benefits? They question the links between work practice, learning, and experience. How are these processes related? Who has access to them? How are inputs to education and skill development regulated? Answers to these questions remain elusive, prompting a renewed search for the skills and abilities most likely to ease the transition to the workplace.

In an attempt to determine how individuals can best be educated for the changing world of work Levin and Rumberger (1988) identified the cognitive competencies deemed to be the goals of formal education. These were then linked to the dispositions required by the workplace, and the personal management skills of the individual, to arrive at a composite set of requisite workplace skills. Speculation that some skills might be more important than others—so-called 'essential' skills—sparked a growth industry of publications offering definitive lists of critical skills required for employment in the global economy.

Essential Skills for Employability

Regardless of how they are presented, the responsibility for development of essential skills falls to the educational system, which must prepare students for entry to a workplace characterized by new management systems, production processes, and increasing global competitiveness. Employers now expect the education system to supply

4

workers equipped not only with the high-level technical and academic skills appropriate to their particular area of employment, but also with cognitive or 'soft' skills like critical thinking, problem solving, and conflict resolution (Evers et al., 1998). Much of the competing literature on enhancing employability (Handy 1984; Carnevale et al., 1990; McLaughlin, 1992) refer to these soft skills.

The rhetoric of 'employability skills' pervades discussions of changes in the labour market. Critics question the way they have been packaged and promoted. Proponents—including powerful industry representatives—consider them the answer to the school to work transition and youth unemployment; teaching students employability skills enhances not only initial employment opportunities but also future social mobility

One of the most prominent examples of support for the concept of employability skills is the Conference Board of Canada's 1992 *Employability Skills Profile* (McLaughlin, 1992). The report "uses the word 'skills' as a shorthand term for the whole set of characteristics that make a person employable" (McLaughlin, 1992, p. 3). The concept of employability skills has gained momentum. Today, although still largely untested, the Conference Board's employability skills have become part of government policy. They are being embedded in the curricula in high schools and colleges in British Columbia. The Ontario Standards and Accreditation Council is considering system-wide generic learning outcomes, and Human Resources Development Canada is conducting research on defining standards for employability skills.

Meanwhile, Evers et al., (1993; 1998) compiled an independent list of "essential skills and competencies," based on the results of a longitudinal study investigating the skill development of university students and graduates. They conclude that university students need to develop four bases of competence (managing self; communicating; managing people and tasks; and mobilizing innovation and change) to be able to thrive in the workplace. The skills would serve as a foundation for lifelong learning. While the Conference Board's profile applies to all employees, the list compiled by Evers and colleagues is specific to university graduates and the skills they need for corporate employment. According to Evers et al., (1998), demand for specific skills and competencies far exceeds supply. The authors argue that universities must expand opportunities for practical experience and job training to address this deficiency.

Tension created by these debates increases demands on universities to supply highly trained and skilled workers for a rapidly changing labour market, while at the same time providing a meaningful undergraduate experience for students (Millard, 1991). This calls into question the traditional separation between academic and vocational education—between the world of 'learning' and the world of 'work' (Matson & Matson, 1995). Increasingly there is an "expectations gap" between what today's stakeholders want from universities in terms of the changing opportunity structures of the labour market and what they perceive universities to be providing. The demand is for an education relevant to the "new" and highly competitive global information economy.

To narrow the expectations gap, universities are changing the development and delivery of higher education. Alternative strategies are being devised that will prepare young people to take their place in the workplace of the new economy. This study investigates one such strategy—the expansion of university-based cooperative education (co-op) programs. In what follows I attempt to understand the process of co-op education, and its importance and role in the context of today's debate on the relevance of higher education.

What is Co-op?

Co-op education combines classroom and workplace learning alternating students between each context. Simply put, students in a co-op program spend a semester in the classroom developing theoretical knowledge, followed by a semester in a discipline-specific workplace implementing theory and developing skills in practical application, then return to the classroom again to engage in further academic study. Co-op students thus operationalize academic knowledge by undertaking relevant, paid work, then bring their on-the-job learning back to the classroom for further analysis and reflection. This alternating cycle continues for the duration of the undergraduate program. Students are paid 'market rates' while on work placement with employers. Upon successful completion of the requirements for a degree, students graduate with a 'Co-op Designation', signifying a base of discipline-specific experience.

As a pedagogical innovation, some suggest co-op education is too narrowly focused on vocational issues. Supporters of traditional liberal education question whether it is the role of universities to train students for the workplace. Teaching 'employability skills' is seen as the responsibility of the workplace, not the university (Streek, 1989). However,

7

supporters view co-op as an investment in human capital. When educational institutions and businesses work together in this way, they are said to provide a socially beneficial combination of 'relevant' education and skills. Furthermore, relevant skills are portable. This is an important consideration at a time when the workforce is highly mobile, and the organization of capital and production are being fundamentally restructured.

Dramatic economic and social changes have taken place in recent decades—changes that have altered the relationship between higher education and the economy. New forms of organization and the new jobs they create demand new and higher level skills. How do these changes impact higher education? How are the effects interpreted and acted upon? The interesting question of how the internal and external lives of the university are linked (Clark, 1983) remains largely unexplored in the co-op literature. What is the impact of the new economy's appetite for highly skilled workers on university curricula? Are universities being asked to provide more professional training today at the expense of the liberal arts? What is the role of co-op education in preparing students to take their place in the discipline-specific world of work? And, how is 'disciplining' structured in co-op? Using Foucault's (1977) understanding of discipline, co-op students can be viewed as "docile bodies" being moulded into the image of disciplinary professionals in the workplace. Discipline is also "the means of correct training." Foucault's notion of an integrated system of control and production—with its routine operations of surveillance and assessment can be directly applied to the process of co-op in the classroom where the 'examination' shapes co-op students academically.

While discussions of human capital and economics dominate the debates surrounding the external life of the university, researchers studying internal changes focus on learning. Research evidence suggests that learning, and motivation for learning, are mediated by activities embedded in a context that "makes sense," or matters in some way, to the learner (Engeström, 1994). Because co-op alternates students between classroom and workplace contexts, they are able through reflection and praxis to engage in what I call "continuous contextualized learning." Co-op education provides an opportunity for students to translate cognitive concepts into practice. They then reflect on outcomes while internalizing them and, through repeated practical application, externalize their knowledge. The literature on experiential learning (Engeström, 1994; Marton et al., 1997) provides insights to contextualized learning that those who support co-op as a pedagogical innovation can look to for support.

To understand the unique set of social forces and relationships represented in co-op education requires historical as well as contemporary interpretations. The conditions that gave rise to co-op's social structure must be considered, as well as the factors that support and maintain it as an ongoing system. In what follows, therefore, I briefly describe the context in which cooperative education originally developed—the expansion of science and industy that marked the early 20th century. Because co-op began as a program to educate engineers, I discuss the pivotal role engineering played in bringing the university and industry together.

The Co-op Tradition

At the beginning of the 20th century, the progress in science achieved during the nineteenth century had created a need for "professional men trained to design and to maintain the industrial plants which are the commercial outcome of scientific experiment" (More, 1908, p. 255). Engineers began working to standardize scientific research and industrial production. In order to retain control of these processes, they needed to create an apparatus to meet increasing demands for skilled workers. They settled on education as a method of producing both skilled and unskilled workers to meet the new demands of industry.

The concept of cooperative education in engineering began to take shape during the summer of 1894, while Herman Schneider, a recently graduated civil engineer, was building bridges for the Shortline Railroad in Oregon (Ryder, 1987, p. 4). Schneider discovered two things about the students that were hired to work on this project. First, many of the students were performing part-time work that bore little direct relationship to their fields of study or future careers. Second, the difficulties students experienced in adapting their classroom skills to real work situations in the field indicated that certain elements of engineering practice could not be adequately conveyed in the classroom.

When Schneider later began teaching at the University of Cincinnati, he initiated co-op education as a six-year program of instruction in mechanical, electrical and chemical engineering, carried on in cooperation with a number of Cincinnati's electrical and machinery companies. During the school year, students alternated weekly between the

10

industrial shops and the university and were required to work full-time during the four-month "vacation." In total, they spent four years at the worksite and two years in the college classroom. In order to participate in the program students were required to sign a contract and were paid at a starting rate of ten cents an hour while in the workplace. The Cincinnati plan was well received and Schneider soon became a leading spokesman for co-op in educational and industrial circles.

Following fifty years of expansion in the United States, co-op arrived in Canada in the late 1950s, attracting neither fanfare nor much resistance. At that time, the Kitchener-Waterloo area of Ontario contained primarily manufacturing, business and insurance industries. A Lutheran seminary, the only post secondary institution in the area, was located in the city of Waterloo. Local businessmen—some of whom were transferred from the United States to head up subsidiary companies in the area—decided that what was needed was a technologically oriented university. From their familiarity with the U.S. co-op model, and after investigating a number of universities offering co-op programs, this group opted for a similar model. In July 1957, the institution, later to become the University of Waterloo, admitted its first 75 co-op engineering students.

Compared to the rate of expansion in the United States, co-op took root slowly in Canada, with only 15 higher education institutions participating during the first two decades. However, as word of the benefits of co-op spread so did the level of interest, and by the late 1980s, 60 Canadian higher education institutions offered co-op programs to approximately 27,000 students. A decade later, 110 higher education institutions and

61,000 undergraduate students were participating in co-op (Waterloo University, 1998), indicating a growing interest in this type of programming, and attesting to the success of Schneider's original concept. From modest beginnings assisting engineering students to connect theory in practice, co-op has become a North American educational phenomenon, and is now being exported world wide.

With its alternation between academic and vocational contexts, co-op's model of academy/industry cooperation allows students to acquire a broad-based, general education at the same time as accumulating discipline-specific work experience, relevant to changing market conditions. The combination is popular with students. Demand for co-op programs continues to grow. However, despite the popularity of co-op, our knowledge of it is limited.

Gaps in the Co-op Literature

Attempts to establish a body of knowledge about co-operative education have provided much useful information on practical outcomes (see Fletcher 1989; Hilliard 1995; Pratt 1993). Less effort, however, has gone into defining co-op as an educational model, alternative program, or a strategy for learning. Studies report that "something happens" when students enroll in a co-op program (Rowe, 1989; Van Gyn, 1996), and describe what happens to co-op students on graduation (Cash, 1979; Mueller, 1992; Pittenger, 1993). But, there have been few attempts to understand what happens in between, that is what students experience as they participate in co-op programs. For example, little attention has been paid to the role that co-op plays in the opportunity structures for students at the turn of the millenium, or how the external and internal aspects of the co-op

12

program are reflected in the student's experience. We have limited understanding of why students enroll in co-op programs, their perceptions of the co-op experience, and how they come to perceive learning and work. The voices of students detailing their own experiences are missing from the literature.

Finally, in spite of the importance attributed to co-op education in the literature, and the positive views held about the program by researchers, little systematic information has been collected on the co-op process. The literature asserts that co-op students get better jobs, get them faster, make more money, and are, in general, well rounded and productive citizens. While these benefits are all attributed to co-op, there is little empirical evidence about how these advantages are generated. Also lacking are detailed, perspectival accounts. These could shed light on what happens to students when they participate in a co-op education program, and how they come to understand and make meaning out of their experience. My desire to understand this process and my inability to find answers in the current literature set the stage for this study.

The Research Problem

The study first began to take shape while I was working as a career counsellor in the early 1990s. I had established a program of career redirection for casualties of the wave of corporate restructuring and downsizing that began in the mid-1980s. My target group was credentialled professional and technical workers with extensive work experience.

In the early stages, I concentrated on middle managers. Businesses and industries were converting to a 'lean' management structure and 'self-managing' work teams. The

rhetoric suggested that a lean workplace would generate innovation and increase productivity, thereby increasing corporate profits. In this scheme, middle managers were redundant. As my program developed and became more widely known, I began to notice a change in the demographics of those utilizing the service.

The new clients were younger, and with shorter work histories; recent university graduates were enrolling in the program. These recent graduates shared certain common characteristics. For example, few had successfully obtained career employment since graduation. In part, this appeared to be due to a limited understanding of what their field of study entailed beyond the walls of the classroom. Few had participated in part-time work related to their studies during their time at university. Many felt disillusioned because the work they had been able to obtain had not met their expectations of what could be achieved with a university degree. Others came to realize they did not like the field of work they had chosen. Given the opportunity to explore the field earlier they would have changed their course of studies, and not wasted time studying something they now had no intention of pursuing as a career.

The numbers of recent university graduates entering the program made me curious. Why were people with university degrees experiencing such difficulty obtaining suitable employment? Had the currency of the university degree diminished and, if so, why? What were employers looking for in recent graduates? In discussions with my clients, one factor surfaced with increasing regularity. Many stated that if they had taken a co-op program, they would not be in their current predicament. At the time I had only a vague

notion of what co-op entailed and began investigating. What was it about co-op education that caused these graduates to view it as a panacea for un-or underemployment? When I subsequently enrolled in a Ph.D. program in Adult and Higher Education, I decided to pursue research on the topic.

The purpose of this study is to provide a more complete understanding of students' experience of the process of co-op education. I attempt to understand co-op in the context of today's debate on the relevance of higher education. The study explores the tension between co-op education as a human capital investment, and co-op education as a pedagogical innovation from the perspective of the students. The study is situated at the University of Victoria (UVic), the third largest co-op provider among Canadian universities. I investigate co-op's historical development within the institution, and focus on the methods of recruitment, forms of regulation, effects of the learning context, academic implications and employment outcomes. My immediate goal is to understand how co-op students develop perceptions of learning and work, and how they use these perceptions to understand their experience. The larger objective concerns debates on the relevance of higher education in the broader society. By studying co-op at UVic, I hope to be able to say something about the general provision of education and training for the new world of work.

Research Questions

In an effort to understand the role of co-op education in the new century my study is guided by the following broad research questions:

15

(1)   How does the structure of co-op education impact students'
       understanding of learning and work?

(2)   How do students make meaning of the co-op process?

The university classroom and the work-site form the contexts within which I investigate experiences of co-op education. To further refine the context, I examine how UVic policy constructs co-op education, and how this construction shapes or defines the programs offered.

This nested case study of four co-op programs within UVic focuses on the co-op student as the primary unit of analysis. The university, the co-op department, the classroom, and the work-site form the context within which the student experiences co-op education. I document certain social processes which organize cooperative education as schooling for the "world of work" (Griffith, 1993, p. 2) and investigate how the experience of co-op occurs. By linking the experience of participants engaged in the co-op process with societal and institutional processes, I hope to paint a more dynamic picture of co-op than currently exists in the literature.

Structure of the Thesis

In Chapter Two, I situate co-op education at my study site—the University of Victoria. In a brief history of the university, I detail the arrival and expansion of co-op and place co-op in the organizational structure of the university, before examining the co-op process in the four programs selected for my study.

In Chapter Three, I present a review of the literature, beginning with the research literature on the philosophy and theoretical orientation of co-op, then turning to the potential of co-op as a pedagogical innovation and the benefits attributed to co-op. I briefly review the changing role of university education in Canada since the early 1900s, then focus on the relation between higher education and the labour market. Literature on learning for and in the workplace is presented last.

In Chapter Four, I review the methodology, concepts, and strategies employed in collecting data for the study. I detail data sources, data gathering methods, and procedures; interpretation and data analysis procedures, and threats to validity and the chapter by identifying certain limitations of my study.

In Chapter Five, I report the results of data collection for my study beginning with an overview of what the co-op work term means to administrators and faculty in the university. I next describe who the co-op students are in my study, where they come from, and why they enrol in co-op. Following this I discuss co-op students' work term experiences and describe learning in the workplace. Because the work term is the defining feature of co-op it is an appropriate point of departure for the study. In presenting the findings, I focus on specific themes relating to the structure and function of the work term in co-op education.

In the second part of the chapter, I focus on what happens to students when they return to university and engage in further coursework after completing a work term. I report students' experiences of returning to campus, how they integrate workplace and

17

classroom learning, and the role of the university in the co-op experience. I describe the

impact of the workplace experience on students' perceptions of learning and work and

introduce the 'co-op effect.' The chapter concludes with a summary of the findings.

In Chapter Six, the data presented in the previous chapter are analyzed and interpreted to

explain how and why the process of co-op unfolds as it does. I identify patterns in the

data that relate to how the university structures co-op education, and how students make

meaning out of their experience of the program. I describe how co-op students' perceive

the difference between learning academic tasks and learning through practical

application. I examine the importance of context to meaningful learning, and show how it

affects co-op students' constructions of professional knowledge and identity. Results are

interpreted using theoretical perspectives on learning and work to develop an

understanding of why things happen the way they do in co-op. The analytic and

interpretive focus is co-op students' perceptions of how and where learning and

knowledge production take place, and how co-op students, as learners, think about what

learning and knowledge really are, and how they are acquired.

Chapter Seven begins with a summary, discussion, and conclusions of the study. I then

discuss the study's implications, make recommendations for further research, and suggest

areas for improvement in co-op.

CHAPTER TWO

CO-OP AT THE UNIVERSITY OF VICTORIA

Chapter one described the background and purpose of the study as well as the broad

research questions that will guide it. In this chapter I introduce the University of Victoria,

my study site, and detail the implementation and subsequent expansion of co-op within

the university. I begin with an introduction to the campus and a brief history of the

university, then I briefly describe the people, events, and tensions surrounding co-op's

implementation at UVic. I outline the university's organizational structure and examine

where co-op fits in that structure, then describe the four co-op programs selected for my

study. Finally, I introduce a graphic model of the co-op experience.

The University of Victoria

The University of Victoria is a community of slightly more than 17,000 students[1], and

1,900 faculty and staff. It is located on 160 hectares overlooking Cadboro Bay, just 15

minutes from downtown Victoria. The architecture of the campus is reminiscent of the

1960s, largely made up of two, three, and four-storey concrete structures. Exceptions are

the University Centre, which houses the co-op program's administrative offices, and the

more recent brick building housing the faculties of Business and Economics. The

McPherson Library and the fountain that dominate the east side of campus are central

---

[1] Total enrollment as of November 1998 was 17, 222 and included 9,699 full time and 5,399 part-time undergraduate students, and 1,726 full-time and 398 part-time graduate students.

gathering places for students in good weather; in inclement weather they tend to congregate in the Student Union Building and the various campus cafeterias.

UVic is considered one of Canada's leading universities, with a tradition of excellence in the arts and sciences. It has a well-established reputation for innovative interdisciplinary research and strong professional schools. The university is noted as well for its extensive cooperative education programs, pioneering work in distance education, and support for innovative teaching. Victoria's natural beauty and hospitable climate makes the campus a popular destination for undergraduates with nearly three-quarters of UVic's registered students relocating from outside Greater Victoria. One of UVic's distinct attractions is co-op education. Co-op permeates the ethos of the university. UVic has the third largest university cooperative education program in Canada, with co-ops in 46 academic areas. This wasn't always the case. It is however the setting in which the story of co-op education at the University of Victoria begins to unfold.

History of UVic

The University of Victoria came into being as an autonomous, degree-granting institution on July 1, 1963, through an Act of the British Columbia Legislature. This followed sixty years of offering university-level courses, without the ability to grant university degrees. UVic's early progression from two-year college to full-fledged university can be viewed in three stages.

The first stage broadly covers the years from the turn of the century to the First World War. From 1903 to 1915, Victoria College, as it was then known, offered first and second year Arts and Science courses in affiliation with McGill University. An adjunct to Victoria High School,

20

the college shared the school's facilities and administration, and Principal: E.B. Paul, from 1903-1908; S.J. Willis, from 1908-1915.

With the opening of the University of British Columbia in 1915, Victoria College was obliged by legislation to suspend its higher education operations. This did not suit the residents of British Columbia's capital and, as a result of local demands, Victoria College began the second stage of its development in 1920, in affiliation with the University of British Columbia. Still administered by the Victoria School Board, but no longer associated with the high school, the College relocated to a Dunsmuir mansion known as Craigdarroch in 1921. Under the direction once again of E.B. Paul and subsequently P.H. Elliott, Victoria College built a reputation over the next two decades for thorough and scholarly instruction in first and second year Arts and Science.

The final stage of UVic's transition—from two-year college to university—took place during the period following the Second World War, between 1945 and 1963, guided by principals J.M. Ewing and W.H. Hickman, and the Victoria College Council. Representatives from the parent University of British Columbia, the Greater Victoria School board, and the provincial Department of Education sat on the College Council. Dramatic increases in post-war enrollment forced the College to move from Craigdarroch to the Lansdowne campus of the Provincial Normal School in 1946. Ten years later, the Normal School became the College's Faculty of Education. Late in this transitional period, through the cooperation of the Department of National Defence and the Hudson's Bay Company, the College acquired the 115-hectare (284 acre) Gordon Head campus. In

1961, still in affiliation with U.B.C., Victoria College awarded its first bachelor's degrees.

The University of Victoria became autonomous in 1963. Administrative authority was vested in a Chancellor elected by the Convocation of the University, a Board of Governors, and a President appointed by the Board. Academic authority was given to the Senate, which represented both the Faculties and the Convocation. Having achieved autonomy, and while continuing its strong tradition in the Arts and Sciences, UVic began to look for ways to differentiate itself from Burnaby's newly-created Simon Fraser University and Vancouver's long-established University of British Columbia.

During the 1970s, UVic added professional schools, a new faculty of Law, and schools focused on human and social development. This expansion took place at a time when the political climate favoured making higher education more accessible to students throughout the province. Certain colleges and vocational schools were amalgamated in an attempt to overcome the traditional gap between vocational and academic studies. In 1974, a new University Act established a Universities Council, to coordinate planning in the university sector in BC.

Co-op at UVic

Shortly after the passage of the new University Act, Dr. Howard E. Petch took over as the president of UVic. Formerly a solid-state physicist at McMaster University and the University of Waterloo, Petch quickly grasped the province's urban/rural dichotomy in

accessibility to higher education. His significant interest in meeting the educational needs

of students throughout the province soon became clear.

Petch's arrival in BC coincided with the Social Credit party's return to power and the

appointment of Professor Pat McGeer as the Minister of Education. Particularly in terms

of science and technology, McGeer shared Petch's interest in ensuring access to higher

education for students in the interior of the province (Dennison, 1997). This commonality

of interests helped Petch justify the implementation of new professional programs at

UVic. He argued that students should not have to leave the province to find opportunities

for professional education, and that rural students should have equal access to such

opportunities.

During his time at Waterloo, Petch had witnessed firsthand the beneficial outcomes of

well-established co-op programs. As a tri-partite arrangement involving students,

employers, and the university, Petch reasoned that co-op offered an appropriate method

of providing access to professional opportunities. Students benefit from hands-on

experience; employers benefit from a ready supply of enthusiastic temporary workers;

and the university benefits from an association with business and industry, enhancing its

reputation as a community resource.

Petch began his quest for co-op in the departments of chemistry and physics. Among

fellow-scientists, who understood the value of combining theoretical knowledge with

practical skills in the laboratory, he was able to generate the necessary support to

implement the initial co-op programs. Voluntary commitment to co-op's mix of theory and practice was essential, as no additional financial resources were available. Faculty drafted a plan for a year-round co-op program, overriding the traditional winter/summer academic schedule. Faculty members decided among themselves how courses would be provided, to coincide with the four-month rotation of the co-op schedule, and to ensure that appropriate courses were available to students during the summer semester. This ability to provide academic programs on a year-round schedule was to prove valuable to Petch, when he later sought to implement new mandatory co-ops in Engineering and Business. Faculty also contacted potential employers to ensure adequate jobs for co-op work terms, and organized student supervision during the work term.

That Faculty designed and implemented these programs on a voluntary basis, attests to Petch's ability to inspire people with his ideas. Responsibility for the extra work involved was undertaken with no additional resources or support staff, and no rewards beyond the satisfaction of seeing the programs approved by senate. Nevertheless, involvement with the co-op program enabled chemistry and physics faculty to renew acquaintances with colleagues working in industry, and keep up to date with advances outside the academy.

While the first co-op programs were being developed, UVic's Chemistry Department recruited Graham Branton—an up-and-coming post-doctoral researcher at UBC. Branton became involved with the chemistry co-op shortly after his arrival. If Petch was the instigator of co-op at UVic, Branton was ultimately the one that would ensure that co-op

developed according to Petch's vision. A vital part of that vision involved embedding co-op in the university's academic programs, rather than isolating it as a parallel program.

Branton realized that getting the support of administrative decision-makers was only one part of the challenge. Broad acceptance of the co-op concept depended on a demonstration of co-op's tangible benefits for each department. He set about converting faculty outside science. In 1978 he successfully spearheaded co-op programs in Geography, Computer Science, Public Administration and the writing program in Fine Arts. He constantly canvassed other co-op providers, first at Waterloo and Guelph and then in the United States, to find ways to improve the development and delivery of co-op across a range of disciplines. Appointed as the university's first Director of Co-op Programs in 1979, he directed UVic's ongoing expansion of co-op until his death in 1995.

Despite concerns about the costs of co-op, faculty across the university were converted into supporters by the combination of Petch's vision and oratory and Branton's hands-on involvement. His management skills, including the ability to recruit competent staff and supporters, built a department that survived him, ensuring the smooth transition to the appointment of a new co-op director in late 1997.

With the early success of co-op programs assured, and with Branton in charge of co-op expansion, Petch embarked on the second stage of his plan to establish professional programs at UVic. In late 1981, he circulated a proposal to develop a Faculty of

Engineering. This was a highly contentious proposition. It touched off an acrimonious debate on campus, involving both faculty and students, which time has not yet fully healed.

In preparing his proposal for expansion of professional programs, Petch commissioned an analysis of the number of students pursuing engineering and other professional programs in the province. The results indicated that BC was far below the Canadian average in the number of Engineering spaces available in the province. The addition of a Faculty of Engineering at UVic would not only address the need, but also provide opportunities for students in the interior regions to receive professional training without having to leave the province.

Petch successfully convinced McGeer, the Minister of Education, to provide facilities and funding. With these available, only the Senate remained to be convinced of the benefits of the proposal. The debates were long and according to some, downright hostile. Those in favour rallied behind Petch, and his reports of impending shortages of engineers. Teams of consultants were sent out across the campus to explain in detail the specifications of the program, and attempt to convey the benefits for UVic. Those opposed argued that the addition of engineering would dilute the academic reputation of the university, and would siphon money away from existing programs. Given the indications of impending restraints in government funding for higher education, opponents believed the focus should be on servicing existing programs, before adding new ones. Opposition spilled over into the student body.

Tension among faculty increased. During the senate meeting, there was a call for a secret

ballot to protect those who feared retribution from Petch, if their opposition was known.

This was unique. Until that point, there had never been a secret ballot in Senate. When

the ballots were counted the proposal for an engineering program carried by a vote of two

to one. The Faculty of Engineering, complete with a mandatory co-op program was

established in 1983 and placed its first 53 co-op students with employers in 1984. Over

the next decade the program would expand tenfold, placing over 500 students in 1994-95,

and more than 600 in 1997-98, making it the largest co-op program at UVic.

The third phase of Petch's plan to bring professional programs to UVic started soon after

Senate approval of the Engineering program. Petch once again selected data from his

original professional training survey to demonstrate that the province fell below the

national average, this time on the number of business graduates. He proposed the

establishment of a mandatory co-op business program at UVic. Those opposed to the

encroachment of professional programs in the academy prepared to do battle once again.

Petch deftly[2] countered the opposition by shelving his business proposal in 1985,

allowing Branton to bring forward a proposal for an arts co-op instead (UVic Senate).

Opponents, particularly in the humanities and social sciences, argued that an arts co-op

would debase the academic integrity of their programming. Strong feelings were

---

[2] It was a deft move on Petch's part because he foresaw the impending budget crunch for higher education coming from the Social Credit government, and knew there would be no government money to support the addition of the business program at that time.

27

expressed that the arts and co-op could not be mixed: the two were mutually exclusive. These arguments were advanced in spite of contrary evidence from existing social science and humanities co-op programs. Economics, for example, placed its first co-op students in 1983. Geography co-op had been instituted with little fanfare in 1978, at the same time as the writing co-op program in Fine Arts. Opponents took the position that in disciplines like geography and economics, it was the 'science' side rather than the 'arts' side that lent itself to co-op, overlooking the writing co-op program in Fine Arts.

Counter-arguments by Co-op Director Branton and his supporters, who by this time included a number of senior administrators, pointed to the need for students to find employment upon graduation. They argued that certain of the language departments were beginning to offer courses in translation, which would bridge into co-op programs, allowing students to gain practical experience to strengthen their coursework. Once again, the supporters of co-op carried the day. The arts co-op was approved and placed its first students in the 1987-88 academic year. Today, the arts co-op incorporates students from 17 departments.

Following the successful implementation of a co-op program in Law the following year, Petch—with an eye on the improving economy of the late 1980s—resurrected his plans for a professional program in Business. His timing coincided with two provincial government initiatives. The first was the 1988 report of the Access Committee, which noted the immediate need to create 15,000 new places in degree programs if the province was to meet comparable national standards. The second was the British Columbia Human

Resources Development Project, implemented under the leadership of Deputy Minister Gary Mullins. This project was mandated to develop a policy framework for determining the future education and training needs of the province. The report, (begun in 1989 but not released in final form until 1992) outlined the economic, socio-cultural, and educational changes required to address current deficiencies in the system. The report detailed the government's concern to provide better student access and programs that reflected a closer relationship between business and educational institutions, to develop the human resources that would be necessary in the new competitive economic environment. Anticipating the government's support, Petch revived his proposal for the business program.

The proposal was well timed. Although there was opposition from the anti-co-op group at UVic, the issue was not nearly as contentious as with previous programs. The years 1988-89 had ushered in a period of expansion. More money was available as the government attempted to repair some of the damage to higher education caused by years of restraint. The availability of resources reduced the opposition, and the debate centred on where the program would be located. With the support of the sciences, who were firmly convinced of the benefits of co-op, the decision to locate the new program in the faculty of Arts and Sciences lent academic respectability to the proposal and it succeeded. Having achieved his vision, Petch retired in 1990. The Business program, a mandatory co-op, placed its first 71 students in 1991.

Since that time co-op programs have been developed in the School of Earth and Ocean Sciences and in the Faculty of Social Sciences. The latter is an "umbrella" program covering the departments of Anthropology, Economics, Environmental Studies, Political Science, Psychology and Sociology. These programs appear to have been instituted with much less fanfare than their predecessors. Whether this signals a new acceptance of co-op programs as part of the mandate of the university, or whether those opposed to co-op have simply relinquished the fight is unknown. A tabular representation of UVic's co-op programs and the growth of co-op student placements, is presented in Appendix A.

Policies and Structure of Co-op at UVic

Co-op education programs are accredited nationally by a committee of the Canadian Association for Co-operative Education (CAFCE). This committee strives to ensure that co-op programs across Canada maintain a high degree of quality in programming and delivery. Accredited programs must demonstrate adequate levels of institutional commitment, appropriate co-op curriculum and student preparation, and policies and procedures consistent with national guidelines. At UVic, co-op programs are guided by the policies and procedures of the institution as outlined in the university calendar and in the student and employer handbooks.

The Co-op education program at UVic established as its Mission to "further the social and economic development of society through education programs that expand the learning experience of students by combining academic studies with related work experience" (UVic Academic Calendar, 1998). It aims to achieve this mission, in partnership with employers and students, through policies and programs that:

30

- enhance the educational, personal and professional development of students;

- provide employers with a vehicle for productive interaction with the University in education, human resource development and research;

- strengthen the University's reputation for excellence in its programs, research and service to the community; and

- advance the University's leadership role in program development and quality of service in Co-operative Education.

The integration of academic and work experience requires a close liaison between higher education, industry, and government. In turn, the university has the chance to "extend its resources into the community, providing a total learning experience" (UVic Co-op Brochure, 1998).

Coordinators determine admission to the co-op program. Co-op students are selected on the basis of their ability to achieve an above-average academic standing and their potential for success in a professional career. Once accepted into the co-op program students must complete a career preparation program—including résumé preparation and interviewing skills—prior to undertaking their first work term. Upon completion of a co-op work term students must present for evaluation a report outlining the learning achieved. Students must successfully complete a prescribed number of work terms—determined by their individual program area—to qualify for the co-op designation.

Students may be failed or asked to withdraw from a co-op program if they do not report to an employer once placed for a work term, leave an employer without the coordinator's permission, are dismissed with cause, or receive an unsatisfactory performance evaluation from the employer. Students may appeal any work term pass/fail grade by using the established academic appeals process outlined in the university calendar. Employers, in turn, may be removed from the program if they fail to provide appropriate work, training, and supervision for the co-op student, do not pay for services as agreed, or fail to meet the program's expectations. While on a work term, students are considered as contract employees, but they must maintain their full-time student status at UVic by paying a co-op fee. All co-op programs at UVic are voluntary with the exception of Business, Coaching, Engineering, Health Information Sciences, and Leisure studies, which are mandatory. In all programs, participation in co-op work-terms extends the time required to complete the degree by up to one year.

The co-op education program at UVic is administratively responsible to the Vice-President Academic, through the Associate V.P. Academic. It operates under a central administration and Director, with each discipline area served by specific coordinators and support staff. With the exception of the Arts co-op, and Co-op Japan—located in the Director's Office—the co-op coordinators are physically located within the discipline areas they serve. The degree to which the coordinators interact with faculty is dependent on the relationship of co-op to the particular discipline. Some coordinators have minimal contact with faculty in their departments, while others are fully integrated into

departmental activities. Some coordinators have dual appointments and perform the duties of instructor and co-op coordinator.

Two recent changes in the structure of co-op at UVic are noteworthy—one physical, the other organizational. Under Graham Branton's Directorship co-op's administrative offices were located outside the Ring Road in the Campus Services building. Branton reported to the V.P. Academic at the same level as the Deans of Faculties. Changes followed the appointment of a new VP Academic in late 1996. The first might be seen as symbolic. The co-op administrative offices were relocated to the University Centre building, i.e. from "outside the Ring" to "inside the Ring"[3] The move was considered a way of amalgamating and centralizing resources. Co-op administration is now housed in the same building as Student Financial Services and Continuing Education. The second change was the appointment in September 1997 of a new Director of Co-op Education, and the associated reorganization of reporting structures. The Director of Co-op Education now reports to the Associate Vice-President rather than the V.P. Academic, as was the case in Branton's day. The current administrative structure of the University of Victoria is presented in Appendix B.

---

[3] Local legend has it that the Ring Road, which encompasses the UVic campus, constitutes a symbolic boundary. Those located 'inside the Ring' were considered legitimate components of the University. Therefore, location denotes symbolic status.

It is also worth noting how co-op is currently represented within the University. The

1999/2000 Calendar devotes nearly eight pages to the "Cooperative Concept." However,

the majority of the space is dedicated to course descriptions and practical arrangements.

The philosophy of co-op is described in two brief paragraphs:

> Cooperative education can be described as a process of education which formally
> integrates the students' academic and career studies on campus with relevant and
> productive work experience in industry, business and government.
>
> The accumulation of up to two years of varied and program related work experience
> enhances the students' intellectual, professional, and personal development, by providing
> opportunities for applying academic theories and knowledge, evaluating and adjusting
> career directions, and developing confidence and skills in working with people (1999:
> 45).

This broad definition is followed by a list of the co-op programs offered in each faculty,

and a brief note stating that "admission and graduation requirements for cooperative

education programs are determined by the individual departments." The importance of

obtaining and maintaining a high academic average is also made explicit in the calendar

> In general, Coop students are required to achieve an above-average academic standing,
> and to demonstrate the motivation and potential to pursue a professional career (UVic
> Calendar, 1999: 45).

The description then defines the work term component of co-op and describes the

seminars and workshops that students are expected to complete prior to embarking on

work terms. A set of general regulations governing student participation in co-op

programs follows. These include a definition of the co-op work term, courses required for

work term preparation, the co-op work term fees, how work terms are evaluated, the

purpose of the work term report, and co-op requirements for graduation. While the

university sets out general guidelines for the operation of co-op programs, it is left up to

each department to determine admission and graduation requirements. While there are

certain consistencies between programs, there are also differences. I briefly outline the

characteristics of the four programs in my study below.

The Co-op Programs

The study focuses on the co-op programs in Business, Chemistry, Engineering and Geography. The Faculty of Business defines co-op as:

> an integrated approach to higher education which enables well-motivated students to follow a program that alternates study terms on campus with paid work terms in a variety of job settings. The Business Co-op program is designed to provide students with the analytical expertise and practical knowledge necessary to excel in positions in the public and private sectors [UVic Business Co-op].

The Faculty of Business offers an undergraduate program leading to the Bachelor of Commerce (B.Com.) degree, with concentrations in: International Business Management, Entrepreneurship, Tourism Management, Hotel and Restaurant Management, or General Business Management. The B.Com. is a mandatory co-op program, requiring a qualifying year in either the Faculty of Humanities or the Faculty of Social Sciences[4].

Admission to the B.Com. program takes place in the student's second year. Spaces are limited by quota to approximately 160 a year, allocated on the basis of academic merit and extra-curricular activity. The minimum Grade Point Average (GPA) for admission to the Faculty of Business is 70% (B- or 4.0 on the UVic 9.0 scale)—assessed over the previous 12 units of course work in the qualifying year. Once admitted to the B.Com. program, students must declare their area of concentration by the end of the first academic term. As a mandatory co-op program, the degree requires eight academic terms and two co-op work terms, which must take place in the student's third and fourth year. To be eligible for a work term students must maintain a minimum GPA of 3.0 (65-69%) in all prior academic terms.

---

[4] The Faculty of Business changed the structure of the Bachelor of Commerce program. Effective September 2000 students will be required to complete two years of full time study prior to entering the B.Com. Program, and a further two years to graduate.

Turning now to Chemistry, the department portrays co-op as:

> one of the most effective human resource development systems in use today. It takes
> highly motivated students with above average academic abilities and exposes them to two
> different but complementary learning environments, namely: the classroom and the
> workplace. The outcome is a broader, more relevant education for the students, and a
> supply of experienced, ready-to-work graduates for the employers [Uvic Chemistry Co-
> op].

The Chemistry co-op has been in existence at UVic since 1976. With approximately 100

students it is now recognized as the second largest chemistry co-op in the country. It is an

optional program that boasts a 100% placement rate for all students requiring work terms,

and reports the greatest number of student/faculty contact hours of any Chemistry

department in Canada. The department acknowledges the role of employers as "co-

educators" of students on work terms, and suggests that "each work term becomes, in

effect, a four-month interview providing an excellent window on future recruitment."

Students are required to have a minimum of a B average (75-79%) in a Chemistry major

for admission, although more than half of current Chemistry co-op students have first-

class averages (above 85%).

In the Faculty of Engineering, the Bachelor of Engineering (B.Eng.) is a mandatory co-op

program founded in 1983. The Faculty of Engineering defines co-op for prospective

students as

> a special form of higher education where you study and work while earning your degree.
> What you learn on campus is enriched by real-life experience during alternating study
> and work terms. As an engineering Co-op student, you will normally complete 5 or 6
> four-month work terms in addition to eight regular academic terms [UVic Engineering
> Co-op].

Students require a minimum average of B in Math 12 and Physics 12 and an overall GPA of at least 65%[5].

The B.Eng. program admits approximately 140 first year students annually, and these students all take a common curriculum during their first year. Students may also transfer to the B.Eng. program in second year if they have completed equivalent courses and have a GPA in excess of 75%. These transfer students—between 40 and 60 annually—will usually complete twelve months of course work (September – August) before undertaking a first work placement. For another 40 or 50 students each year, a third option for admission is through the B.Eng. Bridge program, open to students who have completed a two-year college-level Technology Program. Under a partnership agreement with Camosun College in Victoria, UVic accepts B-average Technologists directly into B.Eng. third year, upon completion of the six-month, Camosun Bridge Program. Students taking this route complete three, rather than five, mandatory co-op work terms for their degree.

In the Geography department, students with a B+ average in all geography courses, and a B average overall may apply for admission to the voluntary co-op program. These averages must be maintained each term for the student to remain in co-op. The department describes co-op as:

> an integrated approach to higher education which enables a student to combine academic training with associated work experience. The program aims to enhance the quality of education for highly motivated students. After beginning their academic training, students are able to alternate an academic term on campus with paid, full-time employment for the

---

[5] Higher minimum GPAs are demanded in times of increased enrollment pressure. For example, because of competition for spaces in September 1998 students required 75 % in Math and Physics for admission to the B.Eng. program.

subsequent four-month term. This employment period is called a work term [UVic
Geography Co-op].

Benefits ascribed to Geography co-op include an opportunity to "gain familiarity with

and valuable experience in occupations related to geography, and acquire important skills

and techniques which will enhance opportunities for finding permanent employment." In

addition to the academic requirements outlined above, students must successfully

complete four work terms to graduate from Geography with the co-op designation.

There are two routes for entry to co-op, depending on whether the program is a voluntary

or mandatory program. In all cases students must first meet the entrance requirements of

the university. For certain mandatory co-op programs, such as Engineering, the student

applies directly to engineering once accepted by the university. Once accepted into

Engineering the student is automatically enrolled in a mandatory co-op program. For the

other three programs in the study—Business, Chemistry, and Geography—students begin

first year university studies before applying to the co-op program.

The Business co-op is a mandatory co-op. Beginning with the winter semester in

September 2000, students must complete two years of general studies for admission to

the program. Once accepted they must complete two co-op work terms for graduation. In

the voluntary co-ops—Chemistry and Geography—students complete at least one year of

general studies before applying to co-op. If a student decides that they no longer want to

participate in a voluntary co-op they can leave the program and continue on with their

studies as a regular student. Also, if a student in second year decides to enroll in a

voluntary co-op, the opportunity is available providing their marks are high enough and

they are willing to devote the necessary time to complete the prescribed number of co-op work terms.

Summary

This chapter described co-op education at the University of Victoria. A brief history of UVic showed the university's transition over a period of sixty years, from a traditional Arts and Science College to a degree-granting university. I explored the implementation of co-op education and the resulting tensions, and discussed the impact of changes in organizational structure on co-op. Next, I summarized the co-op admission process in the four programs selected for my study and introduced a model of the stages of the co-op process. The next chapter reviews research on co-op and locates gaps in the literature.

CHAPTER THREE:

REVIEW OF THE LITERATURE

The increasing popularity of co-op programs and the anomalous space they occupy

outside the mainstream (neither completely vocational nor entirely academic) motivated

researchers to begin studying co-op as an educational strategy. Early studies, carried out

largely by co-op practitioners, tended to highlight the beneficial outcomes of co-op

programs without exploring their theoretical underpinnings. Much of the subsequent

research follows a similar pattern, addressing the "needs, issues, and concerns of

professionals in the field rather than theoretical academicians" (Bartkus & Stull, 1997, p.

9). These authors argue that "there is no consistent, systematic effort in place to raise

questions and seek answers" (ibid, p. 7). Earlier criticism by Wilson (1988, p. 83) had

commented that research in co-operative education "fall[s] short of the ideal of scientific

inquiry to illuminate relationships, predict effects, explain findings in light of existing

theory, or contribute to theory development." This study is one attempt to address these

shortcomings.

The Co-op Literature

The problematic issues in the co-op literature are threefold. First, co-op practitioners have

not always documented the benefits of co-op education programs in a form that other

researchers can build on. Many of the co-op studies are descriptive, especially the early

research; observational and anecdotal data are used to identify program benefits. Some

early studies do not follow the convention of providing evidence for claims. They are

testimonials rather than attempts to understand co-op's relevance as an educational strategy. Second, some co-op researchers argue that the volume of research on co-op has not reached a substantive level to qualify as a research base (Wilson, 1988). A search of Dissertation Abstracts International, for the fifteen years between January 1982 and March 1997, revealed few dissertations on vocational higher education.

Third, of those dissertations considered relevant for my study (n=32), many rely on survey methods to collect data on a range of issues related to co-op education. Little attention was paid in the dissertations I reviewed to the social relations of co-op programs, or the individual experiences and social sites within which they occur. Yet an understanding of what happens during the co-op process, and the meanings students make of it, is essential information—not only for universities currently offering co-op programs but also for students and employers participating in these programs. Appropriate research can assist practitioners and planners to develop programs relevant to the demands of a rapidly changing workplace.

In the discussion that follows I organize the research on co-op education into three broad categories. First, I consider the philosophy and orientation of co-op. Second, I concentrate on co-op's pedagogical aspects and review the benefits of co-op. Third, I investigate recent research on co-op students.

Philosophy and Theoretical Orientation of Co-op

Claims that co-op education is rooted in the philosophy of American pragmatism are common. Much of the early literature accounts for the benefits of co-op from a Deweyan

perspective on theory and practice. But critics such as Saltmarsh (1992) argue that these

claims are a mistaken attempt to validate co-op by cloaking it in the respectability of

Deweyan experiential learning. He states

> When justification is needed for the practice of cooperative education, John Dewey's
> educational philosophy is resurrected to validate experiential learning and cultivate
> acceptance among sceptics and detractors within what is referred to as higher education's
> 'mainstream' ...(p.6).

The reason such attempts fail to bring co-op education into the mainstream of educational

thought and practice, according to Saltmarsh, is that the roots of co-op are Herman

Schneider's not John Dewey's. It is impossible, he argues, to read Dewey into

Schneider's educational philosophy.

> [T]he reason we cannot recognize Deweyan reforms in Schneider's cooperative plan is
> that the two men had debated and arrived at mutually antagonistic solutions to industrial
> education (1992 p.10).

Support for this contention might be inferred from the absence of any reference to

Dewey's ideas in Schneider's writings on educational reform. By linking the workplace

with the school, Schneider assumed the schools would accommodate workplace

demands, not the reverse. The cooperative education plan put the workplace at the centre

of learning by moulding students' learning to a set of predetermined standards based on

workplace norms. Conceptualizing co-op in Deweyan terms would require a fundamental

reconstruction of its philosophy and practice, placing it "solidly within the scholarly

specializations of knowledge at the university" (Saltmarsh, 1992, p. 14). While this idea

might appeal to certain researchers, attempts over the past ninety years to have co-op

recognized as mainstream education have not been successful.

But, those who see Dewey's 'invisible hand' in co-op are not easily dissuaded. Van Gyn

(1994) suggests that rather than looking for one specific theory of co-op, it might be

possible to select an 'orientation' encompassing a number of Deweyan theories applicable to curriculum design. Revisiting the work of Miller (1985), she suggests a 'transaction orientation' as an appropriate theoretical perspective on which to construct a cooperative education curriculum model. Central to a transaction orientation is "the facilitation of problem solving within meaningful contexts through curriculum strategies" (Van Gyn, 1994, p. 19). In other words, the organization of co-op content would become problem-centred and developmental. She argues that "in the transaction curriculum, content, instructional and organizational strategies that enhance the opportunity for complex and authentic problem-solving will lead to more effective attainment of the purposes of that curriculum" (Van Gyn, 1994, p. 20).

Demetriou (1995), proposes a Deweyan model based on a study of a three-credit anthropology course incorporating a two-credit work experience, intended to sensitize students to diversity in the workplace. The model draws on performance-based experiential learning, and builds on the development and application of competencies. The author makes the normative contention that it will "move co-op from where it is now to where it should be to better prepare students for the future" (1995, p. 34). This will be accomplished, she argues, by using:

> [a] developmental integrated model grounded in mutually supportive career growth and experiential learning opportunities that would develop the critical and cutting-edge capabilities of our students (Demetriou, 1995, p.38).

However, when tested, the model indicated a heightened awareness among students during the academic portion of the program but failed to demonstrate its effectiveness in helping them adapt to a diverse workplace.

Finn (1997) goes a step further, and suggests the need for a new paradigm for cooperative education. She repeats the call of previous researchers (e.g., Fletcher, 1990; Ricks et al., 1990; Wilson, 1996b) for more theory-based research which "informs our practice and uncover[s] the meanings embedded in co-op experience" (p.36). Armed with this theory, she contends we can begin to develop knowledge "unique to cooperative education" through our own "distinctive lens." But what would such a theory look like? The author supports Fletcher (1989) and suggests that what is believed about co-op in many cases reduces to truisms, not validated by research or supported by theory. Ricks et al., (1993) point to a tendency by co-op practitioners to disregard research that does not support their own beliefs of co-op's tacit worth. By looking only at co-op's perceived advantages, and attempting to convert others to their beliefs, practitioners create ambiguity around co-op's actual benefits. According to Ricks et al., (1993) unless co-op demonstrates that what it does is different from what non-co-op education does, it has no claim to unique accomplishments.

One way to demonstrate that difference is by developing and testing theoretical models of co-op education. Heinemann (1983) was among the first to attempt an integrated model for co-op education. It focused on the interaction between the student and the work environment, and outlined the types of educational processes students might encounter in the work place. More recently, Branton et al., (1990) attempted to integrate the co-op academic and work terms to produce a model that could account for co-op's educational benefits. They claimed the co-op curriculum model creates optimal conditions across three components of the learning process: (1) condition of the learner; (2) learning

44

environment; and (3) learning outcomes. Both the Heinemann and Branton et al., models address educational outcomes but they omit a theoretical input, or starting point, which would allow for the inclusion of the various aspects necessary for a comprehensive pedagogical framework. Acknowledging the difficulty of such a task, Branton et al. suggest that perhaps no single theory can encompass all aspects of a program as complex as cooperative education.

Subsequently, Heinemann et al. (1992) resurrected and adapted Heinemann's earlier (1983) pedagogical model in a study of work-experience enriched learning. In the revised model students were encouraged to engage in active inquiry in the workplace. Each student was to observe a co-worker, then interview them to find out why they performed certain tasks in a specific way. The student was then asked to analyze and reflect on their co-worker's response, and prepare a brief report. Students presented their results and received critical feedback in a subsequent student forum.

These attempts to link the philosophical and theoretical orientations of co-op to the academic curriculum appear to be a way of gaining support for co-op as a pedagogical innovation.

Co-op as a Pedagogical Innovation

As mentioned earlier, a strong practitioner orientation has produced several lines of enquiry that attempt to legitimate co-op as a pedagogically sound form of educational delivery. Studies on the impact of co-op participation on career development emphasize the importance of co-op education in a student's career decisions, and approach to finding

45

a first job (Pittenger, 1993; Sharma, 1995; Weinstein, 1980; Wilson, 1974). Studies on personal growth indicate that the co-op experience enhances students' self-confidence, and self-concept (Ducat, 1978; Fletcher, 1990), and values and attitudes (Mueller, 1992; Rowe, 1992; Smith-Eggeman, 1994; Tillman, 1990; Williams et al., 1993). Other research indicates an increase in student independence, social maturity and interpersonal skills as a result of participation in co-op programs (Fletcher, 1989; Marks, 1971; Rowe 1992; Wilson, 1974; Wilson & Lyons, 1961).

As a way of strengthening the case for co-op a number of researchers conducted empirical studies to provide evidence for the benefits attributed to participation in co-op education. For example, using multivariate analysis of variance to test differences between co-op and regular graduates, Rowe (1992) was able to demonstrate support for certain aspects of co-op. Co-op graduates in her study had a significant financial advantage (p<.01), and were more likely to be employed full-time and earn higher salaries than non-co-ops. This supports earlier findings by Wilson (1988) that work experience is a critical factor in bringing about the effects of co-op education, and Brown (1976) who demonstrated that co-op graduates are more likely to obtain jobs related to their academic background.

A team of research psychologists undertook a formal assessment to determine whether co-op's benefits could be described and measured (Williams et al., 1993). Results of the study indicate that co-op students possess significantly more practical job knowledge than non-co-op students, and that co-op students in general display more 'tacit

46

knowledge' (Polanyi, 1967; Sternberg & Horvath, 1999) than their non-co-op

counterparts. This suggests that co-op students develop a conception of how and why the

world of work operates as it does. The study also showed that participation in co-op for

as little as five months, comprising both classroom and workplace experience, has a

demonstrable and measurable impact on co-op students. Mueller (1992) investigated the

effects of work experience using Chickering's (1969) standardized instrument based on a

theoretical model of student development. He found that co-op experience affects a

student's development of autonomy, sense of purpose, and mature interpersonal

relationships.

Wessels and Pumphrey (1995) analyzed the impact of cooperative education on job

placement and advancement of co-op graduates. Their findings suggest that co-op has

little effect on job-search time, contradicting earlier studies (cf Rogers & Weston, 1987;

Gardner & Koslowski 1993). Second, while co-op education had little impact on job

turnover, co-op students with higher GPAs had a lower turnover rate. Third, the

likelihood of respondents believing their employer was benefiting from their college-

level skills was significantly higher for co-op graduates. And fourth, co-op graduates

received more advancements than non-co-op graduates ($p<.05$). If the co-op graduate's

first job was with an employer who had hosted them during their program, however, there

was a negative impact on advancements. Co-op students generally start at higher levels of

pay and responsibility, and in jobs better matching their skills. The author's suggest these

factors could account for fewer advancements during the early years of employment. A

47

comprehensive review of the literature on the post-graduate pecuniary benefits of co-op participation can be found in Somers (1995).

While many of the studies on starting salaries of co-op versus non-co-op graduates are conducted using samples of engineers, at least two studies were conducted using social science and humanities students (Seidenberg, 1987; Rowe, 1992). Rowe found statistically significant differences in starting salaries between co-op and non-co-op graduates, while Seidenberg concluded that co-op participation was not a significant factor in explaining starting salaries. He attributes this lack of effect to the demographic characteristics of the students in his sample. Somers (1995) correctly points out that a critical variable in determining the earnings of humanities and social science graduates is whether they are employed in their first job in a professional, technical or managerial capacity. Those employed in these types of positions can earn more than students who are not.

The lack of attention to co-op students majoring in humanities, arts, and the social sciences prompted a study comparing co-op and non-co-op psychology alumni (Rigio et al., 1994). The sample consisted of 82 former students in an Industrial/Organizational Psychology (I/O) co-op, and a comparison group of 47 students who had expressed interest in the I/O co-op, met the course prerequisites, completed the application process, but never enrolled in the course or co-op (p.61). Results indicate that the cumulative GPA of co-op students was slightly but not significantly higher than non-co-op students. Co-op alumni also had significantly more responsibility in current jobs (p<.05) than comparison

alumni, and co-op alumni were slightly, but not significantly more satisfied with their current jobs. Finally, co-op alumni had higher current salaries (p<.05) and higher salary histories than comparison alumni.

Oloroso (1995) used a series of integrative seminars in an attempt to tie work experience to the content of various liberal arts courses. The study attributes co-op students' successful attainment of measurable outcomes from a work experience to their developing awareness of work as learning. While this study provides a number of innovative strategies for co-op program curriculum, Oloroso hints at structural problems with the co-op program studied. She states "the evaluation process was kept rather simple to encourage supervisor participation" (1995, p. 45).

Sharma, Mannell, and Rowe (1995), examine career expectations and job outcomes of co-op participants, including intrinsic and extrinsic rewards, and expectations for support and encouragement from the work organization. While traditional comparisons between co-op and non-co-op are made, expectations about job outcomes are based on the amount of work experience acquired by a student. Relevance of, and satisfaction with, the work experience are examined to determine benefits to co-op education that might accrue due to relevancy of the work experience component. Results indicate that career-related work experience affects student career expectations and expected job outcomes, and is mediated by the perceived relevance of and satisfaction with the work experience (Sharma et al., 1995, p. 45). Participation in co-op has a small but significant effect on career expectations, independent of the amount of work experience. For the authors this

indicates that students admitted to co-op programs have higher self-esteem and more self-confidence.

While the volume of research on the benefits of co-op continues to grow, attempts to understand why and how these benefits are derived have not kept pace. For example, there is little investigation of what happens during the process of co-op to account for the benefits accrued. Also, more investigation of the characteristics of students who enroll in co-op is needed to ascertain input variables that might contribute to success in the program.

Research on Co-op Students

In her study of entry-level characteristics, Rowe (1989) argues that "students who select co-op are more advanced than regular students in the areas of career development, personal growth, and academic achievement" (p. 16). She suggests two possible explanations for this phenomenon. First, students with particular characteristics might be differentially attracted to co-op. Second, students with particular characteristics might be specifically recruited and selected. To date, the question of whether students freely select co-op programs or are actively recruited in an attempt to ensure a program's success has not been explored in the literature. Rowe also found small differences between co-op and regular students on measures of career maturity, and the importance of various characteristics of work.

Co-op students in Rowe's study had higher academic averages than non-co-op students (p. 22) but, in contrast to non-co-ops, did not tend to view their undergraduate work as

preparation for post-graduate or professional programs. This finding is consistent with a stereotypical assumption in the literature that co-op students graduate into the workforce while other students proceed to further education. However, evidence from Stern et al., (1992) contradicts the stereotype. The area has not been well studied nor debated.

Van Gyn et al.'s (1996) study of entry-level characteristics of co-op and non-co-op students reveals interesting demographic data about co-op students. First, the co-op sample had a significantly higher percentage of participants over the age of 22 years, suggesting that co-op students, by and large, are older than regular students. Second, the proportion of co-op students from rural areas was significantly higher than for non-co-op students. Third, contrary to previous research (cf Siedenberg, 1987), co-op students reported a significantly greater amount of pre-entry work experience than other students[8]. Finally, co-op students had a significantly higher pre-entry percentage of first-class academic averages than non-co-op students. This held across all disciplines, supporting Rowe's (1989) contention that co-op programs attract excellent students.

Based on their review of entry-level characteristics, Van Gyn and her colleagues (1996) contend that co-op, as a form of education delivery, is "a valid education model that produces academic benefits" (p.15). However, Rowe (1989) indicates that entry characteristics are only one variable among many. While academic standards for co-op

---

[8] These results should be viewed with caution, because the co-op students in the sample were older than their non-co-op counterparts and therefore may have had more opportunities for work experience.

51

entry may be higher than for regular university entrance, Rowe's results make a compelling argument for the influence of situation-specific effects, such as popularity of particular programs, general socio-economic level of the areas surrounding the university, and cultural factors.

Section Summary

The literature reviewed to this point demonstrates gaps in current knowledge about the theoretical and pedagogical foundations of co-op education. Further, while there is a growing body of empirical literature on co-op education, it has not reached a level where it provides a substantial base for researchers to draw on. Dissemination of co-op research is largely restricted to a small number of publications directed to co-op practitioners. This orientation has led to attempts to legitimate co-op as a sound form of educational delivery, through empirical studies on the benefits of co-op. Research on co-op students indicates that co-op students have higher academic averages and are more advanced in certain areas than regular students.

The literature reviewed above also reveals little consideration of the broader context within which co-op programs are developed and delivered: that is, the rapidly changing economic and institutional context in which the university strives to deliver relevant programming to meet the needs of its stakeholders. As a result, some broad issues related to my study are not addressed by the co-op literature. In the attempts to define a pedagogy of co-op one clearly related factor that has been overlooked is the linkage of education and training to labour market outcomes. What is it that education produces and that employers look for?

Recent attempts to define what skills employers value in new recruits have resulted in the notion that there are skills, or sets of skills, thought essential for employment in the new economy (cf employability skills in Chapter One). But in the rush to lay claim to definitive sets of skills that enhance employability, the changing nature of the areas in which such skills are developed and applied—namely the university and the workplace— have been neglected. In the remainder of the chapter I incorporate perspectives that shed light on these broader issues.

I begin with a brief history of the changing role of the university in Canada to set the context[7] for a broad investigation of the changing relationship between higher education and the labour market. This is followed by a brief overview of the ways that universities are responding to the labour market demands. In the final section, I explore the literature on learning in the workplace and in the classroom.

The Changing Role of the University

Historically, the university has had an important role to play in promoting the principles of social democracy through teaching, research and social critique. Universities have long been concerned with balancing liberal and vocational education. In Medieval times they were the source of knowledge for the four traditional faculties: theology, law, medicine

---

[7] This is a necessarily truncated version. My intention is simply to provide a snapshot of the 20th century. The history of higher education in Canada is well represented in the literature. Interested readers should consult Cameron 1991; Dennison and Gallagher 1986; Gregor and Jasmin 1992; Harris 1976. The history of challenges to post-secondary education in British Columbia is documented by Dennison (1987; 1997), and Fisher and Gilgoff (1987).

and arts, providing what is now regarded as a classical, liberal education (Harris, 1976). In the closing decades of the nineteenth century, the university increasingly found itself challenged by the utilitarian demands of industrial capitalist society. Scientific management in large corporations, and changing agricultural technology, meant that "the classicist and the cleric increasingly shared the university stage with the engineer and the economist" (Axelrod & Reid, 1989, p. xv). Academic specialization and the 'culture of professionalism' began to encroach on the traditional role of higher learning. Universities augmented the older professions of theology, law and medicine with programs in dentistry, pharmacy, agriculture, engineering, and forestry (Harris, 1976, p. 261). By 1911-12, of the thirteen thousand university students in Canada, 55 percent were enrolled in professional programs (excluding theology) and 45 percent in arts and science (Axelrod & Reid, 1989, p. xv).

The onset of the First World War saw an unprecedented effort by the Canadian government to promote the development of scientific research in Canadian universities (Gingras, 1989). This resulted in an increase in recruitment into the sciences and restored a balance between the number of undergraduates enrolled in professional and arts and science programs. By the 1920-21 session there were just over 10,000 undergraduates enrolled in professional courses and just under 10,000 in arts, pure science, letters and philosophy (Harris, 1976, p. 234).

University students felt the effects of a ravaged economy during the depression of the 1930s. Economic disparity, class discrimination, the rise of fascism, and the fear of war

54

were political issues that inspired the passions of concerned youth, causing unrest on university campuses. Led by the Student Christian Movement and reinforced by members of the peace movement, and the activities of socialist and communist youth, students called for reforms to higher education (Axelrod, 1989).

The Second World War brought Canada's universities closer to the federal government, which actively increased its intervention into higher education in order to maximize the war effort (Keifer & Pierson, 1989). Through such agencies as the National Conference of Canadian Universities—composed of the heads of Canada's institutions of higher education—and the departments of National Defence, Labour and National War Services, the federal government "guided universities on how to put their resources, of 'manpower' and expertise, at the disposal of the state" (Keifer & Pierson, 1989, p. 162). The National Selective Service guidelines of 1944 stipulated that male university students enrolled in courses of study deemed essential to "the prosecution of the war or in the national interest," such as mathematics, physics, biology, or chemistry, could continue to be exempt from military call-up until completion of their degrees. However, those enrolled in arts courses—language and literature, fine arts, history and philosophy—could only avoid being recruited if they placed in the top half of their classes (ibid, p.162-3).

The higher education system in Canada has undergone substantial change since the Second World War. The number of post-secondary institutions increased, and existing institutions expanded both enrollment and program offerings. The role and function of the university, in relation to society, was redefined "from private domain to public

55

utility" (Corry, 1970). The view of universities as public utilities and 'feeders' for

industry now underscores higher education policy in Canada. Current issues in higher

education—including public accountability, the quality debate, the relevance debate,

importance of research, demands for inclusive programs, and access policies—are rooted

in this public utility role of the university.

During the 1950s and 1960s, as the economies of the Western world grew, higher

education in Canada expanded. University budgets increased, faculties expanded, new

facilities were installed, all in an attempt to keep pace with a student population that was

doubling in numbers. In the 1960s, a number of important changes in the relationship

between higher education and governments took place. The decade was one of

unprecedented expansion of higher education, with the number of university-level

institutions, student enrollments, and faculty rising dramatically. Following the dictates

of human capital theory (Schultz, 1960; 1961; Denison, 1962; Friedman, 1962; Becker,

1964) expansion of educational opportunities and the development of requisite facilities

were regarded as a necessary social investment for future economic growth. The federal

government also articulated a policy of universal accessibility, with equal opportunities

for all Canadians to acquire as much education and training, as they desired (Dennison &

Gallagher, 1986). There was a corresponding increase in graduate programs offered in

Canadian universities. Healy, (1978, p. 44) reports that between 1960 and 1975, sixteen

new Canadian Universities were established, and the number of universities offering

graduate programs increased from 28 to 47. At the same time, many provinces began

structuring publicly funded community college systems to offer skills upgrading through continuing education, retraining and basic education skills for adults.

When the economy began to slow down in the late 1960s, universities were among the first to feel the pressure (Cameron, 1991). When budget trimming failed to stabilize finances, the federal government decided to change the funding structure for universities. Faculties and programs were consolidated and faculty hiring curtailed. The demands placed on institutions of higher education to accommodate increasing numbers of students with decreasing funds led to student unrest during the 1960s (Axelrod & Reid, 1989). Government actions, and university reactions, in response to economic restraint, impacted the subsequent shape of higher education in Canada.

Predicated on a conviction that the university curriculum must provide relevant training for a variety of increasingly complex jobs, and with support from second wave human capital theory (Marginson, 1997), vocationalization has been an increasing trend in higher education over the past three decades. Worried about obtaining high-skill, high-wage employment, students have pressured the university to focus more on skills for employment. Employers have also demanded that the curriculum become more directly relevant to their needs and that the skills they require should be incorporated into the curriculum. Meanwhile, enrollments in the social sciences and humanities—which like the fine and performing arts are not considered vocationally relevant—continue to decline (Grosjean et al., 2000).

While the professionalization of society has altered the traditional role of the university, it has also been mutually beneficial to universities and the professions they serve. For the professions, university education justifies their claims to a knowledge base, and at the same time provides a method of screening entrants to the profession. By offering career-oriented courses, universities have expanded their client base and enabled individual departments and faculties to increase their power within the institution by including professional training in areas that were previously outside the university's domain (Eraut, 1992). According to Stark et al., (1986) this is not a new phenomenon. They suggest that historically the preparation for most professions changed from apprenticeship status to university status when attempts at on-the-job training were no longer sufficient to produce a competent professional. However, Jencks and Riesman (1968) argue that the desire for professional status in certain professions pre-dates the accumulation of a body of knowledge. Whatever the case, the prestige and income associated with professional work has contributed to a dramatic increase in the number of occupations requiring a university degree (Fisher et al., 1994). As a result of this shift, the advance of the culture of professionalism in the university and the professionalization of society has surpassed the traditional liberal concept of education (Axelrod & Reid, 1989).

As higher education attempts to respond to the technical and social changes in the wider society, universities in particular face a major dilemma. The pressures of government fiscal restraint combined with calls for increased accountability place additional demands on universities (Cameron, 1991). The withdrawal of state funds, and the movement by industry to make up the shortfall affects the traditional separation of education and

training within the university. This results in universities becoming far more conscious of their vocational responsibilities than in previous decades. This is evident in the conflicting priorities facing universities in the last decade of the 1990s.

As the 1980s gave way to the 1990s, governments across Canada were facing financial challenges and calls from taxpayers to reduce spending on education. The OECD released a report titled *Education and the Economy in a Changing Society* (OECD, 1989), and the Economic Council of Canada followed with the release of *Good Jobs, Bad Jobs: Employment in the Service Economy* (Economic Council of Canada, 1990). The Council demanded increased standards of excellence and more highly educated individuals to cope with an information based society. Universities were immediately faced with conflicting priorities. On the one hand governments were urging financial restraint in the development and delivery of education; while on the other, educators, with limited resources, were trying to cope with increasing enrollments, and criticism from potential employers and graduates who feared an erosion in the quality of education.

Changes in government policy, reflecting changes in the country's economy, resulted in reduced funding for post-secondary education. At the same time as financial constraints were imposed, state intrusion into the day-to-day operations of universities diminished autonomy, resulting in changes to governance of institutions. In turn, this affected institutional and faculty culture (Cameron, 1991; Jones, 1994). On behalf of taxpayers, the state began demanding 'more for less' and increased accountability to demonstrate that universities were living up to their obligations to society. Amidst these conflicting

priorities, were calls for the definition of common goals and cooperative action, to maximize the role that post-secondary education could play in meeting individual and economic goals (Government of Canada Prosperity Secretariat, 1991; McLaughlin, 1992). Nearly a decade later, no national policy on post-secondary education has been articulated in Canada.

Fundamental societal changes brought about by technological innovation and economic restructuring have had a profound impact on higher education in general and universities in particular. The globalized market's increasing demands for applied knowledge and skills have affected the nature and importance of knowledge and significantly changed the role and function of the university. No longer is the university a privileged societal institution unquestioningly supported by tax dollars. Today it has to justify itself and its programs. Accountability—for both financial and educational performance—increases the pressure on universities (Atkinson-Grosjean & Grosjean, 2000). They must cooperate with government and the private sector to enhance economic opportunities, while at the same time providing more direct educational opportunities to meet the needs and interests of a variety of stakeholder groups. But, accountability is not a straightforward issue when dealing with institutions of higher education.

While it is easy to measure quantity and quality of inputs, it is much more difficult to assess outcomes. How do we know if graduates have received a high-quality education? How do we determine that a measurable level of competency has been achieved? How do we ensure that higher education serves the employment and life needs of graduates?

Universities are increasingly being asked to develop educational outcome measures which focus on knowledge, skills and values (Evers et al., 1993). These measures determine the understanding gained by studying a particular field; the abilities or proficiencies developed in certain areas; and whether certain positive attitudes (e.g., respect for diversity), have been instilled. Thus, there is a tension between quality and standards on the one hand and equality and access on the other. Changing signals of what constitutes quality in university education heightens these tensions. Who sets the standards of quality? Who judges when these standards have been met? How does this affect the educational experience? What are the implications for the university?

Universities today are experiencing mounting pressure to reform the liberal arts to increase the employability of graduates. In Canada, as elsewhere governments attempt to utilize universities to meet their responsibility for what John Dewey refers to as the 'public good,' while at the same time reducing financial support for higher education. But, having a traditional commitment to the public good is what enables universities to promote the specific principles and causes of social democracy.

Higher Education and the Labour Market

Over the past forty years, research on the relationship between higher education and the labour market has been closely linked to changes in policy and practice. Teichler (1999b) points out, however, that "most of the research approaches chosen and most of the questions raised mirror...the hopes and concerns expressed by the policy actors and practitioners involved" (p. 169) rather than those engaged in higher education.

Beginning in the 1960s, it was hoped that expansion of higher education would not only contribute significantly to economic growth, but also reduce inequality by providing greater opportunities for access to higher education (Bissell, 1968; Jencks & Reisman, 1968; Blau, 1969). During the 1970s, debates shifted from access to "over-education." There were perceptions of a mismatch; higher education was graduating increasing numbers of students but their skills did not match employers' demands for qualified labour (Dore, 1976). This situation led to a search for ways to increase the 'employability' of graduates (Granovetter, 1974; Sewell & Hauser, 1975). By the 1980s policy discussions broadened to include the diverse roles of higher education and the structure of graduate careers (Squires, 1987). More emphasis was placed on field of study and program, and student demands for individual options and strategies (Levin & Rumberger, 1988). The 1980s was also a decade of reflection on the shortcomings of higher education fuelled by the April, 1983 release of the report *A Nation at Risk: the imperative for educational reform* by the US National Commission on Excellence in Education. The report detailed the failure of US education to compete internationally and led to immediate calls for educational reform.

In the 1990s a number of topics competed for attention. On the one hand there was a renewed emphasis on "employability," placing responsibility on institutions of higher education to prepare graduates for the world of work (McLaughlin, 1992; Bloom, 1993), and suggesting how individual students can prepare for career success (Carnevale et al., 1990; Evers et al., 1993; 1998). On the other hand, questions were raised about the extent

to which the university should deliver skills and competencies 'on demand' to the labour market (Buchbinder, 1993; Teichler, 1999b).

The relation between the higher education and employment systems raised questions about the type of skills needed in a rapidly changing workplace. For example, was it possible to define and deliver through the higher education system the basic skills, or sets of skills, that students would require in the workplace? Or would the technologically enhanced workplace develop "general skills" in "expert" workers that differ from the basic skills acquired through an undergraduate degree? In response to the first question, Levin and Rumberger (1988) argue that formal education delivers cognitive competencies like communication, reasoning, problem solving, obtaining and using information, and the ability to continue learning. However, they point out, the workplace requires skills which are not part of the formal academic curriculum such as a willingness to take initiative and perform independently, an ability to work in groups, competence in planning and evaluating one's own work and the work of others, understanding how to work with persons from different backgrounds and cultures, and the ability to make effective decisions. To these dispositions Carnevale et al., (1990) added personal management skills like self-control, honesty and integrity as well as pride in one's work and respect for others.

Teichler (1999b) points out the fluid nature of employment demand, and argues that employers currently overvalue the social and personal skills required for specific occupational fields and undervalue specialized cognitive skills and knowledge (p.175).

He argues that universities should prepare students with a wide range of generic skills and competencies, so they can become "active agents of innovation and change" in a world of work rapidly adapting to the demands of a globalized economy (ibid).

Aided by new technologies, globalization extends economies, markets, cultures and politics beyond national boundaries into global markets (Marginson, 1997). These changes place a unique set of demands on systems of higher education already burdened with funding cutbacks and expectations of accountability, productivity and efficiency (Brown, 1998). As a result of these changes institutions of higher education are forming partnerships with business and industry while pursuing international students and other financial opportunities. Pressure is increasing to treat students as consumers in a market structured around employability. In consequence, universities are "adapting critical thinking from philosophy and applying it to business and industry contexts where the meaning is different" (Levin 1999, p. 397).

To compete in global markets, business and industry must focus on technological innovation and management restructuring, as well as issues of labour costs and productivity. Thus concerns are frequently raised about the adequacy of workforce skills and the function of higher education in preparing students for the rapidly changing workplace. Business complains it cannot find enough skilled workers to meet the spiralling demands of global competition in a 'knowledge intensive economy.' Meanwhile, representatives of higher education insist that they produce broadly educated,

adaptable individuals and question whether business actually needs the skills it demands (cf Stasz, 1997).

Levin (1999) argues that globalization—whether manifested culturally, economically, or politically—prompts a need to understand how, and why, Canadian institutions of higher education respond as they do. A global economy affects government revenues, altering funding structures and policy initiatives, which in turn affects universities. The culture of Canadian higher education increasingly reflects the multicultural nature of its participants, whose numbers are bolstered by new immigrant populations—a consequence of international political restructuring. The predominant role of the state in Canadian higher education, with demands for accountability and relevance, compounds the influence of global forces on universities. And, as global market forces and societal demands increasingly drive educational policy, and people begin choosing to educate themselves in different ways, universities are forced to respond to new challenges in order to maintain their relevance.

Over the past decade, the social relevance of higher education, particularly the connection between higher education and the world of work, has again become a key topic in educational policy debates (Teichler, 1999a). The relevance debate has returned with a renewed sense of urgency, framed in large part by tensions between the economy and higher education. The economic perspective questions how job requirements have changed, and asks what skills are currently in demand. Meanwhile, concerns about higher education's societal role, refines and redefines what universities are expected to deliver,

and how they should respond to economic changes (OECD, 1992, 1993; UNESCO, 1995).

Higher education's fundamental objectives are being challenged. Universities today must find a balance between pursuit of knowledge for its own sake and as a direct service to society. The dichotomy lies "between fostering generic skills and providing specific knowledge, between responding to the demands directly expressed by the employment system and shaping the world of work proactively" (Teichler, 1999a, p. 287). These decisions become increasingly difficult when "employers overemphasize needs for skills in short supply, general skills as well as competencies which are assessed directly and elaborately in the selection and recruitment process, [even when] these expectations ... are inconsistent with their recruitment and personnel policies" (Teichler, 1999a, p. 293).

How can higher education find a balance between appropriate links to and distance from the world of work? Even if the demand/supply questions above can be met, other issues must be addressed, such as the transfer of skills and knowledge from higher education to the world of work. A curriculum is required that develops 'key competencies'— knowledge immediately useful for work. Needed too is a more complex curriculum covering high-level knowledge and cognitively complex tasks, to prepare students for ongoing professional practice. Identifying the future tasks of graduates and the competencies that employers will expect is difficult. Teichler (ibid) advocates constant communication between higher education and the world of work so that each can learn to read the signals of the other. Beyond communication, cooperation with industry could

66

assist higher education to expand beyond the restrictive framework of classroom instruction.

A prevailing theme in current policy debates surrounding the relationship between higher education and employment, situates graduate employment as an indicator of institutional performance. An institution's responsiveness is gauged by its ability to read labour market signals on the nature of future jobs and training needs (de Weert, 1996). But institutions of higher education and employers disagree on the form those signals should take. For example, one sector of the economy might demand university graduates with specialized knowledge, while another presents a requirement for generalized knowledge and practical skills. The institution's inability to respond to divergent and sometimes competing demands reduces its ability to satisfy either sector.

But, economic changes alter what workers at all skill levels need to know, how they will use what they know, and when they need to learn it. Using federal data on labour force activity in Canada and relative earnings by level of educational attainment, Riddell (1995) indicates that the decentralized market economy has escalated employer demands for increasingly specialized skills and knowledge over the past 15 years. As a result, those with the requisite (professional) attributes have enjoyed increasing rewards, while those with limited or inappropriate skills (such as the social sciences, humanities and arts) have seen a lowering of relative earnings and employment. In other words, employers have become more selective. Faced with a substantial excess labour supply, employers

seek to add value by screening potential employees for selective attributes beyond the basic skills required to perform a job.

In much of the literature reviewed to this point, the debates have focused around the university's role in providing programs and courses to equip graduates to take their place in the world of work. However, little attention was paid to the activity of learning that goes on in the programs and courses, and the role of the university in providing a learning environment. To understand the learning that takes place when co-op students' alternate between the academic and workplace contexts of their programs, we must turn to literature on contextualized learning.

Contextualized Learning

Engeström (1994) defines learning as "an active process of constructive sense-making" (p. 9). Students construct a picture of the world and form explanatory models of its different phenomena by "correlating and merging newly acquired material into their ongoing activity and earlier constructions" (p. 12). This constructivist perspective suggests that learning—as a cognitive function—is nonetheless context dependent. Internalization becomes the basis of learning. Contextualized learning is the transformation of material actions into mental actions. 'Meaningful' learning occurs when new knowledge merges with and transforms former knowledge, resulting in a higher quality of understanding.

Contextualized learning is said to lead to 'deep-level' learning (Marton et al., 1997). When educational programs articulate between the classroom and the workplace,

68

participants are able to accumulate learning experiences in both contexts. But these experiences do not simply aggregate. Instead, through a process of reflection-in-action, students begin to supplement previous, incomplete perceptions with more holistic understandings of how the world works. These understandings are then internalized as knowledge. The process of comparing internalized perceptions with external stimuli is an individualized process, but certain strategies have been identified to classify students' approaches to learning.

Learning Strategies

A learning strategy, or conception, is a way of describing how students approach learning. Students bring differing conceptions of learning to co-op education, based on previous experience. They may perceive learning as accurately reproducing information required by the teacher (surface-level learning) or, alternatively, as a way of transforming information to achieve personal understanding (deep-level learning). According to Marton et al., (1997), surface-level learning involves the storing of a myriad of individual facts to be recalled later for a test or some other purpose. Deep-level learning takes place when the student attempts to go beyond the facts to search for holistic meaning in the content. Superficially learned facts are quickly forgotten, while assimilated constructs connected to a meaningful whole persevere.

The literature categorizes these two basic approaches to learning in a number of ways. For Ausubel, Novak and Hanesian (1978) the distinction is between 'rote' learning (memorization) and 'meaningful' learning. Marton and Säljö (1976) contrast a 'deep approach' (for personal understanding) to a 'surface approach' (for reproduction of

69

information presented during a course). Svensson (1977) distinguishes between 'atomistic' learning (discrete bits of information) and 'holistic' learning (attempts to make sense of a concept in the framework of a larger context). Engeström (1994) argues that it is only in the move to 'investigative learning'—where the learner formulates a hypothesis based on previous experience, then tests and modifies it according to the result—that there is a transition from surface-level to deep-level learning. Thus education—the accumulation of learning experiences—can be differentiated by the context in which the learning experiences take place. And contextualized learning is a critical component in the development of competence.

Evidence supports the importance of context and the meaning it gives to learning. According to Brown, Collins, and Duguid (1989) the constituent parts of knowledge are a product of the activity and situations in which they are produced. Describing the role of peer interaction in enhancing, motivating, and channelling the choice of activities, Rogoff (1990) contends it leads to insightful solutions to unforeseen problems. Structured activities like group work or in-class presentations, allow co-op students to act as "important cognitive facilitators for one another" (Rogoff, p. 183). Collaborative situations provide instructors with an opportunity to observe what students can do, what they actually do, and—as Vygotsky claims—what they can almost do.

For Vygotsky (1978), the acquisition of skills in the context of their application represents a 'zone of proximal development.' He describes this as "the distance between the actual developmental level as determined *by* independent problem solving and the

level of potential development as determined *through* problem solving under adult guidance or in collaboration with more capable peers" (1978, p. 86, emphasis added). This abstract area is large at the beginning of the task since the learner needs assistance to grasp new concepts. With assistance, the zone of proximal development shrinks: the learner needs less and less help with the task, moving eventually to a point of independence in the application of the skill. Through repeated practice of workplace procedures and reflection on that practice, co-op students begin to acquire expert knowledge of a profession. The concept of "near peers" is also recognized as a powerful tool for learning in communities of practice (Lave & Wenger, 1991); these are explored more fully below.

Situated Learning and Communities of Practice.

Theories of situated learning focus on the relationship between learning and the social contexts where learning occurs (Lave & Wenger, 1991; Wenger 1998). Lave and Wenger (1991) interpret learning as a gradual and social process, where initial observation is followed by carefully orchestrated processes of co-participation—or Legitimate Peripheral Participation. The responsibility for learning is mutual between novice and expert. Reciprocal teaching and learning occurs at individual rates. Novices assume responsibility for learning by interacting with peers, and by participating fully in the learning experience. Situated learning theory (SLT) provides a theoretical base for educational programs, like co-op, that include a workplace or experiential learning component. They also provide a lens through which to view the organization of the contemporary workplace, where activities are undertaken in communities of practice (Lave & Wenger, 1991). Wenger (1998) describes communities of practice as groups that

form and function as a unit to work on a particular project after which they dissipate, with members becoming part of new groups and projects. Adaptability to changing work environments, requirements, and participants in both current and adjacent communities of practice is thus an increasingly important attribute of workplace success.

Theories of situated learning foreground the role of context—especially the tacitly understood and richly complicated context within which rhetorical transactions and social actions take place. Educational institutions are particular social and spatial contexts specific to learning (Lave & Wenger, 1991, p. 40). But Fox (1999) argues that "formal educational settings [are not] the only, or even most promising, places to study learning in practice" (p 2). Fox criticizes SLT for neglecting issues of power and inequality in communities of practice, proposing instead a framework based on Foucault and actor network theory.

According to Fox (1999), Foucault argues that practices like situated learning-in-action inevitably involve power relations: "power in this sense is immanent in knowledgeable technique, i.e. practice itself as well as identity formation" (Fox, 1999, p. 6). Foucault's (1977) concept of disciplined and docile bodies describes this power and identity formation. Foucault argues that "A body is docile that may be subjected, used, transformed and improved." (1977, p. 136). Foucault uses the seventeenth century soldier as his ideal of the docile body (and monastries, armies, educational establishments, and workshops as the sites of 'disciplining') to represent how, through "subtle coercion" an "infinitesimal power" could be gained over the active body (p.137). Once control of the

object was assured supervision could concentrate on the economy and efficient organization of movements through "an uninterrupted, constant coercion." It was this "meticulous control of the operations of the body", which produced 'docile bodies', that Foucault called 'disciplines' (Foucault 1977, p. 137).

Meanwhile, Wenger (1998) contends that the negotiation of meaning is central to practice. But because practice inevitably involves power relations, Fox views Wenger's omission of it in favour of meaning, as a central weakness of SLT's social constructionism. Lave (1993) notes that context can be viewed, social-theoretically as either pregiven or emergent. But, Fox (1999) points out that activity theory and critical theory are more likely to view context as pre-given than social constructionism, and afford such macro social factors as class and gender, a prior existence within which studies of situated learning take place. According to Fox, for Foucault, macro social factors come into existence through local practices and force-relations. But, is that the case?

Foucault (1977) considers disciplinary power in the context of an "integrated system" of control and production: a system in which, due to the intense, routine operation of surveillance and assessment, both coercion and consent feature prominently. For power to be self-sustaining, it must produce and reproduce definitions of reality which the objects of this power come to see as normal. Thus, the moulding and integration of 'the individual' is a central part of the production of power. "Discipline," Foucault argues,

"makes individuals; it is the specific technique of a power that regards individuals both as objects and as instruments of its exercise" (1977, p. 170).

In the context of Foucault's prison, this "exercise" is designed to be continuous and relentless. Surveillance is the key technique, both of observation and normalization of behaviour: it integrates the individual within the prison system, "producing" the prisoner, whose ideal variant is highly co-operative and responsive to authorities. This cooperation is essentially a combination of habitualized, normalized fear of punishment and hope of reward. In the context of education—identified by Foucault as one of the key sites of the habitualizing, normalizing exercise of disciplinary power—the primary techniques remain the deployment of surveillance and the inducement of co-operation, albeit in a less brutal and more nuanced manner. Whether in prison or education, integrated power is realized through surveillance and extended and guaranteed through cooperation. And in both—and all such sites—"assessment" combines and produces both. Assessment of students (in the form of grades as merit based rewards), and faculty (in the form of institutional evaluations) have traditionally been a defining characteristic of the academy.

Maintaining and monitoring programs like co-op requires considerable levels of both surveillance and consent. Cooperation is vital at each level, and within each context, as is "assessment," i.e. surveillance of its effectiveness. A dynamic is established which serves to integrate and service the system. A "network" of power relations between and within each level of the program is produced, and continually reproduced, on the basis of the integration of those apparent polarities, surveillance and cooperation. For as Foucault

says, "although surveillance rests on individuals, its functioning is that of a network of regulations from top to bottom, but also to a certain extent from bottom to top and laterally; this network "holds" the whole together and traverses it in its entirety with effects of power that derive from one another" (Foucault 1977, p. 176-7). Foucault's understanding of the capillary effects of power is consistent with a view of context as emergent through practical action.

Another explanation of socially situated learning can be found in activity theory (cf Vygotsky, 1981; Engeström, 1990). Activity theory presumes the starting point and primary objective of analysis to be the actual process of interaction in which human beings engage the world and each other (Berryman, 1993). The social roots of cognition are stressed, and the interaction between mind and behaviour is key. Thus the basic unit of analysis is no longer the individual, "but the sociocultural activity, involving active participation of people in socially constituted practices" (Rogoff, 1990, p. 14).

Moore (1998) argues that there is a creative tension between "concepts of individual versus community initiatives, prerogatives, and responsibilities in learning" (p 161). Is the aim of the learning experience to develop pragmatic returns, or to nurture the abstract symbolic mind? Is the individual the primary agent and beneficiary of cognitive development and learning, or the community? According to Moore, these questions represent a dialogue of dichotomies: between cognitive and situative theory; individual versus community; reductionistic versus systems approaches; and inductive versus deductive reasoning.

75

Research on situated learning highlights the need to provide students with a real-world context for education and training, in order to prepare them for the world of work. Some individuals function well only in the context in which they have learned to address the tasks expected of them, for example the classroom. If Foucault's notion of docile bodies, described above, provides an apt description of the moulding of co-op students into workplace professionals, his concept of the 'examination' effectively defines the academic shaping of the co-op student in the classroom. In describing the eighteenth century process of an apprenticeship, Foucault argues that "the examination did not simply mark the end of an apprenticeship; it was one of its permanent factors. It was woven into it through a constantly repeated ritual of power" (Foucault, 1977, p. 186).

The examination "enabled the teacher, while transmitting the knowledge, to transform his pupils into a whole field of knowledge" (the teaching of discipline-specific foundational knowledge). While the examination "guaranteed the movement of knowledge from the teacher to the pupil", it also "extracted from the pupil a knowledge destined and reserved for the teacher" (the replication or reproduction of codified knowledge). The school became "the place of elaboration for pedagogy" (Foucault, 1977, p. 186-7). The examination places individuals "in a field of surveillance" and engages them in a "mass of documents that capture and fix them" (today students are ranked and classified by academic grades and reports).

"Good" students who have been adept at solving "textbook" problems in the classroom, may be ultimately unable to apply the solutions to analogous problems when they join the workforce, unless they are given the opportunity to learn in the workplace as part of their studies.

Learning for the Workplace

Higher education plays a role in relation to the employment system, first by providing job-related knowledge and competencies, and second, in pre-selecting students for future jobs, positions and ranks (Brennan, Kogan & Teichler, 1996). It plays this role whether it is pursuing autonomous educational objectives, responding reactively to presumed needs of the employment system, or pursuing proactive policies of shaping and innovating in the employment system. How much different higher education systems are responsible for selection and training for employment varies considerably however. And one of the roles of university education is to equip students with skills that will allow them to continue learning beyond graduation, whether in learning how to obtain employment, or in learning to learn on the job.

But employment opportunities for graduates are not exclusively a function of either the education system or the employment system. Rather, they derive from the structural and skill linkages between the two systems. For example, Brennan et al., (1996) argue that "higher education is not directly relevant to employment through the kind of education and training it provides, but through the ways students make use of these educational provisions" (p. 2). The majority of U.S. research findings indicate that "competences acquired and subsequent professional successes are less shaped by institutional conditions

77

and provisions than by the students' use of the institutional conditions and provisions"
(Brennan et al., 1996, p. 15).

Employers have little interest in hiring graduates with only basic academic skills. To acquire new knowledge in today's workplace, employees must be able to recognize the limits of their own knowledge. They must know how to ask germane questions that will remedy knowledge gaps, and also be able to identify new sources of information. To equip students for the workplace, therefore, education must adopt effective learning and motivation strategies. Students need not only to learn but also how to apply what they learn appropriately in new situations. Traditional methods of teaching procedural knowledge (techniques, skills and abilities) must be enhanced with a variety of cognitive approaches in order to allow students to develop procedural knowledge and cognitive understanding concurrently. Programs of education—like co-op—that alternate between academic and workplace contexts maximize these two forms of learning and enable students to construct meaningful understanding through interpretive and experiential interactions with their social environment.

Recalling Brennan et al.'s (1996) argument that graduate success in the labour market is shaped less by the institutional conditions and provision of education, than by the use students make of them, Rubenson and Schuetze (1994) suggest that, once on the job, "it is the strategy of how to use the technology, not the technology itself, that determines what kinds of skills are needed and governs the employees' opportunities to develop their competencies" (p. 101). Firms today need qualified workers as a "generalized,

polyvalent, and flexible resource," adaptable to a variety of different work situations (Engeström et al., 1995). Rubenson and Schuetze (1994) point to a shift in employer preferences; demand now is for employees with attitudinal characteristics such as diligence, attention to detail, and ability to work effectively in teams (Streek, 1989). There is a growing belief that skills (work qualifications) are best produced where they are used—namely at the workplace (Streek, 1989; Raizen, 1994).

While considerable research has been conducted on classroom learning and motivation for learning, less is known about informal learning in the workplace. For example, we still have a limited understanding of the skills and competencies that constitute good work performance, and information on how they are acquired. What is the relationships between basic skills (the general skills of literacy, numeracy, and problem solving) and job competence? What role does learning "on-the-job" play in the acquisition of the expertise necessary to move from novice to expert? Can students effectively transfer formal school-based instruction to situations in the workplace? To begin investigating these questions, and their implications for co-op students' learning, we turn to the literature on workplace learning.

Learning in the Workplace

Workplace learning is the primary means by which most people acquire the job-related knowledge and skills to move forward in their careers. Econometric models show that formal education accounts for a 15 percent variation in lifetime earnings while workplace learning accounts for much of the remainder (Carnevale et al., 1990). Cognitive abilities developed through academic learning provide an important foundation for workplace

learning. However, the classroom is a poor substitute for the context-rich environments in which the application of knowledge and skills takes place. It is important to understand not only the different means by which learning takes place, but also the factors that enhance, mediate, or become barriers to effective learning in the workplace.

Learning by doing, and learning from experience are two of the primary ways that workplace learning occurs (Carnevale et al., 1990; Marsick & Watkins, 1990). However, different work sites produce different experiences for individuals. What are the common threads that link one experience to another? Can a particular experience of work shape the individual's knowledge of the world of work as a whole? Is there a role for workplace experience in student learning? Is the appropriate place for skill training the classroom or the workplace? In response to the last question, Hamilton and Hamilton (1997) argue that because workplace-based learning is a means of increasing students' engagement in learning and preparing them for employment, it must be intentionally planned. Simply placing students in the workplace and hoping they will learn does not constitute workplace-based learning, nor does reading about work, or hearing about work in the classroom. These activities may be helpful, but for workplace learning to occur the 'experience' of work must take place in a location where the primary activity is producing goods and services. Workplace-based learning can help students connect what they learn in school with what they need to know to earn a living. Without workplace experience, the ability to memorize abstract information and reproduce it on tests is of little use in an era of rapid market change (cf Brown et al., 1989).

When students encounter a new learning situation in the workplace they have an opportunity to compare contextual information with currently held beliefs acquired in the classroom. This encounter might produce one of three outcomes (Engeström, 1994; Johansson, Marton & Svensson, 1985). First, the new information provided by the situation might be accepted as forming a more plausible explanation of what is happening. In this case the new information alters existing information, and is then internalized as the current explanation of why something happens the way it does. Second, the new information might be rejected. If it does not provide a better explanation of why something happens in a certain way, there is a reversion to existing beliefs. Finally, if the new information is neither readily accepted nor rejected, the student might experience a state of uncertainty (cognitive dissonance). This state prompts a search for additional information to assist in deciding how to deal with the new information, either by using a similar previous experience, or cues from the contextual or social environment. This process of uncertainty followed by a search for meaning enhances students' critical thinking skills.

There is increasing empirical evidence that learning, and motivation for learning, are mediated by activities embedded in a context that makes sense and matters to the learner. Scribner (1984) regards the environment not just as the context in which a problem is embedded, but as an active component of problem solving. She focuses on how novices, with no specific knowledge of the workplace, gradually become more expert as they become familiar with, and actively use, the work setting. The specific social, symbolic, technical, and material resources available in the workplace enable novices to complete

assigned tasks with increasing success. Having mastered a task they can then begin to invent more efficient problem solutions, and share their problem-solving expertise with others. Today's workplace requires employees to operate within a number of domains of knowledge and practice. By engaging in trouble-shooting sessions, novice workers are exposed to the glitches and problems of the workplace. Even if they remain as silent partners during these sessions, they come in contact with the intellectual challenges of the work situation and the benefits of collaborative modes of problem solving.

The sharing of problem-solving experience is captured by Julian Orr's (1988) description of the "war stories" that photocopier repair technicians exchange to learn how to diagnose and solve non-routine problems. These stories become part of the "community memory of the technicians, in which they preserve and circulate their hard won knowledge of machine arcana. Other technicians called for purposes of consultation will bring their own recollections to bear, and a good memory will make one a popular resource" (Orr, 1998 p. 4). The "war stories" are potent because they deal with machine and customer behaviour within the context of a specific situation. The setting and activity mutually create and change each other and in the process, problems are generated and resolved. As a result of such findings the value of informal and incidental learning is receiving increasing attention in the research literature.

Informal and Incidental Learning

Informal and incidental learning can be defined by contrasting them with formal learning (Marsick & Watkins, 1990). The latter (formal learning) is highly structured, institutionally sponsored, and classroom-based; the former usually occurs in unstructured

82

settings outside the classroom and is largely under the control of the learner. This is not to imply that the workplace—one of the areas where much informal learning takes place—is an unstructured environment. Rather, it implies that informal learning takes place in the normal course of daily events without a high degree of design or structure. Incidental learning, on the other hand "almost always takes place in everyday experience although people are not always conscious of it" (Marsick & Watkins, 1990, p. 12). For example, through a conversation with a mechanic recently I learned the nature of the rather expensive repairs required for my car's brakes. This learning was accomplished informally. The mechanic showed me the damaged parts while describing possible causes of the damage and outlining the danger of not replacing them. The incidental learning that took place was embedded in the interaction. The unspoken "message" I took away from the meeting—the incidental learning—was that I might avoid subsequent expenses if I were to pay closer attention to a routine maintenance schedule.

Learning from and through experience is a central feature of informal and incidental learning (Marsick & Watkins, 1990, p. 15). Thus the learning that occurs in the workplace is influenced by the particular situation—the context—in which an incident happens. What we learn, and how we learn, is dependent on factors embedded in the context where the experience takes place. A similar type of incidental learning occurs when a professional confronts a situation that falls outside the repertoire of the profession's rules, and the individual must exercise judgement to resolve the situation (Schön, 1983). To exercise 'professional judgement' requires an individual to "think like" a professional, and draw on background information or contextual learning. Schön

calls this reflection-in-action—the ability to deal with situations of "uncertainty, instability, uniqueness, and value conflict" (p. 50).

Raizen (1994) explores research on forms of situated learning that link the acquisition of cognitive skills and knowledge with real world activities. Citing a study of US Air Force Technicians (Lesgold et al., 1986 in Raizen, 1994, p. 73), she demonstrates how learning from informal experience enables participants to create mental models of the equipment they are working with, and subsequently develop a better understanding of how the equipment relates to the system as a whole. Raizen contends that for novices to become experts they must develop reflective techniques and meta-cognitive skills that allow them to organize salient information around central principles. They learn to use the context to structure problems and problem solutions. The most effective learning takes place through "situated activity," using "the physical environment and the tools it provides, the co-operative construction of knowledge among groups of workers doing a common task, and the culture of the specific work community" (Raizen, 1994, p. 86). Such learning experiences should "enculturate the learner into the community of participants in a given domain or occupation, so that the individual will come to understand the physical, conceptual, symbolic, and social tools of the community and their uses and will become a contributing and valued member" (p. 98).

Using research comparing the performance of experts and novices, and studies on learning and transfer, Donavan et al., (1999) explore how students develop discipline-specific competence. To develop such competence, they argue, "students must (a) have a

deep foundation of factual knowledge, (b) understand facts and ideas in the context of a conceptual framework, and (c) organize knowledge in ways that facilitate retrieval and application" (p. 13). Students must develop a deep understanding of the subject matter if they are to transform factual information into usable knowledge. Organizing information into a conceptual framework allows for greater 'transfer,' enabling students to apply their prior knowledge to new situations and learn related information more quickly. In the development of discipline-specific competence, argue these authors, "learning is influenced in fundamental ways by the context in which it takes place" (p. 22). They thus reinforce the concept of contextualized learning discussed earlier.

The primary concern of education is the development of the individual. Preparation for work is only one aspect of this development. Enculturation into a community of occupational or professional experts is most readily accomplished where the occupation or profession is practiced—in the workplace, not the classroom. Because experts rely heavily on tacit knowledge (Polanyi, 1967), learning through curriculum and pedagogy must be integrated with learning that links the acquisition of cognitive skills and knowledge with activities in the real-world of practice.

Tacit Knowledge

Polanyi's (1967) theory of tacit knowledge explains how individuals acquire and use knowledge. For Polanyi, knowledge exists in both static and dynamic forms (i.e. as knowledge and knowing). Every activity implies two different and mutually exclusive levels on dimensions of knowledge: focal knowledge and tacit knowledge. Focal knowledge understands the object or phenomenon of interest; tacit knowledge

85

manipulates the object or phenomenon. Polanyi argues that living in the world requires the ability to continually switch between tacit and focal knowing, in order to act or gather new knowledge. The process of knowing provides fragmentary clues which—when gathered into categories—can form patterns. These patterns contain theories, methods, feelings, values, and skills that can be used in ways that tradition, judges valid. Tradition—one of the central tenets in Polanyi's concept of knowledge—is a system of rules or norms external to the individual that governs how knowledge is transferred in a social context.

While both novices and experts must follow rules and exemplars, experts rely on experience for making judgements in their work. Empirical evidence indicates that much of this experience is in the form of tacit knowledge, which cannot be made explicit through the use of language (Sternberg & Wagner, 1992; Wagner 1987; Wagner & Sternberg, 1985; Williams et al., 1993). In other words, experts know more than they can tell. Once an expert masters the rules of a profession they conform to the norms—usually static—and change or extend the rules—generally tacit—to develop solutions (Polanyi, 1967). Parts of these solutions may then be articulated as 'rules-of-thumb' or 'work-arounds' for addressing certain problems. The sureness of action in dealing with a problem is a fundamental expression of the expert's tacit knowledge (Sternberg & Horvath, 1999). The role of the professional expert or master is less to make tacit knowledge explicit, than to show the novice how experts do what they do. Novices in a community of practice gain their own tacit knowledge of practice through observation and imitation of the community's ways of talking, being, dealing with things, style and

culture—all of which are tacit. While all are observable they may not necessarily all be explainable.

Senge (1990), however, contends that tacit knowledge can be made explicit. He reminds us that while tacit knowledge is embodied, reflection or careful observation may reveal patterns that can be experienced, expressed, and described. For Senge this resembles a translation of one form of knowledge into another. Nonaka and Takeuchi (1995) call it "conversion." They argue that new knowledge is created when one type of knowledge is converted to another. This conversion can be either tacit-to-tacit (watching somebody perform a task, then doing it); tacit-to-explicit (performing a task, then explaining it); or explicit to tacit (reading about a task then performing it). The interaction between tacit and explicit in the creation of new knowledge is described as a spiral. Within an individual, explicit becomes tacit; then, with reflection and expression, tacit knowledge is translated and creates new knowledge—whether tacit or explicit—that others can share.

In the traditional classroom, however, students are trained largely in an explicit-to-explicit process (reading about, then explaining) that rarely permits the development of tacit knowledge through practical experience. Educational programs, like co-op, that alternate between academic and workplace contexts help to overcome this impediment, allowing students to construct meaningful learning through interpretive and experiential interactions with their social environment.

Summary

The increasing popularity of co-op programs over the past two decades has stimulated interest in the outcomes attributed to co-op—such as rapid transition to the workplace, better starting salaries, and increased job satisfaction. While reports of the benefits of co-op continue to grow, however, empirical research into how those benefits are achieved does not appear to be keeping pace. Few studies are devoted to the *process* of co-op, or what happens to students when they transit that process.

There is little evidence on how students' expectations of co-op are formed and the role that these expectations play in the transformation of students into skilled workers. There are also gaps in current knowledge about the theoretical and pedagogical foundations of co-op education. Another area overlooked in the co-op literature is employability skills— how education and training are related to labour market outcomes. Lists of essential skills and competencies deemed important for employability in the new economy have been implemented as guides to labour market policy. At the same time, the relevance debate has taken on a new sense of urgency framed in large part by tensions between the economy and higher education.

In much of the co-op literature, grade point average is used as a proxy for learning, but little attention is given to the activity of learning itself. Yet empirical evidence continues to mount in the higher education literature, indicating the importance of context and the meaning that it gives to learning. Theories of situated learning provide a theoretical base for programs, like co-op education, that include a component of workplace or experiential

learning. They also supply a lens through which to view the conditions of the workplace today.

In Chapter Four, immediately following, I explain my methodology.

CHAPTER FOUR:

METHODOLOGY

The focus of this chapter is the methodological design of the research. Examination of the methodology sheds light on the thought processes embodied in the research frameworks I selected in my approach to the study. Choices of questions, how questions are asked, of whom they are asked, and about what, are all manifestations of stances and ideologies that underlie a particular research framework. The methodology that follows provides insight into how my thinking became operationalized during the planning of the study. I present the concepts and assumptions underlying my approach, and detail the data sources, data gathering methods, procedures, data analysis, and interpretation procedures that are used to conduct the study. I begin with a discussion of my specifications for the research site, programs, and participants. Next, I explain the study's sampling criteria, followed by a description and discussion of data collection procedures and constraining factors. Finally, I detail analysis procedures and review issues relating to the "soundness" of my study.

Selection of Research Site, Programs, and Participants

While most universities and university colleges in British Columbia offer co-op programs, I required an institution with a demonstrated commitment to co-op education. In order to confine my study within manageable boundaries I considered the relative importance of the following characteristics in selecting a study site: accessibility and ease of entry; range of programs and informants from which to choose; and a potentially rich

mix of processes and constraining factors to study. After preliminary investigation of a number of possible locations, I selected the University of Victoria (UVic) as the most suitable site for my study. Once the study site was confirmed, planning for the study was conducted in four phases.

Phase One: Selection of programs

The wide selection of co-op programs at UVic was a critical element in the selection of a study site, and in planning the research. Since its inception in 1976 co-op at UVic has expanded to encompass all 8 Faculties: Arts and Science; Business; Education; Engineering; Fine Arts; Human and Social Development; Law; and Graduate Studies. It draws students from 41 departments within those Faculties. One of my first tasks was to identify a representative group of co-op programs to allow collection of a variety of data while, at the same time, restricting the number of programs in the study to a manageable size. Four selection criteria were developed to aid in narrowing my choices. First, I investigated how well a program was established. Factors indicating stability were the length of time the program had been operating, and growth in placements over the years. Second, I determined whether the program was a mandatory or voluntary co-op. Third, I looked for a clearly defined labour market for students completing the program. For example Engineering and Chemistry students have a defined labour market that they will enter when they graduate. Engineering students are likely to become Engineers, and Chemistry students Chemists. Business and Geography have more of a mixed labour market, and although there are defined aspects, there are opportunities for students in these programs to enter positions that are not directly related to their field. For example, a Business graduate might find employment in a number of industries, such as finance,

management, or the hospitality and service industry. There are similar opportunities for Geography students to seek employment in a variety of industries. Fourth, did the program represent the structure of disciplinary programs established by Becher (1989).

Becher (1989) presents a rationale for conceiving of academic disciplines as having recognizable identities and particular cultural attributes. He points out that the professional language and literature of a disciplinary group play a key role in establishing its cultural identity. Therefore, each of the academic disciplines defines its own identity and defends its own intellectual territory by employing a variety of devices to exclude those who do not display the cultural attributes of the discipline. Cultural attributes include the "traditions, customs, and practices, transmitted knowledge, beliefs, morals and rules of conduct, as well as their linguistic and symbolic forms of communication and the meanings they share" (Becher, 1989, p. 24). To be admitted to membership in an academic discipline or profession, an individual must be able demonstrate not only sufficient levels of technical proficiency, but also knowledge of, and adherence to, disciplinary norms. An appreciation of how co-op students are inducted into a disciplinary culture is important to our understanding of how the process of enculturation impacts co-op students' experience.

Socialization into a disciplinary culture involves knowledge of the foundations of the discipline, and learning the history and legends of the particular discipline. History and legends are part of what Bourdieu (1997) refers to as social capital that one inherits by acquiring membership in a disciplinary community. Novices are immersed in the folklore

of the practice as well as codes of accepted conduct, which conditions the way they see the world. This contextual immersion is what Snyder (1971) calls the hidden curriculum. Co-op students wishing to become a member of a disciplinary profession must learn to comply with its fundamental cultural rules.

Becher (1989, p. 12), drawing on the work of Biglan (1973) and Kolb (1981) devised a useful heuristic model for classifying academic disciplines into a four-fold typology. Becher identifies four main categories of knowledge domains that underpin academic disciplinary cultures: hard/pure, hard/applied, soft/pure, and soft/applied. In the hard/pure quadrant are the natural sciences and mathematics, while the hard/applied quadrant contains the science-based professions. The soft applied quadrant encompasses the social professions, and the soft pure includes the humanities and social sciences.

By choosing a representative program from each of these four disciplinary cultures, I am able to study a range of co-op student experiences, while containing the research within manageable limits for a Ph.D. dissertation project. Figure 2 illustrates the co-op programs selected to fit my own criteria, and Becher's model.

Figure 1: Co-op programs selected

Hard Pure	Soft Pure
CHEMISTRY CO-OP *established 1977* *100 placements (96/97)* *voluntary co-op* *defined labour market*	**GEOGRAPHY CO-OP** *established 1978* *210 placements (96/97)* *voluntary co-op* *mixed labour market*
Hard Applied	Soft Applied
ENGINEERING CO-OP *established 1983* *591 placements (96/97)* *mandatory co-op* *defined labour market*	**BUSINESS CO-OP** *established 1990* *548 placements (96/97)* *mandatory co-op* *mixed labour market*

Justification

Despite suggestions to the contrary (Allen, 1996; 1997), much of the current debate surrounding relevance of university education concerns the inability of university graduates to secure meaningful employment upon graduation. To address this concern, and to investigate the possible ameliorative role of co-op education, I chose to include four programs in my study. The Geography co-op program represents a soft/pure disciplinary culture. Geography began placing students in co-op programs in 1978/79; it is one of the oldest co-op programs at UVic. With approximately 200 student placements per year and a diverse array of employers it is also one of the larger non-mandatory programs. Geography was a co-op program in the Division of Social Sciences which best

94

fit the selection criteria. The second program was from the faculty of Science. Science faculties were the first to introduce a co-op component to their academic programs. One of the first co-op programs developed at UVic was in Chemistry; it is still very active with placements of 100 students in 1996/97. Its inclusion in my study provides a historical context to co-op at UVic and represents a hard/pure disciplinary culture. The third program selected, Engineering, is a professional program with a *mandatory* co-op. It provides a different perspective from the previous two. By its third year of operation Engineering achieved the highest number of placements of any co-op program and continues this rank with 591 placements in the 1996/97 academic year. Another mandatory program was needed to provide a balanced comparison. Business met all the selection criteria and provided an example of a soft/applied, mandatory co-op.

However, I was concerned that these four selections appeared to give inadequate representation to Arts. While the Arts co-op met all the criteria for selection (e.g., established 1987; 104 placements [1996/97]; voluntary; loosely defined labour market) it represents 18 departments in the Faculty of Fine Arts and the emerging Faculty of Humanities. Therefore, it would have been difficult to select a single program that would adequately represent the diversity of departments. For Arts to be included in the study, it would need to be considered as a separate case study, in and of itself. Cost and time constraints helped in the decision to restrict the number of participant to the four groups identified in Figure 1 above.

Selection of Methods and Participants

Methods of data collection affect how participants are selected for a study. I chose a case study method (Merriam, 1988; Stake, 1995; Yin, 1994), with four nested levels: 1) the University of Victoria as the first level; 2) the co-op department as the second level; 3) the four individual programs selected for the study comprise the third level and; 4) the co-op students are the unit of analysis for the final level (see Figure 3).

Figure 2: Nested Case Study
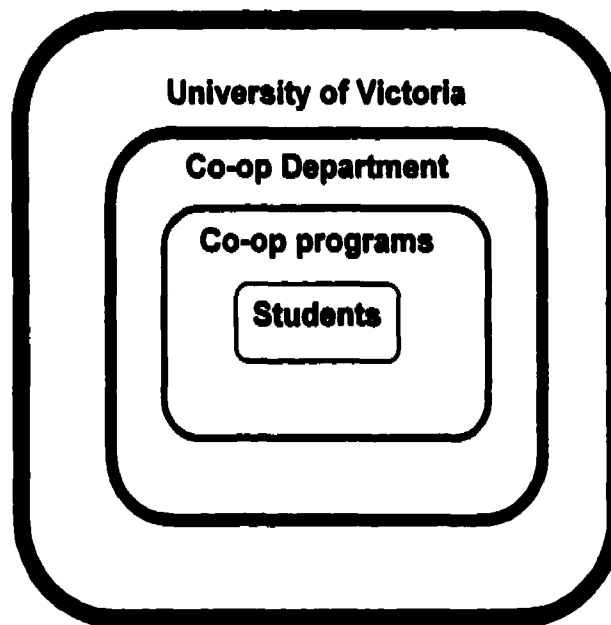
Phase Two: Refining the Problem and Initial Explorations

My preliminary investigations involved an examination of the co-op and higher education literatures, and discussions with a number of co-op students about their experience. At this stage the research problem became clear. How, on the one hand, to explain the beneficial outcomes of co-op enumerated in the literature and, on the other hand, to situate these outcomes within the debates surrounding the relevance of higher education.

During the fall of 1996, I began a systematic study of co-op education at UVic based on both primary and secondary sources. Exploratory interviews with key informants from the university and examination of written and electronic materials allowed me to sharpen and refine the research problem. Additional knowledge and insight gained during this period shaped the design for the next phase of the study, which utilized survey methods and a sample of students in UVic's co-op programs.

Phase Three: Design of the Study and Sampling Strategy

During the spring of 1997, the vital tasks of gaining consents and ethical clearances were accomplished. Over this period, a survey instrument was constructed, pilot tested and revised. After a series of pilot-tests it was administered to a representative sample of co-op students at UVic. Development of the student survey is described later in this chapter.

I arranged to interview a sample of senior university administrators, faculty, co-op coordinators, and co-op students in order to generate interpretive material for analysis. Data from the survey and interviews were collected during the winter of 1997-98.

The survey and interview questions were designed to produce data bearing on the factors and variables my preliminary investigations suggested might be relevant to an understanding of the nature and process of co-op education. Students were asked about their background and pre-enrollment employment history, reasons for enrolling in university, satisfaction with delivery of courses, integration of coursework and work experience, goals, and expectations for future career.

The student survey was administered to both co-op and non-co-op students. The decision to administer the student survey to both at once was practical and logistical. The survey was administered during class time and therefore required the support and assistance of the coordinators and faculty. In order to facilitate the administration of the survey, I met first with the Co-op Director, and subsequently with the co-op coordinators from each program area under consideration. It was the consensus that because the classes contain both co-op and non-co-op students, it would be difficult to administer the survey only to the co-op students. It was agreed that all students in the selected classes be surveyed, but that only co-op students be interviewed.

This strategy was a practical way of collecting data during class time, which might also be useful in helping me develop a more complete picture of co-op. Documentary analysis, observations, and both formal and informal interviews comprised the major modes of data collection. The latter were particularly relevant for furthering my understanding of how the process of co-op education leads to its reported outcomes.

My sampling strategy was purposeful sampling following Patton (1990), or what LeCompte and Priessle (1993) refer to as criterion-based selection. Using this strategy, particular settings, persons or events are selected deliberately in order to provide important information that might not be obtained from other sources. In other words, where required, I selected people who were able to be informative because of their

comprehensive knowledge of, or involvement with, co-op education, thereby assisting me in finding answers to my research questions.

Participants selected for interviews represented the four constituencies of the study: the institution; co-op department; selected co-op programs; and the students within these programs. Co-op policy was documented using university documents and analysis of interviews with senior members of the administration (n=7). These individuals provided information that helped me understand the context within which the study took place. I conducted informal interviews with faculty (n=27), the Assistant Director[8] of Co-op (n=1), and co-op coordinators (n=6) to determine whether they share an institutional perception of the role and function of co-op education, and its situation in the university structure. This background information combined with the results of interviews with co-op students (n=45), allows me to begin to answer the first research question: 'how do co-op students perceive learning and work?' In-depth interviews with co-op students, helps me understand the second question 'how do students make meaning of their co-op experience?

Overview of the Stages of Data Collection

Prior to data collection I met with the coordinators of the co-op programs under consideration. I previewed the study with them and discussed timing and data collection methods. My purpose was to solicit their assistance in conducting the study by having

[8] I selected the Assistant Director of Co-op because of their long involvement with the development and operation of co-op programs at UVic. The newly appointed Director of Co-op arrived in September 1997 from another institution.

them act as points of reference to which I could return as the study progressed. By establishing these relationships early on I was able to limit the number of time-consuming cul-de-sacs encountered during data gathering. The coordinators became key informants for my study, and as such played a valuable role in the research. For example, coordinators were instrumental in negotiations with faculty instructors to allow administration of the student survey. They also met with co-op faculty liaison representatives to ensure that the survey could be conducted during regular class time.

When investigating how participation by the engineering faculty could be negotiated it became clear that in Engineering it would be beneficial to survey all three sections (mechanical engineering, electrical and computer engineering, and computer science). The reasons for this were twofold: first, by including the computer science component it levered the involvement of the other two sections; and second, the computer science section of engineering is a voluntary co-op. As described in the previous example of classes containing both co-op and non-co-op students, the survey was administered to the selected engineering classes but only students from the mandatory sections would be interviewed. In this way the integrity of the matrix, detailed above, was maintained and any comparisons made are within, and between, the mandatory (business and engineering) and the voluntary (chemistry and geography) co-op programs.

Throughout the study, I conducted informal as well as formal interviews with senior administrators, teaching faculty, and coordinators which provided information on internal and external factors affecting the university in general, and the co-op program in

particular. This helped me establish the university context for the study. I obtained permission to conduct in-class observations of each of the classes I subsequently surveyed, to gain insights into the classroom context.

Initially, in-class observations were conducted one week prior to administration of the student survey. Each observation would culminate with a request for an informal interview with the instructor after class. This approach was reasonably successful, but there was some hesitancy of faculty to provide time for interviews. Due to time constraints on my part, and concern by faculty about my visits to class on two subsequent occasions—once for observation, and secondly to administer the survey—especially during the busy time approaching exams, this approach was revised near the end of the study's first wave. A compromise strategy—whereby I combined the in-class observation and student survey into one visit—was agreed upon and proved both efficient and effective during the second wave of the study. I observed a selected class during regular class time and during the last 20 minutes of class the instructor would turn the class over to me to administer the survey. An unintended benefit of this arrangement was that it allowed me to engage instructors in conversation about my study and their teaching while the students completed the survey questionnaires. This initial 'classroom conversation' inevitably led to an offer to continue the conversation after the class was dismissed, or at a later scheduled time. This alleviated an earlier problem where I experienced a hesitancy of faculty to commit time for interviews. Consequently, I was able to arrange faculty interviews directly without having to seek assistance from the co-op coordinators. The subsequent interviews were relaxed and the faculty appeared more forthcoming in

responding to questions. These interviews also generated interest in my study and a number of faculty members followed up with me to see how the study was progressing. I now describe the data collection in greater detail to make my reasons for selecting specific procedures explicit.

Methods of Investigation

Findings derived from more than one method of investigation and multiple sources of evidence allow for the development of converging lines of inquiry (Yin, 1994 p. 92) resulting in triangulation of data sources and perspectives. With triangulation, potential problems of construct validity are addressed, because multiple sources of evidence essentially provide multiple measures of the same phenomenon. Thus, a more complete picture of the phenomenon of co-op is obtained which is likely to be viewed with greater confidence and allow a greater claim to validity to be made.

In addition to the collection of documentary evidence, the research was designed as a two-phase study. The first phase consisted of a survey of a select group of students at UVic, some of whom were co-op students and some who were not, for the purpose of identifying potential interviewees, as well as to gather basic satisfaction and demographic data about the students. As well, data collected from co-op students participating in the survey was subsequently used to corroborate statements made by students participating in in-depth interviews, and also attests to the construct validity of the survey instrument.

The decision to use a two-phase design is based, in part, on my own constructivist belief that cooperative education, like all education, is developmental and evolutionary, and

also, in part, on the belief that data resulting from these efforts will allow for a more in-depth understanding of the co-op process and how students make meaning of their experience of the program. I agree with Miles and Huberman (1994), that researchers seeking to investigate what "goes on" in education should include data collection methods that focus on naturally occurring, ordinary events in their natural settings. I chose this study design and method of data collection because the student survey allows me to collect demographic data on a large number of participants, and interviews because meaning is central to discovering the individual's perceptions of the co-op program.

The Student Survey

A survey instrument was constructed for this study by adapting questions from proven survey instruments (A copy of the questionnaire can be found in Appendix C). The following instruments were consulted during the construction of the student survey questionnaire: (1) The *National Apprenticed Trades Survey* (NAT), a survey conducted by Statistics Canada for Human Resources Development Canada, # STC/ETC 180-75019; (2) *Extending the Map of Understanding Student Success* (MUSS), a survey of UBC students conducted by Lesley Andres (1997); and (3) the *1992 Survey of 1990 Graduates,* (NGS), a national survey conducted by Statistics Canada, Cat. No. 81-003 Vol.1 No.2. The 1992 survey was the fourth time in the last fifteen years that the NGS was conducted. In 1992 questions were added to determine graduates satisfaction with the delivery of their program and to assess how well programs provided them with skills and knowledge of job opportunities in their field.

Questions from each of the above sources were adapted and supplemented where necessary to construct the student survey for my study. For example: questions relating to 'reasons for enrolling' were adapted from NGS, MUSS, and supplemental questions were constructed from profiles of student enrollment at UVic. Questions on student relocation 'to attend UVic' were constructed to provide information on the student body at UVic, to reflect the importance of the geographic location and reputation of the university, and test internal reports that indicate that UVic attracts a large number of rural students. Questions on 'employment between high school and university' were adapted from NAT and are included to reflect prior work experience. This is important in attempting to calculate the impact of the co-op work term. Questions on relevance of 'previous work experience' were adapted from MUSS, NGS and supplemented with constructed questions.

Questions on student 'satisfaction with delivery of courses' were adapted from NGS and NAT. Questions on 'skills development' were adapted from the NGS and supplemented by questions on team-work, leadership, and specific job skills which were constructed from the literature on employment skills and reflect employer demands. Questions on 'knowledge provision' and 'opportunities' were adapted from NGS and NAT. Questions on co-op students' 'satisfaction with the work term' are adapted from the in-school training and on-the-job training sections of NAT. Choice of 'undergraduate program and part-time employment' questions were adapted from MUSS. Finally, questions on 'future plans' were constructed to provide information on students' career aspirations, while questions of 'retrospective choice' were adapted from NGS.

104

Demographic questions—age, length of time in Canada, citizenship, and gender—were adapted from NGS, MUSS, and a survey instrument developed by Fisher and Echols (1998). Categories of ethnicity were drawn from NAT, and categories of parents' employment were adapted from The National Occupations Classification (NOC). These categories allow me to appreciate the range of characteristics of students enrolled in co-op education. A coloured insert in the survey questionnaire requested further participation in the study and included space for students to provide personal contact information. Three questions requested information on whether or not the individual was enrolled in a co-op program, length of time in the program, and the number of completed work terms. This information was useful in selecting students for in-depth interviews.

Pilot Testing the Survey Questionnaire

The questionnaire was pilot-tested at three levels before it was considered appropriate for use. The first level consisted of meeting individually in August 1997 with three undergraduate students. Two were in co-op (Geography and Chemistry) but would not be part of the in-class survey because they would be out on a co-op work term when the survey was administered; one was not in co-op. Each was asked to complete the questionnaire then discuss the wording and perceived meaning of the questions. The purpose of pilot-testing the questions at this level was to ensure that the wording was appropriate for students at the undergraduate level, and to ensure that the meanings were unambiguous. These three initial tests were conducted in my office, and each was tape-recorded. I began each session with a brief introduction of the purpose of the research, a

confirmation of their willingness to participate, and an assurance that the student would not discuss the questions with friends prior to the conduct of the survey.

Participants were asked to complete the questionnaire, and be prepared to subsequently discuss their impressions of the questions with me. Each was seated at a desk in my office, where I had placed a microphone connected to a tape recorder, and provided with a copy of the proposed questionnaire. Students were asked to read the questions out loud and debate with themselves on what each was asking. They were to indicate verbally whether the wording and the meaning of the questions were clear and understandable. To make them comfortable in this exercise I left the office and closed the door so they would not be disturbed. When the students had completed the questionnaire I discussed each question with them to gather suggestions as to wording and possible inclusion or exclusion of questions or topics.

The second pilot-test was conducted at UVic between September 15 and 19, 1997. I met with the coordinators of the Chemistry, Engineering, Business, and Geography programs to request assistance in locating students, both co-op and non-co-op, who could assist me with the pilot-testing of the questionnaire. I briefly reviewed the purpose of the study and the need to pilot-test the survey questionnaire with undergraduate students from various levels of each program, ensuring that the students who took part in the pilot-test would not be drawn from the classes that would subsequently be administered the survey. Volunteers were located to complete the survey questionnaire as follows: six Chemistry students were selected representing the three years under consideration (4 were co-op

students and 2 were non-co-op, two females and four males); three male students from Engineering (two third-year, and one fourth-year); two females from Geography (third and fourth-year); and four Business students (two females and two males) from third, and fourth-year.

Students in Engineering and Geography completed the pilot test of the instrument individually, but those in Chemistry and Business conducted the pilot-test as a group. Each test began with an explanation of what the students should do in terms of critiquing the questionnaire and providing me on-going feed-back as they completed the questions. I attempted to tape-record the initial pilot-tests but found that this was not entirely successful, as students seemed inhibited by the presence of the tape-recorder. I abandoned it and instead engaged in discussion with students and took scratch notes of their suggestions. I tested Chemistry students in succession at the lab-bench in three different chemistry labs. Engineering and Geography students were tested in the co-op library and Business students were tested in a vacant classroom in the Commerce building.

The students were enthusiastic about participating in the pilot-test and didn't seem to mind that I was taking up about 40 minutes of their time. Students were candid in their appraisal of the questions. Two of the participants volunteered to be interviewed as part of the study. Not wanting to disappoint them by denying them an opportunity to tell their story I explained that interviews would not take place until next semester (possibly in February) and as luck would have it they would be out on a work-assignment. I allowed

them to give me their names and e-mail addresses in the event that I might later want to interview students who are not involved in the study to corroborate certain information provided by those in my sample.

As a result of the second pilot-test changes were made to the wording of Question 5, regarding family origin, and a sub-question was added to Question 13 regarding satisfaction with course availability. The words "outside of class time" added to Question 13, sub-question (b) regarding access to instructors. Changes were also made to Question 11 to improve text flow.

The third pilot-test was pre-arranged and conducted with eight undergraduate students (2 students from each of the four programs in the study) in a classroom at UVic on November 4, 1997. This pilot test was done to simulate the subsequent administration of the survey. Beyond getting student feedback it allowed me to accurately gauge the amount of time required to complete the questionnaire. When students were interviewed subsequently they expressed no difficulty in reading or understanding the questions. Two of the student suggested they felt rushed in completing the questionnaire. This prompted me to extend the time required for completion from ten minutes to fifteen. This was the amount of time negotiated with instructors when the survey was subsequently administered.

Following pilot testing the final survey instrument used to collect data on student

demographics and levels of student satisfaction with various aspects of their co-op

program consisted of 22 questions (see Appendix C).

Survey Data

A student survey was used to collect demographics and data on levels of student

satisfaction with aspects of selected programs (see Appendix C). The survey

questionnaire contained 22 items divided into five categories. See Table 1.

Table 1: The Survey Questionnaire

	Information Collected	Questions
Part A	Background Information	1-6
Part B	Reasons for Enrolling	7-12
Part C	Satisfaction with University Courses	13-14
Part D*	Satisfaction with Co-op Program	15-18
Part E	Future Plans	19-22

* For non-co-op students, this section sought information on part-time work

Parts A and B requested background demographic information and reasons for enrolling

at the University of Victoria. Part C focused on student satisfaction with courses and to

what extent they believed their courses provided skill development, knowledge, and

career opportunities. Part D questioned co-op students on their satisfaction with the co-op

program, while Part E explored students' plans for the future. Other than specific yes/no

questions, respondents were able to rate their replies on a 4-point Likert-type scale.

Following the development of a codebook, individual survey responses were coded and

entered into an SPSS program for later analysis. Write-in answers were quantified, coded,

and entered as numerical data.

The student survey was administered to selected classes of 2nd, 3[rd,] and 4th year students

(both co-op and non-co-op) in Business, Chemistry, Engineering, and Geography.

Table 2 : Participants in Each Year of Program Surveyed

Year Program	2nd	3rd	4th	Total
Business	126	111	100	337
Chemistry	92	90	20	202
Engineering	74	171	53	298
Geography	n/a *	84	91	175
Total	292	456	264	1012

*Due to difficulty finding a 2nd year Geography class with a representative number of co-op students who had completed a work term, only 3rd and 4th year classes were surveyed.

Co-op programs operate on a four-month rotation (four months in class followed by four months on a co-op work-term). Therefore, in order to capture students away from the university on work terms, the survey was conducted in two waves. The first wave was conducted in November and December 1997, with the second in March and April 1998. Following in-class observations the student survey was administered to: Business (n=12 classes), Chemistry (n=5 classes), Engineering (n=6 classes) and Geography (n=4 classes).

Along with demographic information, background work experience, reasons for enrolling in university, and satisfaction with certain components of the university experience, students were also able to volunteer for an interview. The survey was administered during regular class time and collected directly. Completed questionnaires were placed in one envelope and volunteer recruitment forms in another. The separation of the two parts of the survey protected anonymity of student respondents. Of the 1,040 survey forms distributed, a total of 1012 were returned complete and usable, for an adjusted completion rate of 97.3 percent. This provided a sample size for my study of 1012 students (737 co-op, and 275 non-co-op students).

The focus of this study is the co-op students' experience, therefore, only co-op student responses are reported. Table 3 indicates the number of co-op students who participated in the study by year in the program.

Table 3: Co-op participants by year of program

Year Program	2nd	3rd	4th	Total
Business	126	107	91	324
Chemistry	10	43	12	65
Engineering	74	169	52	295
Geography	n/a *	21	32	53
Total	210	340	187	737

*Due to difficulty finding a 2nd year Geography class with a representative number of co-op students who had completed a work term, only 3rd and 4th year classes were surveyed.

Following administration of the survey in each wave, in-depth interviews, lasting from one to two hours, were conducted with co-op students selected from the four programs (Business, n=16; Chemistry, n=7; Geography, n=8; and Engineering, n=14). Interviews were conducted at various locations on the UVic campus or at the student's place of work. Interviewees, who volunteered when completing the student survey, were selected according to the following criteria: co-op program area, number of years in the program, number of work-terms completed, and gender. In using these criteria for selection, my intention was not to obtain a sample of participants that in any way could be purported to represent the wider population of co-op students. Instead, it was intended to help me appreciate the diverse nature of a group of learners who had chosen to enroll in co-op programs. I was interested in whether students from different backgrounds had different attitudes and approaches to co-op education.

Interviews were also conducted with the instructors of each of the twenty-seven classes surveyed to provide insights into the classroom context, and with co-op coordinators

from each of the programs studied, the Assistant Director of Co-op Programs, and senior administrators from the university.

Representativeness of the Sample

Of the total population of undergraduate co-op students (n=2789) enrolled at UVic in the 1997 winter session, 1713 co-op students (61%) were enrolled in the four programs under study: Business (n=739); Chemistry (n=85); Engineering (n=698); and Geography (n=191) (see Appendix A). My sample of 737 co-op students, therefore, represents 43 percent of the total target population of co-op students in these four programs. My sample contains 44 percent of the total population of Business students, 77 percent of Chemistry students, 42 percent of Engineering students, and 28 percent of Geography students enrolled in co-op at UVic during winter session 1997.

Representativeness of the study sample was confirmed through a comparison of my sample of co-op students with the 1998 UVic Undergraduate Student Survey (UVic, 1999), designed by the Office of Institutional Research in collaboration with the academic and administrative departments.[9] The survey selected sixty-eight course sections to provide a representative cross-section of students in all faculties and years of study. The survey was self-administered by students between January 30 and February 24, 1998. A total of 2086 completed/usable responses were received for an 80% response rate. As can be seen from Table 4, the co-op students in my sample are representative of

---

[9] The 1998 Undergraduate Student survey was chosen because it provided demographic information on both co-op and non-co-op students enrolled at UVic during 1997; data that was not readily available elsewhere.

the population of students surveyed by UVic in terms of origins, gender, age and work experience.

Table 4: Comparison of my Sample with the UVic Undergraduate population

	My Sample (n=737)	UVic Sample (n=2086)
UVic classes surveyed	(n=27)	(n=63)
Where are co-op students from?		
Victoria	32%	26%
Lower Mainland	19%	21%
Elsewhere in BC	35%	31%
Outside BC	9%	17%
Outside Canada	5%	6%
Gender	Male = 66%; Female = 34%	Male = 63%; Female = 37%
Age		
18-20 years	26%	24%
21-24 years	60%	56%
Mature (25+ years)	14%	20%
Work Experience		
work before entering UVic	58%	76%

Interview data

Perceptions of co-op stakeholders were determined through in-depth interviews and analysis of documents. Informal interviews were conducted with faculty after administering the student survey to their class. These interviews were conducted in a variety of settings including the classrooms, faculty offices, and on several occasions at the Faculty Club over lunch. Similar questions were asked of each in an attempt to determine faculty perceptions of co-op. These interviews were not tape-recorded but notes were taken. Where this was inappropriate (e.g. the Faculty Club), I reconstructed the information as soon as possible after the interview. Along with faculty interviews, I also conducted informal interviews with co-op staff from the Director's office, and co-op students who were undertaking a work term in the Director's office.

Each formal (in-depth) interview was tape recorded and transcribed verbatim. The transcription was checked against the recording, and amended where necessary for

accuracy. Attempts were made to remove personal identifiers from the transcripts to ensure anonymity of interviewees, and alphanumeric codes and pseudonyms were applied. Transcribed interview data was entered into a qualitative database and coded using Atlas.ti software. Students were contacted once transcription was complete and offered an opportunity to review the transcripts for accuracy. Although I returned copies to all interviewees from the first wave of interviews, there was a low response rate (20 percent) from them on follow up. These respondents wished to provide additional information where they felt they had not completely answered a question. Additional comments were transmitted to me verbally. I wrote them down in the margin of the respective transcripts for consideration during analysis. Most students, however, appeared content to just receive a copy of the transcript and did not question the transcription.

Because of the amount of time involved in trying to get students to review and comment on transcripts, during the second wave of in-depth interviews I asked participants if they would be willing to review and comment on a copy of the transcript of their interview. Armed with the knowledge of the length of time the transcriptions were likely to take I was able to suggest a time when I would return the transcript to them and when they should contact me with their comments. Many of the interviewees simply stated that they saw no need to review the transcripts. Those who did agree were provided copies. A follow-up reminder to submit comments by the agreed upon deadline resulted in very few comments or criticisms of the material in the transcripts.

Concern was expressed by three interviewees that certain, discipline-specific comments appearing in the transcript might be traced back to them; extra efforts were taken to remove that threat. Interviewees expressed satisfaction with the final product. The follow-up by interviewees reviewing transcripts was lower in the second wave (16 percent) than the first. One of the interviewees suggested that because many of the students began a work term shortly after the interview, "all their attention is focused on the tasks of their workplace, and they have little interest in doing anything that reminds them of school."

However, because of the frequency with which I was on campus during the data collection phase I had opportunities to meet students I had interviewed earlier and continue discussions over coffee. There was also a small group of students who kept in touch with me by e-mail to follow the progress of the study and keep me apprised of certain situations in specific programs areas. In this way I was alerted to changes taking place within the programs that I would have otherwise missed. This allowed me to construct a more complete picture of the dynamics of these program areas.

In-class Observations

In-class observations allowed me to study the teaching approaches of instructors and gather data on the form and content of verbal interactions between instructors and students. I was able to document non-verbal behaviour, and patterns of classroom activity. I carried out a total of 27 in-class observations. Classes lasted for 90 minutes in some cases, while others were two and one-half hours. My procedure was to arrive early and select a vantage point near the back of the classroom that allowed me to observe the

115

in-class activities. In this way, I observed how students entered the room, where they chose to sit, how they reacted to the material being presented, and their interaction, or lack thereof, with instructors.

As the study progressed, it became evident that some of the early hesitation by faculty to participate in my study could be attributed to the fact that the timing of my study coincided with teaching evaluations. Apparently, certain faculty members were suspicious of an unknown individual sitting at the back of the room taking notes. After this was explained to me I made an effort to introduce myself to the instructors before each class to reassure them that my interest was the students behaviour in the classroom, not an evaluation of their teaching. This reassurance proved helpful. Word of the nature of my study was soon passed among faculty, making it easier for me to arrange to survey their classes.

Data Analysis Procedures

Procedures for data analysis bring order and structure to the quantity of data collected during a study. Analysis began with the ordering of the initial data in terms of field notes and preliminary investigations. Strategies were established for the sorting and coding of data before survey data collection began. These procedures became part of an iterative process throughout the remainder of the study. Preliminary analysis of both quantitative and qualitative data proceeded during the summer of 1998. The concurrent process of data collection and analysis enabled me to identify themes and patterns emerging from the data, allowing me to determine ways to fill gaps in current data, and ensure that sufficient data was collected to answer the research questions. Initial analysis began

while transcribing early field notes of observations of the campus and students. Daily write-up of field notes helped me to identify themes, patterns of activities emerging from the notes, or questions posed by the data for subsequent follow up. The fall and spring of 1998-99 were devoted to intensive analysis of the evidence gathered throughout the study.

Soundness of the Study

All research must adhere to certain standards that stand as criteria against which the trustworthiness of the project can be evaluated (Lincoln & Guba, 1985 p.290). Lincoln and Guba stress the importance of establishing not only the "truth value" of a study, but also its applicability, consistency, and neutrality. Careful attention to a study's conceptualization, and the way in which the data are collected, analyzed, and interpreted are also ways that validity and reliability concerns can be addressed (Merriam, 1988, p. 165).

Validity and Reliability

Validity and reliability refer to the correctness or credibility of a description, conclusion, explanation or interpretation in terms of its 'criteria of soundness', considered by Lincoln and Guba (1985) as appropriate constructs for inquiry. Maxwell (1996, p. 88) argues that the key concept for validity is the validity threat: a way in which the researcher might be wrong. These threats can be interpreted as alternative explanations for the phenomenon under study. To guard against threats to validity I adhere to four criteria considered by Lincoln and Guba (1985) as necessary for evaluating the soundness of qualitative

research: credibility, transferability, dependability, and confirmability. Each is discussed below in relation to my study.

Credibility

To meet credibility requirements a study must demonstrate that "the subject [of the study] was accurately identified and described" (Marshall & Rossman, 1989, p. 145). My study is based solely on data derived from a comprehensive study of co-op education programs in my chosen study site. Descriptions of data and patterns of interaction are only considered if they are obtained within the boundaries established for the study. This includes the setting, the people in the setting, and the theoretical framework of this study. All aspects of the research are made explicit. In that sense I have followed the advice of Yin (1994, p. 37] in conducting my research "as if someone were always looking over [my] shoulder."

Transferability

I have stated the theoretical parameters of my research and data collection methods. My research involves triangulation of multiple sources of data (Yin, 1994, p. 91). I have collected data using multiple methods and sources of information including a variety of informants, documentary evidence, and personal observations. In certain cases the multiple sources of evidence provide multiple measures of the same phenomenon. It is therefore left to future researchers who might be interested in conducting a similar study and who might design research using the same parameters, to determine any possibility of transferability.

Dependability

According to Marshall (1989, p. 146) this construct attempts to account for "changing conditions in the phenomenon chosen for study as well as changes in design created by increasingly refined understandings of the setting." My study is iterative, the situations and settings that I studied did not remain static. However, by constantly relating the data to the theoretical framework I have attempted to minimize any effects that changing conditions may have on my study. I have also maintained a "paper trail" of what data was gathered and how it was gathered so that I can account for both the process and the product of my study.

Confirmability

The concern here lies with the traditional concept of objectivity—can others confirm the findings of my study? I am interested in recording the complexity of situational contexts and interrelations as they occur, rather than controlling the research conditions. Therefore, I leave it to future researchers to decide the merits of replicability. While I agree in principle with Marshall and Rossman, (1989, p. 148) that "qualitative studies by their nature … cannot be replicated because the real world changes," I also believe that the survey instrument and interview protocols developed for this study have the potential for future use with similar populations of co-op students, either from the same or different institutions of higher education

I acknowledge that subjectivity cannot be excluded from my study because of the nature of the investigation. I attempt however, to provide controls for bias in interpretation of the data. I maintain a "chain of evidence" (Yin, 1994, p. 98) which allows others to

follow the derivation of any evidence from initial research questions to ultimate

conclusions. My collected data and data collection procedures are maintained in an

organized, retrievable form, available for external investigation, or to other researchers

wishing to reanalyze the data.

Ethics

Merriam (1988, p. 179) identifies two points in a qualitative study where ethical

dilemmas can emerge: during the collection of data and in the dissemination of the

findings. I acknowledge that the close association created by the in-depth interview

situation means that it is rarely bias-free, and calls for increased self-awareness of

personal assumptions and values on my part as the researcher. I do not consider over-

involvement likely. I maintained a friendly yet professional approach during interviews. I

did not offer anything in return for permission to conduct my study. My data collection

methods involve no harm, or invasion of privacy to the participants. Those involved with

the study were provided with a statement of the purpose of the research and the methods

of data collection. Each participant signed an informed consent form acknowledging their

willingness to participate in the study and consenting to the use of the data derived from

the interviews for the conduct of my study. The research was conducted and reported

following the terms and conditions of Ethics in Research, as stipulated by the University

of British Columbia, and the University of Victoria in granting permission for me to

conduct this study.

Limitations of the Study

The study had certain limitations in relation to the sample design and the retrospective nature of the inquiry. Participants in the study were recruited from selected classes in Business, Chemistry, Engineering, and Geography known to contain large numbers of co-op students. Interview participants were recruited through the student survey, and the influence of self-selection in this regard is unclear. Although the participants met the criteria for the study, it is possible that other factors influenced their decision to participate further. For example, only students with a very positive experience, or those with a very negative experience may have chosen to be interviewed. It remains unclear what role deciding to volunteer for the study played.

A second limitation concerns the data collection procedures. Although I conducted a large number of interviews and observations, it was not possible to clarify the interpretations of study participants about specific issues, to the extent that all ambiguity was removed. However, repeated interviews and observations produced similar findings to the extent that interpretations were replicated in others' responses. Therefore, the results can be seen as robust because they are derived from a variety of informants.

Specific data collection procedures also produced a third limitation. The study used students from four co-op programs, broadly representative of the Arts and Sciences. The study was cross-sectional and gathered information at a single point in time during the co-op program. The single interview design severely limited any opportunity to develop a deeper understanding of the experiences of women and other minority students in the co-

121

op programs. And, because interviews were held during the academic semester, attempts to follow-up with students and have them review transcripts of their interviews was hampered (in some cases) by students relocating for a work term. A longer study, with students repeatedly interviewed after each of a number of work terms, could provide more information on the critical points when students' perceptions of learning and work change. Also, the four programs studied represent approximately ten percent of the total number of co-op programs offered at UVic, and a larger sample might provide additional information on certain of the parameters under study.

A fourth limitation relates to the retrospective nature of co-op students' recollections about their experiences. Time may have altered the memories of their experiences and it was not possible to directly assess the accuracy of individual stories. Nonetheless, the consistency of patterns in students' recollections was sufficiently reflective of the phenomenon of interest. In addition, reviews of the relevant literature supported critical components of the students' explanations of their experiences.

Finally, due to time restrictions and financial limitations it was not possible to interview employers of co-op students to verify students' comments of the co-op workplace.

In Chapter 5, immediately following I report the results of data collection beginning with students work term experience then focusing on what happens to students when they return to university and engage in further coursework after completing a work term.

CHAPTER FIVE:

RESULTS

In this chapter I present the results of my data collection. Because co-op students alternate between two contexts—the academy and the workplace—they draw on their experiences in both contexts to develop their perceptions of learning and work. The boundaries between the two contexts are permeable; we cannot assign learning to one camp and work to another. However, certain activities can be more clearly presented if we maintain an analytic distinction, at least initially. For example, the workplace is where co-op students develop skills and experience in the practical application of theories learned in the classroom, while at the same time learning how to be a professional in their field. Meanwhile, the university combines academic preparation with work experience and professional training in an attempt to ensure the relevance of co-op education to employment. In presenting the results, therefore, I have chosen to segregate out 'learning for the sake of learning' as a continuing mandate for universities. I frame co-op students' experience in the academic context as learning *for* the workplace, and their experience on the work-term as learning *in* the workplace.

I begin by providing details of the study participants. Next, I investigate co-op students' experiences of the workplace, then explore what happens to students when they return to the university to engage in further academic training. I use data drawn from institutional and departmental documents, the student survey, and interviews with administrators, faculty and coordinators, to provide a broad general overview. The details of the co-op

students' experience are drawn from student interviews and my field notes. Data are presented according to the following broad categories: study participants; doing co-op; skill development and learning; and professional development.

The Study Participants

Students participating in the study are a diverse group. A total of 1,012 students participated in the student survey. Of these, 73 percent (n=737) were co-op students. It is the co-op students in the sample that are the focus of this study and therefore, unless otherwise stated, the following results relate only to the co-op students in the sample.

Of the total number of co-op students participating in the study, 64 percent[10] are male and 34 percent female. Only one program—Engineering—shows a marked gender disparity, with considerably more males than females in the sample. One-quarter of the students (26%) are between eighteen and twenty years of age; a further 36 percent are twenty-one to twenty-two, and 24 percent are twenty-three to twenty-four years of age. A smaller number of students (14%) are 25 years or older. There was neither a marked difference between the ages of male and female students, nor in the distribution of ages across programs. However, the Engineering sample contained no females over 25 years of age.

More than three-quarters of participants (79%) have lived in Canada all their life or are Canadian citizens. The dominant cultural group is English-Canadian (53%). Chinese-Canadians are the next most numerous group (10%) with the balance representing

---

[10] Because of rounding of percentages in this section totals may not always equal one hundred.

Canada's multicultural diversity. The University of Victoria draws students from throughout the province as well as other parts of Canada. More than two-thirds of participants (68%) moved to Victoria specifically to attend university: 19 percent from the Lower Mainland; 35 percent from elsewhere in BC; 9 percent from other Canadian provinces; and 5 percent from other parts of the world, predominantly Asia.

An approximation of co-op students' socio-economic status can be inferred from parents' combined occupations. More than two-thirds (69%) of respondents classified fathers' occupations into four broad categories: professional (38%); senior management (14%); craft/trades workers (9%); and technician (8%). The top four occupational classifications for mothers—accounting for 70% of the total—included: professional (34%); service/sales (14%) clerical (14%); and never employed (8%).

On average, more than one-half of co-op students in the study had work experience prior to entering university. Two-thirds of Geography (66%), and Engineering students (65%), and one-half of Business students (56%) worked between high school and university. Less than one-half of Chemistry students (43%) had work experience when they enrolled in university. The characteristics of student employment are presented in Table D1 (see Appendix D). Few co-op students worked in areas related to their current field of study between high school and university. The prime motivators for undertaking employment were to make money for tuition and to gain work experience.

In general, the majority of students entering university believe it is important to obtain a degree. Co-op students attend university for intellectual development and to improve their chances of employment on graduation. Table D2 (Appendix D) indicates co-op students' reasons for enrolling in university. By and large, they enroll for general self-improvement, to gain knowledge of a field of study, to improve their chances of deriving a good income from employment when they graduate, and to acquire specific job skills. Geography students indicated that gaining a broad liberal education is an important reason for attending university, while Engineering students appear more closely focused on a future professional career.

Students pursue co-op for a variety of individual reasons. Each approaches with a 'learning orientation,' which may include academic, personal, vocational or social reasons for seeking higher education. These reasons are not made explicit in the survey data, but become apparent through student interviews.

For example, when asked why they enrolled in co-op responses were evenly split: some students suggested that it was an investment in a specific future career; others that is was an aid to deciding what career to pursue.

> I could go and get a Bachelor of Science but then, what do you do with that after you graduate? But, with engineering co-op you graduate with a career [CSP12].

> I felt that if I did something where I had the opportunity to you know, try out different jobs and see what it was like, then I would come out with something a little closer to what I wanted to do [CSP15].

Other students enrolled after being 'sold' on the benefits of co-op either by UVic representatives touring the province, or friends currently in the program.

> They came in [to my College] and did a presentation on the wonders of co-op, the
> innovative programs. That really sold me [CSP25].

> A couple of friends in my first year were in the business program and what they were
> studying seemed really interesting to me [CSP21].

Geography is unique among the programs in the study in that it offers both a B.A., and a

B.Sc. degree. Therefore, students can specialize in cultural and human geography, or

technical courses like GIS in physical geography. Some students enroll in geography co-

op both for the experience and career direction.

> I wanted some actual work experience. And, I just thought that co-op would be a good
> way to go because if I was working in the field that I was studying, then I would get a
> better idea if that was what I wanted to do [CSP15].

Others enroll as a result of peer pressure, and the financial incentives offered by co-op.

> I found out through other friends in Geography in my first year. Co-op was kind of a
> buzzword. They said it would be work related to the courses that you learned in school
> and it was good money [CSP17].

> I had friends that were in co-op programs at other schools. Basically they had nothing but
> good things to say about it, and since I was paying for school on my own, I thought it
> would be a good chance to try and make some money to offset the costs, and also gain
> some experience [CSP44].

Once admitted to the co-op program, students must successfully complete the required

discipline-related coursework, ensuring they maintain a sufficiently high GPA to remain

in the program, along with completing a prescribed number of co-op work terms.

Results of the student survey, presented in Table D3 (Appendix D) indicate that co-op

students have ambitious plans for the future. When reporting their ambitions upon

completion of the co-op program, student responses separated not along the anticipated

science/arts dichotomy but according to the mandatory/voluntary split. Students in

mandatory co-op programs of Business and Engineering are significantly more likely to

seek employment in their field directly after graduation, than co-op students in the

voluntary programs of Geography and Chemistry [X^2 = 21.75 (3) p< .001]. These results are consistent with those in Table D2 (Appendix D) where Business and Engineering students suggested that they enrolled in university to develop in-depth knowledge of their field of study; improve their income on graduation; and acquire specific job skills.

Co-op students were asked to identify the job or career that they were aiming for on graduation. The two top career choices for Business students were financial planner (38%), and business management (17%). Chemistry students are aiming for careers as chemists (31%) and in medicine (28%). A majority of Engineering students (68%), not surprisingly, plan a career in Engineering, and Geography students seek positions as resource managers (26%) and planners (17%).

The analysis of students' future plans produces a result that contradicts previous research. Slightly more than one-half of all co-op students in the study include graduate education as part of their future plans (Table D3, Appendix D). Co-op students in Chemistry appear the most likely to pursue graduate education and Engineering co-op students the least likely [X^2 = 44.63 (3) p< .001]. These differences might be explained, at least in part, by the different career paths chosen by students in the two programs. For example, a number of students in Chemistry plan to apply to medical school upon graduation. A science background is a prerequisite for Medical school, so Chemistry became a focus for these students. Students described the benefits that the Chemistry co-op would provide. First, they would develop a solid background in Chemistry, which would be useful to them while studying Medicine. Second, their co-op work terms would provide experience in

areas that would assist their application. Work terms with pharmaceutical companies or

agencies like the Cancer Clinic were perceived as ways of enhancing their Curriculum

Vitae, and improving their chances of acceptance into Medical School. Finally, and not

inconsequentially, co-op students can complete their undergraduate programs debt-free,

allowing them to entering Medical School without the burden of debt that other students

might carry. Chemistry co-op graduates are therefore in a better financial position both

during their medical training and subsequently, when they wish to establish a medical

practice. The Chemistry co-op thus appears to provide students with opportunities to

accumulate experiential, social, and financial capital and thereby enhance their chance of

success in their chosen career.

Engineering students, on the other hand, have different expectations, tied both to the

strength of the Engineering culture and the process of certification that Engineers must go

through once they complete their academic training. In order to obtain the designation of

professional engineer (P.Eng.) graduates must work for a period of time under the

guidance of certified engineers, while they learn the various codes and bylaws that they

will be required to adhere to once certified. Achieving the status of P.Eng. provides

opportunities for individuals to undertake sole responsibility for engineering projects.

Therefore, it is in the students' best interest to begin the process of qualifying for the

P.Eng. as soon as possible after they graduate. Because of the dedicated labour market for

graduating Engineers, there is a good possibility that students can draw on the

professional networks (social capital) and previous work experience (experiential capital)

developed during their co-op work terms, to locate a company or consulting firm to employ them during this qualifying period.

Co-op students expressed confidence that they would find employment upon graduation from their program. One-quarter of Business students (25%), one-third of Chemistry students (34%), and one-sixth of Geography students (17%) indicated that they were not worried about finding a job in their field. Engineering students were the most confident with almost two-thirds (62%) expecting to find employment in their field on graduation from their program.

Part I: The Workplace Context

'Doing Co-op': The Co-op Work Term

Almost without exception 'doing co-op' is the way the students I interviewed referred to the work term component of the co-op program. To 'do co-op' was to undertake a co-op work term. To be 'on co-op' was to be away from the university on a work term.

The work term is not only an integral part of the process; it is the distinguishing feature of the co-op program. It is what sets co-op students apart from non-co-op students. In discussion with the actors and agents of co-op, it becomes clear that the work term is the axis on which co-op turns. It is through the work term that the four levels of the case study described in the methodology chapter are brought together. The university, through its senior administrators, is the interface between the community, governments and

industry—all external players in the co-op process. It is also the administrative body that oversees the policies and processes of co-op education within the university.

The university delegates responsibility for the operation of co-op education programs to the Director of co-op, and through the Director's office to the co-op coordinators, who are the brokers between the university and the workplace. Coordinators have to be able to "talk the employer's language to be able to determine employers needs" [CP1], and be able to "bring a sense of the curriculum to co-op employers so they understand the level of education and training that co-op students have to offer" [CP3].

University faculty are charged with delivering content knowledge and skills to prepare students for life beyond the university. Because of the prominence of co-op on the UVic campus, faculty will inevitably become part of the system that prepares co-op students to undertake learning in the workplace. One faculty member explains it this way "we have to take it seriously, co-op programs make a lot of sense for us. Because, like it or not, 80 percent of our budgets come from governments—which means taxpayers—and since we can no longer ensure that an undergraduate education will lead to jobs for our students we have to make provisions for them to be able to get jobs when they graduate. Co-op programs, and particularly the work term where they get to apply learning, are legitimate ways of doing that" [CF14].

The central role that the co-op work term plays in facilitating links to the business community is evidenced both through the number of student work placements in the local

community, and through the creation of an co-op advisory council, made up of representatives from business and industry. Because the business community is heavily involved in planning for the co-op program through the advisory council, and then in promoting it with government "they feel a fairly keen sense of ownership of it," according to one administrator (SA2). Industry support for co-op education is not confined to the Sciences and Applied Sciences, but extends to the Arts and Humanities. For example, in the minutes of the UVic Board of Governors we find a report of a survey of employer demand for co-op students in the Victoria region. Business leaders from 117 organizations believed that there was "a need in the business community, and society in general for skills which are developed during the Art, Sciences, and Humanity *(sic)* degree programs" (UVic, 1987).

As an educational strategy co-op education allows students to contribute to society, through employment, whilst pursuing their degree, and provides the opportunity for them to develop skills which will best serve them in the future. For some students a co-op work term affords an opportunity to 'try out' a job that may look interesting. Co-op experience can help them decide that, even though the job provides learning and skill development, it is not what they eventually want to pursue. One student remarked "I found out that that was work I didn't really want to do when I graduate. And, before, I thought it was something I wanted to do. So, in that respect it was a very worthwhile experience" [CSP23]. Others were confident that their co-op experience would help them make a successful transition to the workplace, even though they had not, as yet, committed to a specific career path.

> Because of co-op I will basically be able to leave the University being kind of well
> rounded and having a base of knowledge to work from. A base of good solid experience.
> And a degree that would be valuable, or recognised in the workplace. I have got
> transferable skills out of my co-op jobs that can be applied to other jobs [CSP41].

Co-op students are—to use the words of one student—the "sentinels of co-op," and when

on a work term represent all levels of co-op in the university to the community and

society in which the workplace is embedded. Until they have completed a work term,

students report, they do not feel like, nor are they perceived as, *bona fide* co-op students.

The number of work terms varies depending on the program. Business students must now

complete two work terms (reduced from three at the beginning of the study) to graduate

with the co-op designation. Chemistry and Engineering each require that students

complete five work terms, and Geography students must complete four work terms.

Selection for and Satisfaction with the Work Term

The way students select and are selected for work terms is similar, though not identical,

in all four programs in the study. The process of applying for a work term generally

begins with students retrieving information on potential job opportunities from an

electronic bulletin board, e-mail list, notice board, or job book maintained by the co-op

coordinators. Students prepare job applications and submit them, along with a résumé, to

the co-op coordinators, who forward the applications to prospective employers.

Employers review the applications and select the individuals they wish to interview.

These names are conveyed to the coordinators, and students are notified. Following

successful interviews, students decide which position to accept. For most students this is

the standard process for obtaining a work term. A small number of students, however, for

reasons of their own, choose not to use the co-op office to find their jobs, and instead use

personal contacts to identify employment opportunities. If approved by the co-op office these jobs can be accepted as work terms.

The process of applying for co-op terms means that each year, while courses are underway, co-op students must think ahead to the upcoming work term. Approximately mid-way through each term co-op jobs are posted and students must prepare their résumés and applications. A majority of students described how the uncertain time between submitting an application for a co-op job and confirmation of a placement increases pressure on students, particularly when some are studying for mid-term exams.

> I remember one semester having five or six interviews without getting a job, and you start to feel a bit discouraged. And the pressure starts to build. Can you pay the rent at your apartment? Are you going to be living there in May, or not? Just all of a sudden it's a lot going on [CSP17].

> I know other people that have gone back to old jobs or that have taken jobs for very low pay and completely unrelated to business or the field that they are interested in just to get a work term so they can get back to studying for exams [CSP39].

An increasing number of anxious co-op students seeking a decreasing number of good work terms creates a buyers' market, and employers become increasingly selective when hiring for co-op positions. This increases the level of uncertainty felt by students.

> It's not uncommon to have like a seven or eight-dollar [an hour] job and the employer short lists ten or twelve people for one or two positions. And they do a second or third interview for some of them [CSP33].

> The ones that I did get short-listed for, and interviewed for, were, what I considered, pretty menial jobs and just not really what I was expecting [CSP16].

However, students must be adequately prepared before they go out on a work term. Faculty and coordinators are sensitive to the fact that inadequately prepared students reflect negatively on the program.

> I think we have to be a little careful of the level of education when we send students out. We can't send them out too early because they don't have that much to offer. We could tarnish the program a little bit if we don't send out good students with some skills [CF3].

134

The competition for good co-op jobs is intense, and because of the limited job market in some disciplines for students with basic skills, not every student will get a 'dream job' for their first work term. As one student explains:

> There is a lot of pressure from the co-op department to use the first co-op as a 'learning experience.' The idea is that if you started with a really lousy job, you would be able to learn from that experience and get a better one next time. Some people did. But the way it turned out for some students was not exactly as expected [CSP24].

Despite some anxious moments around securing a work placement students express general satisfaction with the process of selection for the work term. Co-op students were asked to rate their satisfaction with the work term component of their program as part of the student survey. Table D4 (Appendix D) indicates their responses. The results indicate that, in general, most students are satisfied with their work term experience. Chemistry students reported greater levels of satisfaction than students in other programs on all aspects of the co-op work term, with the exception of rate of pay while on the work term which was lower than Geography and tied with Engineering. How much of the level of satisfaction with rate of pay on the work term is an actual portrayal of industry standards, and how much is attributable to students perceptions of rates of pay offered in certain industries, like the pharmaceutical industry, cannot be determined from these results. Students in Engineering and Geography appear generally satisfied with all aspects of the work term. On the other hand, Business students appeared less satisfied with the work term than students in the other three programs.

Students were asked to rate their level of satisfaction with the integration of their coursework with the co-op work experience. In general, most students indicated satisfaction with the integration of coursework and work term experience. Chemistry

students appear most satisfied (82%), followed by Engineering (77%) and Geography students (65%). Business students were less satisfied with the integration of their coursework with the co-op work experience (36%). These results parallel the general lack of satisfaction with the work term by Business students reported earlier.

Once a student secures a work term placement they can return attention to their studies and prepare for exams. There is an obvious benefit in being hired in the 'first round,' as students who are successful in obtaining a placement early can devote more time to their studies. There is also a certain prestige associated with a first-round placement. Students who do not get a placement in the first round must enter the competition in a second round, held nearer the end of term when students are preparing for final exams. Once the academic term ends, students with a placement embark on the co-op work term component of the program, while students without a placement must decide on alternatives.

Students must complete a specific number of work terms to graduate with the co-op designation. Therefore, if students are unsuccessful in securing a work placement at a designated time in their rotation, they might have to consider taking extra coursework during that term, and preparing instead for an extended work term in the future to make up the deficit.

While on a work term, students are required to develop a report for presentation and evaluation on their return to the classroom[11]. Upon completion of the work term employers evaluate the students performance, the work term report is submitted and students return to the university for further coursework. Mid-way through the following academic semester, in all but the final semester, the process of applying for co-op work terms begins again. This cycle is repeated until the student graduates.

A large majority of students see the first work term as legitimating them as co-op students and indicating their commitment to the program. Most consider it a 'a big deal.'

> That first co-op is a big jump. Yeah. Once you get one out of the way, you're sort of head and shoulders above the crowd. And then people start taking you seriously [CSP42].

The first work term shapes their perception of what co-op is about. Before students go out on the first work term they have a different view of what the workplace is like. As one student commented "even if you are studying engineering, it isn't until the first work term that you realise that this is what engineering is all about. It isn't just studying math. It lets you know that engineering is not quite what the university paints it to be" [CSP23].

In the workplace students have the opportunity to 'try out' procedures which they have only learned about theoretically. The opportunity to attempt a procedure or skill previously learned in the classroom, and to produce a tangible outcome is a rewarding experience for many students. They discuss the excitement of discovery and the impact on their perceptions of learning. One student summed it up succinctly: "when you get into the workplace, and you get a chance to really try it, you start to see that it's do-able,

---

[11] There is variation among the programs as to who is responsible for this evaluation and the formality of the process.

137

this stuff is do-able! And, you realize that you can pretty much work in any situation and make things happen, just make it work" [CSP28].

On the work term students might also learn skills not yet encountered in the academic context. The work experience can thus increase students' appreciation of the importance of classroom learning, and give them a head start on the courses they will be taking in the following academic semester. The work term can thus motivate them to learn more about their disciplines.

> I sort of got a little ahead of the program load. There were definitely some times during my work term when knowing more would have been helpful. But I also found that having the co-op first I have a very good understanding of the classes I am taking now. I pay attention a lot more. Because I realize how important some of the things they are talking about are-versus-if I hadn't done the co-op and had just taken courses, then sort of half-heartedly paid attention a lot of the time. But I found that I was like, oh, this stuff really isn't boring, it's what actually happens, so I'm going to pay attention now [CSP38].

The first work term allows students an opportunity to develop on the job skills. For some, without previous exposure to wage labour, it introduces them to the realities of financial responsibility, and payroll deductions.

> My first co-op term was great, I learned a lot and I mean I was making a lot of money. But I was also making cash money. And, I soon found out that there is a difference between making cash money and taking deductions. So, I also learned about Revenue Canada [CSP3].

While most students perceive the first work term as pivotal, not all are equally enthusiastic about their initial co-op experience.

> There are several lower level jobs which aren't exactly people's dreams jobs, like there is one here in town at XXX laboratories, which is basically washing glassware for four months. And that can get pretty boring. So after my first work term, I was thinking, this is not what I expected. Like I don't know if I want to stay in the co-op program if I'm only going to be washing glassware every four months. But, the second co-op was much better [CSP17].

> I hated the job I had for my first work term. I just couldn't believe I settled for this. I was asking myself "why?" [CSP30].

The first work term also brings out differences in perceptions between co-op students and coordinators as to what constitutes an appropriate work term. One student complained "A lot of the jobs they try to float to the mechanical engineers are actually computing jobs—like doing web pages for somebody. As far as I'm concerned, that's not really mechanical engineering" [CSP42]. Where possible coordinators attempt to guide students in the choice of a work term appropriate to their level of education and training. However, because of increased competition for a diminishing number of 'good' work terms, coordinators' recommendations do not always match students' expectations.

While reports of less-than-satisfactory work terms can affect student morale in a co-op program, a positive workplace experience can profoundly affect a student's attitude and confidence.

> Going into my third year of university, after I had a good work-term experience, I was pumped up--gung-ho to get into courses and stuff, and get out there again, believing that the next one would be even better than the first. So, I was very fortunate. I felt like I had one of the best co-op jobs possible. I was really excited [CSP24].

The first work term serves as an introduction to the workplace, and establishes a co-op student's legitimacy. Although students only have a modest amount of workplace familiarity by the second work term their outlook on co-op changes and also the way they relate to, and are perceived by, faculty.

> Compared to my first one, my second co-op was really good. It was totally geography. I learned some new skills that will help me in the future. When I was writing my [work term] report I was thinking, "You know, I've done this and this and this." You know what I mean? Like, just building my resume all the time. So now I am looking forward to my next co-op [CSP17].

> After the second work term the relations with the professor gets closer. They advise you more. They take more interest in what you're doing. And they try to help you along a lot more [CSP38].

The experience of co-op work terms helps students understand the practical relevance of what they learned in course work—something that may not have been immediately obvious at the time. By seeing "theoretical" problems embodied in the workplace, they come to appreciate the power and transferability of underlying concepts.

> But you don't realize that until you go on co-op and your fellow workers, they're complaining because they're not being paid enough and you wonder what sort of compensation package they give these people. Or how many hours, or how to schedule for when you're planning the production schedule; how much time do you need for breaks and stuff like that. I mean that was straight out of Commerce 340, which was operations management, or Commerce 310 which was Canadian organizational behaviour like how to manage employees and stuff [CSP38].

> A lot of my courses then really made sense. Like all the management information systems - I actually saw that there is an actual department for that, and there is a need for all this, and that was really interesting. Human resources, and just all my courses actually made sense - it gave me more confidence in the academic school system, I guess. Before I thought they were just trying to suck money out of us, and there was really no need for us to be taking these courses. It was good because it made me realize that all my hard work is paying off, there's a reason [CSP43].

Another student was able to make a contribution to his co-op workplace by operationalizing a procedure he had just learned in class. He anticipates that future courses will provide him with enhanced levels of relevant skills.

> I'm really hoping some of my courses will be like my last school term. The first assignment I got on my work term was like a continuation of this course I had just taken. I just sat down and, because I had just taken the course, I just sat down and boom, I just had the thing right there and they were very impressed, oh he's so smart. And it was terrific because it was just right from my course, so I phoned the professor up and told him [CSP20].

The increasing preference of some employers for eight-month, rather than four-month, work terms causes a dilemma for a small number of co-op students. One explains how difficult the decision is.

> They would really like me for an eight month work term. But I'm not quite sure at this point. My supervisor talked to me yesterday and asked me if I was interested in working for another four months. Because they think it's probably better [for them] if they don't have to train someone new. They would like me to stay instead of hiring a new co-op student. But, I just don't know [CSP6].

From an employer's perspective, eight-month terms cut down on training time and allow a longer period of productive time for co-op students. They also provide the employer with a longer time to determine if the co-op student would make a good future employee. These benefits all accrue to the employer, and have been mentioned by students during interviews. Students in Business suggest that some employers are unwilling to consider co-op students for training positions in management unless they agree to an eight-month term.

> Employers are not willing to hire someone for four months, and put them in a management position, and then have them leave. They just can't afford to do that. [CSP43].

> A lot of times they won't even look at us because [a four month work term] is way too short for the amount of training they have to provide [CSP9].

There are certain benefits for both co-op students and employers when a student agrees to an eight-month work term. The longer time spent with one employer can provide opportunities for the student to undertake more intensive training in a speciality or gain more in-depth experience of a particular workplace. By allowing a student to participate in different aspects of a job, and work in different areas of specialization, the employer can gauge the student's potential productivity as an employee. Extending the length of employment allows co-op students to accumulate more income, which is an important consideration for those concerned with the rising cost of education. Eight months also allows ample time for students to determine if the type of employment is one they want to consider as a career upon graduation.

However, there can be academic and personal drawbacks to this kind of arrangement for co-op students. While an eight-month work-term carries little downside risk for the employer, co-op students must consider that by altering their four-month routine they will

141

have more difficulty readjusting to being back on campus and will also break the

connection with their cohort. One student described how "difficult adjusting back to life

as a student" can be after an eight month work term.

> I was on co-op for eight months and it was a little difficult in the sense that you have to
> have a student network as well as an employer network if you want to get by in co-op.
> Like you have to know people and missing eight months of school and then coming back,
> you notice that there aren't the same people in your classes as there was before, so, that
> was a little difficult. Because, I mean, you miss a class someday, and you would like to
> get the notes, or you have got a lab and you would like to work on it with somebody.
> There is that kind of difficulty [CSP44].

What the student found to be "way harder is getting excited about studying again,

especially when you feel that you are just another lowly student being talked at." There

was a perception that "Nobody seems to think that you have anything to offer from your

time away, you know? That kind of thing is hard" [CSP44].

Returning students may also experience difficulty getting into required courses, and may

have to accept courses that are not their first choice, or they may have to wait until

courses are offered again in a subsequent rotation. These course availability problems can

extend the length of time it takes to complete the degree.

> It doesn't necessarily help to take an eight month job because you shift your whole
> position in your program. I have delayed my graduation by a year just by taking an eight-
> month work term [CSP36].

Some students resent that the co-op office views eight-month work terms as carrying the

same financial commitment and reporting as two four month terms.

> The thing that doesn't sit well with me is if you do an eight month work term and want to
> have it count as one work term, they won't let you do that. You have to do two four
> month work terms [with the same employer] and pay the three hundred and fifty dollars
> [co-op fee] twice [CSP40].

Others simply find it difficult to get back into the routine of university classes after a

work term and with the agreement of their employer and the co-op coordinator, choose

instead to spend eight months on the job.

> After working for four months, I came back to university and thought, I don't want to be
> in school right now, I don't feel like sitting in class. I want to work another four more
> months. And so I just did that [CSP37].

Students must consider that an absence from the university for eight months might

adversely affect academic motivation and grades, and ultimately jeopardize their co-op

standing. For these reasons, eight-month work terms are usually not encouraged by co-op

coordinators, and despite the fact that a faculty member tried to convince me that "eight

month work terms don't work. In the second half the learning curve goes flat after about

one and one-half weeks" [CF17], approximately one-fifth of students in the study

indicated during the interviews that they are still interested in pursuing eight-month work

terms.

Because the work term has emerged as such a prominent feature in discussions around

co-op, it should come as no surprise that it acts as a lightning rod for student

expectations. No one associated with co-op speaks of the work term dispassionately.[12] It

seems appropriate, therefore, that co-op students chose the quality of the work term as a

way to gauge whether or not their expectations are being met.

> I guess I had sort of false expectations when I came in. I thought everything was going to
> be, you know, the jobs would be there, and we would have all of these interviews and
> stuff [third-year student].

> It is sort of a shock. Because everyone hears about co-op, and that that's the way to go,
> and you'll get the jobs. But really, I found it took a lot of my own efforts. I really had to
> go out and find jobs myself [third-year student]

---

[12] Because of the sensitive nature of certain responses contained in this section I do not report the program area or gender of
respondents in attributions for quotes. This is done to preserve the confidentiality of respondents.

Because the work term is the defining element of co-op, students tend to single it out for criticism. Approximately one-third of the students expected more appropriate jobs than they were offered and the lack of "good jobs" came as a disappointment.

> They were promising there would be a lot of jobs for everyone in the co-op; the co-op department was going to find jobs for everyone. But, somehow it didn't happen [fourth-year student].

> I expected that you would be able to pick and choose which jobs you wanted and be able to get one you actually liked [third-year student].

Students who based their expectations largely on what they saw in the co-op program literature, or heard through anecdotal accounts, felt let down by co-op. One student described it as "being led down the garden path."

> From what they said in the handouts, when I came into co-op, I was expecting like, real jobs that would enhance your skills to make you a better person once you graduated [third-year student].

> They make you believe that as a co-op student you will have all this experience in your field, so it makes you much more prepared for the real world [second year student].

Students with high expectations of the quality of job that they might get, suggested to me that they felt disappointed when they had to settle for a job of less quality. They partially blamed themselves for not getting the same kinds of jobs as past students.

> I think they have competent people working in co-op. I think it's maybe me. It's just a matter of me getting into the system or into the groove. I haven't seemed to get the kind of jobs they advertised. I hope it will work out [fourth-year student].

A group of approximately five students mitigated their situation by finding ways to acquire the required number of co-op work-terms without doing the work. They found ways, in their words, to "beat the system" in order to appear as successful as past students. For example, if they couldn't find a job through co-op, some students returned to a former part-time position, and classified it as a co-op work term.

> If they can't find a job through co-op they will *take* a job that they worked at part-time for the last four years to get money to go to school, and use that as a co-op job. That's how they're getting around the co-op [fourth-year student].

> I needed a job for a co-op work-term and there were no jobs, so I just went back to my old job that I had before I came into co-op, and I was extremely disappointed. Because, the whole co-op build-up they give you, about getting valuable work experience and everything, it just wasn't working for me [fourth-year student].

A trend is beginning in some of the larger co-op programs to encourage senior students to find their own work terms. According to one co-op coordinator the policy is designed to enable co-op students to participate in developing their own jobs.

> We encourage our senior students to do their own job development. This puts more onus on the student, because they need to take responsibility for their own learning. We're empowering the students to ensure they have a good learning experience and they get something out of it. We're putting more of the responsibility on the student to make sure that the success of their work term depends on them. We let them know that we are there and we're a support structure; but they're the ones who have to be pro-active [CP4].

Students who disagree with this policy were candid during interviews about ways they had discovered to outmanoeuvre the requirements, often justifying their behaviour on the grounds that 'the system' is at fault. Some students claimed the only alternative to 'deviant' action was to delay their graduation.

> You buy into the system, everything's going to be OK, and then you find out suddenly that it's not going to be OK, then there's no support for you at all. They just say, 'Oh, you're just not like everybody else.' Like I said, people find ways to come up with their own co-ops. And I think that's unfortunate, because it's not really what the co-op program was meant to do [fourth-year student].

> I don't think that anyone should have to do that. But, what else can we do? I think that there is a number of people that really are forced to do this because if they don't then they will be delaying their graduation. Um, and it is really unfortunate, because, I don't want to. People really don't want to. It's disturbing [fourth-year student].

While co-op students are aware of system-beating tactics, not all are in favour of using them.

> I don't necessarily agree with that, because when I graduate from this program, whether someone helps me or not, I want to have some real experience [fourth-year student]

Disappointed in the offerings of the co-op office, some students turn to other campus resources for assistance in finding a work placement.

> I went to the student placement office and they got me a job. A lot of people said, "you're defeating the purpose of co-op." But, I say "who cares?" It's money, and I need it to write off one of my co-ops [third-year student].

From the stories students shared during the interviews it appears that the concept of 'beating the system' is not confined to a single activity, like the work term. Nor is it confined to a single co-op program. The existence of such tactics points to a need for improved communications between co-op coordinators and students in certain programs, and clarification of the practicalities of co-op employment.

Notwithstanding the above concerns, interview evidence clearly indicates that co-op students perceive that the work term provides valuable opportunities for learning and skill development beyond those available in the classroom. During coursework, lab components allow the application of theoretical knowledge in a simulated 'authentic' environment that approximates the activities of the workplace. Co-op students begin to develop new knowledge and skills in these labs, and practice certain actions and routines in simulated professional contexts. But only when these basic skills and understandings are transferred to the workplace can they be refined into the skills of professional practice.

Skill Development and Workplace Learning

The learning and skill development that takes place on the work term fits within the extended mandate of the university to educate both the person and the workforce. One administrator sums it up thus:

> The learning that occurs on co-op work terms is congruent with the university's goals for learning for two reasons: 1) students develop critical thinking and communication skills and, 2) the experience contributes to the development of skill sets like the Conference Board of Canada's employability skills [SA5].

A faculty member comments that "students learn a lot on the work term, but they also learn what else the university should be providing in terms of the curriculum to assist them with their learning for life after university" [CF7].

When students discuss their experience of the co-op work term, learning and skill development almost inevitably enter the conversation. By operationalizing classroom learning in the workplace, students begin to see the relation between theory and application and the practical relevance of what they are studying.

> I think having the background of courses sort of gives you that knowledge that you can learn how to do something. You've got a background and understanding of some things, and when you specifically apply them on the job, you can maybe start to see some relevance there [CSP24].

An engineering student eloquently describes how, on her second work term, she was able to apply what she learned in class to the professional workplace and not only see the relevance of the classroom learning but also begin to understand her future role as an engineer.

> I really like bridges, and this was like civil engineering, and I was building bridges. I was designing bridges, I was right in there making the calculations, deciding what thickness I wanted. It was just using what I had studied in class, and it's really brought my course work into context. Studying it in the course, and just plugging away at problems that you think are useless and totally made up, and you don't see why anybody would want to do that. And then in real life you're actually applying it to make a bridge. It made me realize that this is what I'm going to be doing as an engineer when I graduate, which is awesome [CSP32].

While approximately one-quarter of students spoke of the importance of being able to practice in the workplace what they previously learned in class, more than one-half spoke of the impact that learning in the workplace had on their academic performance. A third-year female engineering student described learning skills in one work term that "actually helped [her] in a subsequent work term." Her academic courses did not help her on the job, but "skills learned on the job helped her once she returned to the classroom"

147

[CSP13]. This emphasis puts learning flows in reverse, with workplace learning providing students with a better understanding of their academic coursework.

> You learn a lot more on the job because you can see how it ties in so many different ways to what you are learning. And that is better. In class we might learn a particular concept A, whereas in the work place we learned B, C, and D. But they tie into A. But we never knew that they tied in until we did it. So Yeah, I think you learn more in the workplace. And, you come back with skills that you wouldn't have learned otherwise [CSP31].

> So I think it's really good that you get paid to go and learn, and to go and do all this stuff, and really, you are still a student. And you don't really know what you're doing yet, but I found that things I learned on my work term were really helpful when I started taking those courses [CSP12].

For other students it wasn't simply a case of transferring what they learned in the workplace back to the academic classroom. The experience and skills acquired in the workplace also contributed to increased self-confidence.

> You know, I learned a lot of analytical techniques on my last work term, and, I really enjoy that kind of stuff. And, although I haven't taken those courses before, they helped me out when it came to taking the courses now. Yeah. You know I feel pretty good, because I don't know if somebody else knows as much about these things as I do (laughter) [CSP34].

And, self-confidence was what made a second-year female engineering student "very excited about learning how to weld, drive a forklift, and work with piping and pumps" on her work term. She felt that the skills she developed "would benefit her in the future" but more importantly she proclaimed, "it allows me to just feel totally competent!" [CSP12].

While the workplace provides opportunities to develop the practical skills of application, it also provides opportunities for students to develop other attributes, such as communication skills. As one student explained:

> I think co-op experience has really helped me because it's given me skills that I didn't have before. Especially, communication skills, both verbal and written. I mean writing technical reports and putting together research reports on a work term sure helps you improve your writing skills [CSP10].

In today's workplace well-developed writing ability is one of the key skills in communicating, from the résumé that a student prepares in order to gain an interview for employment, to the reports, memos, and business letters crafted on the job. The individual with well-developed writing skills will soon discover the associated benefits.

For example, in the workplace, one method of converting cognitive or tacit knowledge into procedural or codified knowledge is through the development of trouble-shooting guides, work-arounds, and training manuals. Individuals who can explain procedures in writing add value to a company or employer. Fellow employees can use the information to either find solutions to current problems or determine ways of avoiding future problems. Further, the individual who can articulate their ideas in writing has certain advantages in today's team-based environment. To be able to summarize and synthesize information for the benefit of others enables an individual to gain support for their ideas and directions.

A majority of students contend that learning skills in the milieu of workplace practice leads to a deeper understanding than can be provided in the classroom.

> When you do it from an application standpoint, you're curious as to "Hey, what happened here?" Because you don't know what's happening, you have to basically think about what was going on, and you learn a lot more when you're doing the problem solving, than when someone in the classroom just tells you what's going to happen [CSP26].

> Going through almost any academic program without having to apply the knowledge, you don't really know what it pertains to. It doesn't matter what you learn, unless you use it. It has no bearing on your own personal life if you don't have to use that knowledge [CSP31].

Skills learned in the workplace can also contribute to personal efficiency in other areas. Many of these skills are not taught in the university.

149

All this work term I'd basically programmed into an Excel spreadsheet. But, it sort of made me realise how I could be efficient. Like when I'm studying, it might lessen the workload for me by using computers efficiently and things like that [CSP32].

I wasn't very good at organizing my time before [I went on a work term]. And I never really got extremely high marks on papers that I wrote. But, after the work term, I noticed that my time management skills are a lot better. I seem to be able to plan things better than I did before and, definitely, my writing style has improved vastly. I have noticed that this year marks on papers especially have been a lot higher. So, that is a definite bonus. And better communication skills and just interactions with people [CSP44].

Co-op students assign high importance to learning in the workplace. During the interviews, when asked "what does learning mean to you?" most students immediately began discussing what they had learned in the workplace, rather than the classroom. Pressed about learning through coursework they largely restricted their responses to brief discussions about whether instructors were good or bad. Effort was required to get them to talk about their classroom learning. In contrast, they were enthusiastic about discussing workplace learning in communities of practice and how the experience would help them in their future profession.

Students in the study are not only concerned with learning for immediate application. They talked of the importance of learning how to learn, and the need to continue to learn. One student suggests that obtaining a degree is only the beginning of his professional career. Lifelong learning will be an integral part of his continuing professional development.

The degree will allow me to take care of the professional aspect of my life well. And obviously, you know, there's going to have to be more courses along the way. There are likely going to be times when I'm going to have to come back and take two or three night classes just to keep up with changes in the profession [CSP25].

These students demonstrate an understanding of the dynamic nature of knowledge. They realize that, in the future, learning and skill development in the professional workplace will be an ongoing process.

150

For engineers, learning never really stops. Learning changes, but it doesn't stop. The type of information you are currently processing will many years from now be completely different. As you get older your soft skills, the people skills, become more developed and you tend to get to know the higher level aspects of projects and assign people that you know can accomplish the tasks effectively and delegate authority [CSP36].

Learning to be a Professional

When a co-op student arrives at a workplace to begin a work term, they enter a community of practice. Membership in a community of practice requires co-op students to undergo a process of enculturation into the professional environment. Learning and skill development take place during this process.

> Workplace experience in an office and in a professional environment, that is important stuff for me to know. Important communications skills are developed. Because you are learning from professionals in the field it is completely different from anything that you will have done in university classes [CSP5].

Through interactions in the workplace, and participation in the activities that make up a profession, students begin to adopt the characteristics of its members, and start to develop a 'professional persona.'

> It comes down to the way you carry yourself more than anything. And that is something that I learned on the work terms. In a professional type job, you interact with a lot of people and a lot of different personalities, and you have to learn how to deal with those personalities and how to get around that. It is something that you don't really get much of in school [CSP15].

> Just being aware of what I should be learning and being aware of what things I want to take away from the whole process. I'm more conscious of what I'm doing when I'm in a workplace. A lot of different things, like being able to get along with other people, meeting deadlines, all of those things that are inherent to the professional workplace [CSP31].

They are encouraged to think 'like a professional' and to see their role as one of becoming a 'junior professional' rather than a co-op student. One student explained " It was incredible learning, just working with them as a co-op student. We took part in everything. We had little group meetings, and it made us feel like real engineers" [CSP13].

151

Supervisors and co-workers are good sources of knowledge about specific areas of practice. "I was placed in with a team of workers and we got pretty good training. They provided small training courses with hands-on experience both from our supervisors, and other team-mates" [CSP6]. With assistance from professionals in the workplace co-op students increase their proficiency and skill level. And, as they increase their skill level they are given additional responsibilities.

> My last work term was really good. They provided really good training and as you learned different skills and how to do things you moved along in progression to where you got increasing responsibility [CSP23].

> My last work term did get my foot in the door in engineering. And I mean I got to learn a lot. And they did make a point of showing me, you know, this is how you do this, OK. And, today you are going to learn this and this, you know. And I certainly knew how to do a lot more when I came out [CSP14].

The co-op program allows students to develop a repertoire of professional skills and accumulate a body of industry-specific work experience. Through their forays into the world of work, they begin to form opinions of the value of that experience to employers making hiring decisions.

> I think when an employer sees, oh well, she's worked in a big plant, she has worked out in the oil fields, she has done this, she has done that, I think that will give me a way better chance for the job over someone who has just been in school for four or five years [CSP12].

> Any time that you can show that you have experience, and that experience can reflect well on you, I am sure it has got to have some effect on potential employers [CSP44].

Without exception, students perceive that the co-op designation acts as a signal to potential employers that they possess workplace-relevant skills and experience. "What it's saying to an employer is that I am confident, I am capable. I don't have the specific skills possibly, but I have these general skills that I can mould and adapt to your situation" [CSP25]. Students see the designation as a guarantee of future employment:

152

"Even if I never graduate with honours, at least I'll have co-op, and that will count for something to employers" [CSP42].

The value of professional experience comes to the fore as students develop confidence in their workplace skills.

> Experience is the key to that confidence that takes you there. Experience...You have the concepts, but you have anxiety about how they work in the real world. Whether you know it or not, all those little unknowns are causing you little dents in your confidence. When you get out there, and you really try it, you start to see that it's do-able, this stuff is do-able. And you realize that you can pretty much work in any situation and make things happen, and make it work. I think experience is the absolute key. Absolutely! [CSP28].

The learning that happens in the workplace seems to possess a durable, lasting quality. The activity involved in practical application seems to affect how students remember, and subsequently recall the procedure when required.

> When I learn something in the workplace I remember it. Once I have a chance to use it, it just makes sense. I could go back to the same job I did four years ago and still remember how to do all the basics. I may be a bit rusty, but I will remember it, whereas if I was to go back and try to recite a formula I learned in first year, no way [CSP31].

> There are a lot of times where we will look at a concept in one of my classes and I understand it at the time, but I can't remember it later. Whereas on my work term, if we work on that concept, and I can see it, it sticks. I will remember that forever [CSP45].

Students also believe that their workplace learning experience will help them once they return to university.

> I've gotten so many skills outside the university environment. I just completed my honours thesis, and I wouldn't have been able to do nearly the job on it, had I not had all the experience outside of the university [CSP10].

> You learn how to conduct yourself in a business environment, which definitely helps when you're dealing with professors back here, or even lab TAs. The work term gives you a chance to show the world what you can give to them. You learn to deal with conflicts, you have to resolve them. You have to make presentations, you have to be able to work in groups, you have to be able to deal with other people of various cultures and backgrounds and languages. And, you have to try and enjoy your work, and you have to try to enjoy the people around you. And that's been the biggest growing experience for me. I've learned a lot about the world, but, more so about myself, and how I interact with other people [CSP26].

Another important element of the co-op work-term experience is the ability to establish a network of contacts in communities of professional practice, "so you know people there who can say: 'gee, I know him, I have worked with him. Or, we trained him, we will give him a job.' That sort of idea" [CSP10]. Students understand that they can increase their access to information and opportunities by increasing the number of networks in which they participate.

> I began to see that you have to have both a student network as well as an employer network if you want to get by in school and get the job you want at the end of it [CSP44].

> It's all relationships and networks. It's getting to know your colleagues, and them getting to know what skills and abilities you can add to their project. And also having contacts in other companies, being able to find out what is going on by having contacts inside a company so you can prepare yourself properly [CSP20].

The development and maintenance of networks is viewed by four out of five students as instrumental in providing employment opportunities upon graduation. Knowledge of employers' expectations and information derived from networks of contacts developed on work terms helps to shape co-op student's perceptions of the labour market, and impacts future career decisions.

> You do build connections. Lots of third and fourth work-term people got the jobs they are in now, because of where they worked before. They met someone that works like at a private company or even in the government, stayed in communication with them, and were able to get their next work term where they wanted. So, when you do graduate, you have built some connections, and you are able to turn that into a full-time job [CSP11].

After experiencing a number of co-op work terms some students form specific ideas of the direction they want their career to take. They then begun to actively position themselves for entry into that field, and demand more challenging work placements.

> I was very, very selective in what I wanted to do, where I wanted to work on this co-op term. I wasn't going to settle for anything less than what this job was because I knew that was the direction I wanted to go [CSP3].

> Clearly what you are willing to take as first year students is quite different from what you're willing to take as a third or fourth year student. Because you are expecting, you are wanting, to learn more. You have more knowledge. You have more experience. You have more expertise. You want more and different challenges. [CSP10].

154

Some are even willing to take lower-paying work terms in exchange for enriched work experience, which they believe will benefit them after graduation.

> In the next work term I am not interested in the pay or anything like that, I am interested in getting some good quality experience that is going to help me once I graduate. That's really what I'm looking for [CSP7].

During their time in the workplace, students observe how quickly changes are occurring in the labour market. A third-year engineering student suggested that "environments in the workplace are changing on a monthly basis, even quicker" [CSP3]. By offering students a variety of experiences in these changing work environments, co-op prepares them for the dynamic reality of the workplace. Another student explained it this way.

> By going in and out [of the workplace], you see the changes as they progress. So in that way, I think co-op can give students a valuable insight into what it's like outside of the school environment—which is a completely different world [CSP29].

A small number of students perceive discipline-specific experience to be of such importance that they will extend the duration of their undergraduate program to undertake more than the required number of work terms and gain specific types of experience. They believe that the additional work experience will assist them in landing the 'perfect job,' or furthering their career ambitions. This is evident in the Chemistry students who exceeded the required number of work terms, one to gain experience at a large drug manufacturer, and another at a Cancer Agency, in order to enhance their applications to medical school. It is also evident in the Engineering students who seek extra work terms in a specific area to enhance their chances of employment in a specialized field.

Receiving market-rate wages on work terms provides the financial resources to enable students to delay their graduation while they accumulate additional work experience; it also allows co-op students to complete an undergraduate degree relatively debt free.

155

While financial resources are an important consideration for all university students, they are of special significance for those planning to proceed to graduate school. Co-op students can continue their education with a clean financial slate.

> Thanks to co-op I will graduate debt free which was a requirement of mine when I enrolled. I am not going to be beholden to, student loans after I graduate, because I want to go to graduate school and that will cost plenty [CSP38].

> When I finish my co-op program I want to get a graduate degree, but I don't want to end up with a big debt. So, I want to see if I can convince somebody to sponsor me to do a PhD [CSP17].

Through experience in the professional workplace students see first-hand how hiring decisions are made. As discussed earlier, this reinforces their perception of the importance that employers place on relevant skills and experience. On their return to the classroom, therefore, many students seek to ensure that they will accumulate as much job-specific course work as possible, to ensure a smooth transition on graduation to a job of their choice.

Section Summary

In this section I presented data drawn from institutional and departmental documents, results of the student survey, interviews with administrators, faculty, coordinators and students to provide a broad general overview of workplace context of co-op. By focusing on details of the student interviews their experience of the co-op work term was revealed.

Students enroll in co-op to develop practical skills, accumulate discipline-specific experience and career direction. Co-op students have ambitious plans for the future. Those in mandatory co-op programs are more likely to seek employment in their field directly after graduation, than their counterparts in voluntary co-op programs. On

average, more than one-half of co-op students include graduate education as part of their career planning. Co-op students in Chemistry appear the most likely to pursue graduate education and Engineering co-op students the least likely. Co-op students expressed confidence that they would find employment upon graduation from their program.

The work term sets co-op students apart from non-co-op students. I provided evidence of the way in which students select and are selected for co-op placements, and reported their satisfaction with the work term. When on a work term they represent university co-op programs to the community and society in which the workplace is embedded. The co-op work term is a benchmark by which students gauge their success, and a yardstick by which they measure whether their expectations of co-op are being met. Co-op work terms allow students to gain discipline-specific work experience, develop professional networks and track changes in the labour market. Through interactions with professionals in the workplace, and participation in the activities that make up a profession, co-op students begin to think and act like a junior professional in a community of practice.

University administrators and faculty members acknowledge that the learning and skill development that takes place on the work term meets the wider mandate of the university. Students contend that learning skills in the milieu of workplace practice leads to a deeper understanding than can be provided in the classroom, and perceive the co-op designation as a signal to potential employers that they possess workplace-relevant skills and experience. Co-op work terms provide the financial resources to enable some students to

157

delay their graduation while they accumulate additional work experience, and allow students to complete an undergraduate degree relatively debt free.

It is evident from discussions with students, that the activities and experience encountered in the professional workplace have the greatest potential to affect students' perceptions of learning at work. But we cannot overlook the other aspect of co-op learning—the traditional classroom. In the next section I investigate students' learning during the academic term.

Part II: The Academic Context

In the previous section I presented the results of co-op students' activities in the workplace and detailed their experience on a co-op work term. In this section I continue the presentation of results, focusing this time on what happens to co-op students when they return to the university after completing a work term and engage in further coursework. I present data on co-op students' participation in the academic context,—a context framed by faculty/student/coursework relationships—and describe how the university reinforces the development of co-op students. I outline students' perceptions of the role of the university in abstracting professional knowledge and assisting the professional development of co-op students; explore the strategies co-op students use to meet the demands of academic coursework; and describe how students see themselves as learners in that process.

As in the previous section, data are drawn from institutional and departmental documents, the student survey, administrator, faculty, coordinator, and student interviews, as well as

personal field observations to detail co-op students' academic experience. Data are presented according to a number of broad general themes. I begin with a general overview of students' perceptions of the role of the university in co-op education then focus on the academic term; student satisfaction; skill development and learning; and professional development. Subsequently, I link the two parts of the chapter through order and discipline, and students' perceptions of learning. I conclude with a summary of the results of students' activities in both the academic and workplace contexts of co-op, and identify patterns of responses as themes for analysis and interpretation in Chapter Six.

Role of the University in Co-op Education

The final section of the student survey asked co-op students to provide a written response to the question "In *your view* how can universities best prepare students for success in the labour market? Co-op student responses were clustered in three broad categories subsequently labelled: What can universities do? How can they do it? What resources are needed?

The results for this question must be interpreted with caution. This was the final question on the survey. A sizeable proportion of the co-op sample, 61 percent (n=449), did not offer any suggestions. Some simply put a question mark next to the question, or suggested they didn't know, or indicated they ran out of time. Therefore the number of co-op students responding to this question (n=288) represents approximately 39 percent of the total co-op sample. Table D5 (Appendix D) indicates that more than two-thirds of participants responding in this category suggest that universities should teach more practical (technical) skills. Others see an integration of practical and general skills as an

important function while a small number suggest a need for the provision of more general skills. Approximately seven percent of the respondents suggest that it is not the purpose of the university to prepare students for the labour market. Students elaborated on this in interviews.

> I just think that there's more to university than just getting a job and I think that a lot of people lose sight of that. They go, I'm at university just so that when I get out I can get a $40,000/year job and that's what I want. If that's what you want, go take a two year diploma course and get that job. If you're in university, you're developing your mind, you're learning something more [CSP22].

> The role of the university is to give you a base of knowledge, but not the experience. So that you have a good enough understanding that you can go out there and be able to get the experience in the workplace and do something with it [CSP41]

Table D6 (Appendix D) contains students' suggestions on how universities can prepare students for success in the labour market. Nearly one-half of the students answering the question suggest that the university should provide more relevant courses. One-third feel that success in the labour market can be enhanced through the provision of more co-op programs, and more spaces in existing programs. Approximately one-eighth contend that universities have a responsibility to improve the quality of teaching.

Table D7 (Appendix D) indicates students' responses as to the resources that are needed. Slightly more than one-half of respondents suggest the university should provide more current labour-market information. Approximately one-third of students suggests a need for more relevant work terms, while others feel there should be greater options in regards to co-op employers. A small group suggests that better labs with up-to-date equipment would help prepare students for success in the workplace.

Increasing student demand for co-op programs adds pressure on the university to find ways of creating more co-op spaces. One administrator explained that such a move "requires changes to the base budget to allow for courses to be taught again in the summer for those students who are out on a co-op work term in the winter," and the "need to find money in the renovation budget to bring co-op coordinators together to share infrastructure" and then "go after the government to fund more FTEs in co-op" [SA4]. It was the opinion of this administrator that "the clustering of co-op coordinators so they can work more closely together is a commitment from the central administration [of the university] for co-op."

Another administrator describes the university's role in co-op as contributing to a student's "complete" education.

> There are still some people in the university who I think, don't understand why we are involved in co-op. But, once we break down some of the old assumptions, frankly I think they will recognize that this is part of what contributes to a student's complete education. I don't think it is any accident that, in this place, some of the *more articulate* graduates are coming out of co-op programs [SA2 emphasis in original].

A third administrator suggested that co-op adds value to the academic portion of a student's undergraduate program

> I mean from a pedagogical point of view co-op adds value but it also adds value as a way of prepping students for potential career choices. I think there's a consciousness that we should be using it for that purpose as well. One of our roles is to prepare them academically for careers. I think that is reflected in a commitment to the notion of embedding it in the academic programming rather than having it seen as something that runs parallel [SA3].

While administrative support for the role of co-op in the university is strong, there are still pockets of resistance at the faculty level. One long-time faculty member described the continual increase of co-op programs as "somewhat disturbing," and suggested that "particularly since the addition of the mandatory Business co-op, the centrality of the

161

university's Arts and Science core has eroded" [CF3]. According to this faculty member, the shift occurred because of a replacement of humanists in senior administrative positions with top administrators who are either scientists or from professional schools [CF3]. This combination of a new administrative regime with the other external forces that are impacting on the university, "has placed us on a rather quick passage to the kind of institution which can soon lose sight of our traditional roots." It is not only happening here, these trends are happening elsewhere. This gives some of us concern about the evolution of the university as an institution" [CF3].

The co-op coordinators, as strong proponents of co-op, more than compensate for any reservations that faculty may have about the role of co-op at UVic. One coordinator suggested "co-op really performs a major function for the university by keeping it in touch with the surrounding community, and one of the side benefits of co-op is that we can bring faculty and employers together for joint research projects" [CP1]. They explained that such joint projects were made possible because "the coordinator knows what's going on in industry, and also knows what the faculty in their department are interested in researching, and, therefore, the coordinator can be the broker to bring the two sides together and get industry to invest some money in university research" [CP1].

Co-op students, on the other hand, have individual perceptions of the role of the university in the co-op process and of themselves as learners in that process. According to one student, the role of the university with regard to the co-op program is to provide students with disciplinary knowledge but to leave the training and practical skill

development to employers. The linking of the two activities through co-op would then allow students to emerge from university into a professional career.

> The role of the university is to give you the base and the knowledge, but not the experience. To educate you so that you have a good enough understanding of a discipline that you can go out there and be able to take the knowledge to a job and do something with it. The role of employers in the co-op program is to find a way for you to apply those skills, that knowledge, and turn them into experience [CSP41].

Other students view the university's role as one of teaching them how to learn in ways that enable the application of learning to other areas of their life. Understanding the importance of the complementary modes of learning in his co-op program led one student to perceive a need to "continue learning probably for the rest of my life" [CSP44]. Another student credits her program with teaching her how to think in more than one dimension. She therefore views the process of co-op as enhancing the traditional role of the university.

> The traditional role of the university isn't to train you for a job. That is the role of technical schools [which] are far better suited to turning out potentially viable workers than the university. Universities turn out people who know how to think. Co-op has taught me how to think, and so it's adding to, not really changing the university's role. The university is still responsible for teaching you how to learn. What you do with that learning is up to you and your employer [CSP31].

The role of the university is largely one of educating students, and then assisting their transfer to the workplace, argues another co-op student. The amount of effort expended by the Faculty an individual is enrolled in will determine a student's "success in making the transition from the university to the world of work." According to this student's argument, the test of a Faculty is the amount of help they provide in the "real world transfer between getting a Bachelor's degree, and getting a job." The Engineering Faculty was described as one of the most effective in this regard, since they "get students a job almost immediately" but, the Faculty of Science is not perceived as being as effective in this transition.

> Science is sort of hit and miss. Sometimes they're very good, students slide right into a job. If you studied the right things and at the right time, the right employer came along and needed those exact skills, you'd get in. But, if you are sort of in general Science, just floating around, no. I know people that have had to come back and get their masters degrees, not because they wanted to, but because they couldn't get a job in their field and decided to go back to school [CSP38].

Because the Faculty of Commerce is new, the student continues, "it is difficult to gauge their success in placing graduates" [CSP38]. But, according to another student "Commerce students are assertive individuals who don't need to rely on the Faculty, but take the initiative in finding jobs themselves" [CSP43]. Yet another student contends that the way in which the university constructs the programs in various faculties, and "the personalities that each faculty attracts," will ultimately determine "if the university is performing its educational role of preparing students" and how good a transfer mechanism they have in place "for getting graduates from the university to the business world" [CSP22]. But, the responsibility for the academic preparation of co-op students does not rest solely with the university. The amount that co-op contributes to a students' overall education will ultimately be determined by students individual perceptions of learning and their activities during the academic term.

The Academic Term

Meeting the demands for course availability in co-op programs is challenging. According to one member of faculty, it is also one of the tests of the university's commitment to co-op in that it is "a real test of the unit's commitment to co-op and the demands of co-op, on time, on program arrangements, and indeed on curriculum" [CF17]. This sentiment is shared by another faculty member who says "there is a place for co-op programs in almost every faculty, including Arts, and therefore, it is something that should to a certain

degree be encouraged.," Always provided, they cautioned "that we don't allow the tail to wag the dog" [CF8].

Scheduling year-round courses in a university that is not formally structured on a trimester basis is challenging. A university administrator comments that "because of co-op we are now increasingly becoming a trimestered institution. Co-op is a genuine trimester program and it is pushing us that way" [SA2]. Some programs have difficulty meeting increasing student demand for particular courses because of the university's requirements. As a co-op coordinator explains,

> In this alternating structure co-op programs must start and end in an academic term. And they can't be summers only. So, the impact on the department is that they have to offer enough courses for the student to continue their program in the summer. And that's not always easy, particularly if the department hasn't traditionally been offering a wide choice of summer courses [CP6].

The academic curriculum specified by the university ensures that co-op students complete the same number of academic credit courses as non-co-op (general) students in meeting the requirements for the baccalaureate degree. Upon completion of each work term, therefore, co-op students must return to their programs for further coursework. In the engineering program, for example, approximately 200 students return to campus each semester to take courses and about the same number depart for a work term. With more than 600 students in the mandatory engineering co-op program, about two-thirds of engineering students will be on campus at any one time. Students alternate between five co-op work terms and eight academic terms to graduate with the B.Eng. degree and a co-op designation. This means that academic courses must be delivered year-round during three different sessions. During the fall semester first, second and fourth-year engineering students are on campus, while third and fifth-year students are on co-op work terms. In

the spring semester students in first, third and fifth-year are on campus, and during the summer session only second and fourth-year students are on campus.

For the Chemistry program also, with approximately 100 students in co-op, some two-thirds of students will be on campus each semester. The chemistry co-op also offers a limited number of eight-month work terms, beginning in January or May. Co-op students must complete five work terms and eight academic terms to graduate with the chemistry co-op designation. By accepting an optional work placement during their first year some students can complete six work terms by the time they graduate. Other students voluntarily extend their time in the program to allow them to take additional work terms to develop specific expertise in a particular area. Co-op students can enroll in either a major or honours program in Chemistry.

The Geography program has approximately 200 students enrolled in the co-op program. Students must alternate between four work terms and eight academic terms to graduate with the co-op designation. Most students will not undertake a work term until they have completed second year. Consequently, there are fewer geography students on work terms during the winter semesters leaving more students on campus. This creates a certain amount of congestion and wait listing for courses. Co-op students can enroll in either a major or honours program in Geography.

The mandatory Business co-op is the largest program on campus with over nine hundred students. Students must first complete a year of general arts and sciences before applying

to the Business co-op. Once accepted they must complete three work terms and six academic terms to graduate from the program with a B.Com. with the co-op designation[13] Consequently, a number of students seek a first work term after completing first-year Business courses. With such a large number of students, and the seasonal nature of some of the opportunities, a large number of business co-op students are off-campus on co-op work terms during the summer session.

Satisfaction with the Academic Term

There is a lot of activity when students return to campus from a work term. The first order of business is to decide on courses for the upcoming semester. For students in Engineering and Chemistry an established curriculum sets out the courses that must be taken in each academic session. A range of courses is also offered each academic term to accommodate areas of specialization within the programs. The courses are structured to provide students with increasing levels of academic knowledge as they progress through the program, equipping them to undertake more advanced training on each successive work term.

Students in Business and Geography also follow a core curriculum for each discipline but because of the nature of the programs and the structure of the labour market there is more flexibility in when students can schedule the required academic and work terms. Because

---

[13] Following restructuring of the Business co-op program, as of September 2000 students will be required to complete two years of general studies before enrolling in co-op, and they must then complete two work terms to graduate with the co-op designation.

course offerings are limited during the summer session, one student suggests that "a lot of people would rather go on a work term in the summer than stay in school" [CSP6]. The shortage of summer-session courses creates added pressure for co-op coordinators. They must find appropriate work terms at a time of year when students from all higher education institutions are competing for a limited number of "good" summer placements. At certain times of the year, therefore, bottlenecks are created as increasing numbers of students attempt to enroll either for a work term or in specific courses.

To obtain a general overview of co-op students' satisfaction with the courses in their program they were asked in the student survey to report levels of satisfaction with various aspects of delivery of courses. The results presented in Table D8 (see Appendix D) indicate that overall, the majority of co-op students in the study appear generally satisfied with the delivery of courses in their program. One student sums it up thus:

> I think the course work has been good. I think it's been valuable. I have been impressed
> with the professors that I have had. Some in particular have been really good and just,
> you really look up to them. And I have been impressed with that. I think that I have some
> skills now which will be valuable in the workplace [CSP39].

Chemistry students described how well co-op is integrated into the department, with "four-month courses rather than year-long courses." Having every required course in chemistry designed like that "makes it really easy to be a co-op student" [CSP17]. And, because the program is small enough, co-op students are assigned a faculty advisor who assists them with various co-op activities.

> Professors really like co-op students. You let them know you are in co-op, and that you
> have worked here and here and here, and half of the time they know one of your [work
> term] supervisors [CSP2].

And, students in the Engineering suggest that their courses are designed to assist co-op students through a process of incremental skills development.

168

> In engineering they are really helpful. They want you to get through. And because it's engineering, obviously, it's really directed towards skills. And they teach you a few skills then send you out on co-op. When you come back they teach you a few more. One of the things I really appreciate is that I have the chance to really learn some valuable skills. If I would say anything about the program, I think it should be more skills oriented [CSP20]

Business, Chemistry and Engineering students report greater satisfaction with the availability of courses in their programs, than students in Geography. While otherwise generally satisfied with the delivery of courses in their program, co-op students in Geography complain that their program is "plagued by wait-lists for certain courses" [CSP1] and the "provision of required technical courses is inadequate to student demand" [CSP10]. Technical courses usually have a large lab component and this appears to be a principal cause of congestion. For example, the Geographic Information System (GIS) course—which students suggest is highly prized by employers—can take only 10 students in the lab at one time.

The length of waitlists for certain programs causes frustration among co-op students. As one commented "last term it was harder to get into my courses than it was doing the work in the courses! That was the hardest work, trying to get in" [CSP15]. For some Geography co-op students, therefore, the difficulty of enrolling in certain courses was an issue that motivated them to develop alternative strategies. One student explains:

> Because of the difficulty of getting into classes I need, when I register, I always sign up for seven or eight classes a semester, just because if I don't get into some of them, I need backups. Like, I eventually ended up getting the courses I wanted but the process was just terrible...two weeks of going to eight classes because you don't know which one you're going to get in [CSP17].

Availability of courses or lack thereof is perceived by some Geography students as an indicator of the university's commitment to learning.

The survey sought opinions on co-op students' satisfaction with access to instructors; that is the level of willingness of instructors to discuss academic matters outside of regular class time. Because the Chemistry co-op is well-integrated into the department, it is not surprising that Chemistry students report greater satisfaction with the availability of instructors than students in other programs.

Co-op students appear to be generally satisfied with university facilities; Business and Chemistry students indicate greater satisfaction than Engineering or Geography students. In part, the satisfaction reported by Business students might be attributed to the recent opening of computer labs in the new building that now houses their program.

Business students are the most satisfied, and Geography students the least satisfied, with the size of classes in their program. This may be due to the number of individual courses offered in the various streams of Business, combined with the newer, well-designed classrooms in which Business classes are held. Also, a number of evening sessions are available to Business students, which is not the case for other programs. Business students thus enjoy a greater range of attendance options resulting in smaller classes and greater satisfaction.

Quality of teaching varied between the different co-op programs. Much of the teaching in the sciences involves straight-forward lecture delivery of materials. In my in-class observations, the professor would come into the class, and proceed to lecture throughout the allotted class time. In the classes that used traditional lecture methods students

demonstrated a behaviour that was replicated in all such classes. If the instructor used an overhead transparency, students would devote their time to trying to copy the details of the overhead into their notebooks. In concentrating on this they were largely ignoring the instructor's explanation of what the diagram represented. There were few opportunities for questions because of the pace of the delivery. There were also few questions raised by students who appeared intent on copying the diagrams into their notebooks. In the non-science programs, in contrast, classes were punctuated by student questions. Questions were answered and student opinions noted. Instructors often challenged students to investigate the area more thoroughly.

Geography classes were usually high-energy classes in comparison to engineering classes, which consisted largely of the instructor delivering material and students taking notes. Many Business classes were also animated and went beyond the delivery of course material. For example, in one class students were divided into groups and asked to demonstrate the skills required in negotiating a partnership arrangement between a Canadian company (represented by one group of students) and a Japanese firm (represented by another group of students). The remainder of the class was responsible for rating each group on their performance and demonstration of specific skills. Needless to say these instructors were the ones rated most highly by students as teachers who not only understood the real world (outside academe), but also cared about students. Students in Business rated the quality of teaching in their program highest, while students in Engineering, where much of the teaching concentrated on the delivery of curriculum materials, rated quality of teaching lowest among the programs studied.

During my visits to the classrooms I saw little acknowledgement that the majority of the class was made up of co-op students. In the larger Chemistry and Geography classes an observer could not distinguish between co-op and non-co-op students. And, while observing a Business class, I noted one faculty member asking students in class "you guys are taking co-op aren't you? What is it all about? What sort of things do you do in co-op?" Because Business is a mandatory co-op, one might expect more faculty familiarity with the program. Notwithstanding the above, students in Business, like students in all the programs studied, rated access to instructors higher than other variables of satisfaction with their courses. I have no way of knowing, however, whether the co-op classrooms I observed are any different from regular classes. Had I spent more time in the classrooms I might have observed different behaviour. However, the length of time I was able to devote to in-class observations was limited.

Once students have confirmed their courses for the upcoming academic term they seek out friends and classmates in their co-op cohort to exchange information about experiences on the work terms. Students consider this a valuable opportunity to "find out" about employers and discuss future plans.

> When you come back from a co-op term it's just really good to sit down and talk with friends and other co-op people about your experience. These are the same people that we are in class with and we all do co-op at the same time. So it's good to get together and talk about what we learned, and who had a good co-op, and what the job was like, and what we want to do for the next one, and what the company was like to work for and what the people were like, and all that. I mean it's good for co-op students to get together because that's how word of employers gets around and how we plan our life [CSP14].

> The networking among co-op students is pretty good. Some rotations are better than others. Our rotation is great. I mean, everybody knows everybody. And information is pretty much passed around very easily. So if someone, you know, is thinking about going on a job, someone will say, (laughter) if I were you, I would check it out and see what others say about it before you go in there [CSP2].

172

Most students see only benefits in networking with members of their cohort to exchange information and ideas, but there is a possible downside. The structure of the co-op program tends to restrict the network of social relationships with students outside the program and cohort.

> The only people that we usually see are people in our rotation, the people who are on the four months on four months off rotation, who you're always at school with and always at work with. So it is harder to keep the same friends actually, who aren't in the co-op program [CSP17].

> The bad point of co-op is that all of my friends are engineers. I only know engineers. And every time I desperately try and escape and meet some other people, you know, I always get sucked back [CSP18].

Returning to campus to continue with coursework is an opportunity for students to select specific courses that, from their work term experience, they perceive to be in demand. As one student comments "I now have a general idea of where the market is going and where I'd like to see myself after I graduate and what kind of courses I need to take to get there" [CSP23]. Another says

> On the work term I learned more about where the good jobs are and the qualifications they are looking for. So, when I came back [to university] I looked for courses that would give me those skills or qualifications. Those are the courses I am taking now [CSP45].

Often, it isn't decisions over courses that cause students most concern. A small number of students were conflicted by the rotation between the university and the co-op workplace. They express difficulty in deciding which context they preferred to learn in. "I don't really know why, but I spend most of my time at work wishing I was in school, and most of my time in school wishing I was at work" [CSP18]. For others the perceived benefits of a good work term are strong enough to create uncertainty about the order of their rotation. Some would consider abandoning an academic term, even after they have secured enrollment in the courses they require, to participate in a good work term.

> I wasn't sure whether I wanted a work term or whether I wanted to go to school, and for once I had all the classes that I wanted this semester, so I kind of wanted to go to school. But if a good job came up, I would take it [CSP11].

Students perceive difficulty in returning to the routine of the academic term after spending time in the workplace, and particularly about being able to "pick up where they left off" in their studies.

> Four months, it seems short, but you start forgetting stuff after four months. That's certainly an issue of having a work term between class terms, it's difficult sometimes to get back into the material [CSP23]

> When other students [non-co-ops] go straight through they have eight months at a time, and you obviously don't forget things between one semester and the very next semester. Whereas with us, you go on a four month work term and if it's not related to the courses you just took you forget everything. And then when you come back to class you have to go and relearn it all from the textbook [CSP29].

This student made the point that by constantly revisiting the material "What was that? How do I do that again?" they were actually reflecting on previous learning and, "finding ways to make it useful" without having to relearn it "a year or two after you graduate [CSP29].

Those who are confident of doing well in their courses, and who know the importance of grades in the academic context, welcome the opportunity to return to familiar ground.

> I had a good co-op experience. It was my first co-op term and it really related [to my courses]. I hope that after I finish this term I can get one that is even better. I will know more and hopefully that will help. It was so neat to actually learn how to actually do things. There is still stuff I still couldn't do, but maybe next time when I know a bit more. [CSP9].

> I am known to be pretty anal about my courses in school. I know how important grades are. And, when I get off a work term it's just like I can relax a bit more back in school. Because I know that I have the knowledge and I have the skills and I can do this. And I don't have to worry as much about it as I do with a job [CSP33].

The co-op rotation suits the learning style of some students—to such an extent that they would now find it difficult to follow a traditional academic pattern of semestered coursework.

I find co-op is good for giving you a break from school. I have a real problem going to school for eight months at a time. It is really hard. And I like going out on the work term, because it gives me a break. But I'm still using my brain, I am still using the stuff that I am learning in school. But it gives me a break from that academic setting [CSP15].

I have thought about it a lot. Because of the way I learn, and more important the things I learn on co-op I wouldn't be able to do two semesters of school in a row [CSP12].

The emphasis on grades, and the way the academic portion of co-op is structured bothers some students. There is a perceived trade-off between high grades and 'real' knowledge. A learning style structured around short-term memorization produces high marks, but at the expense of understanding. One student argues that "the whole [idea] of going through university is to learn how to learn. Not to learn how to do a particular thing or job." If the university is doing its job it won't matter which discipline a student is in; they "will still learn how to learn" [CSP31]. The difficulty comes, she argues, when students are asked to learn something without an opportunity to develop understanding through application. "If I haven't used it I don't remember it," she says. "Although I get really good marks, [and] I'm told I am strong in this field, I can't remember the coursework." The immediate course demands are such that previous learning is displaced by current material. This waste makes her feel "really sad" that she has spent so much time and "so much effort learning how to learn" when, without opportunities to practice, she won't remember anything from her courses [CSP31]. But, learning and skill development are supposed to go hand in hand in co-op.

Skill Development and Classroom Learning

The discipline-specific coursework that co-op students take in their academic program is intended to prepare them for increasingly challenging and responsible positions on successive work terms. Table D9 (Appendix D) presents the results of co-op students'

responses to questions on the survey regarding the extent that their program provides them with skills that are useful in the workplace. The results indicate that, broadly speaking, co-op students are satisfied with the skills, knowledge, and opportunities provided by their program. Business students report significantly greater satisfaction with the development of skills in critical thinking, decision-making, speaking, team-work, and leadership skills than students in other programs [X^2 = 48.26 (12) p< .001]. Chemistry students report non significant differences in gaining in-depth knowledge of a field of study, while Engineering students report significantly greater access to information on jobs in their field, opportunities to meet potential employers, and chance of a good income to a greater extent [X^2 = 21.50 (9) p< .05] than students in the other programs. Geography students report that they develop writing skills and derive knowledge for self-improvement to a greater, but non-significant, extent than students in other programs.

When we look at the extent co-op students perceive that their program provides opportunities to develop skills, knowledge and opportunities an interesting picture emerges. On those parameters that we usually associate with the 'academic' context of the co-op program (for example critical thinking skills, decision-making skills, writing and speaking skills, team-work and leadership skills), students in Business—a highly practical discipline—for the most part rate their program higher than co-op students in the other programs. On the other hand, in areas that might be considered more closely associated with the workplace context (for example specific job skills, knowledge of a field of study, information on jobs in the field, opportunity to meet potential employers and information on the labour market) students in the 'academic' sciences (Engineering

and Chemistry) rate their programs higher than students in Business. This suggests that the Business program is meeting the academic needs of students, but not necessarily their co-op needs. Support for this supposition can be found in the negative tone of the comments presented earlier when students discussed the quality of work-term placements in the Business co-op.

Geography and Business students rate their programs higher than those in Chemistry and Engineering for the ability to develop good writing skills. Communication skills are essential not only in the workplace, as discussed earlier, but also in other walks of life. Writing is a core skill of communicating. The ability to communicate in writing—and the level of that ability—can affect a person's life chances. In the university, students with enhanced writing skills will receive better grades. Everything from term assignments to scholarship applications requires an ability to write clearly and concisely.

Co-op students complain, however, that they have little opportunity to develop writing skills beyond the work term report. They tend to feel that because the work term has no academic credit attached to it there is little attention or effort devoted to assisting students to improve their skills. If a student decides they wish to pursue graduate studies in the future, as a number have indicated above, they will discover that writing skills are much prized—and rewarded—in the academy. Along with writing skills, verbal skills are also essential to students' future social mobility. The individual with well developed communication skills in writing and speaking (combined with good listening skills) will

navigate the modern academy and workplace with much greater ease than individuals with lesser capabilities.

Chemistry and Engineering students rate their programs higher than Business and Geography for the ability to develop specific job skills, knowledge of a field of study, information on jobs in the field, opportunities to meet potential employers, and chance of a good income. This might be explained, in part, by the dedicated nature of the workplace experience of co-op students in the sciences. There are defined labour markets for Chemists and Engineers, whereas Geographers and Business graduates might be found in a more diverse array of employment. Because of the defined labour market students in Engineering and Chemistry have greater opportunities to obtain co-op work terms that are directly related to their academic coursework, and as a result derive greater financial returns. The focus on development of skills for a dedicated labour market might also explain the lower rating given by science students for their program's ability to provide knowledge for self-improvement, which was rated highest by Geography, and Business students.

Students can use the knowledge gained in the academic classroom as a base on which to expand their skills and knowledge through practical applications in the workplace. Both co-op faculty and coordinators support an incremental approach to academic training in preparing students to embark on successively more challenging work placements. They recognize the importance of having co-op students bring their workplace experience back to "enrich the classroom." One faculty member sums up the situation as follows:

> When they've got a certain level of skill development then they go out and apply that. Then they're learning more on the work term, and they're bringing that experience and understanding back to the classroom. That's the really important part. They can share their experience, pass it on to other students. So we believe that it enriches the classroom and the campus to have co-op [CF2].

Thus, planning appropriate work term placements is an integral part of ongoing classroom learning. According to a co-op coordinator,

> Proper placements are so important for the student to get the experience that they need so that when they do come back to the classroom, they're motivated. And there's nothing that opens the mind faster than, you know, having a good experience like that and then wanting to go to the next stage [CP3].

In each co-op program the disciplinary courses provide basic knowledge of the field, and the workplace provides opportunities to develop knowledge through application. Students must first be equipped with the core knowledge of a profession, before they apply the knowledge in the workplace to develop practical skills.

> In class, they can't prepare you for every job. If you go into a brokerage that is going to be different than what you're going to be doing if you go into a bank or something. But I think for the most part that the courses can provide the basic skills, or the generic skills. Yeah, and we are university students. We can apply the knowledge that we have learned to the actual job [CSP25].

> I think having the background of courses provides you with the knowledge that you can learn how to do something. You've got a background and understanding of some things, and when you specifically apply it to the job, you can maybe see some relevance of your courses there [CSP24].

The issue of transfer of classroom learning to the world of work is important. During the interviews some students discuss transferring recently acquired skills from one arena to another. For example, one student describes how knowledge and skills acquired in the classroom benefits their subsequent learning in the workplace.

> Basically it's the problem-solving skills and the stuff you learned how to do in class, in a different way that helped me in the workplace. It's not like stuff you actually learned that you could apply, it was the way you thought about the stuff you learned [CSP23]

The student demonstrates an understanding of the importance of reflection and praxis when transferring skills learned in the classroom to the workplace. Another student suggests that it is not just the possession of skills that is important but rather an

179

understanding of how they can be applied in different situations that make them transferable.

> They say that transferable skills are really the key these days, and I think I have some of those, also the ability to learn and to adapt, and that sort of thing. I have got transferable skills out of my co-op jobs that can be applied to other jobs. So it's not exactly what you have learned in class but it's understanding how things, how your job skills and personal skills apply to other things [CSP39].

Beyond the potential for transfer of knowledge between the dual contexts of co-op the results indicate that the co-op rotation suits the particular learning style of some students. They find that the work term's practical experience provides a foundation that later allows conversion of theoretical knowledge into understanding, rather than the other way around. For others, the alternation between the classroom and workplace helps to structure the learning required for a profession.

> If you learn it in school first, and then do it on the job, you don't learn it as well. For me its better the other way around. I'd rather see my hand learn it first and then my head. So, learning the application is more important first and then I can understand the theoretical part when I come back into the classroom [CSP26].

> I mean, I'm glad we have a course structure that we can actually take a work term and then go to school for a term, and then take a work term again. It makes it a lot easier to learn what to do, and then how to do what you're studying. And, by the time you finish your work term, you basically want to go back to school anyway and by the time the end of the school term comes around, you are ready to go back to work [CSP17].

Some students contend that academic coursework only prepares students to a certain level. To "do a job professionally," they contend "requires that employers provide some training, to increase levels of proficiency," and "enable individuals to either stay with the employer or move across to another company at the same level, or even move up" [CSP3]. Another student sums up the role of co-op as follows:

> The role of co-op then becomes one of interlacing the two. Co-op really is that link between the two kinds of learning...and it provides something that eventually leads to a career not just a job [CSP41].

For many co-op students, learning the course material in their program is hard work. As one puts it "in the workplace students learn to work, and in the classroom they work to learn" [CSP45]. Both contexts demand different types of thinking skills.

> With co-op it's a different way of thinking, and working. At work it's a lot more mechanical, a lot more applied thinking whereas at school it's a lot more theoretical, a lot more sort of tugging on your brain. Whereas at work it's well, if you don't know something, you just go ask somebody [CSP31].

To develop an understanding of the course material, and to be motivated to learn it, some students need to relate learning to future workplace use. Subsequent application on the work term then reinforces understanding.

> If you have the course before [the work term], then you know what you can do with it. It makes it a lot more interesting, and if it's a lot more interesting to me, I tend to work harder at it, so I understand it a lot more. Rather than just this thing on the black board - section X, that you have to know by mid-term or memorize by the exam, and that you scuffle out of your brain right after it. Co-op reinforces it, so it sort of gives you a greater appreciation and understanding of the course material. It's sort of links the two together [CSP28].

While some students were enthusiastic about linking the classroom with the workplace others expressed reservations. Some students described the dissatisfaction with the academic component that arises when course instructors fail to acknowledge what has been learned on the work term. Enthusiasm for classroom learning is quickly dampened when students are not given the opportunity to integrate workplace and academic learning on their return to the classroom.

> I came back and I think I'd really done some growing over the time I was doing co-op - I really had a great time on co-op. It was disappointing that there was so little follow up. I just felt that here I was back in the classroom again, and I was doing the same old-same old. Everything that I'd learned on co-op had sort of been forgotten. I just felt that, "Yeah, they've forgotten about what I've just done." They weren't interested in my experiences - I was back in school, and I was just another student expected to do the same old things in class again [CSP24].

Rather than having his co-op experience reinforced, this student feels he is being socialized back into a subordinate status in an academic classroom, where he is *taught*

181

about a discipline rather than about learning and enhancing disciplinary skills, and

understanding.

Because they are rotated in and out of the classroom, co-op students find keeping up with

course work especially demanding. They tend to rely on each other for assistance,

forming study groups to ease the process. Some feel that the workload is too heavy for an

individual to manage alone, suggesting that seeking help from others is essential.

> I would never be able to do it all on my own. There is just some stuff that you don't
> understand and can't get out of the books. You have to find someone that does understand
> [CSP18]

> I think people work together a lot in engineering because the amount of work that they
> give us doesn't seem to be humanly possible for one person to do. And you almost
> wonder if the profs didn't plan it like that. You know, to encourage teamwork and things
> like that [CSP14].

For example, in Engineering the intensity of the workload has prompted the development

of social structures in the form of groups of students that collaborate on assignments.

Students view studying together as a method of collaborative learning and mutual

support.

> It's absolutely a good idea to collaborate with your buddies, your engineering
> colleagues...and all together produce, produce the learning that you need to get done.
> Most of the time we would end up coming up with the right solution. And I would be
> able to learn why it was the right solution [CSP36].

> [Study groups] are good because you also make friends and stuff. Then, if you are having
> troubles with something, and you know oh, he wouldn't mind helping me out because he
> really understands the subject or, she wouldn't mind helping me out because we study
> really well together. We can help each other out. And because you are friends you are not
> afraid to ask for help. So I think it really helps [CSP12]

Because of the amount of coursework in their engineering program, and the need to

maintain their GPA in order to remain in co-op, some students define collaboration rather

broadly.

> Sometimes, I would just be overwhelmed, I had an assignment that I couldn't get done.
> So, the morning before it was due, I would go and find somebody and say, "look, can you

> give me a hand with this? I need to get it done" And they would say OK, and basically I'd copy the answers. I try, as much as I can, to get things done myself. But there were times when I had to. You know, I just didn't get it done, and I needed the answers because I needed the marks. So, that kind of thing happens [CSP5].

Senior students who have completed a number of work terms begin to adopt the discourse of the professional workplace to describe their collaborative academic activities. For example, some will refer to their study group, as their 'team' and to course assignments as 'products.'

> In fourth year I tended to try and save time by collaborating with my colleagues. There are a lot of things where if you can't access the instructor, then you have to work with your own team [CSP27].

> I think that the product that I am able to achieve by working with other people in my team is greater than what I can do on my own [CSP45].

While the sheer volume of coursework prompts many students to seek help, others perceive specific social benefits from studying together at this stage of their degree, rather than attempting to go it alone.

> I think it is important to belong to a study group, not only for studying, but because a lot of the time, study groups will turn into a social group. And maybe sometimes you don't get too much studying done, but the social aspects are important [CSP16].

> The more informal aspects, you know, are really beneficial. You have a friend you sit with in the class and you get together after and go over notes. There is always that social aspect [CSP44].

The social aspect sometimes becomes predominant however, to the detriment of studying. One student cautions "if you are not careful, a lot of the times study groups can just turn into a social gathering. And then you don't get too much studying done" [CSP45].

Socializing, however, is not necessarily considered by students to be a negative. Many co-op students remarked that the support of their study group, and especially the

understanding that others found the coursework difficult, was essential motivation to complete the disciplinary course work necessary to get back out on another work term.

An important part of learning to be a professional is learning the language and norms of the professional workplace. While co-op students are on a work term they are immersed in the culture of their profession and have an opportunity to engage in the practice the way professionals do, situated in a community of practice. With repeated forays into the discipline-specific workplace, students begin to view themselves as junior members of the community, or "professionals in training." They expect the academic component of the co-op program to assist them in the transition from student to professional.

To develop as professionals, co-op students must have a chance to reflect on their workplace learning. Reflection includes opportunities for students to discuss their experience and receiving appropriate feed back. As well, to become professionals in a field co-op students must learn the history and abstract foundational knowledge of the profession in the classroom, as well as demonstrate competence in the application of professional skills in the workplace. One way the university assists with the professionalization process is by providing opportunities for co-op students to reflect on their workplace activities, by preparing and presenting reports.

Presenting a Professional Report

Shortly after returning from a co-op work term students must finalize and submit a work term report. The co-op regulations stipulate that for students to remain in the co-op program they "must maintain the academic standing set by their discipline, and submit a

written report following each work term" (UVic, 1999e). In addition each discipline

decides the form that the work term report must follow, and the purpose of the report.

Provision is also made for students to make oral presentations of their reports in most co-

op programs.

The Chemistry department, for example, contends that the work term report provides

students a useful opportunity for reflective learning. By looking back on a successfully

completed project, students are expected to achieve a greater understanding of what was

learned on the work term. The experience gained in research and technical writing helps

students develop professional skills in report preparation, which will serve them well in

their future professional life. Some students see this report requirement as a straight

forward part of the process.

> When it comes time to hand in your work term report, you have one faculty member
> that's kind of your advisor, and they read it, and they mark it. And if it's judged as
> satisfactory then that's the end of it. But, you have got to do that report to complete the
> work term. And you're also supposed to give a ten or fifteen minute presentation on what
> you have done. You can give a little slide show if you want. It's basically just for the
> information of people going out on the next co-op term [CSP2].

Others view the requirement more as an opportunity to achieve a professional standard in

report preparation and also as a way for Chemistry faculty to keep up to date on what

students are doing on their co-op terms.

> There is a little reporting structure we go through around the work term report. The report
> is given to the coordinator and he submits it to a member of faculty, who grades it. This is
> good because of course they get to read about what the students have been up to. You are
> then asked to fix the points that have been illustrated to be not up to a certain standard.
> You also have to do an oral presentation. Then you are also required to go and talk to
> your co-op advisor, who again is a member of faculty, to let them know what you've
> done. Basically it closes up your work term, to make sure that all of your requirements
> have been met, and you are going to gain credit for that work term [CSP17].

When Chemistry co-op students give a presentation on their work term employers it is an opportunity for fellow students to learn more about what it's like to work for that particular employer.

> You have to listen to the people around you who are talking about employers and every semester, after a work term, we go and do a talk on the employer and what you did on your work term and those are really good. And it is very helpful to go to them and listen and hear what people have done, so you know next semester, when you are applying for jobs you know what to look for, and which employers to pick, and which to stay away from! [CSP8].

Once the work term reports are approved students receive credit for completing the work term. The reports are archived in the co-op coordinator's office. They are kept there as a resource for Chemistry students to consult when they are considering a future work term with one of the co-op employers. Before being stored away for future reference, however, co-op work term reports are evaluated by the Chemistry Co-op Committee. Prizes are awarded to the two best reports submitted each semester to recognize excellence in research and reporting, and encourage co-op students to take their work term reports seriously.

Professional Engineers are frequently required to make presentations to a variety of audiences as part of their work. To begin preparing co-op students for this future professional role the Engineering program requires students returning from each co-op work term to give an oral presentation to interested faculty and students. To ensure the presentation is conducted in a professional manner an Engineering Faculty Associate (a senior non-faculty engineer), moderates the session. Engineering students view the work term report and subsequent oral presentation as an opportunity to develop communication skills.

It's good because they get like, retired engineers, people from outside the University, to look at them. That's a pretty good experience to deal with them actually. And people think that engineering is all Math and computers and stuff, but writing is one of the most important things you can do. That's what a lot of it is about. That is something I learned on my first work term. Was that, sure, engineers spend some of their time doing equations and design work and stuff like that, but well over half of their time is spent writing reports. And you have to be able to do those well if you want to get anywhere [CSP5].

In addition to completing the work term report each engineering student submits a form containing relevant information on the co-op employer.

We have file folders in the ESS office, with co-op students' work term reviews of the companies, what they did, what their responsibilities were, what the company does, what their experiences were, would they recommend it to other students, why or why not. These are available to all engineering students. The employer review form is included in the work term package that we get and it is one of the forms that is mandatory for students to fill out. Because coordinators are not aware except for you know coming to do the work site visits, they are not aware of the experience that students have with an employer [CSP13].

To ensure that students have an opportunity to improve their report writing and presentation skills a certain level of leniency is permitted on the first work term report.

I was really nervous about my first work term report and especially the presentation, speaking in front of other students. They take into account that this is your first work term report, but they let you know that as you continue through they expect better quality [CSP36].

Co-op students in the business program must submit a written work term report to the coordinator during the two weeks following their return to campus. Because of the large numbers of students in the program it is impossible for faculty to devote time to grading work term reports. To assist students, detailed guidelines are posted on the co-op website. Work term reports must receive a satisfactory evaluation from the business co-op office before the work term is recognized as complete. A copy of the report is forwarded to the work term employer.

Actually, in the work term report I think all they want is to see what you did on the work term or anything interesting in your work term, like what you learned about business. They don't really expect anything special. You can write anything that's related to the work term [CSP6].

Because of the number of students in the business program the co-op office is swamped with work term reports when students return. Consequently students suggest that their reports do not receive sufficient attention or credit.

> We have to write a work term report and yet we're not really given credit for it, and we can't get feedback on how we did. If you can even find your coordinator, because there are so many students wanting feedback and they are so stressed out, then they will probably talk to you but, they don't really have time to discuss it with you. I think there should be a little more personal interaction. The feeling I get is that you know, there wasn't really any extra effort put in, like they weren't really taking it personally [CSP16].

With the restructuring of the Business co-op program and a change in the number of required work terms this situation might well be addressed in the future.

In the Geography program each co-op student's work term report is evaluated by a faculty member in the department. Once the report is assessed, and a satisfactory evaluation received from the employer, the student is given (non-academic) credit for the work term. In the Geography department all the faculty are involved in marking work term reports. One student described the process thus:

> When you hand it in, it basically gets marked by one of the professors in Geography. All of the professors mark work term reports. So, they take ten work terms each or whatever. And they, you know, give you sort of a report card and check off if it is satisfactory or not satisfactory. They really go through everything, you know like, there is how you arrange things, your spelling, grammar, [and] relevance of the topic to geography. It's actually good because you can choose a project that you worked on throughout the work term and have that as your report [CSP4].

The opportunity for an oral presentation of the work term report is welcomed by some Geography co-op students as a way of improving their speaking skills. Those with less confidence or less well-developed skills approach this with a certain amount of trepidation.

> It is really good for your speaking, public speaking skills definitely. But that has to be my absolute worst (laughter) is public speaking. I mean, I hate to get out in front of a class. I think it would be less intimidating also, if the students who showed up maybe just wanted to be there to listen to what you did, if they took an interest in it. You know, I don't think it would be as scary. But still, it's public speaking. But, the scary part is that you are in

> front of your adviser. I just did my presentation and it was awful. My work term report
> was sort of done at the last minute, I just did it, and it showed. I could have died [CSP22].

Because of an increased emphasis placed on the work term report by the co-op

department and the university some Geography students are now taking this into

consideration when looking for co-op terms.

> The work term report has become such a big deal that, I mean, when you are looking at
> the job, you try to take this into account. What you would like to get out of it in terms of
> training, certainly is the most important. But you also look at the procedure they have in
> place in order for you to get a work term report out of it. Because we now have to sort of
> go through, you know, what are you getting from this work term, what are you learning
> from this work term. How is that contributing to your education, and so on [CSP11].

The increasing demands and changing structure surrounding the work term report are one

indication of how the university and the co-op department maintain order and discipline

in UVic's co-op programs.

Order and Discipline

Order and discipline in undergraduate co-op programs at UVic are maintained largely

through the structure of the undergraduate curriculum, the policies and procedures of the

university, the individual faculties and departments, and the co-op department. The

university maintains order and disciplinary structure by regulating co-op students'

activities from admission to graduation, and through awarding academic credit for

foundational knowledge. The university, according to one administrator, has a

responsibility to ensure that "when we plan for expansion of co-op we have to be careful

that we don't shift the place of liberal arts too much and become more concerned with

professional training" [SA1].

189

Another administrator summed up how the university strives to maintain a balance between the traditional academic learning attributed to university education and that provided by co-op education:

> As part of what you are learning, part of your university education, we'll try to put you in contact with potential employers or some work experience which match your classroom training, to help you get your feet on the ground when you graduate. But, that doesn't mean that you shouldn't also be learning the more esoteric and fundamental issues of whatever you are studying. That's where we have to be careful that in encouraging co-op programs we don't significantly alter or shift the priorities in such a way that if you wish to learn the more basic or more foundational principles of a discipline it doesn't go by the board. That's where I think we have to draw the line" [SA3].

The position of co-op at UVic—as a response to the increasing demand for relevant education—is acknowledged by another administrator who contends that "co-op programs are part of the response to the pressure on universities [today] and, if universities are supposed to be helping our students to make it in the real world, then we shouldn't keep the real world entirely away from them all the time they are here" [SA1].

The faculties and departments maintain order and discipline through the content of the academic curriculum and scheduling of discipline-specific courses. One faculty member suggested that the department finds co-op useful for a number of reasons "beyond simply assisting students to get jobs when they graduate." He stated that "we think it is also important to have the co-op coordinators reside in the department, and if possible even do some teaching. Because that way, they're close to the faculty and we can ensure that they get a good sense of the course content we are delivering in the department, and they are also close to the students so they can keep an eye on how they are progressing for us" [CF1].

The co-op department maintains order and discipline by regulating access to co-op programs and administering the non-academic portion of co-op. The co-op department has a policy of selecting students based on an "above-average academic standing" [UVic 1999b]. This average is not articulated beyond the minimum Grades Point Average (GPA) required for admission in each program. Co-op coordinators maintain order and discipline in the way they recruit co-op students and the way they assign co-op work terms. It is left to the coordinators of each program to regulate admission by either adjusting the grade level for admission to control the number of students admitted each year, or by recruiting students with high GPAs into the program. This is interpreted by co-op students in the study as screening, and is a recurring theme in student interviews.

> What they are doing is they are screening people coming into the co-op program and they are only taking those who have a high academic average which may in one sense be interpreted as those people who would be successful anyway [CSP27].

Student accounts of screening by GPA are supported by institutional research conducted on UVic undergraduate students after my study was initiated (UVic, 1999). This research indicates that one-half (50%) of co-op students at UVic entered the university with academic averages of more than 85%, compared with one-third for non-co-op students in the general undergraduate population. This difference becomes more pronounced at the highest academic level, with more than 21% of UVic's co-op students entering with an academic average above 90%, compared with less than ten percent for the general undergraduate population (UVic, 1999).

Interestingly, there is a certain level of support by co-op students for this type of screening. Some even suggested that, due to a perceived shortage of 'good' co-op jobs, there should be more vigorous screening to reduce the number of co-op admissions.

> When the job base for co-op work terms seems to be getting smaller, I think you have to be a little more strict about who gets in [CSP15].

> I think they should screen people a bit more carefully and then stick with the ones they select and make sure they are able to get jobs [CSP20]

Faculty members also echoed this sentiment, when commenting on which students in their programs they thought would benefit from co-op.

> I think it's a mistake to argue that co-op is equally beneficial for all students. I think there's pretty convincing evidence that some students benefit far more from co-op programs than others do [CF6].

> A lot of it starts with the whole issue of attitude and willingness. If you don't want to get something out of something like co-op, you're going to get less out of it than somebody who does [CF16].

The establishment of GPA as a primary entry criterion, and the method by which the criterion is administered, situates the institution, and in particular the co-op coordinator, in the role of gatekeeper. In voluntary co-op programs the coordinator is instrumental in determining who is admitted. In mandatory co-op programs, students must still apply to the program through the coordinator. In all co-op programs, coordinators play a pivotal role in the allocation of work term placements, leading some students to complain about selective application of the standards and raising questions about access to the program.

> I'm pretty sure that people with higher marks get better treatment. And people who are in [their] good books get a little better treatment [CSP2].

> There are just some students who appear to be more buddy-buddy with the coordinator, and they tend to go to a lot of the better jobs. Whether or not those are a coincidence, who knows? [CSP17].

Restrictive access and preferential treatment are earmarks of élite programs. Although still not fully accepted as mainstream, co-op has acquired academic legitimacy at UVic by virtue of its location within the university, and its enforcement of high academic standards.

In an attempt to balance the training objectives of the work term with the academic objectives of the student's undergraduate discipline, the co-op department develops policies to order and structure the workplace component of co-op programs. One such policy is the development of academic learning objectives for the co-op work term.

To extend academic criteria into the workplace, and thereby maintain order and impose structure on the students' experience, the co-op department requires that students meet with their employers early in the work term, to develop a set of learning objectives which will provide some academic legitimacy for the work term. Indeed, in recent promotional literature, the co-op department refers to employers as "co-educators" of co-op students [UVic, 1999d]. The co-op department's introduction of learning objectives is a recent policy decision not yet fully integrated into the program. Some coordinators contend that objectives are essential to evaluate the learning that happens on a work term. One argues "we have to find ways to evaluate…so we can demonstrate that they have learned something during the work term, not just what they did" [CP6]. However, this sentiment was not universal; according to an administrator "not all of our coordinators have bought into the idea of students setting learning objectives while they are on the work term" [SA2]. A faculty member raised concerns about the limits of learning objectives for the workplace "we have to be a little bit careful with having students set learning objectives. We don't want students to just focus on the objectives they have written down, and possibly pass up other learning opportunities that might present themselves during the work term" [CF2].

There are a number of concerns raised about the co-op department's argument for setting academic learning objectives for the work term. First, is the context of the workplace. When developing learning objectives, some way of accounting for the effects of social and cultural factors in the workplace must be found. Otherwise, all that is created is an ineffective cognitive measurement of what happens to students 'on co-op.' It is one thing to claim that 'learning' happens to students on a work term; it is quite another to identify the sources and the influences of that learning. Without this knowledge, it is difficult to support claims that the learning is transferable.

Second, an objectives-based approach tends to focus students' attention on particular outcomes and they may lose sight of other learning opportunities. Third, having students set academic learning objectives is, in theory, a way of enabling students to take control of their learning. However, there are indications in interview comments that students do not understand how to construct learning objectives, nor do they have the ability to evaluate when the learning objectives have been achieved. In consequence, co-op students see the requirement as one more academic demand on their workplace experience.

Finally, alternatives to learning objectives can be found in the literature review (Chapter Three). For example, the work of Heinemann, DeFalco, and Smelkinson (1992) on work-experience enriched learning in co-op provides an alternative to behavioural objectives by engaging students in active enquiry through observation and interviewing of co-workers on workplace practices, reflection and report preparation for evaluation and

feedback once they return to campus. This could be expanded to include journal writing. Students would be encouraged to keep a journal of their workplace activities, and use the journal as the basis for a discussion of workplace learning, or as part of a work term report. In the vocational and higher education literature, the work of Billett (1999) on guided learning at work, and that of Engeström's (1994) on training for change, are also useful resources. While the policy on learning objectives helps to reinforce the academic respectability of the learning that happens on the work term, it does little to assist co-op students to become self-directed learners.

Guidelines for co-op employers advise workplace supervisors to assess student performance by "focusing on educational objectives" for levels of development in the areas of "intellectual skills, human and social skills, and professional workplace skills" (UVic, nd p.1). Co-op students, in turn, are instructed to provide co-op coordinators with an assessment of the learning environment of the workplace during the coordinator's site-visit. It is doubtful, however, particularly on an early work term, if a student would have the knowledge or the courage to question a co-op employer's established practice and report this to the coordinator. This dilemma was evident in a situation described by a co-op student who worked for a known co-op employer—a member of the UVic employer's council—but felt helpless to complain in the face of bad workplace practices. The student complained "I couldn't say anything about it because they might pull me out and then my co-op doesn't count. I don't have time to look for another one. If they pulled me out then I would have to wait for another term to get a co-op, and I can't do that" [CSP30]. The

co-op department maintains that learning assessments are designed to assist co-op students in setting goals for the work term.

Along with learning objectives and assessments another way that the university and the co-op department maintain order and discipline is through the levying of fees for participation in co-op work terms. Students expressed concern during interviews over the fee they are required to pay while they are away from the university on a work term. Co-op students—unlike regular undergraduate students—are required to maintain year-round registration at the university as long as they are in the program. During the time they are on a work term they are assessed an administrative "co-op fee."

> Because of the way co-op works [the co-op fee] is mandatory. The work term is
> considered a course, so I guess the University wants some money. Or somebody wants
> money. I guess that is how they pay the people in the department and what have you.
> And initially no one had a problem with this. I know they didn't because um, they were
> providing a service for us [CSP33].

While appearing uncertain of how co-op funds are allocated, a number of students nevertheless expressed concern about the way that the university allocates revenues from co-op fees. "It just doesn't seem fair. We are paying co-op fees and we aren't getting anything for it. And, they won't tell us where the money goes. So, we don't know if we are subsidizing another program that is not as good as ours" [CSP38]. another student suggested:

> Each department has to cut corners in order to manage the budget they get from the
> university. That might mean less on-site visits for out of town placements. It's my
> opinion that the co-op fees from the students should go directly back to the department
> that the students belong to, not to general funds [CSP26].

Because the co-op fee is perceived as an administrative charge for coordinators to locate jobs, students who find their own jobs tend to argue they should not have to pay the co-op fee.

196

Last term I found my own job without any help from them. And, I'm not going to go through them to find my next job either, I'm going to find it myself rather than have to settle for something that I don't want, but have to take. But, I still have to pay that fee. It's sort of like a processing fee - and I don't know what they do with the money we're paying, but it's something you have to do to graduate [CSP24].

The results presented above indicate that co-op students' adherence to the established order and discipline structure provides support, albeit reluctant support in some cases, for the policies and procedures that structure their experience of the co-op process. But what do co-op students think about the university's attempts to balance traditional modes of knowledge production and co-op education? How do they perceive learning and its relationship to the academic and workplace contexts?

Perceptions of Learning

To understand how students make meaning of their co-op experience we must understand how they perceive learning, and the contexts—both academic and workplace—where learning takes place. To investigate how co-op students think about what learning and knowledge are and how they are acquired, at an appropriate point during each interview I asked co-op students "in your program, what does learning mean to you?" Vague responses were probed with follow-up questions such as "but, what does that mean to you in terms of learning?"

Interestingly, when asked the question, the first reaction of a large majority of students was to begin describing learning on their work terms. The co-op work term appeared to them to be synonymous with learning, and effort was required to focus on the concept of learning in relation to the classroom. One student explained "what we do in the classroom is study;" learning, in contrast, "takes place on the work term when we get to see how

197

something actually works" [CSP20]. In discussions with other students it became clear that this was a commonly held perception of learning among co-op students in the study.

Learning does not have to be directed to be meaningful, however. For one student, learning takes on the broader objective of accumulating knowledge to help him better understand how the world works. "For me it is my quest for knowledge. I'm not really coming here to find a better job or anything like that. I haven't had problems finding work in the past. This is for my own enlightenment" [CSP35]. For others, in order to learn, the material must have personal meaning or value. These different learning styles are valid and valuable. However, the pressure for grades in co-op courses tends to homogenize learning styles in favour of those that will achieve the required grades.

> You only take out of a course what you find interesting and pertinent and of value to yourself. But, because we are graded, and because of all those things that depend on grades, there is this pressure that you have to learn everything quickly. But you can't, so to get the grades you only learn what you are taught—what you think will be on the exam [CSP31].

The rotation from the workplace to the classroom requires a shift in learning style for some students. The importance of academic grades means that some students will focus on their 'tried and true' methods of learning to satisfy the academic demand.

> The girls in engineering are in there because they're good. It's just that we tend to have less practical experience, we don't have as much hands-on experience. When it comes to machinery and things like that, we have basically no experience. So what we do is we rely on a different strength. We got straight A's in high school, and we know how to study. And when we're back in the classroom atmosphere, we just study, study, study [CSP32].

The work term appears to have a strong enough impact on students' perceptions of learning, that the pedagogical activities of the co-op classroom are diminished, and those of the workplace enhanced. In the workplace, one "learns by doing" and emulation. As one student describes it, "If you want to learn you have to find somebody that knows and

does what you eventually want to do and find out what you need to do to be able to do the same thing" [CSP36].

Students contend that learning workplace procedures in the classroom does not seem to be 'real' and therefore is not taken seriously. There is a feeling of artificiality attached to learning something out of context.

> In class you do cases and stuff and apply concepts to live situations in the classroom, but it's still just in a book. Like it's still not really taken seriously. It's not really real [CSP30].

> Sometimes I really have trouble trying to just concentrate on learning something in class. Like it just isn't real. And, I try as much as possible to do like all the regular assignments, to try and keep up on top of things. But, when they stand there and tell us how important this is, and try make us learn something in class, I just keep thinking, it's school, it isn't real [CSP3].

One student described the difference between learning in the classroom and learning in the workplace as the difference between "the text book world and the real world" [CSP41]. For many, classroom learning does not take on meaning until there is an opportunity for practical application.

> You learn all these theories in class...but you don't think there really is a real world. But then when you actually see them and you actually get to help make them, then it becomes really interesting and you start to see... [CSP43].

Co-op students' perceptions of the types of assessment used by instructors in certain courses can also influence their attitudes and approaches to learning.

> The teaching is quite good, um, the only problem that I have is that across the different sections of a course, there isn't a common grading scheme. There are three sections of the same course going on, with different instructors. Like, one class average is an A- and the other class average is like a B. And it is the same material, but it is just like, different tests and a different marking scheme [CSP16].

The time pressure on co-op students and the competition for marks to ensure they remain in the program leads some students to adopt a learning strategy to meet immediate needs rather than trying to understand the nature of the problems. By failing to understand the

underlying concepts students are left with the prospect of memorizing as much of the material as they can to satisfy questions on upcoming exams.

> Most exams, the way they're structured now, are 90 percent memorization. Just the facts. Maybe a few thinking questions here and there, if the professor thinks of them [CSP31].

> Once you are past a certain level, you don't need to memorize formulas. You shouldn't have to memorize a certain equation. If you understand what is going on, you are a lot better off than just having memorized it. Because the day after the exam you are just going to forget it. The next day chances are you are not going to remember very many of the memorized concepts. But, understanding takes time... [CSP17].

A majority of co-op students view the academic assessment and reward system in the university as favouring those with well-developed memorization skills.

> Some subjects—[the] sciences in particular—it's all memorization. And it does favour the students who memorize well. And it disfavours those who understand the concepts but don't remember the formulas. [CSP8].

> A lot of students are straight memorizers. They try to develop a visual memory, or photographic memory, and retain it long enough for the exam. They finish, they get good marks, but they don't understand it [CSP43].

Some co-op students recognize the drawbacks of memorization as a learning strategy, suggesting that other skills might be more beneficial in certain contexts. "Memorization might get you good grades, but in the workplace, it's the critical thinking that is so much more important than just regurgitating facts" [CSP22]. In memorizing facts for reproduction students accumulate and store information for future use. Therefore the capacity for learning is limited by time and space. However, not all students are limited in this way. One student appeared to have learned to map the spatial requirements of knowledge with the precision of a furniture mover.

> Your mind gets trained to what you need to know and what you don't need to know to make sense out of it. You start to take from it what you will, and when you've had work experience and you're comfortable with everything around you, then you have all this space in your head, all this room to put things. And you decide there's things you want to put in, and you start to pick them up really fast. You don't have to take it all in and dump it on top of a big huge pile that's already there. The space is empty and they just drop into place [CSP28]

By selecting only those things that are required to make sense out of a particular situation, instead of simply filling space, the student is constructing space. Through these discussions, co-op students have provided some insight into their role in learning, and what learning means to them.

Chapter Summary

In this chapter I presented data on co-op students' participation, first, on the work term and subsequently in the academic context, and described how the university reinforces the development of co-op students. Students explained the importance of networking, and described the difficulties of interrupting their academic studies for four months while they were on a work term. Enthusiasm for classroom learning dampens when students return to the classroom and are not given the opportunity to integrate workplace and academic learning. They develop compensatory strategies for collaborative learning, and study groups play an important role in meeting the demands of coursework and class assignments. Students also develop learning strategies to deal with the demands of the academic classroom. They describe how the alternating structure of co-op allows them to develop a deeper understanding of the purpose of learning and their role in the social processes that structure their learning.

Co-op education programs are one way that the University of Victoria enhances the educational and professional development of students. For example, co-op students are encouraged to develop their research and communication skills; the university requires them to make professional presentations of their work term reports. Policies such as this presentation requirement demonstrate the university's commitment to the professional

development of co-op students. There is agreement at all levels that the university has a responsibility to assist graduates in the transition to the world of work. To successfully make the transition from higher education to the workplace, and from co-op student to skilled professional, it is recognized that students require a combination of academic and vocational knowledge and skills. In the chapter I showed that learning and skill development are context-dependent and mediated by individual learning strategies. The strategies that students adopt, and the reasons they adopt them, can effect their perceptions of both learning and work.

Order and discipline in undergraduate co-op programs at UVic are maintained largely through the structure of the undergraduate curriculum, the policies and procedures of the university, the individual faculties and departments, and the co-op department. The university regulates co-op students' activities from admission to graduation, and through awarding academic credit for foundational knowledge. The co-op department regulates access to co-op programs and administers the non-academic portion of co-op. Co-op coordinators impose order by the way they recruit co-op students and assign co-op work terms. Order and discipline is maintained in the co-op workplace through the structure of the workplace experience; the collaboration of supervisors with the university in the training of co-op students for professional disciplines; and through student assessments, evaluations and rewards.

Four broad themes can be identified from the results presented in the previous two sections. The first relates to the importance of context, and co-op students' reports of the

impact of the workplace on learning. I have labelled this the "co-op effect." A second

theme relates to students' perceptions of how professional knowledge and identity are

constructed in co-op. Third is a theme that relates to students' experiences of the methods

of assessment used in the co-op program. The fourth theme focuses on the power of the

academic context in shaping the experience of co-op students.

In the next chapter I provide an analysis and interpretation of the data using these themes

as a framework to examine how students experience the process of co-op.

CHAPTER SIX:

ANALYSIS AND INTERPRETATION

In the previous chapter, during the course of presenting the results, certain patterns of responses emerged that might affect students perceptions of learning and work. These patterns of response form the basis of the themes that will be investigated in this chapter. I analyze four broad themes emerging from the presentation of results. The first theme relates to the importance of workplace context. The second theme addresses the construction of professional knowledge and identity. The third theme centres around methods of assessment in co-op, while the fourth focuses on the power of the academic context.

I: Analysis of Results

The analysis proceeds in two phases. First, I conduct an internal analysis of the themes arising from the presentation of results beginning with the importance of context, and indicating how context affects the construction of professional knowledge and identity. I use the notion of assessment to reveal the power of the academic context over the co-op process and the linkages to perceptions of learning and knowledge production. These results all interconnect through students' experience of learning in co-op. Therefore, I subsequently weave them together to explain the learning experience of co-op students.

Second, by selecting the most coherent and persuasive explanations, I reintroduce appropriate theoretical concepts and use the theoretical literature to interrogate the results

in each of the themes. Specifically, I identify how perceptions of learning and work

develop and change as a result of co-op students' classroom and workplace experiences,

and how students come to understand the impact of these learning contexts on their

individual and co-op experiences. I conclude with a summary of the impact of the co-op

effect on students' approaches to learning and work and on the outcomes of the co-op

process.

Theme 1: The Co-op Effect

Co-op students distinguish between learning from books and learning through hands-on

application. What I call 'the co-op effect' is the perception that learning takes place as a

result of the activities of practical application in the workplace, not through the activities

of the classroom. What goes on in the classroom, students suggest, is not learning but

'study,' or the 'learning about' a discipline. Co-op students express certain concerns

about the potential for transfer of learning from one context to another.

In the workplace, as students are learning disciplinary skills, they are also learning to be

members of a situated community (Lave & Wenger, 1991), while being disciplined as

members of a profession (Foucault, 1977). In this way, co-op students learn not only

content knowledge, but also disciplinary norms, expectations, and standards in a

particular area. Learning occurs generally through experiencing the activities and cultural

norms of the discipline (Lave, 1991b). Co-op students move from novice toward expert

through co-participation with members of the disciplinary community. Thus, co-

participation allows for learning through performance and engagement within a

community of practice rather than solely through cognitive acquisition of knowledge—

205

the dominant mode in the academic context (Brown et al., 1989; Lave & Wenger, 1991; Rogoff, 1990).

The co-op workplace, then, can be seen as a situated community of professional practice where students learn on-the-job, (Lave & Wenger, 1991; Wenger, 1998), while being disciplined as workers (Foucault, 1977). Classrooms are sites where students learn *standards* of disciplinary practice while being disciplined into the role of university student (Biggs, 1987; Entwistle, 1996). That is not to say that disciplinary *skills* are not learned in the academic context. But despite attempts to simulate the professional context in the classroom, disciplinary practices and discourse learned there will not be those of the workplace. As student comments in Chapter 5 make evident, learning workplace procedures in the classroom does not seem real ("it's still just in a book. It's not really real," and "I just keep thinking it is school, it isn't real") and, therefore, the procedures "aren't taken seriously." The academic context within which the students are taught certain disciplinary procedures is perceived to be distinctly different from the professional context to which co-op students aspire. The social roles and communicative practices are also perceived as distinctly different in academic and workplace settings.

How do students act when they exchange the classroom context for the workplace? Do they act in ways that are grounded in the academic context, where they learned professional content? Or do they attempt to act in ways that they perceive as more appropriate to a professional in the workplace? To investigate this question we must analyze what co-op students' experience when they 'do co-op.' As reported earlier,

'doing co-op' is how students refer to the work term component of the co-op program. To 'do co-op' is to undertake a co-op work term.

Because the co-op work term is a key element that differentiates co-op from other undergraduate programs, it is worth briefly recapping the process of preparing for the work term before beginning the analysis. From the time they are accepted into the program until they actually go out on a work term students are in a state of what might be called suspended animation or limbo. Although they have been accepted into the co-op program, and attended the 'co-op only' course in preparation for the work term they do not feel like they actually belong until they have survived the *rite de passage* of the first work term. They have heard stories from other students and co-op coordinators about the workplace experience, and have developed expectations of what that first job will be like, and what it will do for them. But until they actually have the experience, the co-op portion of the program does not exert an effect on them.

One of the first activities on a co-op term is for students to meet with their employer to develop a set of learning objectives for the work term. While the co-op department provides certain broad guidelines for setting objectives, results indicate that students have a limited understanding of the purpose and function of workplace learning objectives. Some express concern that it is 'just another academic exercise' and they fail to see how an evaluation of workplace learning objectives will affect their progress in the program, since the work term carries no academic credit.

The first work term provides students with an opportunity to develop on-the-job skills, and receive payment for their efforts. This experience serves a number of purposes. First, it allows students to see first-hand the tasks that professionals in their field perform in the workplace (Lave & Wenger, 1991). Second, by receiving wages for their work, they begin to appreciate the exchange rates of wage labour (Sewell & Hauser, 1975). Third, students begin to develop an understanding of the structure and function of the workplace including employer-employee relations, structural hierarchies, and the roles and responsibilities of new members in a community of practice (Wenger, 1998).

The co-op work term is also important to learning and skill development in students. In terms of meaning, co-op work experiences provide students with valuable opportunities for exploration and clarification of their career goals and acquisition of skills and experience related to those goals (Hays, 1991). Co-op students perceive that both their educational and career goals are clarified as a consequence of their work experience (Wilson & Lyons, 1961; Weinstein, 1980). Further, students opt for co-op because they perceive it will provide the skills, insights and professional contacts essential to making meaning out of their experience and assisting in planning their future (Bonds, 1989).

The competition for work terms in co-op is not unlike the competition for jobs in the regular labour market, except that co-op students have access to privileged information—the employer has already signed up to participate in co-op and, therefore, the pool of candidates is restricted to co-op students. However, some students would like to see this restricted even further. For example, students in Geography and Business complain that

208

senior students out-compete them for 'good' co-op jobs because employers opt for the candidate with the highest academic qualifications and level of work experience, rather than assessing the actual level of skills and experience required for the job. Factors such as these increase the level of uncertainty in students based on their expectations of the co-op work term.

Many of co-op students' expectations revolve around the work term. Students form expectations of co-op based on positive promotional material provided by the university, and on the anecdotal evidence of other co-op students and coordinators. The benefits of co-op are strongly promoted. Expectations of success in co-op are reinforced by the instructors who prepare students for the first work term. Co-op coordinators expound on potential benefits of co-op during these job preparation courses, in a manner designed to motivate students to strive for the best. The unintended consequence of such an approach serves to instil unrealistic expectations in co-op students who have not yet experienced a work term. Students recount at length tales of promises made about what the co-op program and those associated with it would do for them. When these expectations subsequently fail to be realized students become confused, disappointed, and feel let down by co-op. Unable to duplicate the successes of previous students, as recounted by coordinators, students begin to doubt their own abilities. Doubts soon give way to disappointment and anger at what are perceived as misrepresentations about the co-op program. During interviews, discussions around unmet expectations of the work term elicited the greatest emotional response from students.

Why does this happen? Some students are in an impressionable state when they first join co-op, and unrealistic expectations, once formed, are difficult to dislodge. The promotional efforts of coordinators are largely driven by pressures to keep the number of students in each program at a sufficient level to qualify for, or justify, claims for funding to operate the programs. The number of funded positions for coordinators and support staff for co-op programs and consequently their respective salaries are, by and large, predicated on the number of students enrolled in co-op. The benefits of the program are thus promoted not only to students, but also to the university administration.

The impact of these promotional attempts on students' expectations appears to receive little attention. Students describe a roller coaster effect. Excitement at the possibilities offered by co-op is followed by the disappointment of reality, and then uncertainty and anxiety over their abilities, and finally anger at what some described earlier as 'being led down the garden path' with promises that don't materialize. Results presented earlier also indicated that for some students these unmet expectations were justification for finding ways to circumvent what they perceive as an unfair or faulty system.

Despite these negative aspects of co-op administration, the workplace experience provides co-op students with positive reinforcement and a first-hand opportunity to learn how employers make hiring decisions. Through participation in workplace practices and discussions with fellow workers and supervisors, students come to understand the importance that employers place on relevant skills and experience. This enables them to

determine areas of scarce or in-demand skills and, upon returning to class, they have a clearer idea of how to position themselves for entry into their field upon graduation.

While doing co-op students also learn the importance of networks of professional contacts. Just as human capital is defined as the knowledge and skills that an individual accumulates over time, social capital can be regarded as the network of relationships that an individual accumulates over time (cf Bourdieu, 1973, 1986; Coleman, 1988). Burt argues that "your social capital gives you opportunities to turn a profit from the application of your human capital" (1992, cited in Meyerson, 1994, p. 384). Burt is referring here to networks of contacts which later might allow co-op students access to employment opportunities—not otherwise available—where they can demonstrate their skills.

Coleman (1990) stresses that as an asset "social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: they all consist of some aspect of a social structure, and they facilitate certain actions of individuals who are within the structure" (p.302). The value of these aspects of social structure is that co-op students can use them to achieve their interests. For Bourdieu (1997), too, social capital is relational; it is directly tied to membership in a group. The amount of social capital possessed by individuals depends on the size of the network of connections they can effectively mobilize, and the amount of capital (economic, cultural or symbolic) each member of that network possesses. The network, in effect, exerts a multiplier effect on the capital possessed by the individual.

Consequently, networks formed on co-op can extend beyond the work terms to shape students' perceptions of the labour market and assist with employment opportunities upon graduation. Through repeated work terms students begin to understand how they can increase their access to information and opportunities by increasing the number of networks in which they participate. For co-op students, developing a professional network begins with acceptance into a community of workplace practice (Lave & Wenger, 1991). It is then incumbent on the student to maintain and enhance their network through contributing to it, as well as drawing on it, to assist their transition from the university to the world of work upon graduation.

An interesting phenomenon that showed up in the study was the practice of over-investing in discipline-specific experience in order to enhance future employment or career choices. In this scenario, students extend their undergraduate program in order to accumulate greater amounts of work experience by undertaking more than the required number of work terms. In some cases this is done to enable the student to develop specific types of experience deemed important to their future career. For these students the urgency of completing the degree in order to contain educational costs is not an issue because they are paid on work terms. And, because they are paid, they are not foregoing earnings from employment upon graduation.

Extending their program to gain further discipline-specific experience is a strategic move designed to maximize employability on completion. A number of the students I

interviewed had completed seven work terms, when the requirement for graduation was five. Extending the number of work terms was most prevalent in Chemistry, followed by Engineering. It was unusual to find students who would consider doing more than the required number of work terms in Geography. Students in Business were emphatic that they were not interested in completing more than the minimum. To some extent, the types and quality of work term opportunities available in the dedicated labour markets for Chemistry and Engineering co-op students might explain differences between co-op programs in the Arts and Sciences. Industry-specific experience is perceived by science students as a type of experiential capital that enjoys an enhanced exchange value on the labour market.

One possible reason behind the rejection of over-investment by Business students might be their earlier reported dissatisfaction with rates of pay on co-op work terms. The cash flow from additional co-op work terms would not adequately compensate them for the lost opportunity costs of permanent employment. Their primary objective was in securing employment upon graduation and undertaking additional training on-the-job. On the other hand, students in the science-based disciplines enjoy a higher rate of compensation on the work term, than co-op students in the arts.

The Chemistry and Engineering programs both require students to successfully complete five work terms for graduation. A number of students I interviewed in each program had completed seven work terms, and two students intended to complete an eighth work term. As described in Chapter five, Chemistry students perceive that specific work experience

will enhance their future career prospects, while Engineering students tend to be focused on specific employment prospects upon graduation. Chemistry students who over-invest in work term experience, therefore, tend to prefer breadth of experience, while Engineering students opt for depth of experience. This means that over-investing Chemistry students are more likely to seek seven individual four-month work terms in a variety of areas, while Engineering students would select two eight-month work terms in specific areas. How successful the scheme of over-investment is in helping co-op students achieve their goals, or the advantages that can be gained by over-investment cannot be determined from this study, but is fertile ground for future investigations of the benefits and advantages of co-op.

Theme 2: Construction of Professional Knowledge and Identity

A second pattern of responses concerns the construction of professional knowledge and identity. Of interest here is how co-op students learn to be professional, how they construct professional identities, and how the social structures aid or hinder that development. Professional knowledge is constructed around content in a process tied directly to issues of disciplinary identity, values and purposes (Becher, 1989). Co-op work terms provide opportunities for students to gain discipline-specific knowledge and work experience while participating as junior members of a community of practice. Here students are normalized into thinking and acting like other members of the community (Foucault, 1977; Lave and Wenger, 1991). Also, as was seen earlier, by transferring new knowledge to the workplace or introducing modifications to workplace procedures, co-op students can contribute to changes in professional practice.

.

214

While the first work term provides co-op students with an introduction to the workplace, subsequent work terms serve to deepen their perceptions of what it means to work as a professional in their chosen field. They begin to make connections between what is learned in the classroom and how theory is applied in the discipline-specific workplace. They also learn new practices and procedures in the workplace and are anxious to demonstrate that new learning when they return to the classroom. In many cases, however, they find little opportunity to do so. Students describe their frustration at the apparent lack of faculty interest in what has been learned on co-op. This frustration is not restricted to the practical skills specific to the workplace. It includes other skills developed in the workplace and not taught in the classroom, such as time management, specific computer skills, team-work skills and so on. The classroom appears to be unable or unwilling to accommodate the reflection and internalization of knowledge gained in the workplace. The data suggest that when co-op students return to the classroom from a work term, attempts are made to refocus them into the academic context. The disciplinary devices mobilized include traditional modes of delivery of curriculum material and rewards based on academic norms in the form of grades.

Data presented earlier indicate that classroom learning does not take on meaning for co-op students until there is an opportunity for practical application. Although students learn disciplinary skills in the academic context, these skills are usually 'transitional' to the workplace applications, not 'reflective' of them. In other words, students consider disciplinary skills learned in the academic context as skills developed 'for' the

workplace. In contrast, they view reflection on skills learned 'in' the workplace as a way of strengthening understanding of the potential applications.

While certain techniques and practices can be learned in the classroom, disciplinary practice is context dependent, and so are the consequences of actions. Even though students might learn certain procedures under the controlled conditions of the classroom or laboratory, practical application still requires adaptations to context-specific sites of practice. During one of my in-class observations, for example, a student sitting behind me muttered under his breath that specific procedures being outlined by the instructor in his lecture were no longer in use in the workplace. Other students mentioned during interviews that certain procedures they are asked to learn in class "do not necessarily work that way in the workplace" where conditions of application vary considerably from those of the university classroom or laboratory. Given the apparent distinctions between their treatment in the academic and workplace contexts, students' comments about workplace practices that made them feel like "real professionals" seem salient.

Several issues complicate the professionalization process in co-op programs, particularly in the scientific disciplines of Chemistry and Engineering, and in the technical aspects of non-science disciplines, like Geography and Business (Becher, 1989). Research indicates that during professionalization two types of knowledge are constructed simultaneously: knowledge that is observable and verifiable, and knowledge that is social and rhetorical (Latour & Woolgar, 1979). Professional knowledge, therefore, can be thought of as knowledge constructed in a process tied directly to issues of disciplinary identity, values,

and rhetorical purposes, 'around' content (Bucciarelli, 1994). In other words, in the co-op classroom disciplinary knowledge is constructed as the cognitive content of a discipline, conveyed largely through oral and written communication about professional skills. In the workplace, disciplinary knowledge is constructed in the milieu of practice—it is not learning *then* doing, but rather learning *by* doing; not learning theory *for* practice, but learning theory *in* practice; not learning *about* a profession, but learning *to be* a professional. The process of constructing professional knowledge in co-op then, can be seen as a complicated mixture of disciplinary identity, values, rhetorical purposes, and technical content.

In the workplace students develop a repertoire of professional skills while accumulating industry-specific work experience. Order and discipline are maintained in the co-op workplace through the structure of the workplace experience, the collaboration of supervisors with the university in the training of co-op students for professional disciplines, and through student assessments, evaluations and rewards. It is during the co-op work term that students are disciplined to become workers in professional workplaces. As students work under the guidance of a supervisor or other senior employee they are offered instruction in specific procedures, then observed as they practice the procedures to ensure that they perform within the acceptable limits of the workplace. Students are kept under observation as they learn the routines of the workplace, and advised of acceptable site-specific practices and behaviours. In effect, student behaviours are moulded to 'fit' into the discipline specific workplace (Foucault, 1977). As they gain more experience they develop procedural knowledge and expertise in certain areas of a

profession. Enhanced levels of procedural knowledge are a foundation of tacit knowledge (Polanyi, 1973; Sternberg & Horvath, 1999). Through repeated practice in the workplace, students begin to build a tacit knowledge base of professional practice. One of the benefits of developing tacit knowledge, and skills in expert practice, is that the knowledge is available for use in other settings.

Another area with the potential for conflict is the way that co-op students construct their identities in the academic and workplace contexts. Students in the early years of the co-op program refer to themselves as a 'university student' in one of the four disciplines under study. Then, after gaining workplace experience they move on to identifying themselves as a 'co-op student.' Finally, for some, identity takes a more professional turn. When asked during the interviews "how do you identify yourself when others ask what you do?" students in Business and Geography responded that they usually identify themselves either as a university student, or as a co-op student. But students in Engineering identify themselves as engineers, from as early as second year. Interestingly, Chemistry students in their senior year, with a number of completed work terms identify themselves as 'B.Sc. Chemists.' These are indications of how students in different disciplines construct their identity at different stages of their program. The development of an engineering identity early in the program can be attributed to the strong professionalization structures and the prescriptive nature of disciplinary coursework in Engineering, combined with a mandatory co-op program to provide practical experience.

Does classroom discourse and practice help co-op students construct a professional identity, or does it instead reinforce their identities as students? The classroom practices I observed and those reported by students in the study indicate that little attempt is made by the university to address the students' attempts at the development of a professional identity. When they return to the classroom from a work term co-op students are once again cast in the role of students, and the norms of learning are those of the classroom. In the academic context students are rewarded for independent success in a competitive grading system, and treated not as junior members of a community of practice, but rather as individuals that do the bidding of that practice. By moulding themselves to academic governance, co-op students become subordinate, self-disciplining subjects of the academic context in which they participate (Foucault, 1977).

While there are certain consistencies in the way that students construct their academic identity, there are also inconsistencies. The data are contradictory on how co-op students from different disciplines construct their workplace identity and on the difficulties of constructing an identity other than that of student when they return to the classroom. Data presented earlier indicate that co-op students are able to contribute to a community of practice by bringing with them new ways of doing certain procedures that can improve workplace practice in some way. The reward for such activity is the acknowledgement of colleagues and supervisors, and a feeling by the student that they have been able to make a small contribution while gaining valuable experience. In the classroom, on the other hand, students have little opportunity to influence the development of curriculum or make changes. A rigid system of rules and norms, methods and procedures, enforces power

differentials (Biggs, 1987). Instructors wield power over students in terms of grades. Coordinators have the power to assign good work terms or restrict access and opportunity. The only way to successfully navigate these power shoals is to become a consummate student and strive for the academic grades that constitute the currency of the university.

As students advance through the co-op program, and after completing a number of work terms, they begin to use the discourse of the workplace to describe their activities in the classroom. The adoption of the discourse of the workplace is an early indicator of changes in students' perceptions of what it means to be a professional in a field of study, and their role within the profession. It also signals the internalization of workplace discipline (Foucault, 1977). By adopting the language of the workplace co-op students are 'trying out' their new hybrid role as a student/professional. This might be viewed as a transitional stage during which the perception of themselves as co-op students gives way to one of 'professionals in training,' as students move toward full membership in their professions. Becoming a professional involves more than simply learning the foundational knowledge and skills of a discipline; it also requires that students learn to conduct themselves in a professional manner. Beyond learning disciplinary knowledge, language, and norms during the professionalization process, therefore, students are also required to develop a professional persona.

A professional persona evolves during repeated forays into the workplace, and from participation in the activities that make up a profession. As they increase their proficiency

and skill levels students also begin to adopt the mannerisms and vocabulary of the profession, and begin to think of themselves as junior members. They start to visualize themselves becoming full members of a community of professional practice upon completion of their program. Co-op students also develop professional networks and track changes in the market. Knowledge of market conditions and the establishment of networks of professional practice will help them position themselves appropriately for the transition from co-op students to skilled professionals. The level of importance that co-op students attribute to the development of specific skills in professional practice can be seen in the "over-investment" phenomenon discussed earlier. Students willingly extend their time in university to accumulate experience or practice in areas that they deem important to their future career.

Theme 3: Methods of Assessment

A third pattern of responses relates to methods of assessment in co-op and possible conflicts that might arise from the use of two sets of criteria for assessing student achievement and progress. One set is designed to assess understanding through reproduction of the principles of practice, the other assesses understanding through demonstrated proficiency in practice. Both methods of assessment are employed in co-op, but only one carries academic credit.

Perceptions of the methods of assessment used to evaluate progress in courses can influence co-op students' attitudes and approaches to learning (Ramsden & Entwistle, 1981). The time pressures on co-op students, and the competition for marks to ensure they remain in the program, leads some students to adopt a learning strategy that

addresses the immediate needs of reproducing facts on a test (surface-level learning) rather than fostering understanding (deep-level learning). Students perceive that the academic assessment and reward system in co-op favours those with well-developed memorization skills, rather than well-developed understanding. Engeström (1994) points out that while it is easy for students to shift from a deep to a surface learning strategy to accommodate perceived assessment objectives, this shift is often difficult in reverse. He presents further evidence that some students can develop a compromise strategy or 'strategic approach' by finding a middle ground. In other words, in some courses students will adopt a surface strategy because assessment is based on accurately reproduced facts, and in others use a deep approach where assessment encourages the demonstration of understanding. Co-op students in the study comment that opportunities to demonstrate understanding are limited to "those few thinking questions on tests." Therefore, students who value understanding may adopt a strategic approach to learning course material as a coping mechanism. They may perceive a need to compete with students acknowledged as good memorizers, for the grades required to remain in the co-op program, and also to ensure they are considered among "those with the best marks [who] get better work terms" [CF17].

Both the co-op department and co-op employers use a combination of workplace and academic criteria (learning objectives and work term reports) to conduct assessments of co-op students' performance on each work term. Co-op employers are instructed to assess students progress toward the learning objectives established at the onset of a co-op term. Midway through the work term the co-op cordinator makes a site visit to evaluate

student's progress on the work term. On completion of the work term the employer is also requested to evaluate the student's performance, skill development, and work habits. Completion credit (non-academic) is granted for each successful work term. These processes and methods of assessment in co-op form what Foucault (1977) describes as an integrated system of disciplinary power.

Academic credit is reserved for those activities that take place in the classroom and can be assessed using traditional academic criteria. A stated objective of UVic's co-op programs is to enhance the professional development of students. However, the reality of practice appears to contradict this objective. Although attempts are made to extend the academic context into the workplace through the development of learning objectives for work terms, the academy rewards cognitive understanding over the development of procedural knowledge and practical skills. It seems at odds with itself, and with the mainstream educational curriculum, by using differing evaluation criteria.

Theme 4: Power of the Academic Context

A fourth broad theme concerns the power exercised by the academic context over co-op students' professional development in the classroom, and progress in their program. Differences in the academic and workplace contexts cannot easily be resolved. With a mandate to assist the professionalization of students by allowing them to benefit from the synergy of dual learning contexts, co-op education carries structured-in conflicts between the workplace and the classroom. The workplace can more readily take on the characteristics of the academic context in its approach to learning than the reverse. The academy would have greater difficulty attempting to adopt workplace criteria that might

displace or distort the academic perspective of learning. For example, in the classroom co-op students demonstrate their learning of theoretical principles by appropriate reproduction on assignments such as tests; in the workplace, knowledge is demonstrated through proficiency of practice. But, what happens when these two systems get out of synchronization? If one of the objectives of the university co-op program is to assist the professional development of students, does it not contradict itself if it rewards cognitive understanding over practical or tacit knowledge?

The power of the academic context is further reinforced by students' interpretations of the objectives of their coursework. When I asked students what was the primary objective of their coursework they invariably answered that the objective was to get good grades. Therefore, what appears important to students in the academic context is not necessarily the development of an in-depth understanding of the foundations of a discipline. Rather it is the accumulation of a sufficiently high GPA that can be parlayed into future co-op opportunities. Faculty members confirm that "students with high GPAs find the co-op program somewhat easier," suggesting that what finally matters to both instructors and students is less the academic work undertaken in the co-op classroom, than the grade assigned to the work.

Further evidence of the power of the academic context was reported earlier through students' complaints of inflexible schedules for the delivery of disciplinary coursework, reinforcing the suspicion that the academic syllabus is privileged in the classroom. The types of activities that allow for reflection-on-practice, through sharing of students'

experiences of the workplace, are severely limited. One way that co-op students found to provide a forum was to get together with others in their cohort—people who understand because they are in the same situation—and talk about their workplace experiences during the social activity of study groups. This activity places the statements from engineering students—who find that they increasingly "associate only with other engineering students"—in perspective.

Among their fellows, co-op students can freely exchange information about the work term and share stories of unique learning experiences or novel solutions they discovered to particular workplace problems. In much the same manner as the photocopier repairmen sharing 'war stories' about novel solutions to unusual problems in Julian Orr's (1998) study, students derive informal knowledge of the profession through discussions with other co-op students. The incidental learning that takes place in these gatherings is similar to that which occurs in communities of practice in the workplace (Lave & Wenger, 1991; Marsick & Watkins, 1990; Raizen, 1994). At the same time as students are socializing and sharing 'co-op stories,' they are learning novel solutions to problems that might prove useful when they encounter a similar situation on a subsequent work term.

Co-op students' perceptions of the workplace indicate that their understanding of the realities of the professional context are not shared by the university. The university's mandate contains no reference to the professional development of co-op students. The university places great emphasis, and therefore above-average rewards, on the conduct of research. Rewards accrue to faculty who meet the standards of the academic context.

225

Professors comment that "you can be a bad teacher, but as long as you are a good researcher, you can still get tenure." Rewards for teaching contributions to co-op were perceived by faculty as inadequate.

The results also indicate that the actions of co-op students are linked to their experiences of the level of support for learning and skill development in the educational environment (cf. Astin, 1993; Baird, 1990; Becker, 1961; Bidwell, 1989; Pascarella & Terenzini, 1991). Quality co-op experiences are essential to students' perceptions that the university is meeting its responsibility to assist their professional development, and also to guide their actions toward achieving their educational goals.

The analysis of these four broad themes raises a number of questions. In the classroom, do co-op students learn 'in theory' to be professionals, but have limited opportunity to convert the theory into practice? What happens when they attempt to apply theory to practice? Do co-op students see workplace and classroom practices as distinct? Do they choose to act in ways that are more explicitly grounded in the academic context while in school? How does that affect their perceptions of workplace knowledge? When faced with a change in context (i.e., from the classroom to the workplace) which repertoire do co-op students draw from? The influence of the academic context is evident in one student's explanation of how they conducted a new procedure in the workplace, using the academic, rather than the workplace context, as a guide: "I just chose to do it the way I learned in school and it worked out." But there is little evidence from the study to indicate that students were able to successfully adapt workplace procedures to classroom

exercises involving group work. This suggests that despite the value the students themselves place on workplace learning, power still resides with the university classroom and the academic context.

Section Summary

In this section I analyzed the patterns of results occurring in the data and described four broad themes emerging from the results. I began by looking at the 'co-op effect'—the influence of the workplace context on co-op students' perceptions of learning and work. The workplace experience provides co-op students with opportunities to develop skills in the context that they will be used, while establishing networks of professional contacts that will assist their transition from the university classroom to the world of work upon graduation. Co-op students generally agree that learning skills in a context of application infuses the learning with a durability not experienced when knowledge is acquired out of context. Students in different disciplines construct their academic and professional identity differently.

The power exercised by the academic context over co-op students' professional development in the classroom is mediated through methods of assessment. The academy values cognitive understanding over the development of procedural knowledge and practical skills. Inflexible schedules for the delivery of disciplinary coursework lend support to complaints that the classroom context privileges the academic syllabus rather than practical knowledge. Inflexible schedules limit opportunities for reflection-on-practice, where students share experiences of the workplace. The usual claims for co-op are that students learn to be professional through the cumulative effects of workplace and

227

classroom experience. My evidence contradicts this, suggesting that students returning to the classroom from a work term are forced to re-adapt to the academic context.

In the following section I reflect on and interpret the findings of my study using theoretical perspectives from the research literature on learning and work.

II: Perceptions of Learning and Work

In this section, I summarize predominant patterns of student's responses to learning and work and suggest possible explanations for them. In order to examine the role of cognition and expertise in the workplace I revisit the theoretical literatures of cognitive and situated learning presented earlier in the literature review. My objective is to interpret these literatures as I examine how theories of cognition and situated learning can be used to understand how, and in what ways, the workplace influences co-op students' construction of knowledge.

Cognitive Learning

Cognitive psychology provides accounts of how individuals organize "representations" of both conceptual and procedural knowledge into cognitive structures. These are acquired, organised in memory, and subsequently used in both routine and non-routine cognitive activities such as problem solving, transfer and learning (Billett, 1999). The argument here is similar to that found in the adult education literature through Mezirow's (1991) "meaning systems" which act as filters in learning.

The ability to later deploy effective cognitive structures in non-routine situations within a domain of knowledge distinguishes experts from novices (Wagner & Sternberg, 1986). Cognitive psychologists contend that the knowledge and skill required for workplace performance, although associated with a particular discipline or subject matter, must be generic enough to enable the transfer of knowledge from one situation to another. This focus prompted attempts to identify generic competencies for the workplace (cf Conference Board of Canada, 1992; Evers et al., 1998; Carnevale et al., 1990).

The cognitive literature further suggests that knowledge acquisition and development occur largely through problem-solving, defined as a cognitive activity (Billett, 1996). This perspective, however, disembeds thinking and learning from their contexts, and, therefore, fails to account adequately for the influence of context on learning in situations like the workplace. Expertise is constructed as a cognitive phenomenon in which thinking is a skill. The utility of internal attributes is emphasised at the expense of social and cultural contributions to thinking and acting. Cognitive psychology thus fails to account for the effects of context on learning in regards to co-op.

Regardless of this shortcoming, results of this study indicate that learning objectives are becoming part of the work-term process. Co-op students must now set cognitive learning objectives for the work term in advance, thereby possibly excluding the sociocultural workplace context and running the risk of students focusing on the behavioural objectives at the expense of other learning opportunities. Thus, to understand how co-op students construct discipline-specific knowledge in the workplace we need to reach beyond

cognitive psychology. We need a broader view of knowledge construction, one that incorporates the sociohistorical origins of knowledge and its appropriation through social mediation (Vygotsky, 1978, 1987).

A constructivist view of knowledge construction situates individuals in the social and cultural circumstances in which they act. To understand how co-op students develop skills and expertise on a work term, therefore, we must first acknowledge that in particular workplace's embedded values reflect the culture of practice. We must also take into account the particular circumstances under which the knowledge originates, and is then transformed by the student. The desire of co-op supporters to be perceived as advancing students' learning in a way acceptable to academic parameters is evident in the mapping of progress against learning objectives. In reality, however, such objectives fail to capture any sense of the conditions under which co-op students' knowledge construction and learning take shape in the workplace.

The above discussion links back to the previous discussion on generic or key competencies for the workplace. What makes the generic competencies argument difficult to accept uncritically, is that competencies or skills suggested as generic to workplaces—such as reading and quantitative skills, cognitive thinking skills, and various interpersonal skills—are viewed as learning outcomes comparable in value to specific job skills or capabilities (Berryman, 1993; Carnevale, 1990; Conference Board of Canada, 1992). Because the generic competencies argument has its roots in cognitive psychology, it tends to privilege declarative or operational knowledge (knowing-how to

perform a skill), rather than competent application of the skill. The generic competencies argument also ignores the reality of the workplace—even within specific professions or occupations, job demands vary considerably between different companies and contexts— and therefore it makes little sense to specify exact competencies without developing an ability to transfer or apply them in different contexts.

A key assumption about learning at work is that it has something to do with an individual experiencing something new at work then, by reasoning or logically thinking through their previous work experience, they are able to give the new experience meaning (Billett, 1996). However, the reality about learning at work in co-op is that it is framed by the assumptions of the particular way it is viewed. Proof of an individual's on-the-job learning currently relies heavily on what is observable and measurable. This perspective assumes an objective reality, and ignores any contribution from subjective experience.

The prominent discourses of learning at work include such terms as "experience-based learning," "competence," "reflection," and "cognition." In some cases, even though they have different meanings, these terms are used interchangeably, pointing to the degree of complexity of factors that can shape one's learning, and also determine what counts as learning in the workplace. Dissatisfaction with this conflation of terminology led researchers to seek different approaches to understanding the importance of the social and cultural setting in which cognitive activity takes place. One such approach—situated learning—stems from a sociocultural theory of cognition, which argues that the social setting in which cognitive activity takes place is integral to the activity, not just the

231

surrounding context for it (Tennant, 1999). As such, situated learning theory (Lave & Wenger, 1991) offers a powerful theorization of the workplace-based learning that co-op students experience.

Situated Learning

While on a work term, co-op students develop knowledge through guided participation in goal-directed activities of the practice. In this scenario, learning occurs through engagement with routine and non-routine problem-solving activities, under the influence of a particular community of practice. Through repeated activity in work situations with similar sociocultural practices, a student can, over time, develop a repertoire of skills that will become associated with expert practice. According to Billett (1999) knowledge acquired in this way is more likely to later transfer across settings that share similar sociocultural practices.

Co-op students responses reported earlier indicate their enthusiasm with what they learned on their work terms. But, when asked *how* they learn, common responses are "just by doing things," or "I watched someone else do it and then I tried it," or "my supervisor showed me and I just did it." Two things might be interpreted from these comments (1) the types of activities that co-op students engage in will determine what they learn, and (2) the amount of guidance students receive while engaging in learning will determine the quality of that learning. This suggests that once a skill is learned, its successful transfer to another workplace situation will depend on the type of guidance available in the new workplace. In other words, a skill learned in one workplace can be transferred to another workplace once the procedures and guidelines for application are

232

ascertained. Following this view, skills learned in the classroom might transfer to the workplace as long as appropriate guidance in application is provided. Guidance, then, becomes a key element of rapid and effective transfer.

Students can also transfer skills between situations by using either trial and error to achieve satisfactory results, or by accessing expert or tacit knowledge. Although a skill might be generic (like learning to drive) the specific application (driving a bus) can be performed well in a short period of time with guidance, or learned over a longer period of time through trial and error. This suggests that a skill must be learned first (driving a car) before specific applications of the skill (driving a transport truck) can be subsequently practised.

Once a skill is learned well enough to be automated (routinized or internalized), effort must be directed to appropriate applications of the skill. This suggests that what is important in the transfer of skills is not adequacy in the skill itself, but the ability to adequately practice the skill in different settings. After all, isn't that what differentiates experts from novices? Experts have the ability, with seemingly little effort, to switch the application (practice) of a skill between a variety of areas within the same sphere of professional practice. The limitation is that the areas of practice must be similar enough to enable the transfer to take place. An individual skilled at driving a car will not necessarily be able to transfer that skill and knowledge to an attempt to drive a transport truck.

Therefore, the key to transfer appears to be the opportunity to practice a skill in a variety of similar (i.e. closely related) situations. Hence co-op students progress from novice toward expert through sequential work terms in similar workplaces. Co-op thus appears to provide more opportunities for students to become proficient in certain skills. Students are able to access appropriate guidance in a variety of discipline-specific areas, enabling them to develop 'patterns of expertise' which can be drawn on in the future when confronted by a similar problem in a different setting. In fact, they develop tacit knowledge. They become able to search through their memory banks, or utilize environmental cues to indicate which skills are appropriate to meet specific applications. They are then able to visualize the correct application in their head before they respond. With time, they might become proficient enough in a skill that the response appears to happen before a clear idea is formed (Hatsopolous & Hatsopoulos, 1999).

Once a co-op student develops a body of tacit knowledge they will be able to perform tasks quickly and efficiently, but may not be able to explain fully how they accomplished the task. This is what Joseph Horvath (1999) and Michael Polanyi (1973) refer to as "knowing more than they can tell." If experience allows individuals to develop enhanced skills in application, then it follows that with experience (repeated use) comes the tacit knowledge of the multiple uses for that skill, within appropriate limits. Experience gained through repeated use of a skill then becomes a proxy of tacit knowledge.

In light of the above, it appears that what co-op students learn through the everyday activities of the workplace, is different from what they learn in the routine activities of

the classroom. Different workplace settings present opportunities for a variety of activities, experiences and guidance. This being the case, appropriate placement becomes a critical factor in the quality of workplace learning. Through direct (from supervisor) and indirect ("the way we do it here") guidance, co-op students on work terms gain experience, which reinforces and extends their knowledge. In some cases the workplace might also offer opportunities for students to develop certain specialized skills in areas that are not offered by the university.

Drawing on Piaget's (1968) concept of equilibrium, Billett (1999) suggests individuals integrate new information with what they already know. A student in the study who described being faced with learning a new computer software package on the work term provided an example of this. In attempting to understand how to use it the student "simply thought about (reflected on) other programs I was already familiar with, and approached it the same way" [CSP20]. The process employed by the student was one of seeking equilibrium between what was known and what was new. A process of assimilation (linking existing knowledge to the activity) and accommodation (transforming existing knowledge into new knowledge by incorporating new concepts) allowed the student to complete the task. The process of accommodation would have been the most difficult part of the process for the student. Because knowledge building is demanding work, a student must be motivated to engage in it, particularly if the task is unusual or out of the ordinary. Research tells us that if a task has personal meaning it will be easier to learn, and will allow accommodation more readily (Tennant 1999; Engeström 1994). The novelty of the workplace compared with the classroom, and the difference in

235

learning context (community of practice) may motivate or stimulate a co-op student's desire to construct new knowledge. They then will become more willing to modify existing knowledge structures in order to learn new skills.

Billett (1999) extends the work of Anderson (1993) and Shuell (1990) to illustrate how learning occurs through problem solving. He points to two types of problem solving: (1) routine (analogous to assimilation), and (2) non-routine (analogous to accommodation) problem solving. Routine tasks are what we do every day (like computer keyboarding), and every time we deal with them we reinforce our existing knowledge. Non-routine problem solving, on the other hand, requires an extension of existing knowledge; we must construct new knowledge to deal with the uniqueness of the problem.

Co-op students indicate that they use their daily activities in the workplace to assist them with both routine and non-routine problem solving. They extend their proficiency with current skills through repeated use and reinforcement, and develop new skills through guided assistance in addressing new problems. Problem solving in these everyday activities is what Rogoff (1990) refers to as 'moment-by-moment learning.' And, because problem-solving situations are influenced by the circumstances in which they take place, what is learned will, to a certain extent, be situation specific.

Co-op students in the same learning situation will develop new knowledge at different rates. Students' existing stock and level of knowledge vary, as do their individual learning styles. Accordingly, they will internalize new information differently, and

236

reproduce it at different levels. Compare, for example, a co-op student learning a new skill on a first work term, with a student from the same program on a fourth work term. The first-term co-op student must construct new knowledge using a limited base of existing knowledge containing few similar examples. The more experienced co-op student, with a larger and more varied base of knowledge to draw on, will be able to find solutions more rapidly.

But, a co-op work term is not just about learning new things in new situations; students do not construct their workplace knowledge unquestioningly. Each student approaches the work term with an individual set of values and beliefs. Their workplace experiences are filtered through their individual belief systems and structured by the social values and beliefs of the workplace. Further, how students learn a procedure, whether from a supervisor, co-worker, or text-based material like a manual, will help shape their perceptions of the potency of the source of instruction. If the outcome is successful, they are likely to resort to (or consider) that source again in the future, for assistance in solving similar problems.

In summary, co-op workplaces appear to provide students with experiences that are useful in the construction of knowledge for workplace performance. But it is unclear, at this stage, whether that experience and workplace knowledge can be extended to classroom performance when the student returns to campus. Because the two learning contexts are different we would not expect workplace-specific activities to be readily transferable. However, instructors acknowledging the value of workplace training can

237

reinforce certain aspects of workplace skills in the classroom. My in-class observations combined with students' interview comments suggest UVic still has a considerable way to go in this regard.

The question of transfer of learning, particularly from the workplace to the classroom, is made more difficult because the knowledge structures and environments of the workplace are different in kind from those of the classroom. According to Perkins et al., (1993), knowledge structures can be classified into three types: 1) propositional knowledge including facts, statements, and assertions, usually presented as text-based inert knowledge; 2) procedural knowledge, comprising the knowledge we use to think and act with; and 3) dispositional knowledge, consisting of personal values, attitudes and interests.

From the data presented earlier, it is reasonable to assume that co-op workplace experiences will result in students constructing knowledge of all three types. The type of knowledge that becomes dominant will depend on the social situation in which the knowledge is acquired. For example, propositional knowledge might come from reading an employee manual, outlining appropriate employee activities. Procedural knowledge may then be demonstrated in the way the co-op student uses the manual to guide their activities in the workplace, to help them to complete tasks. Finally, a co-op student's dispositional knowledge might include voluntary compliance with, or monitoring of, workplace health or safety standards, or ethical guidelines. Dispositional knowledge can be positive, negative, or neutral towards the employer.

Co-op Workplaces as Sites of Learning

So far we have concluded that the workplace activities in which co-op students engage influence the knowledge they construct, and that the norms and values of the workplace frame the activities of co-op students. In other words, workplace activities and the associated knowledge construction are situated within a context of 'what is done' and 'how it is done' in that particular workplace. Each workplace is situation specific in this regard.

Because each workplace experience can contain elements of both 'what' and 'how' types of knowledge, possibilities exist for inappropriate learning to occur. In much the same way that a 'hidden curriculum' (Snyder, 1971) can exist in the higher education classroom, a 'hidden agenda' can exist in the workplace. This may consist of inappropriate practices (such as lack of quality control, short cuts) or questionable behaviours (restrictive practices or non-inclusive behaviours), which a co-op student might adopt as the norm.

To develop robust knowledge in the workplace co-op students require a combination of engagement with progressively more challenging work tasks, guidance from supervisors and fellow workers, and ongoing, indirect guidance from the workplace setting. Billett (1996) compares robust workplace learning to the learning that results from immersion courses of language studies. He argues that immersion in workplace activities can result in knowledge being constructed and organised in ways that not only achieves current workplace goals, but can also be transferred to other similar situations and circumstances.

Another significant concern in the development of knowledge on a work term has to do with the guidance that is provided to co-op students in the workplace. Knowledge of procedures may be more freely shared in some workplaces that in others. For example, in small competitive businesses there may be concern about the sharing of specific information with a short-term co-op student, who might conceivably secure a future work term with a competitor. Therefore, co-op students must be made aware by the supervisor that because of the proprietary nature of sensitive information, what is offered to the student might be less than is normally appropriate for learning a procedure.

A common concern shared by both the university and co-op employers is how the knowledge acquired in one location can be transferred to another context. Until recently the concern has been for transfer within similar contexts, for example from one workplace to another. But higher education has long suggested that the skills taught to students in the classroom should be transferable beyond the walls of the academy. A perceived lack of congruence between the academic skills provided by higher education and the demands of the market set the foundation for the relevancy debate described earlier.

The Classroom Learning Context

Universities contend that they provide foundational skills that can be applied to a large segment of the market. There are certain generic skills, such as literacy, numeracy, and thinking skills that are required by all workers. How these skills are deployed in the marketplace is to some extent up to specific industries or professions. It is also the

240

responsibility of industry to take these generic skills and mould them to fit the specific requirements of the workplace. This is something that cannot be done in the university classroom. Therefore, as co-op students pointed out earlier, the role of the university is to provide students with the basics of a professional education, with an emphasis on teaching students how to learn, and how to transfer that learning to different contexts.

But does not the responsibility of the university extend beyond the institution? In other words, do universities not have a responsibility to ensure that co-op graduates are capable of adapting to life beyond the walls of the academy? From an educational perspective, then, should not attempts be made to identify skills that have the greatest potential for transfer to areas outside the university? Unlike traditional university students, whose undergraduate experience is largely confined to the classroom and the laboratory, co-op students' experience occurs in both the classroom and the workplace. Because co-op programs involve learning in dual contexts, and because we addressed the workplace learning context earlier, we must now devote attention to the context in which academic learning takes place—the classroom.

Co-op Classrooms as Sites of Learning

I begin my examination of co-op students' perceptions of learning in the academic context by investigating their experience in the university classroom. In the previous section I presented information on the effects of context on learning in the workplace. It is important to make clear that what I am attempting here is an interpretation of students' perceptions of the effects of context on learning, and not an evaluation of the courses

themselves or the methods of assessment in the courses. In other words my interest in this section is in understanding how learning and the learning situation appear to the learner.

A dominant feature of most university undergraduate education is that at some point in the program students begin to specialize in an area of their chosen discipline. At that time the context within which learning takes place changes. The classroom dynamics change. Class sizes become smaller allowing for more personal interaction with instructors and changing the instructor-student relationship. Assessment measures and evaluation of progress are based less on a reproductive orientation (in the form of quizzes and tests) and more on a meaning orientation (essays, case studies, reports), and students conceptions of learning change. In what follows I attempt to demonstrate the effects of the context of learning by examining the relationship between co-op students' approaches to learning and their perceptions of learning tasks at a number of separate, but interconnected levels. In adopting this approach I demonstrate my agreement with Becher's (1989) contention that at a general level, the 'atmosphere' of the academic department affects students' learning orientations and ultimately their approaches to specific academic tasks.

Ramsden (1997) provides a useful framework for analyzing effects of the learning context. He argues that when attempting to understand the effects of context on students' learning, the focus must remain on the ways in which "the students' perceptions of assessment, teaching, and courses influence their attitudes and approaches to studying," and not with the "objective characteristics of assessment and teaching methods" (p.200).

242

This framework allows me to examine the relationship between co-op students' approaches to study and their perceptions of the learning context at separate levels across the four programs. In this way, important differences in the context of learning in the different subject areas can be made explicit.

Co-op students' perceptions reported earlier and my in-class observations indicate that academic departments in the sciences and the arts are inhabited by different types of instructors and students. Therefore the "atmosphere" of these departments differ (Ramsden, 1979; Ramsden & Entwistle, 1981). However, because students in my study are drawn from both pure and applied disciplines in the sciences and arts (Becher, 1989), the task becomes one of differentiating between comments made by students *about* other disciplines, and comparisons made by students between the contexts of other disciplines and their own. The way that a co-op student talks about another program can reflect their perceptions of the context of their program compared to other programs. For example, a Chemistry student suggests "I am in science, and in general people in the science faculty sort of look down their noses at people in the arts faculty" [CSP34]. A business student proclaims "arts courses are not perceived to be particularly useful by a lot of people in the commerce faculty, they take them as filler courses because they are required to take non-commerce electives" [CSP38]. These comments provide evidence of how the attitude of a department can effect co-op students' perceptions of the context of learning in the department.

At the same time the attitudes and interests of individual co-op students can also affect their perception of the context of a discipline. Students' comments presented earlier reveal perceptions of subjectively defined or stereotypical differences between the types of learning expected in different subject areas. Science and Engineering courses are thought of as rigidly defined but worthwhile, while Arts courses are considered by some to be "easier" and less structured. Courses for the Business and Geography programs fall midway between the rigid structure of engineering, and the 'unstructured' arts.

Co-op students' perceptions of assessment requirements in academic coursework can also influence their approach to learning. According to Ramsden (1997) "students' interests, attitudes to studying, and approaches to academic tasks are strongly related to their experience of teaching and assessment" (p.202). Co-op students in my study complained that there are insufficient guidelines for assessment. They suggest that "it's up to the teachers to decide what they teach" and therefore "when they decide to make exams that are much harder than other teachers, you just can't do anything about it" [CSP43]. Others were disappointed that there "isn't a common grading scheme across different sections of the same course," therefore "one class average could be A- and the other class average could be a B, [even though] it is the same material." But the instructors "use different tests and a different marking scheme" [CSP16].

Perceptions of the differences in structure and learning demands between the arts and sciences is described by Laurillard (1997, p. 140) as the difference between "operational learning" and "comprehension learning." Extending the earlier work of Pask (1976),

244

Laurillard defines operational learning as "vertical pathways that allow for the construction of hypotheses, the use of rules, techniques, procedures, and the manipulation of entities in the subject-matter domain." This description of operational learning matches the learning perceptions of the science students in my study. On the other hand, comprehension learning is "horizontal pathways: the description of the construction at both levels, global and local, the interpretation of their meaning, the search for analogies with other similar constructions" (ibid, p. 140). This description, interpretation, and comparison of relationships between topics more closely resembles co-op students' descriptions of learning in the arts. Students' perceptions of the different demands of the two cultures (Snow, 1964) provide an indication of how learning tasks are set in arts and science departments, and how co-op students interpret these tasks.

By contrasting the experience of students from different program areas we can begin to see how the context of learning, and the attitude of the academic department affects students' perceptions of their discipline. Combining these with other results reported earlier we can begin to understand how much context and attitude affect co-op students' perceptions of learning. A growing body of research evidence attests to the effect of context on learning in the university classroom (Biggs, 1987; Entwistle, 1984, 1996; Ramsden, 1979, 1981, 1997), and in the workplace (Lave, 1991b, 1993; Lave & Wenger, 1991; Wenger, 1998; Boud & Garrick, 1999). However, there is little in the way of research on the effects of context in programs—such as co-op—where learning alternates between contexts throughout the program.

Summary

In this chapter I began to explain why certain patterns of results occur as they do. These patterns were subsequently woven into a tapestry of explanation of how learning in dual contexts impacts co-op students, and how they come to understand the role of co-op and their position in the program. Learning in co-op takes place in the dual contexts of the workplace, where learning is socially constructed, and the classroom, where students construct their own knowledge. The workplace context not only supports, but also actively encourages, co-op students to develop a professional persona. This is not, the case with the academic context. Students found learning workplace procedures in the context of the classroom less effective than learning procedures and skills in the context of the workplace, where learning and application took place simultaneously. As they develop skills in the dynamic milieu of workplace communities of practice, students become convinced that learning is what transpires in the workplace, not in the static, rule-bound classroom, where the activity is better described as "studying."

Co-op students' attitudes and approaches to learning are influenced by their perceptions of the methods of assessment used to evaluate progress in the academic context. The seemingly singular focus on grades in the academic context forces co-op students to compete with others for grades in order to achieve their individual objectives. This is just one example of the power of the academic context in co-op programs. Co-op sets up conflicts between the classroom and the workplace by attempting to extend academic assessment into the workplace context, privileging the academic syllabus, and restricting

246

opportunities for co-op students to reflect on workplace practice and share their experiences of the work term.

By operationalizing classroom learning on co-op work terms students begin to comprehend the relationship between theory and practice. The reverse is also true. A large number of students preferred the concrete method of learning "first with the hand and then with the head." For these students, learning the practical applications of a procedure prior to learning the underlying theory leads to a deeper understanding than can be achieved by classroom learning alone. As students progress from novice toward professional in terms of workplace experience, they develop deeper knowledge of professional practices, and increasing levels of tacit and expert knowledge. Evidence indicates that what co-op students learn through the everyday activities of the workplace, is different from what they learn through the routine activities of the classroom.

In the next chapter I present the summary, discussion, and conclusions of the study.

CHAPTER SEVEN: CONCLUSIONS

The university has historically played an important role in promoting the principles of social democracy through teaching, research and social critique. Today the demand is for an education relevant to the "new" and highly competitive global information economy. Universities are changing the development and delivery of higher education. Alternative strategies are being devised that will prepare young people to take their place in the workplace of the new economy. These changes create tension between quality and standards on the one hand and equality and access on the other.

Co-op education, particularly in the cases studied here, is a response to a particular social value, one that perceives a need for university graduates who can contribute new ideas that will build prosperity in the global marketplace. As well as the traditional purpose of developing civic leaders, therefore, universities are perceived as having an obligation to help undergraduates enter the labour market. This is not a universal opinion, however; counter-arguments about the purpose of the university are numerous (see Chapter 3). Concerns are raised that in reorienting the university to feed the demands of the marketplace, we severely compromize its ability to meet the traditional mandate of delivering intellectual challenge and personal fulfilment. It is claimed that an orientation to the market vocationalizes the curriculum and that this, together with an increase in the number of professional programs, disturbs the university's traditional commitment to 'bildung.'

It is the fear of vocationalization that has, in the past, kept co-op on the margins as a non-academic program. Now, however, co-op is being granted limited status within the academic core of the university. Nevertheless, evidence from this study suggests that, while the role of the university in society may be changing, the traditional university classroom is not. One need only consider the lack of academic credit for workplace learning and a steadfast resistance to students transferring workplace experience to the classroom. As a pedagogical innovation, therefore, co-op remains an adjunct to rather than an integral part of mainstream education.

Results of this study indicate that UVic's administrators value co-op education's ability to keep the university in touch with the surrounding community, through the deployment of students on co-op work terms, and through soliciting information from business on changing skill demands in the work place. The demand for co-op spaces and programs at UVic exceeds the supply, creating pressure for the administration to allocate additional funds to co-op programming. The potential of offsetting the increasing costs of undergraduate education through income from co-op work terms appears to be influencing this demand.

In this study I explored students' experience of co-op education programs at the University of Victoria, how this experience shapes their perceptions of learning and work, and how, through these perceptions, they ultimately make meaning out of their undergraduate experience. This chapter summarizes the study, draws conclusions, and makes a number of recommendations.

Summary and Conclusions

The study was designed to provide a more complete understanding of co-op education; it explored students' experience of the program, and focused on the unique set of social forces and relationships represented in co-op education. Two broad questions guided the study: (1) How does the structure of co-op education impact students' understanding of learning and work? and (2) How do students make meaning of the co-op process?

My study was conducted at the University of Victoria (UVic), the third largest co-op provider among Canadian universities. I consulted the documentary record to discover details of the adoption and expansion of co-op programs at UVic, where they were situated in the organizational structure, and how co-op developed historically within the university.

The research design I adopted was that of a nested case study. The University of Victoria represented the first level; the co-op department the second level; four individual co-op programs comprised the third level; and co-op students constituted the unit of analysis for the fourth level. The study employed a variety of data collection methods. In addition to consulting the historical and documentary record, I administered a survey to provide data on co-op students' satisfaction with their programs. Formal interviews were conducted with co-op coordinators and university administrators, and both formal and informal interviews with faculty associated with the four programs under study. My interviews with co-op students were 'in-depth,' focusing on the students' experience of methods of

recruitment, forms of regulation, effects of learning context, academic implications and employment outcomes. My purpose was to understand how co-op students develop perceptions of learning and work, and how they use these perceptions to understand their experience.

The study produced five key findings and six general conclusions, summarized below:

1. The co-op work term produces a 'co-op effect' that shapes students' perceptions of learning and professional work and has a pronounced impact on their experience of the co-op program. Results presented earlier attest to the impact of the co-op effect, on the way students make meaning of their co-op experience. Co-op students perceive the work term as the defining characteristic of co-op education. The first work term is a *rite de passage* into the culture of co-op and is viewed by students as a transformative experience. The work term structures students' expectations of the co-op program; they gauge their success according to the quality of work terms they obtain. As the site of learning, professional development, and transformation, the discipline-specific workplace is where co-op students learn the language and norms of a profession. Developing professional skills in the dynamic milieu of workplace communities of practice instills in co-op students a perception (the co-op effect) that learning is what happens in the workplace, while studying is what takes place in the static context of the classroom. Perceptions of the enhanced market value of situation-specific workplace experience, and the tacit and procedural knowledge embedded in that experience, leads some co-op students to over-invest in accumulating specific experience to enhance future career choices.

2. The power of the academic context, particularly through the setting and assessment of academic objectives, mediates co-op students' professional development. Inflexible schedules for the delivery of academic coursework privilege the classroom syllabus over workplace learning, and prevents integration of classroom and workplace components. To offset being silenced in the classroom, students form groups where they can exchange 'co-op stories' and assist each other's learning. Evidence suggests that while co-op students learn 'in theory' how to be professionals in the academic context, the classroom provides limited opportunities to convert that theory into practice. The professionalization process of co-op students is complicated, therefore, by the difficulty of integrating the professional and academic contexts, and by the opaque connections between a profession's theoretical foundations and the teaching and learning process.

3. Theories of cognition and situated learning employed to explain the co-op effect indicate that learning is socially constructed in the co-op workplace, while in the classroom students construct their own knowledge. An important finding of the study is that while students' *perceptions* of learning are cognitive constructions, their approaches to learning and learning *strategies* (deep/surface), are situated procedures. In other words, perceptions of learning are theoretical constructs that are put into practice as learning strategies. My evidence suggests that, when mapped onto the process of co-op, cognitive and situated theories of learning are complementary rather than contradictory in explaining the development of learning. What students learn, and how they learn from everyday activities of the professional workplace is different from what and how they learn in the routine activities of the classroom. Learning

practical skills in the workplace prior to learning underlying theory in the classroom leads co-op students to a deeper understanding than can be achieved by classroom learning alone.

4. Learning and skill development are context-dependent and mediated by individual learning strategies. The strategies that co-op students adopt, and the reasons they adopt them, affect their conceptions of learning and work. Consequently, the types of activities that co-op students engage in on a work term determine what they learn, while the degree of guidance students receive while engaging in learning will determine the quality of that learning. Workplace learning is situation-specific in the sense that it is more likely to transfer to sites with similar sociocultural practices. Guidance is shown to be a key element in rapid and effective transfer of learning. In the transfer of skills, then, it is not adequacy in the skill itself that is of prime importance but the ability to adequately practice the skill in different settings.

5. Perceptions formed by co-op students of what constitutes 'learning' and 'work', and of the university's role in the economy and society, can help determine whether universities are fulfilling their mandate of providing relevant higher education. There are increasing public accountability and performance pressures on universities today; they are expected to provide valid and reliable assessments to demonstrate that they are fulfilling their mandates. University students are the largest public that experiences university education first-hand. Their perceptions of the experience of university education are important, because they help form public opinion of its relevance.

Based on the findings of this study six general conclusions are supported:

Conclusion One: Co-op education programs are a way that universities can address demands for relevant education.

Universities are changing the development and delivery of higher education as they accept more vocational responsibilities than in the past, respond to social and economic pressures for relevant education, and address government demands for increased fiscal and financial accountability. The increasing popularity of co-op programs suggests that partnerships between students, universities, and employers benefit all participants, and deliver relevant education. Co-op education programs also enhance the educational and professional development of students.

There is general agreement that beyond educating students the university has a responsibility to assist graduates in the transition to the world of work. The learning and skill development that takes place on co-op work terms fits within this mandate. Also, the integration of workplace and classroom learning enhances co-op students' experience and professional development.

Conclusion Two: The decision by students to participate in co-op is driven by a desire for specific outcomes. Some procedures that facilitate those outcomes are considered important, others are not.

Students seek the co-op experience in order to: (1) make academic work more meaningful; (2) learn specific discipline-related skills and; (3) to gain more realistic career expectations. Co-op programs allow students to develop a repertoire of professional skills and accumulate a body of industry-specific work experience. The co-

254

op effect imparted by workplace experience makes the structure of academic requirements an impediment to the outcomes sought by students.

Conclusion Three: The work term is a transformative experience around which students base their expectations of the co-op program; the quality of the work terms is how they gauge their individual success as a co-op student.

The work term sets co-op students apart from non-co-op students. The types of activities that co-op students engage in on a work term determines what they learn; the degree of guidance they receive determines the quality of that learning. The co-op work term becomes a benchmark by which students gauge their success, and a yardstick by which they measure whether their expectations of co-op are being met.

Conclusion Four: Participation in co-op enables students to construct meaningful learning through interpretive and experiential interactions with their social environment.

The workplace experience provides co-op students with opportunities to develop skills in the context that they will be used, while establishing networks of professional contacts that will assist their transition from the university classroom to the world of work upon graduation. Co-op students import concepts from the workplace to the academic context to meet their academic learning and social needs, and use cognitive theories from the academic context to accomplish tasks in the context of the workplace. Mapped onto the process of co-op, therefore, cognitive and situated theories of learning are complimentary.

Conclusion Five: Professional development of co-op students takes place in the workplace.

Co-op work terms allow students to gain discipline-specific work experience, develop professional networks and track changes in the labour market. Through interactions with

255

professionals in the workplace, and participation in the activities that make up a profession, co-op students begin to think and act like junior professionals in a community of practice. As students move from novice toward professional they develop workplace experience, deeper knowledge of the practices of a profession and increasing levels of tacit and expert knowledge. Evidence indicates that the workplace context not only supports, but also actively encourages, co-op students to develop a professional persona.

Conclusion Six: Co-op education is becoming an élite program.

The results of this study indicate that co-op education has indeed been successful in delivering the promised outcomes of relevant education. However, the price for this success is the development of élite status. Co-op was once marginalized for its vocational component, and classed as a program that allowed non-traditional students access to higher education. My evidence suggests, however, that increasing demand for co-op places has led to restrictive screening for admission and access to workplace learning opportunities. Access to co-op programs, and the subsequent ability to accumulate a variety of capitals is restricted to those with high levels of academic and cultural capital. As well, a type of collectively-owned social capital—embedded in the co-op credential—enhances the pre-existing cultural capital commanded by university students. This combination of effects permits those students who already possess capital to accumulate more. Restrictive access policies combine with the fact that co-op programs require considerable financial subsidization, to produce a relatively privileged group of students. This development of vocational élites contravenes co-op's founding philosophy, and erodes its social equity aspirations.

Recommendations

The findings of this study offer guidance for institutions considering the development of co-op programs, and for those currently operating programs. First, institutions seeking to develop co-op programs should carefully review their reasons for doing so, and determine what specific outcomes are desired for participating students. Institutions that currently operate programs may also want to review their procedures in light of the findings of this study. When seeking to improve existing programs, it might be beneficial to both institutions and students to focus on the effect of the co-op work term on students' perceptions of learning and work.

An important consideration brought out in this study relates to the value of guidance during co-op students' learning in the workplace. The importance of indirect guidance in the workplace is not reported in other literature on co-op education. Activities such as listening to other workers talk about their experience, or observing what fellow workers do, can provide co-op students with valuable information on which to base "maybe if I try it this way" approximations of completing workplace tasks. Therefore, if co-op students are to develop robust (transferable) knowledge of workplace activities they must be immersed in the everyday work experiences, where by thinking and acting appropriately in their role, they will learn the practice of the profession.

Of equal importance is the need to articulate the potential for negative results to occur in workplace learning. For all the positive features of the work term described in this study, there are potential drawbacks; robust learning is the norm, contrary results can also occur.

For example, a lack of supervision (guidance) might result in a student repeatedly doing the same tasks inappropriately, or in a less than satisfactory manner, and this can lead to weak learning, frustration, and lack of motivation for the student. It is also important to guard against employers asking students to perform tasks beyond their level of skills or training. Perhaps these could be achieved with guidance, but in the absence of appropriate support students fail to learn how to perform the task with the same ease as others in the workplace. More attention to the training practices of employers seems prudent.

Institutions proposing new co-op programs and those with established programs should use this study as a guide to review existing policies in areas related to program marketing—including admissions, recruitment and retention; program size—including expectations for growth, funding and staff requirements; program administration; and program evaluation.

Recommendations for Policy and Practice

The findings of this study can assist faculties, departments, and professional schools within universities to implement policy and practice related to their efforts to develop the knowledge, skills and attitudes of their students.

First, faculties and professional schools can use the findings of the study to promote to students the benefits of being informed about the expectations and goals of their program, and the assessment methods that will be used to evaluate progress. By adequately

informing students who apply for a co-op program of what they can expect once admitted, institutions can ensure that faculty, coordinators, and students are motivated towards similar goals. Informed students would also form more realistic expectations of the co-op program, thus reducing the frustration of unmet expectations and removing the need for deviant strategies to meet co-op requirements.

Second, the findings of this study also suggest that once students are admitted to a co-op program, peer interactions are important to the way they perceive their experience. These interactions can influence academic self-confidence and motivation to learn (and ultimately GPA), while socializing students into the culture of co-op. Students who experience similar assignments, deadlines, work term competition, and classroom experiences can support one another through co-op seminars or study groups. Therefore, it is worth the effort to provide opportunities for students to interact in the classroom as well, through group projects, or group assignments.

Third, evidence from this study can be used to guide teaching strategies. Students who are organized into classroom work groups problem-solve together and depend on one another to produce group results. They share obligations and expectations, exchange information, challenge each other to analyze and apply information, and draw upon each others strengths in order to facilitate goal achievement. Co-op students who are challenged to apply and analyze information in this way report more positive perceptions of their interactions with other students and about the meaningfulness of their educational experience.

Fourth, the study supports the importance of integrating learning that happens in the workplace with that of the classroom; co-op students perceive their professional development as dependent on learning in both contexts. Universities must find ways to enable co-op students returning from work terms to reflect on skills and knowledge gained in the discipline-specific workplace, thereby assisting the development of a professional persona in the classroom. One way to accomplish this is by allowing students to contribute their experiences of the professional workplace to the pedagogical enterprise. For this to happen, instructors must ensure that the co-op classroom becomes more than simply 'a passive container for cognition and action.'

For program developers and planners the findings of the study indicate that it is important to evaluate whether or not co-op programs challenge students in the ways they were designed to. In other words, do students consider the academic requirements of the co-op program part of learning to become a professional, or are they simply onerous and largely irrelevant make-work tasks? Are there appropriate methods for students to evaluate the delivery of discipline-specific courses in their program? For example, the results of this study suggest that teaching/learning evaluations need to place less emphasis on the personal characteristics of professors and more emphasis on other aspects of the classroom environment

Also, universities are today held accountable for demonstrating that the education programs they offer are relevant. Education socializes individual students in a process of

change that enables them to acquire new knowledge, skills, and attitudes. Meaningful assessments of institutional performance, therefore, must include students' perceptions of the institution's ability to positively influence the changes students must make.

Universities, faculties, departments, and professional schools that are interested in enhancing the quality of their efforts to assist professionalization of students can use the findings of this study as a guide to inform co-op program development and delivery, and the administration and planning of co-op programs. Senior administrators can use information on students' perceptions as a performance and accountability indicator for co-op programs and to guide reward structures for teaching/learning strategies. Understanding the way that co-op students develop and change perceptions could assist faculty who teach disciplinary content, and co-op coordinators who negotiate work term placements with employers. It could also assist in the evaluation of the degree of challenge and support provided in classrooms, and to determine if students' perceptions match pedagogical intentions.

In addition to recommendations for policy and practice implications, this study points out a need for further research.

Recommendations for Further Research

This study indicates a need for further research in a number of areas related to co-op education. First, further research is necessary to determine if the findings of this study are generalizable. Findings derived from one relatively small sample of co-op students at a single university may be unique to these particular students in this particular context.

261

Data collected from students in co-op programs in other faculties and universities could provide evidence to validate, refute, or further refine the findings and interpretations reported here.

Second, further longitudinal research is required to investigate the co-op effect. Longitudinal research designed to investigate students' perceptions of learning and work would allow for the examination of the co-op effect over time. For example, it would be possible to determine the cumulative effect of co-op work term experience to determine if the strength of the co-op effect increases over the period of time that students are enrolled in a co-op program. This would assist in identifying the appropriate number of work terms required for students to derive maximum benefit from co-op work term experience. In other words, longitudinal research could answer the question: what is the minimum number of work terms that are required to maximize the positive aspects of workplace experience on the professionalization of co-op students?

Third, research is needed to further explore differences identified in this study on how co-op students characterize their experience based on the profession or discipline the student is in. Why, for example, do students in one program over-invest in discipline-specific work experience while students in other programs indicate no interest in going beyond what is necessary to obtain the co-op qualification? Is this a localized phenomenon or does it extend to programs beyond those studied? What are the implications of this practice for the structure and function of co-op programs?

Fourth, the results of this study indicate that through the use of selective admission criteria and regulation of access to discipline-specific work experience co-op is becoming an élite program. Further research is needed to investigate whether students accepted into the program are provided with considerably more opportunities than regular students. Because co-op programs consume more resources than regular programs, and because certain advantages accrue to students in these programs, there is a need to investigate if co-op is creating vocational élites at the expense of other undergraduate students in the university.

Finally, future research should examine other aspects that may contribute toward understanding how co-op students' make meaning out of their experiences. For example, an examination of other institutional and program characteristics, using different student groups with different levels of ability drawn from a variety of faculties, may help to determine what factors most influence co-op students' perceptions of learning and work, and indicate how these perceptions impact the experience of co-op students as they progress through their program.

In summary, the results of this study indicate that knowledge about knowledge helps co-op students become aware of the norms, values and assumptions that underpin their work. In other words, learning can help students reflect on how their expertise is linked to their self-concept and identity and practice-oriented higher education programs, such as co-op,

should enable students not only to transfer 'theory to practice', but also to 'combine theory and practice' in the way Herman Schneider originally intended. Practice-oriented education allows co-op students to tackle the complexity of 'real' phenomena intellectually rather than being limited by the extent or shortcomings of theoretical approaches. Practical education can be accomplished through a curriculum that combines a dynamic approach to teaching and learning in the university, with the involvement of practitioners in teaching and other activities in the workplace. To succeed, however, requires a university with a strong liberal arts tradition on which co-op education programs can be implanted.

REFERENCES

Allen, R. C. (1996). The economic benefits of post-secondary education and training in B.C.: An outcomes assessment (CRESP Discussion Paper DP-34). Vancouver: Centre for Research on Economic and Social Policy, University of British Columbia.

Allen, R. C. (1997). The demand and supply of post-secondary education and training in British Columbia (Discussion Paper 97-13). Vancouver: University of British Columbia.

Altbach, P. G., Berdahl, R. O., & Gumport, P. J. (Eds.). (1998). American higher education in the twenty-first century. John Hopkins University Press.

Anderson, J. R. (1982). Acquisition of cognitive skill. Psychological Review, 89(4), 369-406.

Anderson, J. R. (1993). Problem solving and learning. American Psychologist, 48(1), 35-44.

Astin, A. W. (1993). What matters in college? Four critical years revisited. San Francisco: Jossey-Bass.

Atkinson-Grosjean, J., & Grosjean, G. (2000). The use of performance models in higher education: A comparitive international review. Education Policy Analysis Archives, 8(30).

Ausubel, D. P., Novak, J. S., & Hanesian, H. (1978). Educational psychology: A cognitive view. New York: Holt, Rinehart & Winston.

Axelrod, P. (1989). The Student Movement of the 1930s. In P. Axelrod & J. G.Reid (Eds.), Youth University and Canadian Society (pp. 216-246). Kingston: McGill-Queen's University Press.

Axelrod, P., & Reid, J. G. (1989). Introduction. In P. Axelrod & J. G. Reid (Eds.), Youth University and Canadian Society. Kingston: McGill-Queen's University Press.

Baird, L. L. (1990). The undergraduate experience: Commonalities and differences among colleges. Research in Higher Education, 31(3), 271-279.

Bartkus, K. R., & Stull, W. A. (1997). Some thoughts about research in cooperative education. Journal of Cooperative Education, XXXII(2), 7-16.

Beaufort, A. (2000). Learning the trade. Written Communication, 17(2), 185-210.

Becher, T. (1989). Academic tribes and territories: Intellectual enquiry and the culture of disciplines. Milton Keynes: SRHE/Open University Press.

Becker, G. (1964). Human capital: A theoretical and empirical analysis with special reference to education. New York, Columbia University.

Becker, G. (1975). Human capital (2nd ed.). New York: NBER.

Becker, H. S., Geer, B., Hughes, E. C., & Strauss, A. L. (1961). Boys in white: Student culture in medical school. Chicago: University of Chicago Press.

Berryman, S. E. (1993). Learning for the workplace. Review of Research in Education, 19, 343-401.

Bidwell, C. E. (1989). The meaning of educational attainment. Research in Sociology of Education and Socialization, 8, 117-138.

Biggs, J. B. (1987). Student approaches to learning and studying. Melbourne: Australian Council for Educational Research.

Biglan, A. (1973). The characteristics of subject matter in different scientific areas. Journal of Applied Psychology, 57(3), 195-203.

Billett, S. (1996). Towards a model of workplace learning: the learning curriculum. Studies in Continuing Education, 18(1), 43-58.

Billett, S. (1999). Guided learning at work. In D. Boud & J. Garrick (Eds.), Understanding learning at work (pp. 151-164). London: Routledge.

Bissell, C. T. (1968). The strength of the university. Toronto: University of Toronto Press.

Blau, P. M. (1969). The University as a distinctive organization. In R.J.Ingham (Ed.), Institutional backgrounds of adult education (pp. 90-115). Boston: Center for the Study of Liberal Education for Adults.

Blaug, M. (1976). The empirical status of human capital theory: A slightly jaundiced survey. Journal of Economic Literature, 14, 827-855.

Bloom, M., R. (1993). Evaluating business-education collaboration: Value assessment process (104-93). Ottawa: The Conference Board of Canada.

Bonds, C. M. (1989). Career decision-making factors of engineering co-op students. Unpublished Doctoral Dissertation, University of Arkansas, Little Rock AR.

Boud, D., & Garrick, J. (Eds.). (1999). Understanding learning at work. London: Routledge.

Bourdieu, P. (1973). Cultural reproduction and social reproduction. In R. Brown (Ed.), Knowledge, Education and Social Change. London: Tavistock.

Bourdieu, P., & Passeron, J. C. (1977). Reproduction. Beverly Hills, CA: Sage Publications.

Bourdieu, P. (1986). The forms of capital. In J. G. Richardson (Ed.), Handbook of theory and research for the sociology of education (pp. 241-258). New York: Greenwood.

Bourdieu, P. (1997). The forms of capital. In H. Lauder, A.H. Halsey, P. Brown, and A. S. Wells (Ed.), Education: Culture, economy, and society (pp. 46-58). Oxford: Oxford University Press.

Branton, G., Van Gyn, G., Cutt, J., Loken, M., Ney, T., & Ricks, F. (1990). A model for assessing the learning benefits in cooperative education. Journal of Cooperative Education, XXVI(3), 30 - 40.

Brennan, J., Kogan, M., & Teichler, U. (1996). Higher education and work. London: Jessica Kingsley Publishers.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. Educational Researcher, 18(1), 32-42.

Brown, S. (1976). Cooperative education and career education: A comparative study of alumni. Boston: Northeastern University, Cooperative Education Research Centre.

Brown, S. (1998). Universities in Canada. Opinion Canada, 6(1), 1-6.

Bucciarelli, L. L. (1994). Designing engineers. Cambridge, MA: MIT Press.

Buchbinder, H. (1993). The market oriented university and the changing role of knowledge. Higher Education, 26, 331-347.

Burt, R. S. (1992). Structural holes: The social structure of competition. Cambridge: Harvard University Press.

Cameron, D. M. (1991). More than an academic question: Universities, government and public policy in Canada. Halifax: Institute for Research on Public Policy.

Carnevale, P. C., Gainer, L. J., & Meltzer, A. S. (1990). Workplace basics: the essential skills employers want. SanFrancisco: Jossey-Bass.

Cash, S. H. (1979). Employability and job satisfaction of co-op versus non-co-op business graduates. Boca Ratan, Florida: Florida Atlantic University.

Chickering, A. W. (1969). Education and identity. San Francisco: Jossey-Bass.

Clark, B. R. (1983). The higher education system. Los Angeles: University of California Press.

Coleman, J. S. (1988). Social capital in the creation of human capital. American Journal of Sociology, 94(Supplement), S95-S120.

Coleman, J. S. (1990). Foundations of social theory. Cambridge MA: Belknap Press of Harvard University Press.

Corry, J. A. (1970). Farewell the ivory tower: Universities in transition. Montreal: McGill-Queen's University Press.

de Weert, E. (1996). Responsiveness of higher education to labour market demands: Curriculum change in the humanities and social sciences. In J. Brennan, M. Kogan, & U. Teichler (Eds.), Higher education and work. London: Jessica Kingsley Publishers.

Demetriou, S. (1995). Rethinking co-op - A model for change. Journal of Cooperative Education, XXX(2), 34 - 38.

Denison, E. F. (1962). The sources of economic growth in the United States and the alternatives before us. New York: Committee for Economic development.

Dennison, J. D. (1987). Universities under financial crisis: The case of British Columbia. Higher Education, 16, 135-143.

Dennison, J. D. (1997). Higher education in British Columbia, 1945-1995: Opportunity and diversity. In G. A. Jones (Ed.), Higher education in Canada: Different systems, different perspectives (pp. 31-58). New Tork: Garland Publishing, Inc.

Dennison, J. D., & Gallagher, P. (1986). Canada's community colleges: A critical analysis. Vancouver: University of British Columbia Press.

Donovan, M. S., Brandsford, J. D., & Pellegrino, J. W. (Eds.). (1999). How people learn: Bridging research and practice. Washington DC: National Research Council.

Dore. (1976). The diploma disease. London: Allen and Unwin.

Ducat, D. (1978). Cooperative education, self-concept, and occupational concept for community college students. Unpublished Doctoral Dissertation, Columbia University, New York, New York.

Durance, B. (1998). Some explicit thoughts on tacit learning. Training and Development, 52(12), 24-32.

Economic Council of Canada. (1990). Good jobs, bad jobs: Employment in the service economy. Ottawa: Supply and Services Canada.

Edison, K. M. (1981). Cooperative education and career development at Central State and Wilberforce Universities. Unpublished Doctoral Dissertation, Harvard University, Cambridge MA.

Engeström, Y. (1990). Learning, working, and imagining: Twelve studies in activity theory. Helsinki, Finland: Orienta-Konsultit Oy.

Engeström, Y. (1993). Developmental studies of work as a testbench of activity theory: The case of primary care medical practice. In S. Chaiklin & J. Lave (Eds.), Understanding Practice: Perspectives on activity and context (pp. 64-103). Cambridge, UK: Cambridge University Press.

Engeström, Y. (1994). Training for change: New approach to instruction and learning in working life. Geneva: International Labour Office.

Engeström, Y., Engeström, R., & Kärkkäinen, M. (1995). Polycontextuality and boundary crossing in expert cognition: Learning and problem solving in complex work activities. Learning and Instruction, 5, 319-336.

Entwistle, N. (1984). Contrasting perspectives on learning. In F. Marton, D. Hounsell, & N. Entwistle (Eds.), The experience of learning. Edinburgh: Scottish Academic Press.

Entwistle, H. (1996). Ideologies in adult education. In A. C. Tuijnman (Ed.), International Encyclopedia of Adult Education and Training (2nd ed., pp. 182-187). Oxford: Pergamon.

Eraut, M. (1992). Developing the Knowledge Base: A process perspective on professional education. In R. Barnett (Ed.), Learning to effect. Buckingham: Society for Research into Higher education and Open University Press.

Evers, F. T., Rush, J., C., Krmpotic, J. A., & Duncan-Robinson, J. (1993). Making the match: Phase II (Final Technical Report). University of Guelph and University of Western Ontario.

Evers, F. T., Rush, J. C., & Berdrow, I. (1998). The bases of competence: Skills for lifelong learning and employability. San Francisco: Jossey-Bass.

Figueroa, A. (1991). A study of benefits to faculty involvement in ongoing cooperative education programs in 1990 in four colleges in Massachusettes. Unpublished Doctoral Dissertation, University of Massachusetts, Amherst MA.

Finn, K. L. (1997). The spaces between: Toward a new paradigm for cooperative education. Journal of Cooperative education, XXXII(2), 36-45.

Fisher, D., & Gilgoff, B. (1987). The crisis in B.C. public education: The state and the public interest. In T. Wotherspoon (Ed.), The political economy of Canadian schooling (pp. 68-93). Toronto: Methuen Publications.

Fisher, D., Rubenson, K., & Schuetze, H. (1994). The role of the university in preparing the labour Force (A Background Analysis). Vancouver: Centre for Policy Studies in Education, University of British Columbia.

Fletcher, J. K. (1989). Student Outcomes: What do we know and how do we know it? Journal of Cooperative Education, XXVI(1), 26-38.

Fletcher, J. K. (1990). Self-esteem and cooperative education: A theoretical framework. Journal of Cooperative research, XXVI(1), 46-54.

Foertsch, R. (1987). A perceptual study regarding the importance of identified university cooperative education coordinator tasks and perferred organizational formats. Unpublished Doctoral Dissertation, Oregon State University, Corvallis OR.

Foucault, M. (1977). Discipline & Punish: The birth of the prison (Alan Sheridan, Trans.). (2nd ed.). New York: Random House, Inc.

Fox, S. (1999). Communities of practice, Foucault and actor network theory. Paper presented at the 3rd International Conference on Organizational Learning, Lancaster University, June 6-8, 1999.

Friedman, M. (1962). Capitalism and freedom. Chicago: University of Chicago Press.

Gardner, P., & Koslowski, S. (1993). Learning the ropes: Co-ops do it faster. Journal of Cooperative Education, XXVIII(3), 30-41.

Gingras, Y. (1989). Financial support for post-graduate students and the development of scientific research in Canada. In P. Axelrod & J. G. Reid (Eds.), Youth university and Canadian society. Kingston: McGill-Queen's University Press.

Goodnow, J. J. (1990). The socialisation of cognition: What's involved? In J. W. Stigler, R. A. Sweder, & G. Herdt (Eds.), Cultural Psychology (pp. 259-286). Cambridge UK: Cambridge University Press.

Government of Canada, Prosperity Secretariate (1991). Prosperity through competitiveness. Ottawa: Minister of Supply and Services.

Granovetter, M. S. (1974). Getting a job. Cambridge: Harvard University Press.

Gregor, A. D., & Jasmin, G. (1992). Higher education in Canada. Ottawa: Ministry of Supply and Services Canada.

Griffith, A. I. (1993). Understanding the cooperative education work experience. Education policy analysis archives, 1(8), 1-13.

Grosjean, G., Atkinson-Grosjean, J., Rubenson, K., & Fisher, D. (2000). Measuring the unmeasurable: Paradoxes of accountability and the impacts of performance indicators on liberal education in Canada (Final Report). Available: <http://www.hssfc.ca/ResearchProj/Perfind/FinalReportEng.html>: Humanities and Social Science Federation of Canada.

Hamilton, S. F., & Hamilton, M. A. (1997). When is learning work-based? Phi Delta Kappan, 78(9), 676-681.

Handy, C. (1984). The future of work. Oxford: Blackwell.

Harris, R. S. (1976). A history of higher education in Canada 1663-1960. Toronto: University of Toronto Press.

Hatch, T., & Gardner H. (1993). Finding cognition in the classroom: An expanded view of human intelligence. In G. Saloman (Ed.), Distributed Cognitions. Cambridge UK: Cambridge University Press.

Hatsopoulos, N. G., & Hatsopoulos, G. N. (1999). The role of tacit knowledge in management. In R. J. Sternberg & J. A. Horvath (Eds.), Tacit knowledge in Professional Practice (pp. 141-152). Mahwah, NJ: Lawrence Erlbaum Associates.

Hays, J. M. (1991). Coming to terms: Expectations and reality in cooperative education at Northeastern University. Unpublished Doctoral Dissertation, Boston University, Boston MA.

Healy, D. (1978). Report of the commission on graduate studies in the humanities and social sciences (vol. 1). Ottawa: Social Sciences and Humanities Research Council.

Heinemann, H. N. (1983). Towards a pedagogy for cooperative education. Journal of Cooperative Education, XIX(2), 14 - 24.

Heinemann, H. N., DeFalco, A. A., & Smelkinson, M. (1992). Work-experience enriched learning. Journal of Cooperative Education, XXVIII(1), 17 - 33.

Hilliard, G., Pearson, S., King, B., & Young, J. (1995). Undergraduate cooperative education in maritime Canada: Placements, placement sectors and placement locations. Journal of Cooperative Education, XXX(3), 56-64.

Horvath, J. A. (1999). Tacit knowledge in the professions. In R. J. Sternberg & J. A. Horvath (Eds.), Tacit knowledge in professional practice (pp. Preface ix-xiii). Mahwah NJ: Lawrence Erlbaum Associates.

Jencks, C., and D. Riesman. (1968). The Academic Revolution. New York: Doubleday.

Johansson, B., Marton, F., & Svensson, L. (1985). An approach to describing learning as change between qualitatively different conceptions. In L. H. T. West & A. L. Pines

(Eds.), Cognitive structure and conceptual change (pp. 233-257). Orlando: Academic Press, Inc.

Jones, G. A. (1994). The political analysis of higher education: An introduction to the symposium on the university and democracy. Interchange, 25(1), 1-10.

Keifer, N., & Pierson, R. R. (1989). The war effort and women students at the University of Toronto, 1939-45. In P. Axelrod & J. G. Reid (Eds.), Youth university and Canadian society (pp. 161-186). Kingston: McGill-Queen's University Press.

King, A. R., & Brownell, J. (1966). The curriculum and the disciplines of knowledge. New York: Jihn Wiley.

Kolb, D.A. (1981). Learning styles and disciplinary differences. In A. Chickering (Ed.), The modern American college. San Francisco: Jossey Bass.

Latour, B., & Woolgar, S. (1979). Laboratory life: The construction of scientific facts. Princeton, NJ: Princeton University Press.

Laurillard, D. (1997). Styles and approaches in problem-solving. In F. marton, D. Hounsell, & N. Entwistle (Eds.), The experience of learning (2nd ed.), pp. 126-144. Edinburgh: Scottish Academic Press.

Lave, J. (1988). Cognition in practice. New York: Cambridge University Press.

Lave, J. (1991b). Situated learning in communities of practice. In L. B. Resnick, J. M. Leaven, & S. D. Teasley (Eds.), Perspectives on socially shared cognition (pp. 63-82). Washington, DC: American Psychological Association.

Lave, J. (1993). The practice of learning. In J. Lave & S. Chaiklan (Eds.), Understanding practice: Perspectives on activity and context (pp. 3-32). Cambridge UK: Cambridge University Press.

Lave, J., & Wenger, E. (1991). Situated learning: Legitimate peripheral participation. Cambridge: Cambridge University Press.

LeCompte, M. D., & Preissle, J. (1993). Ethnography and qualitative design in educational research (2nd ed.). San Diego: Academic Press.

Lesgold, A. (1986). Cognitive task analysis to enhance technical skills training and assessment. Pittsburgh, PA: University of Pittsburgh.

Levin, H. M., & Kelley, C. (1994). Can education do it alone? Economics of Education Review, 13(2), 97-108.

Levin, H. M., & Rumberger, R. W. (1988). Education, work and employment: present issues and future challenges in developed countries. Paper presented at the XXVth Anniversary Conference of the International Institute for Educational Planning.

Levin, J. S. (1999). Missions and structures: Bringing clarity to perceptions about globalization and higher education in Canada. Higher Education, 37, 377-399.

Lincoln, Y., & Guba, E. (1985). Naturalistic inquiry. Beverly Hills CA: Sage.

Marginson, S. (1997). Markets in education. Sydney: Allen and Unwin.

Marks, E., & Wohlford, J. (1971). The co-op experience and its effect on undergraduates. Engineering Education, 61(7), 822 - 824.

Marshall, C., & Rossman, G. B. (1989). Designing qualitative research. Newbury Park, CA: Sage.

Marsick, V. J., & Watkins, K. E. (1990). Informal and incidental learning in the workplace. New York: Routledge.

Marton, F., Hounsel, D., & Entwistle, N. (Eds.). (1997). The experience of learning (2nd ed.). Edinburgh: Scottish Academic Press.

Marton, F., & Säljö, R. (1976). On qualitative differences in learning: Outcome and process. British Journal of educational Psychology, 4, 4-11.

Matson, L. C., & Matson, R. (1995). Changing times in higher education: An empirical look at cooperative education and liberal arts faculty. Journal of Cooperative Education, XXXI(1), 13 - 24.

Maxwell, J. A. (1996). Qualitative research design: An interactive approach. Thousand Oaks CA.: Sage Publications, Inc.

Mayer, R. E. (1996). Learners as information processors: Legacies and limitations of educational psychology's second metaphor. Education Psychologist, 31, 151-161.

McConaghy, T. (1997). How Canadian universities are managing change. Phi Delta Kappan, 78(8), 660-662.

McLaughlin, M. (1992). Employability skills profile: What are employers looking for? (81-92). Ottawa: Conference Board of Canada.

Merriam, S. B. (1988). Case study research in education: A qualitative approach. San Francisco: Jossey-Bass.

Meyerson, E., M. (1994). Human capital, social capital and compensation: The relative contribution of social contacts to managers' incomes. Acta Sociologica, 37, 383-399.

Mezirow, J. (1991). Transformative dimensions of adult learning. San Francisco: Jossey-Bass.

Miles, M. B., & Huberman, A. M. (1994). Qualitative data analysis: An expanded sourcebook. (2nd Edition ed.). Thousand Oaks CA: Sage Publications.

Millard, R. M. (1991). Today's myths and tomorrow's realities: Overcoming obstacles to academic leadership in the 21st century. San Francisco: Jossey-Bass Publishers.

Miller, J. P., & Seller, W. (1985). Curriculum perspectives and practice. New York: Longman.

Moore, B. J. (1998). Situated cognition versus traditional cognitive theories of learning. Education, 119(1), 161-171.

More, L. T. (1908). A new scheme for engineering education. Educational Review, XXXVI, 255 - 261.

Mueller, S. (1992). The effect of a cooperative work experience on autonomy, sense of purpose, and mature interpersonal relationships. Journal of Cooperative Education, XXVII(3), 27-35.

Nonaka, I., & Takeuchi, H. (1995). The knowledge-creating company: How Japanese companies create the dynamics of innovation. New York: Oxford University Press.

OECD. (1989). Education and the economy in a changing society. Paris: Organisation for Economic Co-operation and development.

OECD. (1992). From higher education to employment. Paris: OECD.

OECD. (1993). From higher education to employment (Synthesis Report). Paris: OECD.

Oloroso, H. (1995). A work-based curriculum for cooperative education students. Journal of Cooperative Education, XXX(2), 39 - 45.

Orr, J. E. (1988, November). Transparency, representation, and embodied knowledge: some examples for the diagnosis of machines. Paper presented at the 87th Annual Meeting of the Anthropological Association, Phoenix, Arizona.

Pascarella, E. T., & Terenzini, P. T. (1991). How college affects students: Findings from twenty years of research. San Francisco: Jossey-Bass.

Pask. (1976). Styles and strategies of learning. British Journal of Educational Psychology, 46, 4-11.

Patton, M. Q. (1990). Qualitative evaluation and research methods (2nd ed.). Newbury Park CA: Sage Publications.

Perkins, D., Jay, E., & Tishman, S. (1993). Beyond abilities: A dispositional theory of thinking. Merrill-Palmer Quarterly, 39(1), 1-21.

Piaget, J. (1968). Structuralism (C, Maschler, Trans.). London: Routledge and Kegan Paul.

Pittenger, K. (1993). The role of cooperative education in the career growth of engineering students. Journal of Cooperative Education, XXVIII(3), 21-29.

Polanyi, M. (1967). The tacit dimension. New York: Doubleday and Co.

Polanyi, M. (1973). Personal knowledge. London: Routledge & Kegan Paul.

Pratt, C. (1993). Procedures and outcomes for students in cooperative education. Unpublished Doctoral Dissertation, Seton Hall University, South Orange NJ.

Raizen, S. A. (1994). Learning and work: the research base, vocational education and training for youth: towards coherent policy and practice. Paris: OECD.

Ramsden, P. (1979). Student learning and perceptions of the academic environment. Higher Education, 8, 411-428.

Ramsden, P. (1997). The context of learning in academic departments. In F. Marton, D. Hounsell, & N. Entwistle (Eds.), The experience of learning (pp. 198-216). Edinburgh: Scottish Academic Press.

Ramsden, P., & Entwistle, N. J. (1981). Effects of academic departments on students' approaches to studying. British Journal of Educational Psychology, 51, 368-383.

Reich, R. (1991). The work of nations. New York: Simon and Schuster.

Resnick, L. B. (1987). Learning in school and out. Educational Researcher, 16, 13-20.

Ricks, F., Cutt, J., Branton, G., Loken, M., & Van Gyn, G. (1993). Reflections on the Cooperative Education Literature. Journal of Cooperative Education, XXIX(1), 6-23.

Ricks, F., Van Gyn, G., Cutt, J., Loken, M., & Ney, T. (1990). theory and research in cooperative education: Practical implications. Journal of Cooperative Research, XXVII(1), 7-20.

Riddell, W. C. (1995). Human capital formation in Canada: Recent developments and policy responses. In K. G. Banting & C. M. Beach (Eds.), Labour market polarization and social policy reform (pp. 125-172). Kingston: School of Policy Studies, Queens University.

Rigio, R. E., Kubiak, C., Taylor, S. J., & Neale, p. (1994). Evaluation of a cooperative education program with an emphasis in industrial/organizational psychology. Journal of Cooperative Education, XXIX(3), 59-66.

Rogers, B., & Weston, W. (1987). A survey of recent engineering graduates: the relationship of cooperative education to job factors. Journal of Cooperative Education, XXII(3), 33-39.

Rogoff, B. (1990). Apprenticeship in thinking: Cognitive development in social context. New York: Oxford University Press.

Rogoff, B. (1994). Developing understanding of the idea of communities of learners. Mind, Culture, and Activity, 1, 209-229.

Rowe, P. (1989). Entry differences between students in cooperative education and regular programs. Journal of Cooperative Education, XXVI(1), 16-25.

Rowe, P. M. (1992). A comparison of cooperative education graduates with two cohorts of regular graduates: Fellow entrants and fellow graduates. Journal of Cooperative Education, XXVII(3), 7 - 15.

Rubenson, K., & Schuetze, H., G. (1994). Learning at and through the workplace: A review of participation and adult learning theory. In D. Hirsch & D. A. Wagner (Eds.), What makes workers learn: The role of incentives in workplace education and training (pp. 95-116). Cresskill, New Jersey: Hampton Press Inc.

Ryder, K. G. (1987). Social and educational roots. Cooperative education in a new era: understanding and strengthening the links between college and the workplace. San Francisco: Jossey-Bass Publishers.

Saltmarsh, J. A. (1992). John Dewey and the future of cooperative education. Journal of Cooperative Education, XXVIII(1), 6 - 16.

Schon, D. A. (1983). The reflective practitioner: How professionals think in action. New York: Basic Books.

Schultz, T. (1961). Investing in human capital. American Economic Review, 51, 1-17.

Scribner, S. (1984). Studying working intelligence. In B. Rogoff & J. Lave (Eds.), Everyday cognition: its development in social context (pp. 9-40). Cambridge: Harvard University Press.

Seidenberg, J. M. (1987). Analyzing the investment returns to cooperative education: the lehman college experience and initial full-time employment. Unpublished Doctoral Dissertation, Columbia University.

Senge, P. M. (1990). The Fifth Discipline: The art and practice of the learning organization. New York: Doubleday.

Sewell, W. H., & Hauser, R. M. (1975). Education, occupation, and earnings. New York: Academic Press Inc.

Sharma, L. A., Mannell, R. C., & Rowe, P. M. (1995). The relationship between education-related work experiences and career expectations. Journal of Cooperative Education, XXX(3), 39 - 47.

Shuell, T. J. (1990). Phases of meaningful learning. Review of Educational Research, 60(4), 531-47.

Smith-Eggeman, B., & Scott, N. (1994). The relative influence of cooperative education on college students' development of interpersonal relationships. Journal of Cooperative Education, XXIX(3), 14-22.

Snow, C. P. (1964). The two cultures: And a second look. (2nd ed.). New York: New American Library.

Snyder, B. R. (1971). The hidden curriculum. New York: Knopf.

Somers, G. (1995). The post-graduate pecuniary benefits of co-op participation: A review of the literature. The Journal of Cooperative Education, XXXI(1), 25-41.

Squires, G. (1987). The curriculum beyond school. London: Hodder & Stoughton.

Stake, R. E. (1995). The art of case study research. Thousand Oaks, CA: Sage Publications.

Star, S. L., & Griesemer, J. (1989). Institutional ecology, "translations" and boundary objects: amateurs and professionals in Berkeley's museum of vertebrate zoology, 1907-1939. Social Studies of Science, 19, 387-420.

Stark, J. S., Lowther, M. A., & Hagerty, B. M. K. (1986). Responsive professional education: Balancing outcomes and opportunities (Higher Education Report 3). Washington DC: ASHE-ERIC.

Stasz, C. (1997). Do employers need the skills they want? Evidence from technical work. Journal of Education and Work, 10(3), 205-223.

Stern, D., Stone, J., Hopkins, C., McMillion, M., & Cagampang, H. (1992). Quality of work experience as perceived by two-year college students in cooperative education and non-cooperative education jobs. Journal of Cooperative Education, XXVIII(1), 34-47.

Sternberg, R. J., & Wagner, R. K. (1992). Tacit knowledge: An unspoken key to managerial success. Creativity and Innovation Management, 1, 5-13.

275

Sternberg, R. J., & Horvath, J. A. (Eds.). (1999). Tacit knowledge in professional practice. Mahwah NJ: Lawrence Erlbaum Associates.

Streek, W. (1989). Skills and the limits of neo-liberalism: The enterprise of the future as a place of learning. Work, Employment and Society, 3, 89-104.

Svensson, L. (1977). On qualitative differences in learning: III. Study, skill, and learning. British Journal of educational Psychology, 47, 233-243.

Teichler, U. (1999a). High education policy and the world of work: Changing conditions and challenges. Higher Education Policy, 12, 285-312.

Teichler, U. (1999b). Research on the relationships between higher education and the world of work: Past achievements, problems and new challenges. Higher Education, 38, 169-190.

Tennant, M. (1999). Is learning transferable? In D. Boud & J. Garrick (Eds.), Understanding learning at work (pp. 165-179). London: Routledge.

Tillman, R. (1990). A study of the ethical orientation of cooperative education students. Journal of Cooperative Education, XXVI(3), 15-29.

UNESCO. (1995). Policy paper for change and development in higher education. Paris: UNESCO.

UVic (1987). Minutes of the Board of Governors' Meeting. (January 19, 1987). Victoria: University of Victoria.

UVic. (1999). University of Victoria, 1998 Undergraduate Student Survey. Victoria: Office of Institutional Analysis.

UVic. (1999a). Co-operative education program: Vision and mission. Available: <http://www.coop.uvic.ca/coop/vision.ssi>.

UVic. (1999b). Co-operative education overview: The co-operative concept. Available: <http://www.coop.uvic.ca/coop/concept.ssi>.

UVic. (1999c). Co-operative education overview: The process. Available: <http://www.coop.uvic.ca/coop/process.ssi>.

UVic. (1999d). Co-operative education program: The benefits. Available: <http://www.coop.uvic.ca/coop/benefits.ssi>.

UVic. (1999e). University of Victoria co-operative education: employer advisory board. Available: <http://www.coop.uvic.ca/coop/advisoryboard/index.ssi>.

UVic, C. (1998). Facts & Figures. Victoria: University of Victoria.

Van Gyn, G., Branton, G., Cutt, J., Loken, M., & Ricks, F. (1996). An investigation of entry level characteristics between co-op and non-co-op students. Journal of Cooperative Education, XXXII(1), 15-28.

Van Gyn, G. H. (1994). The educational orientation of cooperative education: a critical variable in effectiveness. Journal of Cooperative Education, XXX(1), 17 - 25.

Van Gyn, G. H. (1996). Reflective practice: The needs of professions and the promise of cooperative education. Journal of Cooperative Education, XXXI(2), 103-131.

van Manen, M. (1977). Linking ways of knowing with ways of being practical. Curriculum Inquiry, 6(3), 205 - 228.

Vygotsky, L. S. (1978). Mind in Society: The development of higher psychological processes. In M. Cole, V. John-Steiner, S. Scriber, & E. Souberman (Eds.), Mind in society. Cambridge, MA: Harvard University.

Vygotsky, L. S. (1981). The genesis of higher mental functions. In J. V. Wertsch (Ed.), The concept of activity in Soviet psychology (pp. 144-188). New York: M.E. Sharpe, Inc.

Vygotsky, L. S. (1987). Thought and Language. Cambridge MA: The MIT Press.

Wagner, R. K. (1987). Tacit knowledge in everyday intelligent behavior. Journal of Personality and Social Psychology, 52, 1236-1247.

Wagner, R. K., & Sternberg, R. J. (1985). Practical intelligence in real-world pursuits: the role of tacit knowledge. Journal of Personality and Social Psychology, 48, 436-458.

Wagner, R. K., & Sternberg, R. J. (1986). Tacit knowledge and intelligence in the everyday world. In R. J. Sternberg & R. K. Wagner (Eds.), Practical intelligence: Nature and origins of competence in the everyday world (pp. 51-83). Cambridge: Cambridge University Press.

Waterloo, University. (1998). University of Waterloo factsheet. Available: <http://www.adm.uwaterloo.ca/>.

Weinberg, R. W. (1983). The effects of cooperative education on self-esteem and career maturity in community college students. Unpublished Doctoral Dissertation, Rutgers The Syate University of New Jersey - New Brunswick, New Brunswick NJ.

Weinstein, D. (1980). Cooperative education strategies and student career development (CEA Monograph #1). Boston: Northeastern University.

Wenger, E. (1998). Communities of practice: Learning, meaning, and identity. Cambridge: Cambridge University Press.

Wessels, W., & Pumphrey, G. (1995). The effects of cooperative education on job search time, quality of job placement and advancement. Journal of Cooperative Education, XXXI(1), 42-52.

Williams, W., Sternberg, R., Rashotte, C., & Wagner, R. (1993). Assessing the value of cooperative education. Journal of Cooperative Education, XXVIII(2), 32-55.

Wilson, J. W. (1974). Impact of cooperative education upon personal development and growth (Final Report to the Braitmayer Foundation). Boston: Northeastern University, Cooperative Education Research Centre.

Wilson, J. W. (1988). Research in cooperative education. Journal of Cooperative Education, XXIV(2-3), 77-89.

Wilson, J. W., & Lyons, E. H. (1961). Work-study college programs: Appraisal and report of the study of cooperative education. New York: Harper & Brothers Publishers.

Wilson, J. W., Stull, W. A., & Vinsohaler, J. (1996b). Rethinking cooperative education. Journal of Cooperative education, XXXI(2), 154-165.

Yin, R. K. (1994). Case study research: Design and methods. Thousand Oaks CA: Sage.

Appendix A:

Co-op Programs at the University Of Victoria

UNIVERSITY OF VICTORIA ENROLLMENT DATA

Program Area	Summer 1990	Winter 1990	Summer 1991	Winter 1991	Summer 1992	Winter 1992	Summer 1993	Winter 1993	Summer 1994	Winter 1994	Summer 1995	Winter 1995	Summer 1996	Winter 1996	Summer 1997	Winter 1997	Summer 1998	Winter 1998	Summer 1999	Winter 1999
Anthropology																			2	3
Arts - Ugrad	46	59	46	61	44	77		81		73	51	82	64	55	60	95	60	125	72	94
Arts - Grad		1	1	2		1		5		4	3	5	15	20	12	13	11	7	7	9
Biochem/Micro	19	27	26	37	32	36		32		61	47	75	60	64	61	63	48	53	51	63
Biology - Ugrad	74	92	73	110	84	103		93		94	86	127	98	114	96	144	96	118	79	90
Biology - Grad				1																
Business			1	158	146	290		430		526	156	583	447	691	366	739	428	730	463	629
Chemistry - Ugrad	57	68	55	54	61	63		63		80	65	89	74	74	67	85	71	91	63	76
Chemistry - Grad										1	1	1	1	1			1			
Coaching		4	6	11	11	11		13		8	5	13	14	27	26	33	32	41	37	18
Comp. Sci/Math - Ugrad	113	152	142	160	136	191		206		211	166	251	199	287	232	323	282	376	294	331
Comp. Sci/Math - Grad										3	4	5	10	10	24	12	13	27	7	4
Earth & Ocean Sci. - Ugrad													1	1	8	7	11	21	17	19
Earth & Ocean Sci. - Grad						1		5		2	2	1	2	2		3	4	11	3	2
Economics (Ugrad)											7	6	11	10	18	23	17	31	16	18
Economics (Grad)	17	11	14	16	22	18		30		34	37	32	34	34	37	32	31	32	27	18
Engineering - Ugrad	271	441	297	487	314	494		573		596	356	626	434	681	469	696	522	763	526	759
Engineering - Grad	1	1	1									1	1	3	6	2	3	11	1	
Geography - Ugrad	88	108	106	125	113	158		147		173	134	202	147	162	124	191	121	155	77	119
Geography - Grad	7	10	6	7	6	8		11		6	2	6	3	7	10	5	5	12	2	3
Health Info. Sci.	44	47	43	62	58	82		97		92	38	89	70	97	73	90	71	92	64	86
Kinesiology	13	10	7	10	9	8		9		13	9	20	18	24	25	20	25	35	25	32
Law	33	56	29	49	54	58		74		81	80	103	80	101	91	109	77	99	60	62
Leisure Studies	46	44	52	53	40	45		55		62	43	66	56	72	71	89	78	96	91	91
MBA								4		29	11	37	15	25	20	34	40	36	44	29
Physics	38	53	37	39	40	51		49		65	43	61	36	51	42	64	47	83	47	59
Political Science																			8	9
Professional Writing																		9	11	11
Psychology																			3	4
Public Admin.	67	78	81	76	70	80		92		87	71	88	68	76	76	87	63	104	76	72
Sociology - Ugrad																			5	7
Sociology - Grad										8	8	18	16	18	20	15	11	24	15	15
Special Grads.					1	1		5		2	1	2	2	4	6	2	1	11	0	0
Writing	45	36	33	27	29	29		29		30	4	54	48	47	48	49	48	58	24	37
All programs - Ugrad	887	1193	947	1432	1160	1685		1938		2157	1285	2434	1841	2531	1851	2789	2002	2935	1998	2599
All programs - Grad	92	105	109	113	110	120		165		184	145	209	191	227	237	239	214	316	219	170
Total	979	1298	1056	1545	1270	1805	0	2103	0	2341	1430	2643	2032	2758	2088	3028	2216	3251	2217	2769

Notes:
1. Summer 1993 and Summer 1994 reports are missing
2. Winter refers to Fall + Spring terms
3. Information is generated by UVic Records Services

Appendix B:

Administrative Structure of the University of Victoria

UNIVERSITY OF VICTORIA
Administrative Organization Chart

Prepared by Institutional Analysis
August 13, 1998

President and Vice-Chancellor

Executive Assistant

University Secretary

Ombudsman

Office for the Prevention of Discrimination and Harassment

Equity Issues (Assistant to the President)

Institutional Analysis

Editorial

UVic Computing Services

Vice-President Research

Vice-President Finance and Operations

Vice-President Academic and Provost

Associate Vice-President Research

Research Grants Division

Animal Care Facility

Executive Director Internal Audit

Financial Services

Computing and System Services

Motorpool and University Centre

Facilities Management

Campus Security Services

Student and Ancillary Services

Human Resources

Executive Services

Computing Operations and Systems

Systems Development

Land and Information Services

Purchasing

Computer User Services

Telephone Services

Janitorial Services

Printing and Duplicating

Computer Store

Grounds

Maintenance

Minor Capital Projects

Major Capital Projects

Coordinator Administrative Services

Internal Audit

Continuous Budget Planning and Analysis

Analytical Studies

Women's Studies

Ethnographic Studies

Philosophy

Pacific and Asian Studies

Linguistics

History

Counselling Services

Employment Centre

Book Store

Health Services

Athletics and Recreation

Financial Aid

Housing, Conference and Food Services

Child Care Services

Chaplains

Student Society Programs

Social Sciences Programs

Occupational Health and Safety

Advisor on Women

Deans

Faculty of Business

Faculty of Education

Faculty of Engineering

Faculty of Fine Arts

Faculty of Human and Social Devt.

Faculty of Humanities

Faculty of Law

Faculty of Science

Faculty of Social Sciences

Faculty of Graduate Studies

Division of Continuing Studies

Advisor on Educational Technology

Associate Vice-President Legal Affairs

Associate Vice-President Academic

Aboriginal Liaison Office

Co-operative Education Program

University Librarian

Administrative Registrar

Admissions and Records

Learning and Teaching Centre

Social and Natural Sciences

Psychological Foundations

Physical Education

Mechanical Engineering

Electrical and Computer Engineering

Writing

Visual Arts

Theatre

Music

Social Work

Public Administration

Nursing

Health Information Science

Hispanic and Italian Studies

Greek and Roman Studies

Germanic Studies

French Language and Literature

Arts in Education

Computer Science

History in Art

Child and Youth Care

English

Physics and Astronomy

Mathematics and Statistics

Earth and Ocean Sciences

Chemistry

Biology

Biochemistry and Microbiology

Psychology

Protest Science

Geography

Environmental Studies

Economics

Anthropology

Sociology

Technology, Engineering and Computing Programs

Health Science Programs

English Language Centre

Distance Education Services

Cultural Management Program

Continuing Studies Library Service

Continuing Studies in Education

Conference Management

Business and Management Programs

Arts and Science Programs

Curriculum and Social Foundations

283

Appendix C:

Student Survey Questionnaire

The University Student and the Labour Market

Thank you for agreeing to participate in this study. Your responses to this questionnaire will help us learn more about the connection between universities and the labour market in a changing society.

This questionnaire should take about 15 minutes to complete. You will be asked about your educational experience. You will also be asked for some demographic information (age, gender, and ethnicity). Please read the instructions for each question carefully and indicate your response by checking the appropriate box or writing your response in the spaces provided. Please ensure written responses are easy to read.

This is a voluntary but important part of the study. All the information you provide in this questionnaire is strictly confidential. Anonymity will be protected by using code numbers when reporting results. Only the researcher and supervisor will have access to the information from this questionnaire, and individual responses will not be disclosed or released to others for any purpose. Please be assured that responses will not affect your progress at The University of Victoria in any way.

You have the right to refuse to participate in this study without consequences. It is assumed that completion of this questionnaire indicates that consent to participate has been given.

<div align="center">Please complete all sections</div>

Garnet Grosjean (Researcher)
University of British Columbia
Telephone (604) 822-4553

Dr. Kjell Rubenson (Supervisor)
University of British Columbia
Telephone (604) 822-4406

Questionnaire

The questionnaire is divided into five parts. Part A (first six questions) covers background information. Part B (questions seven to thirteen) asks for information on your reasons for enrolling at the University of Victoria. Part C (questions thirteen and fourteen) asks about your satisfaction with courses and to what extent they provide skill development, knowledge and career opportunities. Part D contains one question for non-co-op students (question fifteen). The following three questions in part D (questions sixteen, seventeen, and eighteen) are for co-op students only and request information on their satisfaction with the co-op program. Part E (questions nineteen to twenty-two) asks about your plans for the future.

PART A

1). **Are you?**   ❑ Female   ❑ Male

2). **What is your age?**

❑ Less than 18 years   ❑ 21 to 22 years   ❑ Over 25 years
❑ 18 to 20 years   ❑ 23 to 25 years

3). **How many years have you lived in Canada?**

❑ less than 1 year   ❑ 6 through 10 years   ❑ all my life
❑ 1 through 5 years   ❑ 11 through 20 years

4). **Please indicate the response that best describes you**

I am a Canadian citizen .... ❑
I hold dual citizenship ....   C anadian and _____
I am not a Canadian citizen ....   My status is _____

5). **Every person has a different background in terms of family origin, culture, nationality and beliefs. In addition, each person may have their own sense of who they are. Please indicate the cultural group to which you feel you belong.**

English ❑   Chinese ❑   Sikh ❑   Latin American ❑
Italian ❑   German ❑   Ukrainian ❑   Japanese ❑
Hindu ❑   French ❑   Jewish ❑   Native Indian ❑
Filipino ❑   Vietnamese ❑   Other ❑ (please list in the space below)

_____

6)   Socio-Economic Status of Parents/Guardians.

It would be helpful to get some information about the job(s) usually held by your parent(s), guardian(s). Please choose a category that best describes the usual job of either Father/Guardian or Mother/Guardian or both. If none of the following are appropriate please describe their job in the "other" category.

	Father/ Guardian	Mother/ Guardian
ARMED FORCES		
LEGISLATORS, SENIOR OFFICIALS & MANAGERS		
PROFESSIONALS		
TECHNICIANS		
CLERKS		
SERVICE WORKERS and SHOP & MARKET SALES WORKERS		
SKILLED AGRICULTURAL and FISHERY WORKERS		
CRAFT and RELATED TRADES WORKERS		
PLANT and MACHINE OPERATORS and ASSEMBLERS		
MANUAL WORKERS		
NEVER EMPLOYED		
DON'T KNOW		

SELF-EMPLOYED
(please describe the type of self-employment)_____

OTHER
(please describe) _____

PART B

7) Reasons for Enrolling
Please indicate how **important** each of the following reasons were in your decision to enroll in this university program: (**Check one box for each line**)

		Not at all Important	Not Very Important	Somewhat Important	Very Important
a)	general self-improvement	❑	❑	❑	❑
b)	wanted in-depth knowledge of a field of study	❑	❑	❑	❑
c)	improve chances of a good income after graduation	❑	❑	❑	❑
d)	acquisition of job skills	❑	❑	❑	❑
e)	to gain a broad, liberal education	❑	❑	❑	❑
f)	to find out what I enjoy doing	❑	❑	❑	❑

8) Did you work between high school and entry to university?   Yes ❑   No ❑
(if you answered no to this question go directly to question 11)

9) How many employers did you have between high school and enrollment in your current program?
None ❑   One ❑   Two ❑   Three ❑   More than three ❑

10) Indicate to what extent this work was:

		Not at All	Not Very Much	To Some Extent	To A Great Extent
a)	related to your current field of study or program	❑	❑	❑	❑
b)	necessary to pay tuition for university	❑	❑	❑	❑
c)	an opportunity to gain some work experience	❑	❑	❑	❑
d)	simply to provide money to travel, or for a vacation	❑	❑	❑	❑

11) Did you move to Victoria specifically to attend UVic?   Yes ❑   No ❑
If you answered "yes" where did you move from? _____

12) Did you enroll at the University of Victoria to participate in a co-op program? Yes ❑ No ❑
If you answered "yes" which program?   _____

PART C

13) Satisfaction with Delivery of Courses in Your Current Program of Study
Please indicate your level of **satisfaction** with each of the following:

		Very Dissatisfied	Somewhat Dissatisfied	Somewhat Satisfied	Very Satisfied
a)	course availability	❏	❏	❏	❏
b)	access to instructors (outside of class time)	❏	❏	❏	❏
c)	institutional facilities (library, labs, computers)	❏	❏	❏	❏
d)	class size	❏	❏	❏	❏
e)	quality of teaching	❏	❏	❏	❏

14) Provision of Skills, Knowledge or Opportunities
Please indicate to what **extent** your program provides

A) Skills Development

		Not at All	Not Very Much	To Some Extent	To A Great Extent
i)	independent thinking skills	❏	❏	❏	❏
ii)	decision making skills	❏	❏	❏	❏
iii)	good writing skills	❏	❏	❏	❏
iv)	good speaking skills	❏	❏	❏	❏
v)	team-work skills	❏	❏	❏	❏
vi)	leadership skills	❏	❏	❏	❏
vii)	development of specific job skills	❏	❏	❏	❏

B) Knowledge

		Not at All	Not Very Much	To Some Extent	To A Great Extent
i)	for general self-improvement	❏	❏	❏	❏
ii)	in-depth knowledge of a field of study	❏	❏	❏	❏
iii)	information on jobs in the field	❏	❏	❏	❏

C) Opportunities

		Not at All	Not Very Much	To Some Extent	To A Great Extent
i)	an opportunity to meet potential employers	❏	❏	❏	❏
ii)	improved chances of a good income	❏	❏	❏	❏
iii)	up to date information on the labour market	❏	❏	❏	❏

289

[The following question is for non-co-op students only]

15) Choice of Undergraduate Program
In which academic program are you enrolled?_____

a) What year are you in?   First ☐   Second ☐   Third ☐   Fourth ☐   Other_____
b)   Have you had part-time employment while attending university?   Yes ☐   No ☐
c)   Have you had summer employment while attending university?   Yes ☐   No ☐
d)   Was any of this work related to your field of study?   Yes ☐   No ☐

The next three questions are for co-op students only [all others please go to next page]

---

16 a)   Which co-op program are you in?   Business   ☐
                                                    Chemistry   ☐
                                                    Engineering   ☐
                                                    Geography   ☐
                                                    Other   ☐   please name_____
  b)   What year are you in?   First   Second   Third   Fourth   Other_____

17)   How satisfied are you with the integration of coursework and co-op work experience?

	Very Dissatisfied	Somewhat Dissatisfied	Somewhat Satisfied	Very Satisfied
	☐	☐	☐	☐

18)   Satisfaction with Co-op Work-Term (*students who have completed at least one work-term*)

Please indicate your satisfaction with the work-term component of your co-op program

		Very Dissatisfied	Somewhat Dissatisfied	Somewhat Satisfied	Very Satisfied
a)	preparation for work-term	☐	☐	☐	☐
b)	assignment of work-term employers	☐	☐	☐	☐
c)	relevance of work-term employment	☐	☐	☐	☐
d)	supervision during work-term	☐	☐	☐	☐
e)	opportunity to learn on-the-job	☐	☐	☐	☐
f)	opportunity to develop new skills	☐	☐	☐	☐
g)	rate of pay for employment during work term	☐	☐	☐	☐
h)	integration of work experience with coursework	☐	☐	☐	☐

PART E

19) Future Plans

Please indicate what you plan to do when you graduate from your program

a) I plan to find a job in my field of study   Yes.☐   No ☐
b) I plan to pursue a graduate education   Yes ☐   No ☐
c) I have not made any plans   Yes ☐   No ☐

Please name the job or career you are aiming for _____

20) How difficult do you anticipate it will be to get a job in your field of study after graduation?

	Not at all Difficult	Not Very Difficult	Moderately Difficult	Very Difficult
	☐	☐	☐	☐

21) Retrospective Choice
If you had the opportunity to start your program over again, would you choose

		Yes	No
a)	the same university	☐	☐
b)	the same field of study	☐	☐
c)	the same program	☐	☐

22) Final Comments. In your view how can universities best prepare students for success in the labour market?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Appendix D:

Tables of Results

Table D3: Co-op Students Future Plans*

	Business % n=299 **	Chemistry % n=52	Engineering % n=254 **	Geography % n=50
Find job in field*	95	77	93	84
Graduate education**	57	81	36	58
Have made no plans	14	15	23	21

Note: Not all students answered this question, while some students chose to provide more than one answer. For example, some indicated that they plan to pursue graduate education, but only after working to save the necessary funds. Differences are significant * [X^2 = 21.75 (3) p<.001], ** [X^2 = 44.63 (3) p< .001].

Table D4: Satisfaction with Co-op Work Term

Level of satisfaction	Business % n=324 **			Chemistry % n=65			Engineering % n=295 **			Geography % n=53		
	V	S	D	V	S	D	V	S	D	V	S	D
Work term preparation	5	34	61	26	64	10	16	53	32	4	52	44
Assignment of employers	7	22	71	38	52	10	22	48	30	28	52	20
Relevance of employment	14	32	54	45	43	12	28	47	25	42	40	18
Supervision on work term	9	32	59	52	47	2	24	60	16	28	52	20
Learn on-the-job	24	47	32	72	28	0	51	39	11	72	22	6
Develop new skills	26	44	31	72	28	0	51	35	13	66	26	8
Rate of pay on work term	11	40	50	26	52	22	26	53	22	50	36	14
Integrate work & courses	8	29	53	21	50	29	11	44	45	12	56	32

*Percentages represent responses of V = 'very satisfied', S = 'somewhat satisfied' or D ='somewhat dissatisfied / very dissatisfied' on a four-point Likert Scale.
** Mandatory co-op, hence larger sample size. Note: because of rounding totals may not equal 100%.

Table D5: What can universities do?

teach more practical (technical) skills	70%
integrate practical and general skills	22%
not the purpose of university to	
prepare students for labour market	7%
teach more general skills	1%

Table D6: How can they do it?

provide more relevant courses	45%
provide more co-op programs	28%
improve quality of teaching	13%
offer a greater variety of courses	8%
provide more spaces in existing co-ops	5%
smaller class size	2%

* because of rounding up final total does not equal 100%

Table D7: What resources are needed?

current labour market information	51%
provide more relevant work terms	31%
provide more options of employers	16%
better labs with up-to-date equipment	3%

* because of rounding up final total does not equal 100%

.   .

Table D8: Satisfaction with Delivery of Courses

Level of satisfaction	Business % n=324 **			Chemistry % n=65			Engineering % n=295 **			Geography % n=53		
	V	S	D	V	S	D	V	S	D	V	S	D
Course availability	21	55	25	20	52	28	40	41	19	6	11	83
Access to instructors	31	62	7	32	62	6	25	58	17	28	60	11
Institutional facilities	39	48	14	32	51	17	30	49	21	9	59	32
Class size	36	47	18	19	54	28	20	51	29	4	38	59
Quality of teaching	22	64	15	23	60	17	8	51	41	17	66	17

*Percentages represent responses of V = 'very satisfied', S = 'somewhat satisfied', or D = 'somewhat dissatisfied / dissatisfied' on a four-point Likert Scale.
** Mandatory co-op, hence larger sample size. Note: because of rounding totals may not equal 100%. Differences are significant $[X^2 = 40.82 (12) p< .001]$

Table D9: Extent that Program Provides Skills Knowledge and Opportunity

Degree of Extent:	Business % n=324 **			Chemistry % n=65			Engineering % n=295 **			Geography % n=53		
	G	S	N	G	S	N	G	S	N	G	S	N
Thinking skills +	31	58	11	43	46	11	22	61	17	42	45	13
Decision-making skills +	39	55	5	34	49	17	21	55	24	21	56	21
Good writing skills +	20	58	23	14	52	34	10	42	49	30	49	21
Good speaking skills +	38	47	15	5	45	51	5	32	63	13	45	42
Team-work skills +	75	24	1	29	31	40	29	53	18	49	36	15
Leadership skills +	25	57	18	8	23	69	8	44	48	11	40	49
Specific job skills	11	47	43	35	51	14	29	49	23	19	45	36
Knowledge-self-improve	20	67	13	25	52	23	16	61	24	40	51	9
Knowledge-field of study	27	57	17	57	40	3	49	45	7	45	42	13
Info on jobs in field ++	14	49	38	23	51	26	31	50	20	17	47	36
Meet employers ++	15	47	38	39	35	26	51	38	11	19	28	53
Chance of good income ++	30	57	17	42	51	8	63	34	3	19	60	21
Info on labour market ++	14	43	46	15	40	45	29	43	28	13	30	57

*Percentages represent responses of G = 'to a great extent', or N = "not much / not at all" on a four-point Likert Scale.
** Mandatory co-op, hence larger sample size. Note: because of rounding totals may not equal 100%. Differences are significant + $[X^2 = 48.26 (12) p< .001]$, ++ $[X^2 = 21.50 (9) p< .05]$.

Appendix E:

Interview Guides

Guiding Questions for Administrator Interviews

1) Please tell me a little about your background and any involvement you have had with co-op *(if response is no involvement with co-op, go to question # 4)*

2) What do you think the greatest value of co-op education is to the university of Victoria?

2) Can you describe your relationship to the co-op program?
    With whom do you associate most closely?

4) Please tell me what you consider are the primary goals of the co-op programs at UVic.

5) What are co-op's greatest strengths?

6) Do you think co-op education has value for employers? Why?

7) Do you think co-op has value for students? (If yes, what do you think is the greatest value of co-op for students?)

8) Does the co-op program meet your expectations?

9) If there were one thing that you would like to see the co-op program accomplish, that it is not currently accomplishing, what would it be? Whose support would you have to obtain to make it happen?

Guiding Questions for Faculty Interviews

1) Please tell me a little about your background and any involvement you have had with co-op
    (*if response is no involvement with co-op, go to question # 6*)

2) Can you describe your relationship to the co-op program?
        With whom do you work most closely?

3) Why did you agree to participate in the co-op program?

4) Does the co-op program meet your expectations?

5) Please tell me what you consider are the primary goals of the co-op program

6) Do you think co-op has value for the university? (If yes, what do you think is the greatest
value of co-op education to the university?)

7) What are co-op's greatest strengths?

8) Do you think co-op has value for employers? Why?

9) Do You think co-op has value for students? What do you think the greatest value of co-op
    education is to students?

10) If there were one thing that you would like to see this program accomplish, that it is not
currently accomplishing, what would it be? Whose support would you have to obtain to make it
happen?

Guiding Questions for Coordinator Interviews

1) Please tell me a little bit about your background and your involvement in co-op

2) Why did you become involved with the co-op program?

3) Does the co-op program meet your expectations?

4) Can you describe your relationship to the co-op program?
   With whom do you work most closely?

5) Please tell me what you consider are the primary goals of the co-op program

6) What do you think the greatest value of co-op education is to the university?

7) In your opinion, what are co-op's greatest strengths? What makes it successful?

8) What do you think the greatest value of co-op is to employers?

9) What do you think the greatest value of co-op is to students?

10) If there were one thing that you would like to see your co-op program accomplish, that it is not currently accomplishing, what would it be? Whose support would you have to obtain to make it happen?

Guiding Questions for Co-op Student Interviews

During the interview I would like you to think through your time in the co-op program, and tell me in your own words about your experience. I'm interested in finding out why you enrolled in co-op, your experience of the program, both on the UVic campus and on your work terms, your thoughts on how the program might be improved, and finally your plans for the future.

(Request agreement to proceed, and have interviewee sign an informed consent form)

To start with, can you tell me what attracted you to the co-op program at UVic?

How did you find out about co-op?

What did you expect the program would do for you?

What do you think formed these expectations?

Does the co-op program live up to your expectations?

Now, broadly speaking, what has your experience with the co-op program been?

If we look closer at these experiences, how is the teaching in your program?

What does learning mean to you?

How do you see the work-term in light of this?

Can you tell me a bit more about your experiences on work-terms?

What are co-ops greatest strengths?

How do you see the role of the co-op coordinator?

Reflecting on your time in the program, what does co-op education mean to you?

You have talked a lot about the program, and obviously thought a lot about it, if there was one thing you would like to see done to improve the program, what would that be?

How could that be done?

Whose responsibility do you think that is?

What else can you think of?

What are your plans for the future?

Do you think your co-op experience will help you? How?

Do you have any final thoughts or comments?