You Never Run Out of 'Why'.

Critical Thinking and Pre-service Teachers

A Thesis Submitted to the College of

Graduate Studies and Research

In Partial Fulfillment of the Requirements

For the Degree of Master of Education

In the Department of Curriculum Studies

University of Saskatchewan

Saskatoon

By

Dave Luukkonen

ABSTRACT

Education literature is replete with articles on critical thinking in secondary and post secondary education. However, the bulk of this literature focuses on the process from the educator's perspective of student performance and understanding of critical thinking. Very little research seems to have been done to uncover what the students themselves may think.

This thesis attempts to address this lack of enquiry into student perceptions by illuminating how a group of pre-service teachers (and one long service master teacher) have experienced critical thinking in their education, and how they define and understand it.   The thesis consists of a literature review that briefly examines the history of critical thinking in education, and how student understandings of critical thinking are perceived by professors and others at the post secondary level.

Then, through a series of semi-structured interviews, the thesis examines the perspectives of eleven participants in comparison to those commonly held by writers and educators in the field. The data indicate that most of the participants did not acknowledge encountering critical thinking methodologies or structures during their K-12 education in any significant way, and that K-12 did not prepare them for critical thinking at the University level- and in fact often did not meet the criteria laid out in Saskatchewan Curricula. This finding is in general agreement with the literature. However, in addition, most of the students asserted that their experience indicated that high level critical thinking was not actually required for success at the undergraduate level.

The data from this thesis suggest that further study may be useful in understanding how critical thinking may be better taught and encouraged at all levels of education.

ACKNOWLEDGEMENTS

I would like to thank my thesis Supervisor, Dr. Richard Julien for the uncounted hours he has spent counseling and encouraging me on the long road to the completion of this work. Without his continued support this work would not have been completed.

I also appreciate the support I received from my committee, Doctors Angela Ward and Jeff Park. Their guidance and input was profoundly helpful.

A special thank you to my partner Marie; without her support I could never have undertaken this work at all.

TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION

I first became interested in critical thinking as a young broadcaster; I wondered how people were able to form largely unsubstantiated and often superficial opinions on issues ranging from economics and the environment to politics and social issues. As I gained experience and encountered diverse people and perspectives the question became "why do *I* believe what I believe?" As I matured I found that evidence occasionally trumped one of my weakly reasoned tenets. For example, I believe I was unthinkingly racist for most of my early life. Nobody ever explicitly 'taught' me to disrespect our First Nations' peoples, but that wasn't necessary; racism was threaded through the conversations and jokes shared in social situations from the school playground to the workplace. As an adult I encountered individual aboriginal people who did not fit the 'model' I expected. These collisions between what I unconsciously 'knew' and what I was encountering in my personal and working life were uncomfortable, but eventually resulted in a fundamental shift in my belief structures. Likewise over the years I spent as a broadcaster, I experienced both relative wealth and relative poverty and my political views shifted as I began to see that not everything I believed about politics and society could be justified by the evidence of my own experience. Thus, as radio announcer I was fortunate to encounter many different people and perspectives and live through experiences that helped learn to question all opinions, including my own.

Eventually, I left commercial radio to become a teacher. As I moved from college life to becoming a high school teacher, I discovered that many of my students were reluctant to think critically about questions or issues. Several times, in fact, students asked that I stop making them think and just give them the answers! Most of them were far more comfortable with a pedagogy that did not demand much of them: rote learning; taking notes; and regurgitating the dictated notes in tests. I found it took me far longer than I had anticipated it would to develop a classroom atmosphere

1

that welcomed deep inquiry. As a more experienced teacher, I still struggle with developing a classroom with a critical thinking culture. Moreover, many students seemed to be unable, or unwilling to distinguish between informed opinion and uninformed opinion, which often led them to protest a mark I gave them on responses by arguing "But, that's my opinion! It's an opinion question, and I have the right to my opinion!" This corruption of post-modernism's contention that nothing can be absolutely known seemed to arise every time I assigned a writing assignment that did not absolutely demand research and source documentation. In one particular case, one of my students, a highly skilled hockey player who was expected to play at the Junior level, (often a stepping stone to the professional ranks) argued that I should give him an "A" instead of a "C" on his essay because the assigned topic called for an opinion, and his was "as good as anyone's". Now, I have often described my hockey career as brief and unmemorable and have told students, to their general laughter, that "nobody ever loved the game more, or played it worse than I did", so my student laughed when I asked him if he felt my opinion on how to play the game should be taken as seriously as his. "Mr. Luukkonen", he laughed, "I have a lot more experience!" This became a 'teachable moment' as I then asked, "So then, are all opinions equally good? Should all opinions be worth an "A"? After a brief reflective pause, he conceded that perhaps not all opinions are equally sound, and we talked about how he might improve his own writing by better informing his opinions before setting them down. As I did my research, I soon discovered that his conviction (that opinions cannot be judged), is not restricted to younger students, but has been identified and discussed in studies of college students as well (Trossett, 1998).

When I returned to university to pursue graduate studies in curriculum, I found my colleagues had similar experiences. We discussed critical inquiry and critical literacy in a number of my graduate classes, as indeed we had done in my methods classes as an undergraduate student. I began to wonder why, since we educators so clearly valued critical thinking, it seemed to be less than common in our K-12 classrooms.

When I began to search for a topic suitable for this thesis, it seemed natural to make the focal point critical thinking and the K-12 educational system. As I undertook

the initial research, it became apparent that there was a fairly extensive body of literature that considered what educators and other academics knew and felt about critical thinking (CT) and its teaching from K-12 through to university. While many writers used the term "critical thinking", it became apparent that they intended a myriad of definitions by the term. Writers in the field often used other terms to define what I would consider critical thinking; terms such as 'reflective thinking' and 'clear', or 'deeper' thinking to describe the thinking that interested me. While I will discuss the semantic differences in the use of the term CT later in my research, I would like to point out that the general use of the term critical thinking embodies a thinker's intentional movement beyond the superficial understanding of concepts and issues.

After a review of the literature, it became clear to me that much less had been written about what students think and know about critical thinking than about what academics believe students should and do know. Thus, my research focus eventually narrowed to a few salient questions such as: What do pre-service teachers know about the subject of critical thinking? What did they learn about CT in their K-12 educations? What sort of obstacles do they envisage to its teaching? My research hope was that their perspectives, coupled with the other research data would illuminate some of the issues around teaching and learning critical thinking skills. The final result would be, I hoped, some insight into how we might improve existing programs or implement new programs to improve critical thinking in our school system. At the very least, I hoped we might gain some further understanding where we may be falling short.

Critical thinking seems to have always been a perennial core concern for educators (Carr, 1990; Cotton, 1991; Potts, 1994) for a long time. In the 20th century, thinkers like John Dewey and Bertrand Russell revisited the theme, and by the century's end critical thinking was still a cause for concern and debate- led by critics and thinkers like Richard Paul, and Linda Elder. In response, many school systems have adopted specific approaches to teaching critical thinking- particularly in history and social studies. Indeed, as Ian Wright (2003) suggested, "The centrality of critical thinking has been impressed upon us in the social studies literature and in curriculum guides for so long that it has taken on motherhood status"(p.1). In our own province, critical thinking has become a strand common across the content areas. Saskatchewan Learning (1988)

for example, has made it a fundamental learning goal for all students- calling it a Common Essential Learning and provides this brief definition linking critical thinking to creative thinking:

> Critical and Creative Thinking can be described as qualities of good thinking processes and as types of thinking. Creative thinking is generally considered to be involved with the creation or generation of ideas, processes, experiences or objects; critical thinking is concerned with their evaluation (4).

The handbook provides this rationale:

> The importance of having students develop good critical and creative thinking skills has to do with the foundations needed for a democracy and with the tools needed for independent and life-long learning (p.30).

And:

> The goal of incorporating critical and creative thinking processes into Saskatchewan's K-12 Curricula is to develop individuals who value knowledge, learning and the creative process, who can and will think for themselves, yet recognize the limits of individual reflection and the need to contribute to and build upon mutual understandings of social situations (p.29).

As we shall see later in this thesis, tying critical thinking to creative thinking so explicitly can be problematic because it can blur the distinction between good thinking in terms of reasoning structures and good thinking in terms of cognitive ability. Furthermore, as Mary Bozik noted (1988), while Critical Thinking is often defined and discussed in education literature, there is little to be found on how teach Creative Thinking (1). The literature is in general agreement that the two are connected, but it appears that when it comes to critical and creative thinking, the former is much easier to define, discuss and design structures for than the latter. This issue aside, Saskatchewan Learning's written goal suggests that critical thinking, if not paramount, in Saskatchewan curricula, is certainly highly valued. Other education systems, from California to British Columbia have adopted much the same stance (Paul, 1995; British Columbia Ministry of Education, 2003; Alberta Learning, 2003). Over the decades, and particularly in the last quarter century, much has been written about the failures of

4

education systems to teach critical thinking (Paul, 1995, Adu-Febiri, 2002). As well, fair bodies of work have emerged to describe both obstacles to teaching and practising critical thinking and to lament its general lack in students emerging from high school. Likewise, there is no shortage of competing definitions of the term, though many of these, as Ken Petruss (2004) notes, are narrowly defined for the purposes of a specific field of expertise. The simplest definition - that critical thinking is the process of making judgements based upon considered understandings of available evidence, while satisfyingly brief, is not comprehensive enough. The tradition arising out of the scientific method goes further, adding an element of uncertainty; conclusions must generally be tentative, and subject to change as more convincing evidence becomes available. In the 20th century, Dewey and Russell contended, although neither used the exact term, that critical thinking, Dewey's deliberate reflection and Russell's open minded skepticism, needed to be cultivated as habits of mind in citizens in order to be useful to society (Chomsky, 2003; Dewey, 1910; Russell, 1928; 1935). Dewey's work was the earliest of the century; in 1910 he argued that:

> No words are oftener on our lips than *thinking* and *thought.* So profuse and varied, indeed, is our use of these words that it is not easy to define just what we mean by them. The aim of this chapter is to find a single consistent meaning. Assistance may be had by considering some typical ways in which the terms are employed. In the first place *thought* is used broadly, not to say loosely. Everything that comes to mind, that "goes through our heads," is called a thought. To think of a thing is just to be conscious of it in any way whatsoever. Second, the term is restricted by excluding whatever is directly presented; we think (or think of) only such things as we do not directly see, hear, smell, or taste. Then, third, the meaning is further limited to beliefs that rest upon some kind of evidence or testimony. Of this third type, two kinds — or, rather, two degrees — must be discriminated. In some cases, a belief is accepted with slight or almost no attempt to state the grounds that support it. In other cases, the ground or basis for a belief is deliberately sought and its adequacy to support the belief examined. This process is called reflective thought; it alone is truly

educative in value, and it forms, accordingly, the principal subject of this

volume (1-2).

Dewey also offered a five step plan for approaching a problem and forming a "completely developed thought":

(i) a felt difficulty; (ii) its location and definition; (iii) suggestion of possible solution; (iv) development by reasoning of the bearings of the suggestion; (v) further observation and experiment leading to its acceptance or rejection; that is, the conclusion of belief or disbelief. (73).

While it may be inferred then, that Dewey believed that all problems in life and across subject areas could be approached with this process, I think to argue that Dewey thus reduces the teaching of thinking to a cognitive process that can be taught as a skill set is an oversimplification of his approach to education. In fact, Dewey noted (1920) that students would learn best in an environment that encouraged a social approach to learning in which students competed less, and cooperated more (pp.12-14). In 20th century schools, argued Dewey:

The mere absorbing of facts and truths is so exclusively individual an affair that it tends very naturally to pass into selfishness. There is no obvious social motive for the requirement of mere learning, there is no clear social gain in success threat. Indeed, almost the only measure for success is a competitive one, in the bad sense of that term—a comparison of results in the recitation or in the examination to see which child has succeeded in getting ahead of others in storing up, in accumulating, the maximum of information. So thoroughly is this the prevailing atmosphere that for one child to help another in his task has become a school crime. Where the school work consists in simply learning lessons, mutual assistance, instead of being the most natural form of co-operation and association, becomes a clandestine effort to relieve one's neighbour of his proper duties (p.13).

Russell believed to teach thinking skills, students should be exposed to a variety of opinions and read the best works of the leading proponents of the most celebrated schools of thought in history, economics and philosophy. He insisted that:

A young man learning economics, for example, ought to hear lectures from individualists and socialists, protectionists and free-traders, inflationists and believers in the gold standard. He ought to be encouraged to read the best books of the various schools as recommended by those who believe in them. This would teach him to weigh arguments and evidence, to know that no opinion is certainly right , and to judge men by their quality rather than the consonance with preconceptions… a young man should learn to think that all questions are open, and that argument should be followed wherever it leads (1928, Freedom versus authority in education, p.170).

So while we can argue that critical thinking is a set of reasoning skills that can be taught, it is also more than that; it is a willing, deliberate habit of mind that consistently challenges existing opinion, whether general or specific and whether held by others or by ourselves. By the 1950s, beginning history teachers were advised that a student must learn to reach conclusions based on as many of the relevant "facts" as possible. As Edgar Wesley and Stanley Wronski (1958) told readers of their teacher's text:

The student of social studies and the adult citizen are both faced with the necessity of reaching conclusions about social problems without knowledge of *all* the facts. The conclusions, therefore, must be tentative. They may be reviews and revised whenever new conflicting data are found. This tentative nature of conclusions itself is a vital understanding that students should gain from a study of problems (p.174).

It should be noted that this work was a revision of their original 1937 text, and the authors advise us in their preface of extensive additions and revisions, including the passage above, which was part of an entirely new chapter which "deals with the problems approach in social studies teaching and reflects the increasing attention that this approach is receiving in the professional literature" (v). Their text is evidence of the progression of ideas in the writings of Dewey and Russell percolating outwards and settling into established acceptance. However, as we shall see in the literature review, the idea that we should actively teach critical thinking as well as expect it from our students is not the intellectual property of the twentieth century. It has been defined variously through the ages, and educators and philosophers continue to define and

redefine it for various purposes today (Cotton, 1991; Petruss, 2004; Ennis, 2004). For the purposes of this research, I have adopted a fairly broad definition of critical thinking- inspired in part by the ideas of Bertrand Russell, and also by those of Richard Paul and Linda Elder. Elder approved the following definition through our email correspondence in December 13th 2005:

> It is the process of thinking about issues, arguments and documents or records from multiple perspectives (in terms of their content, origin, function, structure and purpose) with a view to improving that thinking, and to reaching conclusions based upon this reasoned understanding of the best available evidence.

Thus, a critical thinker should be able to both analyze and assess not only the thinking of others but his or her own as well. Further, the root purpose of this structured thinking is not to 'prove' one's opinion, but to improve it. As Paul & Elder argue:

> Critical thinking is that mode of thinking — about any subject, content, or problem — in which the thinker improves the quality of his or her thinking by skilfully analyzing, assessing, and reconstructing it. Critical thinking is self-directed, self-disciplined, self-monitored, and self-corrective thinking. It presupposes assent to rigorous standards of excellence and mindful command of their use. It entails effective communication and problem-solving abilities, as well as a commitment to overcome our native egocentrism and sociocentrism (2007, para.2).

These precepts owe much to the work of Russell as well; the idea that good thinkers consider multiple perspectives, question their own thinking and biases and hold all opinions tentatively pending better evidence is found (as will be shown in the literature review) threaded through Russell's writings (1928; 1935). This definition is not necessarily the only 'true' definition of critical thinking, but it is the best general description I have found for it.

The goal of the critical thinker is meta-cognitive; we use it to both evaluate and improve our own thinking. It is at its core, a subset of vital skills and attitudes that can be brought to bear as part of a larger set when applied to critical pedagogy, to critical literacy, and to social and political thinking- in short, skills to aid achieving the ancient

Greeks ideal of living "the examined life" (Paul & Elder 2007, para.16). Very little of the literature that I surveyed for this thesis discusses this possible inability of College and University instructors to think critically about their own teaching. Indeed, almost all of the literature I reviewed focuses on the students' failings and the quality of teaching they receive from K-12. This thesis is an attempt to discover what one group of students think about the process. Many of the themes that my participants identify and discuss in the interviews mirror what I had discovered in my literature review, especially in terms of obstacles to teaching and learning critical thinking skills.

However, as we shall see, a couple of unexpected perspectives also emerged, and these prompted me to return to my research anew to see if others had encountered similar data.

Summary

While educators at all levels seem to generally agree that critical thinking skills are a vital component in student development, most of the literature reviewed in this thesis considers the question only from the perspective of the post secondary teacher, administrator, planner, or school governors (e.g., governmental departments of education). I found little had been written about how students themselves perceive critical thinking: its nature, its learning, its application and their own ability within the skill set.

This thesis attempts to help bridge that gap and address one basic research question: How do pre-service teachers understand and define critical thinking? This question is then pursued from several different angles in which the students were asked to consider what obstacles might hamper the teaching and learning of critical thinking skills, and whether their K-12 educations prepared them for the type of thinking required of them at university. This thesis cannot answer these questions but attempts to illuminate a particular set of skills, attitudes and understandings about critical thinking in a particular group of teacher candidates at a particular time-before they fully enter the profession. While no firm conclusions are reached in this thesis, the data point to a need for college level instructors to reflect upon their own perspectives on critical thinking at university- and revisit their own post secondary teaching practices. In particular, the data suggest that we need to re-assess how we encourage and reward

critical thinking in our own classrooms at both the K-12 and post secondary levels. Are we actually encouraging students to think critically? Are we letting obstacles such as limited time or an overcrowded curriculum stop us from using critical thinking strategies that seem more time consuming than lower level strategies (Torf & Sessions, 2006)? Or are we assessing them based on how well their thinking meshes with ours (Fox, 2002)? Further, there is evidence in my research that suggests that while Critical Thinking has been actively included both as an ideal and a teaching objective in Saskatchewan curricula since the late 1980s, we have not been very successful in achieving it.

CHAPTER TWO

LITERATURE REVIEW

The Background

Since the time of Socrates, educators, philosophers and historians have stressed the importance of critical thinking in education and democracy (Carr, 1990; Cotton 1991). A half century before the birth of Christ, Socrates counselled the youth of Athens to form opinions based on evidence, and to ask deep questions in search of stronger understanding (Foundation for Critical Thinking, 2007, para.1; Russell (1979) pp.100-111). Socrates insisted, as Mark Kingwell (2000) put it, "…that we must examine our beliefs, not merely hold them" (p.43). Plato (*The Republic,* book VII) used his famous 'allegory of the cave' to make reason- the ability to distinguish appearance from reality- the highest human virtue and the rarest (Russell 1979, pp.140-144). Medieval philosophers were rigorous in their use of logic- at least on questions not involving their Christian faith which was not open to such internal debate (Russell, 1979). In the early twentieth century, Dewey insisted that education should inspire reflective thinking, not mere memorization, and should produce citizens capable of knowledgeable participation in their democracy (Dewey, 1910; Chomsky, 2003. pp.25-26). Bertrand Russell argued that critical thinking needs to be not just a skill, but a habit of mind (Hare, p.3). Russell pondered, as Howard Woodhouse (1983) tells us, the nature of the education system to be developed and concluded that its overseers should have a revere the right of the child to learn and develop freely, and feel an acute responsibility to ensure that the system does not try to "mould all children in a uniform manner" (15). Children should have not just the negative freedom to not be interfered with; they should enjoy the positive freedom of being able to "pursue those interests in which he is led by the natural development of both his growth and impulses" (Woodhouse, 15). This is absolutely one of Russell's most deeply held convictions; however, it must also be noted that Russell (1928) did recognize that the child's freedom to learn could not be absolutely unguided:

> Freedom, in education as in other things, must be a matter of degree. Some
> freedoms cannot be tolerated. I met a lady once who maintained that no child
> should ever be forbidden to do anything, because a child must develop its nature
> from within. 'How if its nature leads it to swallow pins?' I asked; but I regret to
> say the answer was more vituperation. And yet, every child, left to itself will
> sooner or later swallow pins, or drink poison out of medicine bottles, or fall out
> of an open window…Therefore, one who advocates freedom in education
> cannot mean that children should do exactly as they please all day long. An
> element of discipline and authority must exist; the question is as to the amount
> of it, and the way in which it is to be exercised… There must be educational
> institutions, and children must be to some extent under authority. But in view of
> the fact that no authority can be wholly trusted, we must aim at having as little
> authority as possible, and try to think out ways by which young people's natural
> desires and impulses can be utilized in education (Freedom,157,163).

While Russell did agree that some external limits on student freedom must be in place,
one must seriously doubt that he would ever agree that these should apply to student
thinking and inquiry. Students must be free to go wherever a question leads them
(1928, Freedom, 170), and "… education should have as one of its aims to teach people
to believe propositions only when there is some reason to think that they are true...one
of the things taught in schools must be the habit of weighing evidence, and the practice
of not giving full assent to propositions which there is no reason to believe are
true."(1928, Free thought, 140-141). Thus for Dewey and Russell, teaching the habit of
critical thinking was to be a vital part of schooling. Today's educators stress it no less;
curricula from the western Canadian provinces place critical and creative thinking at the
forefront of their learning objectives (Alberta Learning, 2003 *English Language Arts,
Senior High School*; British Columbia Ministry of Education, 2003; Saskatchewan
Education , 1992; Social Studies 10: Social Organizations; Saskatchewan Education
1988, *Understanding the Common Essential Learnings)*. Despite this, post-secondary
instructors and employers continue to lament that young people emerging from our
public schools to attend university do not think critically and seem unable to solve
problems independently (Adu-Febiri, F. 2002; Paul, R. 1995; van Gelder, 2005).

Western Thought: From Sophistry to Social Studies

While many trace the origins of critical thinking to Socrates, a case can be made that an even earlier Greek school was its cradle. In the 5th Century BC, the Sophists were, as Russell (1979) tells us, dedicated to following an argument to wherever it may lead; which was often to scepticism (p.95). They were the first of the Greek philosophers to assert that complete knowledge was unattainable. They used dialectical reasoning and rhetoric as their philosophical tools, were prepared to charge for their services, and marked it as a point of honour to be able to argue multiple sides of the same issue with equal skill and force- prompting Pigliucci (2004), of New York State University, to observe this is how the Sophist became synonymous with intellectual dishonesty (p.1). Russell (1979), for his part, noted dryly that the Sophists appear to have been the first incarnation of the modern lawyer (p.95). Protagoras (490-421 BC) was the most renowned of the school, however, like Socrates, we know of Protagoras only through some of Plato's dialogues. His best-remembered tenet is that "Man is the measure of all things", meaning that truth is relative to the understanding of the person who holds it and there are, therefore, no universal truths (Pigliucci, 2004). This post-modern anticipation was ridiculed by Plato, who mocked the Sophists, partly because they were mercenary in that they charged students for their learning, and the public for their services, and partly because Plato believed that since truth and virtue must be intertwined, for the good of society and human development, the Sophists were amoral in the use of their talents. Further, of course, as a man of independent financial means himself, he had neither understanding nor sympathy for thinkers who had to charge for their work to survive. Thus, Plato judges doctrine by its social effects and values rather than by objective analysis; a "vice" which Russell says Plato cursed philosophy for the next millennium (1979, p.95). For all their faults, the Sophists must be credited with being among the earliest of thinkers to consider questions (and argue them) from multiple perspectives. What is lacking in their work is a consistent effort to arrive at a best argument as an approximation of truth rather than of victory.

This is where Socrates enters our story. He is celebrated as the original paragon of reflective and purposeful thinking. Indeed, an important teaching method is named for him: The Socratic dialogue or Socratic Method. It is defined in a modern sense as

purposeful questioning by a knowledgeable discussion leader who asks participants in the discussion to examine their beliefs and separate those which are supported by logic and evidence from those which are not (Foundation for Critical Thinking, 2004). The Oxford Companion to Philosophy defines it more simply and generally as "any philosophical or pedagogical method that disinterestedly pursues truth through analytical discussion (838). In either sense, a Socratic dialogue is a process of question and response between participants discussing a theme or question, and is generally considered to have been a staple of Socrates' instructive dialogues with young Athenians.

Thus, while we may argue that while we owe the modern idea of scepticism and dialectical reasoning to Protogoras and the Sophists, we owe Socrates a debt of gratitude for its refinement from a polemical tool to a guide for rationality.

Medieval Thinkers

Through the middle ages, critical thinking was applied mostly to the defence of Christianity- notably by Saint Thomas Aquinas who abandoned even the pretence of beginning from a neutral starting point and following the argument to wherever it may lead (Russell 1979, p.453). Aquinas instead began by declaring that he already knew the truth through his Catholic faith, and the object of reasoning is to 'prove' that faith. He did, however, also insist that arguments be based on evidence and that every argument should face "cross examination":

> such thinkers as Thomas Aquinas (**Summa Theologica**) who to ensure his thinking met the test of critical thought-always systematically stated, considered, and answered all criticisms of his ideas as a necessary stage in developing them. Aquinas heightened our awareness not only of the potential power of reasoning but also of the need for reasoning to be systematically cultivated and "cross-examined." Of course, Aquinas' thinking also illustrates that those who think critically do not always reject established beliefs, only those beliefs that lack reasonable foundations. (Foundation for Critical Thinking, para. 5).

The strangest alliance between Catholicism and critical thought existed in the province of the 'Schoolmen'- Franciscan philosophers like Roger Bacon and William of Occam.

It is strange, even ironic, because the founding principle of the Franciscan order is a life of poverty, preaching, and simple faith; a life that eschews needless education. Saint Francis believed education to be the enemy of humility, giving the student a pride and status that would make it difficult for him to do his 'real' work among the poor (Moorman, 1968, p.54). In his letter to St. Anthony, Francis says he is pleased that Anthony wants to teach theology to the friars, but makes it clear that he must "not extinguish the spirit of prayer and devotion" (St. Francis, "Letter to St. Anthony"). In Admonishment 7, Francis rails against those who "do not know how to follow the spirit of the divine letter, but only desire to know great words and to explain them to others". Despite Francis's disapproval, his followers played a key role in the founding of colleges at the University of Paris circa 1219, and Oxford in England circa 1225 (Hutton, pp.124-125; Moorman, 1968, p.134; Ward, Waller, Trent & Erskine, 1908.).

The least likely Franciscan was Roger Bacon (d.1292). A 13th century mathematician and scientist as well as a churchman, Bacon believed in experimentation and argued that there were four principal causes of ignorance, described thus by Bertrand Russell (1979): "First, the example of frail and unsuited authority…Second, the influence of custom. Third, the opinion of the unlearned crowd. Fourth, the concealment of one's ignorance in a display of apparent wisdom" (p. 456). Bacon was not well-respected in his own time; his own order regarded him with suspicion due to his alchemy experiments, which were associated with black magic (Russell, 1979, p.455). None the less, his devotion to inquiry and reason place him in philosophical succession to the ancient Greeks. His work pointed out flaws in Aristotelian science, not the least of which was that its conclusions were incompatible with observable facts of nature. While Roger Bacon (1268) did believe that conclusions could be reached through reason, he argued that experimentation and observation was also required:

> There are two ways of acquiring knowledge, one through reason, the other by experiment. Argument reaches a conclusion and compels us to admit it, but it neither makes us certain nor so annihilates doubt that the mind rests calm in the intuition of truth, unless it finds this certitude by way of experience. Thus many have arguments toward attainable facts, but because they have not experienced

them, they overlook them and neither avoid a harmful nor follow a beneficial course. Even if a man that has never seen fire, proves by good reasoning that fire burns, and devours and destroys things, nevertheless the mind of one hearing his arguments would never be convinced, nor would he avoid fire until he puts his hand or some combustible thing into it in order to prove by experiment what the argument taught. But after the fact of combustion is experienced, the mind is satisfied and lies calm in the certainty of truth. Hence argument is not enough, but experience is (para.2).

Thus Roger Bacon anticipated what would later be called "the scientific method" (Cantor, 1993. pp. 447, 534). The scientific method is, of course, a structure for critical thinking in which one observes, poses a hypothesis, tests it with experimentation and observations and then reaches a tentative conclusion.

William of Occam, also pondered critical thinking, insisting that the study of logic and the increase of human knowledge could be separated from "reference to metaphysics and theology" (Russell, 1979, p.465). Occam contemplated individual issues and phenomena rather than general concepts, and in this, like Roger Bacon, his work anticipates more modern investigations of nature (Cantor, 1993, p.534). Interestingly, the axiom for which he is best remembered, the idea that the simplest solution that fits the known and observable facts is probably the correct one (Occam's razor), does not appear explicitly in any of his works. It is, however, suggested by something he did write: "It is vain to do with more what can be done with fewer", which Russell interpreted as meaning that if something can be known without assumptions or hypotheses, there is no need to resort to them (1979. pp. 462-463).

Humanist, Renaissance and Enlightenment Thought

In the sixteenth century, René Descartes wrote *Rules for the Direction of the Mind*, in which he argued that a system of discipline is required to guide critical thinking (Foundation for critical thinking, para. 8). The system he developed was based on a commitment to doubt; it was, if you will, a return to the principle of scepticism. Other renaissance thinkers included Machiavelli- whose humanist/republican sensibilities were revealed in *The Discourses* and the *Art of War,* in which he describes the functioning of the ideal state as a republic which can defend itself by means of a

volunteer militia, and then apparently abandoned in his political advisory, *The Prince,* in which he offers advice for the effective maintenance of a tyranny. His philosophy revisited Plato to the extent that he recognized a dissonance between the real agendas and policies of government and the appearances which the rulers assume for the ruled (Foundation for Critical Thinking, 1997, para. 10).

In England, Thomas Hobbes and John Locke each examined society reaching very different conclusions. Hobbes argued in *The Leviathan* that man's natural inclination was towards discord; that without government to control men, life would be one of constant war and, "…which is worst of all, continual fear and danger of violent death; and the life of man solitary, poor, nasty, brutish and short" (p. 219).   Hobbes, in his lifetime (1588-1679), witnessed enormous bloodshed, revolution by the Puritans and the execution of a lawful King, all of which convinced him that only a strong ruler could ensure public safety (Russell, 1979, pp.533-535). Locke, on the other hand, argued that people are not naturally inclined towards any particular attitude but are shaped by experience and an understanding of that experience (Pigliucci, 2004). Locke's thinking on human nature and human rights became the intellectual basis for critical thinking about the obligations of government as well as the governed (Foundation for Critical Thinking, 1997, para.11).

Hobbes, Locke and other Renaissance thinkers embodied a notion of intellectual freedom hallmarked by a willingness to question established knowledge and accepted world views.

Sir Isaac Newton, Galileo, and Robert Boyle brought this critical habit of mind to the sciences, where it became the framework of organized thinking and experimenting which we call 'the scientific method" (Foundation for Critical Thinking, 1997 para. 12). In this paradigm, knowledge is acquired by experiment, observation, and reasoned examination of evidence.

The French enlightenment of the eighteenth century produced thinkers like Voltaire, Montesquieu, and Diderot, who all worked from the premise that the social world could be understood through reasoned thinking of the human mind and that all views are subject to the scrutiny of reason (Foundation for Critical Thinking, para.13).

The same elements of thinking were applied by Adam Smith to economics in *The Wealth of Nations* (p.243*).*

In pre-revolutionary America, Benjamin Franklin (1749/1931, p.11) argued that while the ideal education would teach students "everything that is useful, and everything that is ornamental", it is hardly possible to do so in the time available for education. "Art", said Franklin, "is long, and their [the students] time is short. It is therefore proposed that they learn those things that are likely to be *most useful* and *most ornamental*". Prominent on Franklin's list are the study of history, and the practice of debate, for the purpose of developing reasoning citizens:

> On historical occasions, questions of Right and Wrong, Justice and Injustice will naturally arise, and may be put to youth, which they may debate in conversation and in writing. When they ardently desire victory for the sake of the praise attending it, they will begin to feel the want and be sensible of the use of logic or the Art of Reasoning to discover truth and of arguing to defend it and convince adversaries"(pp. 22-23).

About the same time, Immanuel Kant (1781) insisted in *Critique of Pure Reason* that our senses interpret a universe that is only partly accessible to analysis through reason- that our senses filter down the universe to our level. Kant's arguments are organized in complex syllogisms, which even luminaries of philosophy find difficult to explain (Russell, 1979; Foundation for Critical Thinking, para.14; Rossi, 2005).

In the nineteenth century, we see critical thinking in Charles Darwin's works on biological evolution (*The Descent of Man)* and in Karl Marx's critique of capitalism, *Das Kapital* (Foundation for Critical Thinking, 1997, para.16).

By the turn of the twentieth century, sociology had become a discipline in its own right, and thinkers like William Graham Sumner (Folkways) examined the human inclination to uncritically accept the beliefs of one's society (a tendency he labelled 'ethnocentrism') and the concurrent tendency of schools to act as agents of this indoctrination (American Sociological Association, 2005, para. 5; Foundation for Critical Thinking, 1997, para.17; Russell, 1928, "Free Thought"). On the other hand, one should also recall that Sumner didn't necessarily argue that this was a character flaw. He saw it as part of the natural order, and contended that this tendency made

social economic reform an exercise in futility. His extreme form of laissez-faire economics has been aligned with Social Darwinism (American Sociological Association, para.7)- which, as Shermis (2004) explains, is a distortion of Darwin's theory of biological evolution misapplied to social theory to explain the alleged inferiority of some cultures in comparison to others.

Russell himself wrote often and precisely on the value of critical thinking arguing in 1928 that:

> William James used to preach the 'will to believe'. For my part, I should wish to teach preach the 'will to doubt'. None of our beliefs are quite true; all have at least a penumbra of vagueness and error. The methods of increasing the degree of truth in our beliefs are well known: they consist in hearing all sides, trying to ascertain all the relevant facts, controlling our own bias by discussion with people who have the opposite bias, and cultivating a readiness to discard any hypothesis which has proved inadequate (p.129).

The earliest social studies texts from Saskatchewan's school history are sketchy documents indeed, but one such text insists that Canadians need to be informed and capable of reasoned judgement to fulfil their duties as citizens (Arnold-Forster 1918). In the larger world, as the new century matured, theorists from Dewey and Russell in the first half of the 20th century, to Paul, Costa and many others today, have tirelessly reiterated the need to inculcate not just the process of critical thinking, but the habit of it in our students (Hare, 2001). Dewey (1910) declared "reflective" thinking was a fundamental skill, writing that:

> While it is not the business of education to prove every statement made, any more than to teach every possible item of information, it is its business to cultivate deep-seated and effective habits of discriminating tested beliefs from mere assertions, guesses, and opinions; to develop a lively, sincere, and open minded preference for conclusions that are properly grounded, and to ingrain into the individual's working habits methods of inquiry and reasoning appropriate to the various problems that present themselves (pp. 27-28).

In "Education and Discipline" (1935), Russell argued that one of the key attributes of civilization is "the habit of forming opinions on evidence" by its citizens. In fact, Russell had insisted as early as 1928 in "Free Thought and Propaganda" that:

> Our system of education turns young people out of the schools able to read, but for the most part unable to weigh evidence, or to form independent opinion. They are then assailed, throughout the rest of their lives, by statements designed to make them believe all sorts of absurd propositions such as that Blank's pills cure all ills and that Germans eat corpses. The art of propaganda, as practiced by modern politicians and governments, is derived from the art of advertisement (p. 136).

If this was a concern for Russell at the dawn of the age of radio, how much greater a concern should it be for us, nearly a century later as we face the concerted 'spin doctoring' of politicians and advertisers on traditional and emerging media? The internet alone provides an unprecedented medium for the informed as well as an unparalleled path for information assaults on the unwary and unthinking by the uninformed or the unscrupulous.

Critical Thinking and the Information Age

Russell lived to see the rise of radio and television; one wonders what he might have made of internet 'bloggers' and the sheer vastness and variety of the media assault we face today. It has become a cliché that ours is an age of information; however as clichés often do, this one contains more then a grain of truth. Today, state and private media interests alike are vastly more expansive and intrusive than those Russell despised. We sort through enormous quantities of text, images, and audio every day, and the rate at which change occurs across the social and working spectra seems to be accelerating. Business, government, citizens; all must cope with the flux of social and economic change generated by ever expanding globalization and ever advancing technologies. The most valuable worker in this 'brave new world' will be a craftsperson of the mind who brings more to the job than fundamental skills in the three R's. As Paul contended (1990), "These new kinds of workers, of course are not asked merely to 'use judgement and make decisions,' rather they are asked to use good judgment and make *well-thought-out* decisions" (p.3).

Western Canadian Curriculum designers clearly agree that critical and creative thinking is one of the key skills that educators have a duty to help students achieve (Alberta Learning 2003; British Columbia Ministry of Education 1996; Saskatchewan Education 1992). Moreover, research indicates that both asserts that critical thinking skills can be taught to young students and that they can make a quantitative improvement in demonstrated student skills (Costa, "Teaching for" 2001). Katherine Cotton's (1991) review of the literature- a study of 56 documents on the subject (including 22 studies) supports the notion that most of the strategies and teaching methods designed to increase student abilities in critical thinking have proven to have some utility (p.5).

If today's literature on critical thinking continues to suggest that its teaching is easier to anticipate than to achieve, it must be also acknowledged again that this should not be new to anyone. The same arguments arise time and time again through the 20th century. In its first decade, Dewey (1910) wrestled with the inadequacy of contemporary pedagogy:

> In some educational dogmas and practices, the very idea of training mind seems to be hopelessly confused with that of a drill which hardly touches the *mind* at all… This method reduces the 'training' of human beings to the level of animal training. Practical skill, modes of effective technique, can be intelligently, non-mechanically *used,* only when intelligence has played a part in their *acquisition* (52).

In 1942, the Yearbook for the National Council of Social Studies contended that teachers were paying lip-service to critical thinking, without actually defining the term or teaching its related skills in their classrooms (Case & Wright, 1997, p.179). Richard Phillips (1974) argued that thinking, while central to social studies classrooms, was often so fuzzily defined by teachers as to make it a null concept, contending that:

> There is a tendency, for example, to view thinking as a global process in which everything going on in one's head is of equal importance….whatever thinking teachers have been able to incorporate into their teaching has usually focused on the lower level processes such as memory, recognition, association, etc." (p. 49).

Phillips, echoing Dewey, contended that "reflective thinking differs from looser, lower forms of thinking largely by virtue of the fact that is it controlled by a purpose, namely, the solution of a problem" (p.51). Too many teachers, in his view, seemed to feel that critical thinking was something that students were unready for, but which would somehow magically manifest itself at some later time in the students' lives (p.51).

Today, university instructors complain that students arrive unprepared to do post secondary level thinking (Peirce, 1998; Adu-Febiri, 2002). According to some of them, students seem often not just unable, but unwilling to think critically (Barnett 2000; Hatton & Smith 1995; Keeley et al., 1995, p.1). "They expect", says Pat Rogers (quoted in Francis Adu-Febiri, 2002), "to be fed 'right' answers by experts who will tell them what to do and reward them for following the rules" (p.1).

So then, however much we (educators and employers alike) claim to value critical thinking in citizens, we still seem to have no end of trouble in teaching it (Peirce 1998; Tama, 1989; Paul, 1990; Cotton 1991).

Critical Thinking in Western Canadian Curricula

The analysis of all the ELA and Social Studies curricula and materials of Western Canada's provinces is well beyond the scope of this thesis. However, to understand the context and the general aims of today's program developers in terms of critical thinking, one can usefully look some curriculum examples from Alberta, British Columbia and Saskatchewan.

Alberta Learning (2003) sets a number of tasks for ELA programs. Their most basic aims are twofold: "to encourage, in students, an understanding and appreciation of the significance and artistry of literature" (p.1) and "to enable each student to understand and appreciate language and to use it confidently and competently for a variety of purposes, with a variety of audiences and in a variety of situations for communication, personal satisfaction and learning (p.1). Alberta Learning also asserts that the study of literature from around the world "promotes reflection" on cultural values and invites students to "grapple with the intricacies of the human condition" (p.1). Furthermore, by studying Canadian literature, "students are able to reflect on ideas and experiences of citizenship from Canadian perspectives" and "develop respect for cultural diversity and common values" while "developing their own creative and

cognitive abilities" (p.1). Critical thinking, the authors assert, is interrelated with language, learning and good citizenship (p.2). Note how very like Dewey this next passage sounds: "By becoming critical thinkers, students also become independent, successful and contributing members of society" (p.2). The more specific learning objectives of Alberta's ELA programs are contained in a list of desired "General Outcomes" (Alberta Learning 2003) that include, among others, expectations that these programs will:

- Encourage student meta-cognition, student self assessment, and student collaboration and teamwork.

- Emphasize the importance of context, including studying purpose, audience and situation, in the creation and comprehension of texts (pp.5-6).

To help teachers meet these objectives, Alberta Learning provides resources that include a twenty page guide entitled *Responding to Text and Context.* This excerpt is available in Adobe Acrobat format online. It explains concepts like meta-cognition and guides teachers through activities and assignments that help students analyze texts, and think about their responses to them.

The British Columbia curriculum for ELA 11 and 12 is also available online as either a web document or as a downloadable Adobe Acrobat file. Some 215 pages long, it outlines objectives and suggests practice for classroom teachers. The common objectives for ELA programs cited in B.C. Curricula include the development of literary understanding and declarative knowledge, and, of course, of critical thinking skills (British Columbia Education, 2003). These guides list the required learning objectives and outline teaching strategies to help achieve them. For example, the Grade XI guide lists the following as required outcomes:

It is expected that students will: [italics theirs]

- analyse the merits of print and electronic communications in relation to given criteria

- analyse communications to identify weak argumentation

- describe ethical issues associated with mass media and electronic communications, including privacy and freedom of information

- analyse the relationship between the medium and the message

- demonstrate an appreciation of how their experiences and their membership in communities influence their interpretations of what they read, view, and hear

- compare and analyse different presentations of the same ideas and issues

Given this in their classroom instruction, British Columbia's students are expected to be able to reach "reasoned conclusions from information found in various written, spoken, or visual communications and defend their conclusions rationally".

Saskatchewan Learning (1988) defines critical thinking as crucial both in terms of meta-cognitive and citizenship development:

The importance of having students develop good critical and creative thinking abilities has to do with the foundations needed for a democracy and with the tools needed for independent and life-long learning… Students also need to develop these thinking abilities in order to move their learning beyond memorization or passive acceptance, to understanding and the commitment to persevere until clarity and insight are achieved. Without a commitment to critical and creative thinking the values of rationality, truth and justice achieve little substance in the classroom (Understanding the Common Essential Learnings, p.29).

Saskatchewan Learning publishes, both in hard copy and in electronic form online, curriculum guides (and companion activity guides), as well as numerous resources designed to help teachers in their classrooms immediately and in their professional development over the longer term. For teachers struggling to teach critical literacy and thinking skills, there is a guide to the Common Essential Learnings that offers suggestions on classroom practice (Saskatchewan Learning, 1988). Saskatchewan curricula, like those of Alberta and British Columbia, also suggest strategies and models for critical analysis of issues and ideas, e.g., the dialectical essay (Saskatchewan Learning, Social Studies 20).

Given this wealth of material, it is clear that if we are not teaching students to think and read critically, it is clearly not due to lack of effort on the part of curriculum and resource developers. Yet, it is argued, that we *are* failing. Why? What obstacles

are so persistent and pernicious that generations of dedicated thinkers and educators have been unable to overcome them? As it turns out, there are many.

Obstacles to Teaching Critical Thinking

A significant body of research indicates that the primary obstacle to critical thinking and critical literacy is resistance to the process by students, teachers and others in and outside the education system (Janas, 1998; Keeley et al., 1995; Moore & Ashe, 2002). Resistance takes a number of forms- ranging from simple resistance to the effort involved in the work of critical thinking, to intensely personal reactive resistance to a particular idea or topic. The latter, of course, is more difficult to overcome. This visceral sort of resistance can be the result of cultural hostility to the process (as in a classroom) or the subject (as when examining controversial issues from perspectives that conflict with personal beliefs and values). It is often wrapped up in the resistor's sense of self and identity- an identity created outside the classroom, but which may be shared within it (Gee 1990, Peirce 1998; Paul & Elder 2004; Carroll, 2004). It may have roots in the cognitive difficulty of the task and the relative inexperience of students in attempting it (Peirce, 1998, p.7; Sandwell, 2003). Certainly if teachers are not skilled critical readers and thinkers, it is hard for them to either model the behaviour or judge the quality of their students' critical thinking and responses (Paul, 1995, pp. 170-181).

Cultural Resistance

Students may actively resist critical thinking that challenges their long held beliefs or cultural values (Gee, n.d.; Gee, 1990; Fedje, 1991; Kagan, 1992). All of us, including students, bring an identity to the classroom; one which has largely been constructed outside of the school, but which probably reflects the predominant attitudes and values of their community (Gee, 1990). These attitudes and values are not consciously learned; they are part of the cultural fabric of the student's life and have been absorbed rather than consciously learned. In some respects they constitute a person's worldview and as Robert Carroll (2004) notes:

> We each have a set of basic values and beliefs about the world. These values and beliefs are filters though which we perceive the world and interpret experience. A person's values may affect not only how much importance she gives to facts,

but also what she takes to be the facts. Moral and religious beliefs are part of a person's worldview and they often clash with the views of others (pp. 8-9). Paul and Elder (2004) describe these beliefs as "activated ignorance", while Tim van Gelder (2004) labels the tendency to hold them regardless of emerging contrary evidence, acts of belief preservation (p.5). These misconceptions, are often profoundly seated, and are acted upon by their believers as if they were true, becoming so ingrained in the thinker's belief system as to be nearly impossible to challenge.

Moreover, even if students are capable and willing to engage in critical thinking, the classroom culture may not encourage them to participate visibly. Some research shows gender differences that may inhibit active participation by girls from Kindergarten through post secondary education (Sadker, quoted in The Teaching Resource Center's "Teaching a diverse Student Body" (Brock, Boyd & Moore, 2003, pp.450-452). There is some evidence as well that the sort of adversarial dialogue common to critical discussion is also uncomfortable for female students who prefer consensus making oriented talk (Peirce, 1998, p.18, Brock et al, p. 452). This does not imply reluctance by women to think critically, but rather a preference for alternative methods of approaching the task. A dialogue that seeks consensus is no less a critical thinking tool than a debate.

Students may also, when discussing contentious or controversial issues or texts, resist critical thinking out of discomfort with the subject- or with its implications about their own privileged position in the world. Abigail Foss (2002) discovered that many of her mainstream Grade 8 students were quiet in discussion of a text on "white privilege", while others were angry. As she recalls it, "their silence may have emanated from their discomfort with discussing these issues or because they didn't know what to say" while "other students dismissed Cliff's indictment of white privilege by naming her comments as 'reverse racism'" (p. 398). Thus, the culture of the classroom is a factor that can intimidate students and teachers into soft pedalling or even avoid some issues altogether (Comber & Kamber, 1997, p. 2). Unfortunately, discomfort often goes with the territory in critical thinking. Dissonance between familiar identity and new evidence is at the heart of critical literacy and critical thinking (Gee, 2001). It is impossible to make the process comfortable for the students without diminishing its value; it is often an

inherently political activity. The critical examination of any text –including those written from within the dominant culture- must involve an active attempt to read it from multiple viewpoints. This almost inevitably leads to an examination of the notions of power and equity implicit in the text- often in ways that may be hostile to, and are almost certainly outside of the mainstream discourse (Comber & Kamber, 1997, p.2; Cadiero-Kaplan, 2002, pp. 377-78). Thus cultural resistance in the student, as in the adult, springs from ingrained values that are bound intrinsically into their enculturated worldviews (Peirce 1998). Critical thinking is born, not of consonance, but of dissonance.

Student Resistance

Students may often resist critical thinking assignments for much more prosaic reasons than ingrained or learned bias. The most pragmatic of these is a simple assessment of the task as being too much work compared to the usually assumed teacher/student contract in the school. Critical thinking is hard work- although, as Van Gelder points out (2004), while "…it can seem quite basic, it [critical thinking] is actually a complicated process, and most people are just not very good at it (p.2). Furthermore, students, even at the high school level, may already have years of experience with a pedagogy that rewards note taking and good recall of facts (Peirce 1998, p.4; Sandwell, 2003, p.170; Adi-Febiri, 2002, p.1). They may feel that demanding critical thinking is unfair; that is, that it somehow breaks their pedagogical accord with the system that rewards them for being efficient fact memorizers (Barnett 2000; Adu-Febiri, 2002). As Keeler and Shemberg (1995) point out while comparing problems in psychotherapy to problems in teaching, resistance to change is human nature, and students may feel that it isn't worth the extra effort, even though they recognize that they will benefit from the work (p.2). This learning 'inertia' is, according to some research, endemic. The 1996 NEAP report on reading and writing in the United states (as cited in Peirce, 1998, p.3) showed that only 6 % of American high school graduates arrive at college "ready to learn independently from their textbooks" and the number of Grade XII students (of approximately 11,500 in the study) who write at the highest level of appraisal used is so small it "rounded to zero percent". In

27

America, it seems, students get little practice or instruction in critical thinking, reading and writing before the post secondary level (Paul, 1995, p.170).

This begs the question: How different is it in our system?   Canadian schools do appear to do somewhat better. In nationwide writing tests of middle years and high school aged students, nearly 60% of Canadian students age 13, and 72 % of 16 year olds demonstrated some level of critical thinking in their writing reaching "Code C", the highest assessment in the study (Council of Ministers of Education, Canada, 2002). While our students fared significantly better than those of the USA, this is hardly cause for celebration because the criteria used to judge student work were not overly stringent. The highest level, "Code C", is defined (p.82) as writing that:

- Provides some evidence of judgement.

- Demonstrates critical thought.

- Reaches judgement by considering aesthetic features.

The most common of these attributes- in both age groups- was the first; the least common was the last. The older students demonstrated critical thinking somewhat more frequently. This is a reasonable standard for evaluating writing in a study that does not specifically test for critical thinking and literacy, but it is hardly a ringing endorsement for Canadian education. The experience of Professor Adu-Febiri at the University of Victoria is, unfortunately, not uncommon. Professors across the nation probably would agree that they see students arrive at universities with little experience in more demanding academic work and thinking.

Teacher Resistance

Teachers may resist teaching critical thinking for a variety of reasons. Like students, they bring a strongly enculturated identity to the classroom, and may have equal difficulty in thinking critically about contentious issues. In addition however, teachers may resist critical thinking and literacy and other advanced teaching methods because it is simply not part of their pedagogy (Kagan, 1992). Indeed, some research indicates that teachers choose a teaching style even before they enter colleges of education, and leave with it still largely intact (Moore & Ash, 2002; Hatton and Smith, 1995; Kagan, 1992, Kennedy, 1991).

Sometimes teachers resist change because of previous experience with 'innovations' that were ineffective or poorly implemented (Janas, 1998, p.1). They may feel that innovation is something that is 'done to' rather than with them. For teachers like these, some concepts may seem too radical or threatening to implement. However, since critical thinking and debate has been a documented objective of educators and curricula developers since 1912, it is difficult to see how teachers might reject it as uncertain or radical (Hess, 2004). Indeed, as the literature has shown, encouraging a critical faculty in students has been paramount at least since Socrates first annoyed the city fathers of Athens.

Some research has also found that teachers working with students from disadvantaged backgrounds may also choose lower level critical thinking exercises and structures for these pupils (Torff & Sessions, 2006).

> Six issues were associated with a pedagogical-preference effect in which teachers favored low-CT activities over high-CT ones for low-advantage learners. Among these issues were learners' level of prior knowledge (.15), time constraints (.13), influence of parents (.08), influence of colleagues (.08), learners' level of motivation (.07) and learners' level of ability (.04)(p.5).

Torff and Sessions also note that more expert teachers are more likely to choose "high CT" activities than are less experienced teachers. They further observe that teachers may resist using critical thinking structures and activities because they believe that too much time is required to do so, and that the curricula and time constraints within which they must work will not allow them the luxury of that time (pp.2, 5).

Other research agrees that teacher inexperience is an obstacle to teaching critical thinking. Teachers may also have difficulty using advanced methods if they lack experience in the teaching area. As James Gee (n.d.) notes, one cannot "critique one discourse with another (which is the only way to seriously criticize and thus change a discourse) unless one has meta-level knowledge in both discourses" (p.5). In other words, teachers must not only have declarative knowledge of multiple perspectives in a text, but an understanding of the critical lens that is used to arrive at each perspective. This is especially difficult for beginning teachers, and is a trial as well as those who are teaching outside of their areas of expertise (Mis-assignment of teachers,1986). And

this, of course, (particularly in rural areas) is familiar to teachers' experiences in Saskatchewan. Beginning teachers as well may have enough trouble adapting to the realities of teaching- e.g., classroom management, demands of the curricula, limited instructional time- that they react by abandoning 'difficult' pedagogies and adopt strategies that maximize classroom control and content coverage (Kagan, 1992, pp.141,142). There is, moreover, evidence that suggests that some teachers (or many, as Richard Paul (1995) asserted was the case for the USA) are unable to think critically themselves and may be not be able to recognize good critical thinking in student writing. Worse still, teachers may actually misidentify both sorts of writing, identifying weak reasoning as strong and strong reasoning as weak (Paul, 1995, pp. 170-192.). If teachers are inept critical readers and thinkers themselves- how can they produce students who are capable critical thinkers?

Less common, but no less damaging to student development, is simple inertia, or at its worst, professional laziness. It appears that it not just our students who must battle some form of personal inertia! According to Mary Kennedy (1991, p.171), some teachers simply take the path of least resistance and avoid controversy or difficult pedagogy and teach for "content rather than understanding…leading to a vicious circle of mediocre practice modelled after mediocre practice, of trivialized knowledge begetting more trivialized knowledge".

Systemic Obstacles

The school does not function in a vacuum; the cultural milieu of the larger community shapes the smaller culture within the school as surely as wind sculpts snow. Thus affected, the school climate may confound efforts to bring change to the instructional model- especially when that change challenges the status quo. A prevailing climate of hostility, as Comber & Kamber (1997) tell us, can make critical literacy instruction- a prime area for critical thinking- risky for teachers (p.2). Furthermore, there is also inertia in all social structures. Even a school climate that is not overtly hostile must still overcome this natural social drag before new pedagogy is accepted. Systems typically have norms that 'discourage "risk taking" or "experimentation" (Comber & Kamber, 1997). There can also be a widespread resistance to pedagogical

change by people at all levels of the system; it can be perceived as change for the sake of change, or as a passing trend. As Dewey noted in 1920

> Whenever we have in mind the discussion of a new movement in education, it is especially necessary to take the broader, or social, view. Otherwise, changes in the school institution and tradition will be looked at as the arbitrary inventions of particular teachers; at the worst transitory fads, and at the best merely improvements in certain details—and this is the plane upon which it is too customary to consider school changes.

Schools, like people, resist change, and the change that does occur, is generally forced upon the system (according to Dewey) by changes in the larger world outside the school (1920, p.4).

Teachers also face a diagnosis dilemma. Students who demonstrate the ability to use critical thinking may not be inclined to apply their skills outside of the classroom. Thus, it can be difficult to know whether a student performs poorly on critical thinking tasks because of a lack of ability or a lack of motivation (Giancarlo, Blohm & Urdan, 2004). We can measure the skill with which a student applies reason to a problem, but it is much more difficult to measure the student's inclination to it. As Giancarlo et al (2004) noted: "traditional assessment of students has centered almost exclusively on CT skills, and has excluded CT dispositions until very recently" (p.348). The authors report on progress made in developing an instrument to measure the disposition of secondary students toward critical thinking: That is, the California Measure of Mental Motivation (CM3). They detail the results of four large studies that tested and refined the CM3 test and concluded that the instrument can be used –though further research and investigation is needed to continue refining it- to identify to student inclination to critical thinking in a way that separates disposition testing from skill testing (p.360). Tools like the CM3 may allow teachers to tailor their instruction more effectively by better identifying the causes of low performance on critical thinking assignments. The data indicate that critical thinking skills can be taught with some degree of success using a variety of different methods (Cotton,1991, van Gelder, 2004).

Curriculum Problems

Teachers, administrators and students are also constrained by educational directives and curricula requirements. When classes are based on over-crowded curricula, teachers may be left with too few instructional hours to do more than 'hit the high points' or race through the program in an attempt to teach for coverage- leading to a less constructivist and more transmissional style of instruction (Cotton, 1991). For example, a High School Needs assessment report in Alberta concluded that the social studies curriculum for grades X-XII had "too much content for teachers and students to cover" (Alberta Learning, 2002, p.3).

Standardized Testing

While standardized, high stakes testing is less common in Canada than the United States, it is becoming more prevalent and can be firmly linked with increasing pressure on schools and teachers to demonstrate accountability (Barlow and Robertson 1994, pp.116-120). There are numerous problems with standardized testing that directly impact on the decisions teachers will make in their teaching. After all, if a teacher's career depends on comparative performance between her classes and those of other schools, she might be wise to 'teach to the test'. According to the Ontario Secondary Teachers Federation (2004), this is exactly what happens. 67% of teachers there reported 'teaching to the test' at the expense of the big picture in the curriculum. W. James Popham (1999) agreed that standardized testing doesn't work well as a tool for evaluating school quality or student achievement. Furthermore, he argued that the tests are often mismatched with teaching in attempting to produce a "one size fits all test" (p.10). When teachers have to tailor instruction and activities to prepare students for an exam, it seems inevitable that classroom activities will be content rather than student centered.

Class Size

Another factor over which administrators little control and teachers none is class size. The research on this is generally centered on elementary grades. While consensus has been hard to come to, at least one demonstration project (in Tennessee, USA) has shown that reducing class size can be effective (Illig, 1996). A study by the OECD is less certain, but there is a general consensus that while no significant benefit is gained

until classes have fifteen or fewer students, teaching and learning effectiveness does suffer when numbers rise above 30 (Sokolofski, 2003, p.2). Classes that exceed that number are not uncommon in Saskatchewan. There has been little done on the effects of class size in secondary schools, but in my experience, once classes go beyond thirty students all constructivist approaches become more difficult to implement and supervise. As one of my colleagues at Kindersley Composite School put it, "once you get more than 25 high school kids in a class, you aren't teaching- you're lion taming."

Thus the literature tells us that while critical thinking has been a key objective in education for as long as there has been formal schooling, it has never been easy to achieve- predicated as it is upon a willingness to challenge the status quo, and built, as it is, upon a bed-rock of laborious thought. However, the promise it offers in education for citizenship and for a fulfilling life, remains as compelling and as elusive today as it was for John Dewey early in the 20th century. Furthermore, there is evidence that thinking skills can be taught; a body of work describing what might be called "best practices" in critical thinking instruction is emerging, and some of the research suggests that critical thinking can be taught with some degree of success (Halpern,1993; Cotton, 1991; van Gelder, 2004).

Still, most of the research I've reviewed describes the knowledge, attitudes of educators and researchers at the post secondary level about student learning and abilities in K-12 and at university. Very little research seems to speak to the attitudes and reflections of students themselves. How do students think and feel about their own thinking?

Student Self-Assessment

Research dating back to the late 1970s and early 1980s (Halpern, 1993) suggests that despite the obstacles to critical thinking, it can be taught with a fair degree of success, and that students who complete such a course will generally report that they made gains in their thinking skills. However, other research also indicates that students may not be the best judges of their abilities in various activities- that their self-assessment is more often linked to self-esteem than to reality (Baumeister, Cambell, Krueger & Vohs, 2005). In "Exploding the Self-Esteem Myth", Baumeister et al contend that while student self-esteem is related to how they see themselves as task

performers, it generally is less well related to their actual performance; those with high self esteem tended to overestimate their capabilities. Their research questions the effectiveness of boosting self esteem as a means of increasing performance. They present data suggesting that it may in fact lower performance. For our purposes, their research is interesting because it suggests that we may not see a positive correlation between our student volunteers' self-assessment and their performance on the critical thinking task they will have before them.

Since the early 1900s, and Dewey's seminal work, *How We Think*, an evolving body of research has clearly indicated that thinking skills (and, as Dewey and Russell would asserted, the habit of using them) are essential and should be inculcated in students from fairly early on. (Shermis, 1999; Russell 1995; Cotton,1991).   Since the 1960s, the research has largely confirmed that these skills can and should be directly taught in schools (Paul, 1995; Case, 1997; Beyer, 2001). By the early 1980s, more studies indicated that no matter how much educators expressly valued the idea of critical or reflective thinking, it was often neglected in day to day classrooms (Kennedy 1991; Hay, 2001; Martin & Michelli, 2001; Beyer, 2001).[1] As Hay recounts (2001):

> In 1984, noted educator John Goodlad and his researchers found that although teachers across the United States recognized the importance of higher level thinking skills, when they assessed students, they tested for recall of information about 75 percent of the time (p.9).

Why this dissonance between what teachers think they do, and what actually occurs in their classrooms?   Perhaps it is because these teachers had never been taught how to teach critical thinking skills themselves. Recalls Hay (2001):

> During my undergraduate preparation for teaching in the 1960s, I do not remember any instruction in how to teach higher level thinking skills… it was much later in my teaching career that teaching higher level thinking skills suddenly became the 'hot' topic of education conferences and workshops. Overnight, I was expected to be overtly instructing my students in evaluating

---

[1]Interestingly, the research here is ambiguous; while sources agree that critical thinking skills were not explicitly taught in teacher education or by teachers in classrooms in the 1960s, some of the sources (Martin & Michelli, 2001) also contend that the state tests of the era tested thinking skills more than the largely recall based exam models of the following decades. Thus, although the skills weren't taught, they were expected to have been learned!

evidence, making inferences, synthesizing information and applying other

critical thinking skills (p.7).

Keeley & Shemberg (1995) agreed that there was little evidence that many teachers were successful in teaching critical thinking in their classrooms. As well, educators also wondered whether students were being prepared properly for a world that seemed to require more than a high school diploma and memorization skills (Hays, 2001; Paul, 1995). At the same time, while practicing teachers may not have been particularly adept at infusing critical thinking into their classrooms, authorities above them insisted on it. In the last third of the twentieth century, as the pendulum of educational theory swung vigorously back to the platform on which Dewey stood a century previous, departments and their experts began to expect students to develop critical thinking skills, and in some cases, began actively testing for them (Martin & Michelli, 2001). Now, given that research on classroom practice suggested even then that critical thinking was neither habitually nor well taught, it should likely have been no surprise to anyone that these tests were a disappointment. When the California Department of Education set out, in the late 1980s, to see how effectively students had been taught to use reason in their writing, the answer was plain-not all that well. However, the real surprise was that neither the department, nor the teachers in California demonstrated excellence in critical thinking either. Indeed, experts in the field immediately criticized the exercise as deeply flawed. Paul, for one, called it "a fiasco", noting that the student work presented as an example of rigorous critical thinking largely lacked it (Paul, "Why students and teachers",1992, p.170). Moreover, while the study showed that students reasoned weakly, further research showed that their teachers were not much more adept. As a response to the CAP study, Richard Paul's (1992) subsequent research attempted to evaluate how well practicing teachers evaluated student reasoning with striking results (170). His study showed that experienced teachers (from various disciplines and ranging from elementary to the high school levels) were often even unable to correctly distinguish sound reasoning from flawed. Paul asked teachers to evaluate two essays using CAP evaluation criteria. The first of these was the original and poorly reasoned sample given as an example of excellence in the California State assessment. The second, written by a member of the Critical Thinking foundation staff, exemplified the

skills called for in the California assessment protocol. If California teachers were capable critical thinkers and readers, he reasoned, logic would suggest that they would score the second essay higher on the 8 point rubric. In fact, many not only failed to correctly distinguish between good and bad reasoning, but actually got it backwards-identifying poor reasoning as good, and vice versa (Paul, 1995, pp.176-183). The average score awarded the poorly reasoned essay was 5.4 out of 8; for the Foundation's exemplar, 3.9. The fascinating inference one might draw here is that California teachers, just as earlier research indicated, had been ill prepared for teaching and evaluating critical thinking. If that is the case, then discovering that their students missed the mark as well must be no surprise. R. Nickerson argued that it isn't any more reasonable to expect people to teach thinking without background training that it would be for teachers of sciences or math (cited in Martin & Michelli, 2002).

As educators across North America took notice of this and other research, critical thinking moved to center stage, new curricula and teacher texts began to emphasize its importance (Saskatchewan Education, 1988, p.9; Brandt, 2002; Foreword; Martin & Michelli, 2001). The Secondary Social Studies Curricula in Saskatchewan, revised 1994, made the teaching of critical thinking skills a key element of Social Studies which they labelled a "common essential learning" (Saskatchewan Learning, Social Studies 20, p.5). Teacher advisory texts such as *Understanding the Common Essential Learnings,* quoted Richard Paul and adapted some of his ideas to instructional design. Social Studies curricula defined it with reasonable clarity, and provided new instructional instruments, such as the dialectical essay, as structures for comparative thought (Saskatchewan Education. Social Studies 20). And as Martin & Michelli (2001) observed, teacher education programs (such as Montclair State University's education program) ingrained critical thinking skills into their curricula as well. Despite this renewed emphasis from the late 1980s to the present, the most recent available literature at the time of this writing suggests that not much progress has been made in the intervening years. Professor Francis Adu-Febiri notes that:

> Thinking, that is, the ability to reason systematically with logic and evidence is a valuable human attribute. Thinking is learned and can help people become original, creative, and innovative problem-solvers. However, many educational

systems do not systematically develop thinking skills in students. In my own education up to the bachelor's level, nobody consciously or systematically taught me how to think. Consequently, I have made it a principle of my teaching to introduce thinking skills to my students through my course organisation and delivery (2002).

Adu-Febiri contends that many of his own students are both unskilled in critical thinking, and resistant to its processes in his classes- preferring, in fact, the kind of lecture/notes/ independent study model with which they are already familiar (2002). More disturbing is research that suggests teacher candidates may arrive at teachers' colleges already committed to a teaching style- and leave with that conviction largely unchanged regardless of curriculum and practices of their college program (Moore & Ash, 2002; Hatton & Smith, 1995; Kagan, 1992, Kennedy, 1991).

This background of research gives us a good picture of how experts, academics, and researchers see student thinking, describes the obstacles to it, and the failures in it quite well. However, it does not tell us much about how these students perceived themselves as critical thinkers, how they understood the processes involved, or what they thought about how they had been taught critical thinking. This then, became the focus of my thesis, and the basis of my research questions.

Summary

This chapter has discussed the literature reviewed for this thesis and argues that both the need for, and the benefits of, teaching critical thinking to students during their years of formal education have been established and accepted by educators since the time of the ancient Greeks. This chapter provided both an historical overview and a discussion of the history of critical thinking education and the obstacles that have been found to impair its teaching. The chapter contends that while that goal has always been paramount, in recent years considerable concern has been raised about how well it is actually pursued in K-12 educational systems. The chapter concludes by noting that little has been written about how students view their critical thinking education and abilities, and suggests that the research in this thesis is aimed at addressing that question.

CHAPTER THREE

METHODOLOGY

This thesis asks, "What do pre-service teachers think about critical thinking, the teaching of critical thinking in K-12 education, and themselves as critical thinkers?" To find out, I first developed a literature review that describes the history of the idea of critical thinking, and its currency in classrooms of the 20th century and today. I then interviewed nine students (and one long service teacher) in an effort to capture a snapshot of what they believed about critical thinking and their experiences with it. The semi-structured interviews illuminated four basic research questions: How do the subjects define critical thinking?; What are the obstacles to critical thinking?; Can critical thinking be taught?; and, Did your K-12 education prepare you for the demands of university level thinking?

Research Project

My research premise was that while we knew a lot about what post secondary educators and administrators think about critical thinking and student mastery of it, we know little of what students themselves think and know. I decided to simply talk to students about critical thinking and their experiences with it in their educations thus far. I chose this qualitative methodology for two reasons. First, I felt it would yield rich data both in response to both my initial list of research questions, and through the more open ended discussions that would follow. Thus, I opted for the interview format, and a broader range of questions and discussion, reasoning that the students might well initiate lines of discussion I may not have considered designing into a quantitative instrument.

I limited the research to pre-service teachers of two categories: First, students who had not yet done their extended practicum and second, students who had completed both the practicum and their final semester at the College of Education. To gain further insight, I also sought an interview with one of the most experienced teachers in the Saskatoon area. I hoped to meaningfully compare and contrast the understandings and opinions of the interview subjects with the themes I had already uncovered in my preliminary literature review.

Instrument Design

 I developed an interview procedure that ensured that all participants were contacted well in advance, and given a full explanation of the nature of my research, the design, structure, and location of the interviews, and their volunteer status. I ensured that they were aware that they could 'opt out' of the process at any time. Each of the participants acknowledged their understanding by signing the relevant release form. All but one of the interviews were conducted at an agreed upon date and time in the Social Studies Laboratory, in the College of Education, at the University of Saskatchewan. One interview was conducted in the classroom of one of the participants, at his request. Each of the volunteers chose a pseudonym that I would use as their identifier in all references to them in my thesis. All of the interviews were audio-taped, and the resulting data were stored securely in my office at the University of Saskatchewan and later at my home address in Saskatoon, and finally in the office of my thesis supervisor, Dr. Richard Julien. Upon the completion and publication of this thesis, all participant information will be destroyed. The transcripts, with participants identified by pseudonym alone, will be archived.

Procedure and Analysis

 The research data are qualitative, and I have analyzed them through a comparison process. Each interview followed the same general pattern. I began with a list of initial questions that asked the subjects to define critical thinking, describe their first experiences with critical thinking and recount where and how they began to become critical thinkers themselves. I attempted to use a spiral questioning technique in which I revisited basic questions throughout the interview in order to expand, qualify or clarify each participant's opinions. In step one of the analysis, I transcribed each interview verbatim. I emailed the participants a copy of the transcript of their interviews and invited their responses and reminded them that they could re-visit any of their answers, add further responses to any of my questions, or choose to withdraw from the project. (These transcripts are available in full upon request.) I took the responses I received and made the few changes that were requested by the participants. Secondly, I created a Microsoft Word template listing each of the major research questions under its own heading. I then developed a colour coding system with which to categorize

responses from the participants according to their relevance to each of the questions. The following questions formed the basis for this shared template:

1. How would you define 'good' or 'deep' or 'critical' thinking?
2. Can critical thinking be taught?
3. Did your K-12 education prepare you for the kind of thinking required at university?
4. What are some of the obstacles to critical thinking in the classroom?

I then re-read each transcript, using Word's tool bar to assign text colours to participant responses accordingly. Following that, I copied the coloured responses onto a separate research question template for each participant. The next step was to identify in the transcripts the common themes that addressed my two basic research questions: First, what were the participants' understandings of the critical thinking process, and how did their understandings compare to the presumptions of the academics about student thinking that I found in the literature review? Second, what obstacles did the participants see to critical thinking in general and in the school system and how do these understandings compare with what I found in the literature?

In the last stage of my analysis, I compared these common themes to the literature in a way that illuminates the participants' experiences and suggests some future questions that should be addressed. I created a single larger template in which each of the relevant participant responses was compared in the context of each research question. This, combined with my reflections on the questions and responses, became the basis for Chapter Four of this thesis.

The process of creating these templates also revealed what gaps and weaknesses existed between interviews; where possible I contacted participants by email, and provided them the interpretations of their interviews (their templated interview responses with my interpretation of their intended meaning and additional commentary) and offered them the opportunity to make suggestions and correct any misinterpretation I may have made. Only one participant (Phil) offered further suggestions and comments; I revised the interpretation until he agreed that it was a fair and accurate interpretation of his position on each question.

CHAPTER FOUR

THE PARTICIPANTS AND INTERVIEW DISCUSSION AND COMPARISONS

Introductory Comments

While it is clearly impossible to draw firm conclusions about critical thinking and pre-service teachers from this small sample of interviews (11 in total), it is interesting to note the differences and commonalities in responses to some of the key questions derived from the interviews. These are illuminating, and illustrative of the variances and vagaries of K-12 and post-secondary education. The students' backgrounds varied from urban to rural; from small K-12 school to large metropolitan K-12 multi-school progression; and their ages varied as well- from early twenties to mid-forties. One of the students had attended K-12 in Alberta, while another had attended elementary school up to age 11 outside of Canada. I also interviewed a long service teacher approaching retirement, whose K-12 experience was obtained in Ontario some forty years previous.

Each of the participants is identified in the following biographies and the body of this thesis only by the pseudonym he or she chose.

The Participants

"Craig"

Craig grew up in Alberta and attended K-12 in small urban centers there.

When I interviewed him he had a BA in History (honours) and was finishing his first year in the College of Education. He was preparing for his internship in the fall of 2006.

"Ms. M"

Ms. M. grew up in Saskatchewan. She graduated from high school in a smaller urban center in Saskatchewan in 2003, and began University of Saskatchewan in the College of Arts and Sciences with an eye towards Dentistry. She changed course in the first year and aimed for a degree in Education and a teaching specialty in the Humanities. At the

time of the interview she had now completed her first year in the College of Education and was preparing for her internship in the fall of 2006.

"Mary"

Mary was raised in a rural setting and attended a small school with about 170 students. There were 17 pupils in her graduating class. After graduating, she did a three year degree in History. At the time of the interviews she was finishing her first year in the Education program. She interned in the fall of 2006 graduated with a B.Ed in 2007.

"Jim"

Jim was born overseas, and moved to Saskatoon with his family at age 11. He did grade 6 to grade 12 in Saskatoon, graduating in 1994. He then attended the University of Saskatchewan and earned a degree in medical microbiology. He was very successful financially and in terms of corporate success, but less happy with his work as time went on. He eventually decided to return to university to earn a B.Ed. Despite his professional qualifications and his degree in microbiology, his advisors in the College of Education would not allow him to enter the secondary chemistry or biology stream and he found himself placed in the elementary teacher stream. He felt however, that the elementary training program prepared him to be a very good general teacher.

He has been very successful in his undergraduate education program. He has completed his internship and his final term of classes.

"Rick"

Rick grew up in a Saskatchewan city and attended first an elementary school K-8 and then a high school from 9-12 graduating in 1999. He is a pre-service teacher who has finished his first year in the College of Education. He attempted his internship in the fall of 2006, but did not complete it. At our last contact, he did not indicate any intention to attempt it again. He has a degree in History and most of a degree in Biology. His teaching areas are History/Social Studies and Art. His tertiary area is English.

"Mary"

Mary grew up in a rural setting of Saskatchewan and attended K-12 in a small school with about 170 students. There were 17 pupils in her graduating class. After graduating, she did a three year degree in History. At the time of the interview she was

finishing her first year in the Education program. She interned in the fall and graduated with a B.Ed in 2007.

"Phil"

Phil graduated from a rural Saskatchewan High School in 1990. He characterized himself as a good student though, one who "didn't have to work very hard to get good marks". He completed a music degree in 2001. In the fall of 2004 he started preparing for an education degree and has completed his first year in the College of Education. He interned in the fall of 2006. His teaching areas are music and science.

"Diane"

Diane grew up a small rural town in Saskatchewan and did her K-12 education there. She entered the College of Education in the direct entry program 1996 in the secondary stream. After a year she decided to take a break and finish her B.A in English. After its completion she taught kindergarten and elementary students English overseas; this convinced her that she did want to be a teacher- but not at the high school level.

At the time of our interview, she was finishing her B.Ed and preparing for her internship in the fall of 2006.

"Danny"

Danny is a post internship pre-service teacher. Her areas are middle level science and history. Danny went to school in a smaller Saskatchewan city, graduating in 1990. (This pre-dates the most recent update to the Social Studies/History curricula.) She obtained a B.Sc and worked in a science application for a number of years before returning to university to become a teacher. Her life experience is varied, and includes a wealth of experience working with children as an instructor in water safety, First Aid/CPR instructor and has a respect and anti-bullying facilitator. She is therefore, very practiced in experiential learning.

"Ella"

Ella grew up in rural Saskatchewan and most of her K-12 education was in rural to smaller cities in the province graduating in the late 90s. Her teaching majors are   Home Economics and English Language Arts. Her program is direct entry. When I spoke with

her, she had not yet done her internship and had not decided when she would do it. She is also a working musician and is "on the road" for extended periods.

"Joseph"

Joseph has been a teacher for 30 years, starting in Ontario. He has specialized in Special Education and working with emotionally disturbed children. He's also taught arts at the high school level and social studies at the elementary level.

He has a B.Ed, a post graduate diploma in special education, and a M.Ed in reading and writing.

Key Questions and Discussion

Defining Critical Thinking

When it came to defining 'good' or 'critical' or 'deep' thinking, it soon became clear that none of the subjects defined it in exactly the same way. While they all acknowledged the process as working at a different level than rote memory learning, they varied considerably on what was important in and about the process. For example, Craig contended that critical thinking meant "Being able to analyze and interpret- using educational terminology- getting at the higher levels of Bloom's taxonomy. Beyond just a recall … I think even at the tail end of my education a lot of it was memorization*"*. For Craig, deep thinking- in his initial definition- is all about moving up the scale of cognitive difficulty. Ms. M . went a step further contending that:

> *It's kind of cliché to be saying 'outside the box', but being able to step outside what you read and question it--- what perspective is this? What other perspectives could be brought into it? … and see why your opinion is that way- what have you read that's made you think that way?*

For her, critical thinking involved comparing alternative perspectives alongside a re-examination of her own opinions. Rick agreed with Ms. M, suggesting that:

> *As applied to thinking about yourself and what you think as opposed to an article you're reading. I guess...[Critical thinking is] questioning the answers you come to and wondering why you thought what you thought- and what limitations your thinking and knowledge might be imposing on what you thought.*

Mary defined critical thinking and creative thinking as the thoughtful examination of not just evidence, but the point of view of those presenting the evidence:

> The ability to look at the information that is presented and consider not only what is presented but who is presenting it, what is not presented, how leaving out the information affects how we interpret the information and trying to consider other viewpoints and possibilities.

For Phil, however, CT is a process of making connections between concepts and maintaining a "questioning mindset":

> *... one of the primary components of critical thinking is connectivity- the ability to see how one concept that you're considering has ties to... really, infinite numbers of other concepts. Critical thinking is questioning... a mindset that approaches issues through questions...*

The common element between all of them is the requirement that the thinker do more than simply memorize; she must consider multiple perspectives. Diane, on the other hand, discussed a completely different concept; she saw critical thinking as a process of self reliance:

> *I guess, I think critical thinking is thinking on your own... not just listening to what other people think, but thinking about what you think... not taking things at face value?*

Thus, Diane's initial definition has more to do with independent thinking than critical or deep thinking. Danny, for her part, has yet another definition- one that argues for insight at a higher cognitive level:

> *Looking past what you'd expect others to think of...coming up with different ideas... the ones that make others go...'Oh, I never thought of that before'...Critical and creative thinking is not just looking at one side or two sides, it's looking all around an idea and thinking outside the box... For somebody to not come up with the typical answer I would expect as a teacher.*

The implication here, it seems to me, is that critical thinking may not be something everyone can do. Diane, like Ms. M, however, also noted the need to be fair minded:

There are certain things that I know I have a prejudice about, so when I hear about those issues, I say to myself, "Diane, you know you believe this… but you need to be open-minded and really think about it.

Jim's was the longest of all the initial responses- and perhaps the least clear. His answer on the tape is preceded by a very long pause:

This is a tricky one to answer, but… without using the terms themselves. I think its introspective thought to me… I hate to use all the education terms and- just the general terms- you know, being meta-cognitive and introspective because I think it's beyond that. It's thinking outside of yourself and realizing that there are more perspectives and that there's more value to thought and there's… it really is that, you know, that two sides to the coin theory…

Jim further argued that critical thinking is something students must learn "experientially"; that the teacher's obligation is to give students an opportunity to develop their own "voices". And he worried that:

…I think too often we try to construct their voice by shaping their thoughts when we don't provide them that freedom as individuals to have their own and to share them.

In fact, Jim seemed to be thinking through his answer as he went along. Even so, he included several of the elements common to those of his colleagues: He expects a deep thinker to 'think outside the box' to understand that there are may be multiple perspectives. However, to my mind, he added an element that is vital to good teaching; the awareness that the process of thinking is more important to student development than arriving at the "right" answer:

…we try to work towards the right answer and I think critical thinking goes beyond giving a right answer… It's about analyzing and determining why something is as it is.

In the course of the ensuing discussion, Jim argued that simply examining multiple perspectives was not enough:

More than considered- I think they need to be accepted- whether or not you… not accepted as in 'adopted' as your own thoughts … but… because I think too often we focus on "tolerate" other opinions and "tolerance" …

Jim preferred to use the word "acceptance" in place of "tolerance" contending that:

> *So whether or not you accept it…you have to even think about the word*
>
> *acceptance because whether or not you accept a person's ideas you have to*
>
> *respect them… So I think maybe more so …respect the difference.*

I then asked Jim if he felt that this meant all opinions had to be considered equally valid, citing as an example the views of the Flat Earth Society. His answer was illuminating, and suggested that there is no real counter to ill founded but firmly held opinion:

> *What am I going to gain from trying to disprove that? It's really just*
>
> *frustrating… I mean what's the goal of education –like am I just going to*
>
> *frustrate myself and get myself worked up over it- and I do… I'm guilty of it…I*
>
> *think there is evidence to the contrary of certain things and you can use that*
>
> *but…it's a balance.*

Jim used former Saskatchewan MP Jim Pankiw's opinions (often perceived as anti-aboriginal) as an example, contending that while he was offended by them, he saw little use in getting 'worked up' over them. This sort of reasoning and acceptance of the right to hold and articulate any opinion is, I think, a dangerous to import into a classroom. To me, Jim's responses, while articulate, echoed the students of Grinnell College who argued for the right not only to be heard, but to be unchallenged (Trosset, 1998).

The one practicing teacher (Joseph) interviewed didn't really define critical or deep thinking at all initially. Instead he explained how difficult an ideal it is to reach in a classroom:

> *I use a lot of metaphors when I talk… I guess it would be kind of like Justice.*
>
> *Justice is an ideal… I think critical thinking falls into that category. It's sort of*
>
> *an ideal cognitive skill we want children to have but it's a very difficult*
>
> *cognitive skill to aim for.*

When prompted, he elaborated:

> *When kids think critically… they're stopping and thinking for one. There's a*
>
> *pause, a space. They're looking at some choices… I think a big element of*

> *critical thinking is that there is this space between the synapses- there's a stop*
>
> *and think for a moment and think critically...*

Here, Joseph, like the others, describes critical thinking as a process of considering multiple perspectives. Unlike the others, his expanded definition requires that the thinker choose one of the alternatives based on his or her understanding of their comparative strengths. He also seems to define it as a purely cognitive process. Thus we have a plethora of definitions, none of which seem fully formed in comparison to the definitions common in higher academia. Remember our starting point definition for CT:

> It is the process of thinking about issues, arguments and documents or records
>
> from multiple perspectives (in terms their content, origin, function, structure and
>
> purpose) with a view to improving that thinking, and to reaching conclusions
>
> based upon this reasoned understanding of the best available evidence.

Thus, a critical thinker should be able to both analyze and assess not only the thinking of others but his or her own as well. The goal of critical thinking is to improve thinking. The object is to reach a conclusion based on a reasoned understanding. Only the long service teacher (Joseph) identified on both points.

Did K-12 Prepare the Participants to Think Critically?

In this discussion, the participants' answers tended to be almost inseparable from the series of questions; thus for the sake of clarity, I have included the line of questioning where appropriate, and put the participants' responses into italicized text.

Craig felt that while he had one teacher who encouraged the class to consider and compare differing arguments, he still was not actually prepared for the type of thinking asked of him in his undergraduate history program:

> *I had a really good social studies 30 teacher… we were doing argumentative*
>
> *essays, persuasive essays. I was doing this topic, and I was on the fence- he*
>
> *really forced me to pick one side and argue it from that side. To do that I really*
>
> *had to start thinking about my own beliefs and examining the issue from both*
>
> *sides so that I could do that.*

Even so, he noted that at the end of the class *"...we still had a multiple choice final with part of an essay or whatever... and I got 100 percent. So going into university I wasn't prepared for the types of exams I would have to write.*

Craig felt that while this experience at high school prepared him to write essays clearly and effectively, he had not been prepared for the rigour of university exams. *"...the critical thinking part helped me with my essay writing absolutely... but my exam marks were always substantially lower than my essay marks*

Craig also noted that professors at the University of Saskatchewan had told him they felt students coming out of Grade 12 were unready for university. Craig believed that, while it may be impossible to completely prepare students for post secondary level work, it should be possible to do a better job than we do today. Part of the problem, in his view is that the style of learning required at university is much more independent:

> *It's more the Socratic model where you have the expert teacher and the students are supposed to circle around and draw the knowledge where in the high school I think there's still that mentality where the teacher is there to give the knowledge and the students I think get coddled too much.*

For his part, Phil remembered his K-12 experience as a long process of direct instruction and recall oriented assessment in which critical thinking was not a requirement:

> *It's been quite a few years...so I don't really remember but my general feeling about my education is that it was extremely non-critical. That I learned by rote, through direct teaching. There were maybe half a dozen instances of hands on learning, something beyond textbook reading and worksheet. Critical thinking was not an element, in fact it was discouraged.*

Prompted for an example, he elaborated that:

> *Well, discouraged in the sense that if you don't specifically encourage critical thinking, you're discouraging it right? Because people develop critical thinking... it's not an inherent quality that people have. So unless you challenge students to develop those thought processes and continually refine them then what you're really saying is critical thinking has no value. And here I'm being*

guilty of dichotomies- I'm saying there's either rote learning and copying of notes and do what I tell you or there's critical thinking.

And did his K-12 experience truly prepare him for university level thought and work?

In terms of... well I don't know... when I came to university I was perfectly capable of spelling and forming grammatically correct sentences for example, and sure my education provided me with that.

While Phil was certain that the thinking demands of university were different and higher than those of his high school, he was equally certain that his experiences outside of school were far more important to his development as a thinker than anything he did within the classroom:

When I was in grade 10, I think... I joined a rock band and played with a bunch of guys who were in their late 30s or early 40s. Most of them had some connection in the past to the hippie movement or that kind of mindset. So traveling to gigs I'd experience this kind of debate or discussion of issues or silly stuff like reciting Monty Python skits... but it was a mindset that was one of active intellectual engagement and thought. So that was one of the things, the experiences introduced me to this idea that the world wasn't simply a series of facts... that you learn that there were ways of trying to thread your way through events and issues and try and make sense of them...I don't think I would have been prepared to read literature with any sort of critical eye for the techniques of writing for example.

He further insisted that the reading they did in school was done only *"because it was on the curriculum"*. Phil returned several times to this theme- that the best preparation he received for post secondary thinking occurred outside of the school and that K-12 prepared him strictly in terms of the mechanics of scholarship; the rote skills of memory and the functional skills of writing, reading and so on.

Ella remembered her school days in terms of rote learning as well. When I asked her where the work she did in K-12 studies fit on Bloom's Taxonomy, she laughed and replied that it was *"Probably low!"* and that most of the learning demands in her classrooms centered on simple recall. Interestingly, when I asked her if this was something students were skilled at by Grade 12, she asserted that: it was something you

learn early in our school system, but that these skills were useful well beyond grade 12 and into university: "*... not so much in this college but the university arts and sciences. Same thing... you know memorize the stuff and throw it out there and forget it and then you're great.*" When I rephrased the question, specifically including university, she remained certain: "*Oh yeah, totally.*"

This assertion, that rote learning sufficed at university as well, was delivered in an absolutely matter of fact tone of voice. While surprising to me at the time of this interview, this became a familiar theme in conversations with other participants. Diane, for instance, when asked if K-12 prepared her for university thinking responded :

A: No... (long pause)

Q: What was the big difference?

A: I'm not sure... I didn't really find university required critical thinking either.

Q: Ok. Let's reframe the question. Did high school prepare you to think and write and perform in the way that university professors expected?

A: It must have I got good grades! (Laughs)... I think high school teachers were very good at preparing us for the 'game' we were just discussing- figuring out what the teacher wants and writing that.

Mary agreed: *I think so... it didn't prepare me for what they **told** me they wanted. But what actually got me good grades was... they say "oh we want you to think about this.." but they don't. They don't! They want you to repeat back what they said.* As we discussed the issue further, Mary went on to insist that while she wasn't certain that critical thinking was truly unwelcome in her college classes, mimicking the professor's perspective definitely improved her grades:

> "*I did far better when I could sound like the professor... when I first came here and they were saying, "you have to do this, you know "think about this, and don't always agree with me and I don't necessarily want you to agree with me" and I handed in those first few essays where I argued and I got okay marks. Then I was like, "ok, let's just agree and see find out what happens" and I got great marks and I thought "I know what I'll be doing from now on!"*

When I asked Jim if K-12 had prepared him for the rigours of University thinking and writing he responded quite vehemently replying: "*No, no, no!*" However, when I asked

him what the differences were and how university challenged him differently, he was uncertain, reminding me that it had been a dozen or so years since he first came to university. He did remember being unskilled at taking notes in a lecture, and unprepared to write a paper, and that only one of his high school teachers had actually taught him how to write a paper:

> *Yes, he taught me how to write a paper… he taught us all. He had a specific paper writing assignment that went through the entire term. And it was because of him that I knew how to write a paper. But, there were still like, different expectations! We weren't prepared for university… the only preparation we made for university was like going through and doing those forms of like you know, which careers might suit you and personality assessments.*

Obstacles to Critical Thinking

For Craig, the issue was in classroom delivery. In his view, students weren't required to think critically in high school, and were 'coddled' too much by their teachers and not expected to work independently:

> *…that's one thing I've heard from professors here too. Students come out of high schools and they're not ready… I don't think … maybe you can't get them 100 percent ready but I don't think … in the classroom, we're doing a good enough job.*

Craig felt that students needed to be prepared to work independently at university; that much of the effective teaching- particularly in the History Department in the College of Arts and Sciences was based on a Socratic model in which "*you have the expert teacher and the students are supposed to circle around and draw the knowledge whereas in the high school I think there's still that mentality where the teacher is there to give the knowledge and the students I think get coddled too much.*

Craig believes that students need to learn critical thinking by doing critical thinking in much the same way that students can only learn to write better by doing more writing:

> *I think that's the only way it can get done… there'd be other ways of encouraging them too… bringing in different aspects. Using newspaper articles*

52

and different resources that get the students interested and make them want to
use these skills and excited about it. I think that should be one of the main parts
of teaching… especially in Social Studies. I had one professor who said
something in my first year- that… it stuck: He said "education is what you have
left when you forget everything I teach you."

Q: The content may be gone, but what did you retain?

A: Exactly! From that class I retained knowledge on how to examine articles, on how
to form arguments on how to write essays- skills that translated directly into my later
educational process.

Standardized exams also came under fire from Craig as vehicles for testing rote
learning more than deep thinking:

…Again, I think just with some of the memorization … like departmental exams
here. They have to make a standard exam that will cover the material. I realize
you can make good multiple choice questions but they're still multiple choice
questions and how much of what the student actually brings to the table can you
test when they don't have a choice for interpretation until one essay portion?

In a perfect world, argued Craig, we wouldn't teach to an exam... we'd teach to
students. However, he was not able to envisage an alternative that could lead us to that
ideal: *"I don't think there's any way around that- it's just a fact of life. I think you still*
have to teach that exam because the students have to succeed and that's a reality- you
have students failing an exam no matter what they've learned."

Thus, for Craig, it appears the system is monolithic and largely immune to
change.

Ms. M. described several obstacles in detail: First that the teacher himself or
herself may not be, or may not be trained in critical thinking, second that the class
environment may not be encouraged at all and third that critical thinking is simply hard
work, and as such is often avoided by students:

Well, first of all, the person who is teaching it? Are they critical thinkers
themselves or are they in the class because they have to teach it? Especially in
high school… Another would be the class makeup- I think that's huge…what
kind of perspectives do you have in the class? Your outside interests of

course…I think a lot of kids don't critically think because it's more work,
because it's like "Ok, what am I doing? You know, this is so much harder… I'm
being pushed to do something finally!"

The Overcrowded Curricula

While most agreed that overcrowded curricula could be an obstacle to critical thinking only Joseph, our long service teacher, identified it as the greatest obstacle: *"Within the four walls of the school, the biggest obstacle is the overloaded curriculum. We have far too much content to cover- it's obscene."* I asked him if his supervisors pressured him to get through the curricula; if he had a superintendent peering over your shoulder: *"We don't per se, but there is … this is a community school, we have some alterations in the content but there are other expectations that fill in the gaps. There's tremendous pressure to get through the day."*

Mary agreed that the social studies curricula in particular were "packed" but felt that since there was no departmental exam for Social Studies and that accreditation was no longer required, that if teachers didn't quite get through the curriculum, *"*
it's ok- because you're writing the exam and you can take a little more time."

For his part, Jim felt the curricula his classes covered in high school were just fine:
A: No. I actually… I enjoyed the classes I took in High School. And I actually took so many classes that in grade 12 I ended up with a 4th period spare in the second term.

Can Most People Learn to Think Critically?

Perhaps of all the questions, the one that garnered the most hopeful responses was this one. The subjects agreed for the most part that people could learn to think more deeply and more critically. For Craig, it was a skill that could be encouraged but ultimately that students had to want to learn, and could learn through practice:

> *This is something I got into in my English class… you get all sorts of levels and*
> *you can't exactly teach writing without doing writing. So to sit down and think*
> *you can teach critical thinking… I think you can teach them skills but ultimately*
> *it's up to each individual to use those skills.*"

Ms. M. contended that most people are capable of becoming better critical thinkers:

> *I think they are. It just needs to be…it's one of those boxes that needs to be dusted off and the lid needs to be taken off because a lot of people… they aren't pushed to do it so they just don't do it- they're lazy.*

She was fairly certain that you could help them learn:

> *"I don't know if it can be directly taught, but I think you can teach people how to do it… like the steps. I don't think you can tell anybody how to be a critical thinker, but you can give them ideas of how to open up their thoughts- because everyone has an opinion on something- but you need to show them that they're able to… that there are more than one perspective.*

Mary agreed, but added a cautionary note, surmising that critical thinking is not a natural inclination for people, and that *"we don't reward critical thinking- we reward people who think like us. So… I think you can learn it, but we often… I don't know if we punish people who do, but we reward those who don't."*

The long service teacher, Joseph felt that while critical thinking is a skill we all have- he also felt it was hard work and that some people would be less likely than others to do that work:

> *[Long pause] I think it is an innate ability we have… whether it's developed… but I think in terms of the survival of the species… without critical thinking we would not have survived.*

However, Joseph also agreed that critical thinking is a lot of work:

> *"It's like those Sudoku puzzles… critical thinking is a lot like that. Some people like solving them some people find them too much work. So if there's an easier way… letting somebody else decide for you then "I won't bother."*

Thus, in this small snapshot of a critical thinking community, we see a variety of definitions and perceptions of and about thinking- but also a few themes that seem to recur again and again, some of which my initial research led me to expect, and two which came as something of a shock.

The Expected

Throughout the course of the interviews, some of the common responses echoed the research I had already done. None of the participants recalled having been given a

definition of critical thinking in high school- even though such a definition has been part of the high school Social Studies Curricula in Saskatchewan since 1994 and has been one of the articulated "Common Essential Learnings" since the late 1980s (Saskatchewan Learning, "Understanding" 1988). All of them recognized the principle of 'fair-mindedness' in considering multiple points of view as integral to good thinking in opinion forming.

None of the students was convinced that he or she had learned much about critical thinking in K-12 classrooms. However, when pressed, most could think of a specific class or teacher who encouraged discussion and debate on issues. Initially when asked this question, only two of the participants (Ms. M., and Rick) were immediately able to identify a class or a teacher who specifically taught them a structure for critical thinking- several in fact argued the opposite: that in general, for them in K-12, critical thinking had actually been discouraged. However, when prompted with following questions such as "What about KWL? Did any teacher if teach you that structure?" The participants sometimes did remember some instruction in thinking methods. The most common were class debates and discussions. However only two of the ten could identify the dialectical essay as a thinking tool they had had been taught in High School Social studies in Saskatchewan and even their recollections were somewhat fuzzy on the process they were taught. As Ms. M recalled: *...I believe we had a handout that told us the steps. But until I came into EdCur 386, I didn't really understand why we would have done something like that.*

Rick also remembered being taught the dialectical essay: *... probably in grade XII? I know we did a dialectical essay in ... maybe it was grade XI. I guess that was probably one example.* But he didn't remember getting much explanation of the process involved in writing the essay: *I think in the end most of the class had very different looking papers and none of us knew if it was supposed to look like a report or an essay or who knew what?*

Others could identify it, but only those who had been taught the structure in a secondary methods class in our college understood how to use it or teach it, and none recollected it being taught effectively in their K-12 experience (Ms. M, Curtis, and Rick all encountered a model for critical teaching in their social studies methods classes). Of

course, some of the participants graduated from high school prior to the latest revision of the Social Studies/History Curricula at the secondary level (1994) in which the dialectical essay is mandated, and they couldn't be expected to be familiar with this structure. However, even those who had graduated fairly recently also proved relatively unfamiliar with the dialectical essay even after the term itself had been explained. In terms of other thinking scaffolds or structures they may have learned, few could identify any- even at university. Phil felt he learned to think critically through his experiences outside of school- while playing in a band with older men who enjoyed discussing and debating issues as a matter of course.

Several of the participants noted that they first truly encountered critical thinking at university. Ms. M. noted in that she first had to really challenge some of her own beliefs in her University Native Studies class:

> *...I think there were two white kids in the class out of 35 or 40 of us. And being submerged into there, and being like, Ok I need to rethink what I'm doing because what I have to say isn't what everybody else has to say and maybe they have a different opinion than I do.*

Ms. M. added that the professor had encouraged them to think, to consider the perspectives of both the aboriginal and of the dominant culture:

> *… this was something I hadn't read before- because growing up it was always 'white man's history' there was nothing about the natives- the aboriginals. That was a class where it started to open things up for me. I started to realize that my views were very biased and I wasn't really giving the aboriginal culture a chance to make an impression on me.*

Craig believed that was first truly challenged to think critically in a philosophy class at the University of Saskatchewan :

> *...that was reading Descartes, Philosophy of mind, and the critical thinking he did in his process of thinking about thinking… That struck home with me; if we can question those most basic beliefs and those most basic parts of our beings, shouldn't we be able to question other things as well? In life, in knowledge in education as well?*

On the other hand, several felt their home environments and families nourished their critical thinking appetites. Diane for example, cited her father as her single greatest critical thinking influence, both by letting her make her own decisions and by modelling critical thinking through discussions of the news and current issues at home. Rick also remembered critical thinking at home, but his critical thinking 'sounding board' was his mother:

> *I used to read the newspaper in the morning- I particularly liked the letters to the editor. My mom would read them also and we talked about those and why people would have this angle and why would they say this and well they must believe these things or maybe they believe this… so I guess that would be critical thinking.*

Thus, the participants did not identify any single, universally common genesis for their development as critical thinkers, and their K-12 education (by their recollection) was no more likely to have been instrumental in their development as thinkers than their out of school milieus.

In terms of the obstacles to critical thinking, again, many of the participants' responses corresponded well with what my initial literature review had prepared me to expect:

- Enculturated beliefs and values;
- School systems that push content ahead of process and make the curricula too crowded to allow the necessary time for kids to learn to think;
- Social norms that don't value strong thinking;
- The fact that critical thinking is hard and time consuming.

These themes, familiar from my literature review, were all identified in the interviews. Most of the participants also noted that critical thinking could be hard work, and that the effort required itself could be a deterrent. However, they also generally agreed that CT could be taught, at least to some extent. Here the participants were in agreement on one principle: while teaching it is difficult people can learn to think critically. However it is something they must commit to doing. Craig probably expressed the generally held

opinion, holding that while we can give students the tools and structure for critical thinking, it is up to them to take hold of them and use them:

> *I think it's like writing. You can give them all the tools they need; you can teach grammar; you can teach them in critical thinking how to form an argument; you can teach them syntax; you can teach them sentence structure…[next question: you can give them tools?]…But ultimately it's up to each individual to use those skills.*

The single experienced teacher in the group- Joseph- was the lone exception- arguing that critical thinking is innate to human existence:

> *I think it is an innate ability we have… whether it's developed… but I think in terms of the survival of the species… without critical thinking we would not have survived.*

However, he too noted that it requires more effort than he felt some people were willing to exert. Remember the simile he employed: *"It's like those Sudoku puzzles… critical thinking is a lot like that. Some people like solving them some people find them too much work."*

It is of some interest to note that at least one recent researcher in the field does not agree that CT is possible for all people, or is easily taught. Van Gelder (2004) contends that critical thinking:

> …is actually a complicated process, and most people are just not very good at it… Humans are not naturally critical. Indeed, like ballet, critical thinking is a highly contrived activity. Running is natural; nightclub dancing is less so; but ballet is something people can only do well with many years of painful, expensive, dedicated training…Evolution does not waste effort making things better than they need to be, and homo sapiens evolved to be just logical enough to survive while competitors such as Neanderthals and mastodons died out (2).

Anthropological argument aside, van Gelder's opinion is probably shared by some educators.

Perhaps, not surprisingly, the long service teacher (Joseph) was the most adamant of the group in designating over-crowded curricula as an obstacle to critical thinking: *"Within the four walls of the school, the biggest obstacle is the overloaded*

curriculum. We have far too much content to cover- it's obscene". The other participants may simply not have experienced enough time in the classroom to feel the pressure of crowded curricula pushing them and their students along.

The Unexpected

There were some surprises. One of the participants took the principle of fair-mindedness to extents beyond my comfort level as a critical thinker. Jim preferred not to oppose poorly held opinions, emphasising the need to 'accept' other points of view-even those poorly reasoned and held. This was not something I had expected. Indeed, the point of critical thinking is to move as close to an understanding of 'truth' as possible; that must mean weighing arguments and judging them according to our best understandings of the relative strength of their arguments. Open-mindedness then, is not the ready acceptance of any point of view, but rather the willingness to consider it carefully and justly. However, for Jim, open-mindedness and intellectual humility seem almost to become an excuse to avoid conflict. When I wondered if he meant that like Voltaire, he need not agree with an opinion to defend a person's right to hold it, he agreed with me. However, when I refined the question further by again asking if perhaps we could then argue that one has a right to hold any opinion but that not all opinions are equally sound he reiterated his conviction that critical judgement may be best withheld:

> *But who am I to judge that my standard is correct? …I believe that my*
> *standards are correct…I have my faith based in religious reasons… But I also*
> *acknowledge the fact as a realist and as a humanist that that's not realistic and*
> *I don't believe that I as an individual, part of this global community, have the*
> *right to impose that on anyone else…Now I think, maybe it's like a democracy,*
> *maybe majority rules? Maybe consensus rules? [laughs] I'm not sure where to*
> *draw that fine line. I'm not sure that I've thought about it. My critical thinking*
> *is weak! [laughs]*

In fact, I don't think his critical thinking skills were weak at all. He simply confused the arguable and inarguable. You can challenge a racist opinion with evidence and fact. The same cannot be said of deeply held convictions of faith, for example, the existence of God. There is no way to prove the negative case. The fact that the best efforts of

theologians to produce evidence proving the existence of God may be unconvincing is not evidence of the opposite. This is best expressed by a common scientific aphorism: Absence of evidence is not evidence of absence. However, a critical thinker is well advised to remember another aphorism: Extraordinary claims require extraordinary evidence. To apply the first without remembering the second can lead one down a slippery slope, and become an excuse for manner of unlikely beliefs. Donald Rumsfeld, for example, used the aphorism to dismiss the lack of evidence supporting the Bush administration's insistence that Iraq possessed weapons of mass destruction in 2002 (Shankar, 2002). Interestingly, further research indicated that Jim's views are perhaps more common than one might expect. In Mark Clayton's 2003 article *The Christian Science Monitor*, Patricia King of the University of Michigan contends that "Even four years of college only brings traditional age college student to a very low level of critical thinking and judgment". Clayton went on to argue that these students are unable to come to a reasoned conclusion even when all the facts to solve a problem are present; apparently confusing relentless open mindedness with critical judgment. In fact, this unwillingness to reach a conclusion may even extend into a general disinclination to consider discussion as a means of improving thinking and reaching conclusions. Carole Trosset (1998) conducted a three year study involving some 200 undergraduates at Grinnell College. Over that time she found that students were equally reluctant. Many felt that discussion was pointless on controversial subjects because opposing viewpoints could not be reconciled. Many were only willing to discuss controversial subjects with people they were certain would agree with them. And many believed that they had the right not to be questioned- the right not to have to defend- any opinion at all. Very few were willing to undertake discussion as a means of improving their own thinking- as a tool for critical thinking and understanding (Trosset, 1998). Critical thinking then, may be much rarer at the university level than I had anticipated.

Perhaps the emergent theme that surprised me most in my interview data is that while K-12 may not prepare students for college level critical thinking- it wasn't really required for success at university anyway- as bluntly stated by Mary:

> *I don't know if you had to [imitate the professor's position] but it worked...I did far better when I could sound like the professor... when I first came here and*

they were saying, 'you have to do this, you know, think about this, and don't always agree with me, and I don't necessarily want you to agree with me' and I handed in those first few essays where I argued and I got okay marks. Then I was like, "ok, let's just agree and see find out what happens" and I got great marks and I thought "I know what I'll be doing from now on!

Mary was not alone. Diane echoed her sentiments- and reflected that high school instruction needed to reflect the reality of the university 'game': *"... and this is going to sound really cynical- but unless the university changes, you* [K-12 teachers] *almost have to teach them how to play the university game… otherwise they're sort of out of luck. The university probably should change but if it doesn't where will students get the preparation to succeed?"*

On hearing this, I returned to the literature and found Catherine Fox had discussed this in 2002- suggesting that with the best of intentions, college level instructors- particularly those challenging their students to intellectually challenge the status quo may mistake student adoption of their position as critical thinking.

In the problem posing approach to teaching, which relies on critical thinking as the primary tool for finding solutions, the instructor too often has already solved the problem. In my own composition classrooms, some students seem to equate critical thinking with figuring out what my opinion is and then reproduce it in their papers and class comments. I have told them that I do not expect them to agree with me; I simply want them to think critically. But in reflecting on the comments I put on their papers, and the ways what I lead class discussions, I become uneasy, because my comments, which are intended to encourage critical thinking, often point to my unintentional use of it to guide my students to the "right" answer, the "right" perspective- which is always my answer, my experience (pp.200-201).

Argues Fox, guiding and "privileging" resistance to the status quo or dominant culture can itself become an expression of a teacher's absolute authority" meaning, I think, that when we tie critical thinking to a social agenda explicitly, unwary teachers may privilege the arguments for change and implicitly devalue alternative perspectives until eventually, the students simply adopt the teacher's new 'truth' in order to succeed in

the class. Critical thinking? Not required. And perhaps, even more unfortunately, not encouraged. In the competitive world of academia, even at the undergraduate level, students can find themselves adopting, perhaps temporarily, attitudes and ideas they will not take with them beyond the particular classroom in which they are adopted.

James Gee (n.d.1988, 2004) might argue that Fox's concerns are an example of how a specialized body of knowledge can become what a person's identity, forming what he calls a "Discourse". This becomes a sort of identity kit that defines how a member of this Discourse should speak and behave. He notes that they are "inherently ideological". They crucially involve a set of values and viewpoints in terms of which one must speak and act, at least while being in the Discourse; otherwise one doesn't count as being in it", and that they are inherently "resistant to internal criticism and self-scrutiny since uttering viewpoints that seriously undermine them defines one as being outside them"(1990). As teachers, we may well find ourselves 'trapped' in our own Discourses even while we remain unable to distinguish its mimicry from critical thinking in our students.   The truly neutral classroom may in practice be unobtainable. This does not mean it should not be sought! If the teacher has already explicitly 'solved the problem' for them, students may well devote their thinking expertise into deciphering the teacher's solution and adopting it in order to present 'correct' answers (Fox, 2002). Further, it may impede true critical analysis in another way; if we are inclined to find culture based motives lurking behind arguments with which we disagree, we may neglect to see that the base cause of the faulty argument, is as Charles Temple says, "plain old fuzzy thinking" (2007).

Summary

The interviews yielded rich data on how this group of volunteers perceived and experienced critical thinking.

> 1. Most of the subjects argued that their K-12 education did not prepare them for the rigours of university work and thinking. However, when questioned further, almost all could remember examples of thinking structures and exercises that had been used in their high school or even elementary school classes.

2. Most agreed with the literature on the main obstacles to critical thinking, student resistance, teacher resistance, crowded curricula, and social conditioning.

3. Most agreed that critical thinking skills may not be as crucial to success at university as the literature suggests academics believe it is. In fact, according to several of these students, one can succeed using just enough critical thinking to decipher what the professor believes the answer should be to any given problem or question. Of course, it may well be that the others do not explicitly express the same understanding of the need for reflection on their own beliefs because of flaws in my questioning technique rather than their thinking.

4. There is a clear gap between the stated intention of Saskatchewan Learning to value and instruct students in critical thinking, and what seems to be happening in classrooms from K-12. This may stem from the complexity (an elaborate dialectical structure) of the critical thinking methodology suggested. It is, in my experience as a classroom teacher, and a methods instructor at the College of Education, an intimidating model for both new teachers and students. The way Saskatchewan's curricula link critical thinking and creative thinking may also complicate matters by blurring the distinction between cognitive ability (especially in problem solving) and the habit of sceptical open-mindedness in which CT has its roots.

CHAPTER 5

REFLECTIONS ON THE RESEARCH

It is impossible to describe an entire educational system as a success or a failure based on these ten interviews. It is, however, interesting to see how these very capable students experienced, and described critical thinking in light of their own experiences as both students and beginning teachers- or in Joseph's case, as a highly experienced teacher. It does raise questions that deserve more study. Why were they often unable to recall being taught thinking strategies and structures in K-12? Were these simply not taught? This is probably not the case, since on prompting most of the volunteers could remember a specific classroom activity that encouraged intellectual debate among differing perspectives. It seems possible that since the critical thinking label was never applied to these activities in their school experiences, they never made the connection themselves.

It is equally interesting that while they felt ill prepared for the kind of thinking that is described as university level, most of them felt such thinking was rarely required for success at the college level either. Even so, several of the participants (Craig, Jim, Phil) saw themselves as transformed by some particular thinking experience(s) that challenged their deeply held beliefs. It is further noteworthy, but perhaps not surprising, that these epiphanies occurred both in school and out of it. Clearly then, there is no single 'nesting ground' for the hatching of a critical thinker. My participants encountered and adopted critical thinking in response to experiences at home, in their social groups, and at university.

When we talked about obstacles to critical thinking, and its role in K-12, many of their responses confirmed what we already know from the literature. What is new, and interesting from my perspective, is that a systemic obstacle- the stifling (intended or not) of critical thinking that may oppose an instructor's foundational position on a topic or issue exists at post secondary levels as well as in K-12. Thus we must acknowledge that while elementary and secondary education may not prepare students for the kind of thinking universities demand, it may very well prepare students for the type of thinking

65

that universities actually require. This in turn, suggests that perhaps, critical thinking is both rarer and harder to recognize in our students and ourselves than we would like to believe.

What Have I Learned as a Researcher?

Certainly my experiences in conducting this research make me belief that the study could be improved, both in methodology and execution. Were I to undertake it again, I would structure the interviews differently, beginning with a brief mandatory set of questions and then, if the participant is willing, continuing in a less structured discussion. I found, as I typed up the transcripts, that this lack of an entirely common base of questions made it difficult to uncover exactly the data I was looking for, since in some cases, key questions were addressed only partially, or even missed entirely. While I attempted to contact the participants for clarification, the gap in time between the interviews (at the end of their university semesters) and the creation of the transcripts (during their summer vacations) made it difficult to do. In some cases, I didn't recognize a particular 'gap' until much later when I was actually preparing the templates and interpretations from the raw transcripts. This made re-visiting the questions problematic, as discussed earlier in chapter three.

Further, I had been careful to use different phrases to describe the thinking I wanted to discuss. Rather than simply asking about 'critical thinking', I varied the question to include 'deep thinking' and 'good thinking' as well. This effort, while well intentioned, may well have added to any confusion the participants may have felt in trying to articulate their own definitions. After all, one might interpret "good" or "deep" to be a description of intelligence rather than a process of critical examination of arguments and perspectives.   In fairness however, it should noted that some of the most interesting questions and responses came out of the free flowing discussion rather than my initial list of potential questions. However, my interview technique could be improved. Fortunately it did improve to some degree as I progressed from participant to participant. Several times in the course of the later interviews, I caught myself asking leading questions to try to bring a participant to respond to a theme a previous interview had revealed- and then stopped myself. In earlier interviews I inserted leading questions routinely and noticed them only as I transcribed the interviews. At other

times, I interrupted the participants, or didn't give them enough 'thinking' time to respond as thoroughly as they might have. Even so, I believe the data are interesting and worthwhile.

Where Should We Go From Here?

The next step might be to expand this type of research into a longitudinal study that tracks student understandings from the entry into the college, at their graduation, and again after a few years of service in the K-12 school system. It would be fascinating to see how research of this type in other countries and cultures might compare. There is some literature that describes how teachers develop from student to practising professional (Kagan, 1992) but it seemed somewhat sparse when I was conducting my review of the literature. One might even examine how several different school systems around the world attempt to teach thinking skills and compare them to the stated objectives, methodologies and outcomes of our own K-12 system in Saskatchewan. Further, there is agreement in the literature that the explicit teaching of such strategies can be effective (Cotton 1991; Halpern 1993; Wilson, 2000). Valerie Wilson (2000) notes that earlier research by Nesbitt and Davies identified over 30 programmes designed to build thinking skills through a variety of methods, from direct instruction of thinking strategies independent of curricula content to infusion of critical thinking structures into specific curricula (pp.33-34.) Some approaches appear to have been more successful than others but as Cotton (1991) notes in her review of the 56 documents describing such approaches:

> A broad, general finding from the research base is that nearly all of the thinking skills programs and practices investigated were found to make a positive difference in the achievement levels of participating students. Studies which looked at achievement over time found that thinking skills instruction accelerated the learning gains of participants, and those with true or quasi-experimental designs generally found that experimental students outperformed controls to a significant degree (4).

Cotton's review of the literature persuasively argues that either of the two basic approaches (direct instruction of CT skills, or their infusion into specific subjects) can be effective. However, she also notes that it appears that even when the strategies are

infused into a content area, they need to be explicitly taught first, and then applied to the content areas (1991, p.7). The key to making any of these programmes is, two fold: First teachers must have sufficient time in the curriculum to effect these strategies, and second, they must be effectively prepared to use them (1991, p.6-8). She also implies that this professional training should provide development of teaching skills beyond the direct instruction of specific methods of analysis and constructing meaning; it must also address creating and maintaining effective classroom climates.

> Research shows that positive classrooms climates, characterized by high expectations, teacher warmth and encouragement, pleasant physical surroundings, and so on, enhance all kinds of learning. In the thinking skills literature, there is an especially strong emphasis on the importance of climate (p.8).

CT instruction in this sort of positive learning climate seems to work across the socio-economic strata of communities and schools and from elementary to college level classrooms. Maran Aukerman (2006) contends that in "most classrooms, the teacher acts as the "Primary Knower" who already knows the answer"(p.38). Students are "secondary learners" whose interpretations of text and whose ideas are only legitimized when given the teacher's approval (p.38). She describes classrooms in which children, at the elementary level, in "pullout" groups that include 'special needs' learners as well as mainstream are able to construct sound understandings of texts themselves; the teachers role is not to evaluate their hypotheses but to restate them to ensure all understand them. In her example, grade five students eventually "looked to the text, not to the teacher to resolve their disagreement"(40). Clearly, this is a process that takes both time, and a skilled teacher. However, Aukerman, in a five year study done at another school, teachers who used pullout discussion groups and this sort of 'shared evaluation pedagogy" saw an average growth in comprehension in their students that was 1.5 times the growth rate of their control group classmates (40).

Concluding Comments, Observations and Perceptions

After pursuing this subject for the better part of three years, I've come to believe that if we want students to embrace critical thinking, and employ it habitually to improve their own thinking, then we must clarify how we, as educators define it, and in

the case of Saskatchewan Curricula, redefine it. As it stands now, Critical Thinking is tied intimately to creative thinking in Saskatchewan pedagogy. As I've suggested in this thesis, I believe that is a mistake. While there is a link between the two, and it is much easier to define and provide a structure for critical thinking than for creative thinking. As we see in this thesis, the literature is rich with definitions of critical thinking, and theories about using, teaching and inspiring it. However, there is much less to be found in the literature that defines what creative thinking is, and how to deliberately achieve it. As Mary Bozik suggested in 1987,

> As one might expect, there are as many approaches to defining and teaching critical thinking as there are advocates of its importance. What is not often discussed is the role of creative thinking and its connection to critical thinking (p.4).

Creative thinking seems to be very much like the old fellow in the art gallery who may not know what art is, but "knows it when he sees it". As I see it, the problem with explicitly tying creative thinking to critical thinking as a foundational objective for learners is that it adds an unnecessary layer of complexity to the job of designing instruction. We can teach students structures for comparing arguments, and provide them with opportunities to think long and carefully about ideas, and puzzle over problems, but there is no way to teach the unconsciously arrived at inspiration or understanding that seems to spring from creative thinking. Bozik (1988) lists several approaches that might help students utilize creative thinking, but cannot provide any prescriptive model for teaching it. However, as people think critically at higher levels and with greater skill and understanding, creative inspiration often does emerge as part of a solution or a new understanding. I would argue that it is best to value these creative moments and celebrate them as they occur in our students thinking, but to acknowledge that we need not explicitly connect it to our critical thinking instruction. Attempting to do this can lead to questions such as the following example from the province wide testing that was done for Critical and Creative thinking in 2002, (Saskatchewan Learning, 2003). This question, which intends to test both critical and creative thinking seems more likely to test intelligence:

Figure 16: Grade 5 Exemplar – 'Down the Drain'   Level 5

A priceless (very expensive) diamond ring has been lost down this drain.
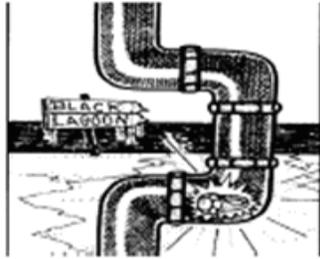
You are asked to recover (get back) the diamond ring. You need to know the following:

a. The drainpipe leads to a black lagoon. The lagoon is a body of water used to treat sewage.
b. Nothing has ever been recovered from the lagoon.
c. The pipe has a diameter (distance across the middle) of 10 cm.
d. The pipe is made of cast iron (heavy iron).
e. The ring is made of gold.
f. The ring is in the elbow just before it drains into the black lagoon.

Students taking this test are tasked with examining the picture, reading the description underneath it, and devising some sort of method for retrieving the diamond ring. While this question addresses problem solving skills, it seems to be more about measuring cognitive ability than critical thinking: it can show us which students have the 'brightest' ideas, but is it really measuring critical thinking? This is indicative of the problem with Saskatchewan's definition of Critical Thinking within the Common Essential Learnings; it does not distinguish between process and cognitive ability.

While we can, and should teach the structures of good thinking, and encourage their habitual use, we need to recognize that we cannot teach intuitive leaps, or do more than measure great depth of thought. What we can do, is teach structures for thinking in which such cognitive leaps can emerge purposefully, and provide a classroom environment that provides opportunities to use the strategies (Bozik, 1988), and (as Russell would wish) encourages their use as a habit of mind.

The critical thinking structure that is supposed to be taught in Saskatchewan's classrooms is a variation on the dialectical model. Here too, I see some problems. The dialectical reasoning structure given to students in Saskatchewan's Social Studies and History curricula is needlessly complex and may intimidate inexperienced or beginning teachers. The concept map (Saskatchewan Education, 1997, p.30) shown on the next page is complex to the point of incomprehensibility to try to explain the process does little to make inexperienced teachers more confident!

Research / Communication concept map:

Research
PEOPLE → UNDERSTAND → REALITY → by creating → VIEWPOINTS → which have alternative → SOLUTIONS / DECISIONS / HYPOTHESIS / VALUE CLAIMS (such as THESIS) → supported by RESEARCH → resulting in a SERIES → of FACTUAL TESTS / MORAL TESTS → leading to a CONCLUSION → such as a SOLUTION / DECISION / JUDGEMENT → from which the RESEARCHER → makes a JUDGEMENT → about the THEMES → which may lead to ACTION

which may be expressed as a → QUESTION / PROBLEM / CHOICE / HYPOTHESIS / MORAL CLAIM

which REJECTS / ACCEPTS / MODIFIES

Communication
PEOPLE → COMMUNICATE → about REALITY → by defining → VIEWPOINTS → which have alternative → SOLUTIONS / DECISIONS / HYPOTHESIS / VALUE CLAIMS (such as THESIS) → supported by an ARGUMENT → resulting in a SERIES → of FACTUAL TESTS / MORAL TESTS → leading to a CONCLUSION → such as a SOLUTION / DECISION / JUDGEMENT → from which the WRITER → makes a JUDGEMENT → about the THEMES → which may lead to ACTION

I believe it is past time to review our multiplicity of definitions on critical thinking, return to the basics of Bertrand Russell and simply learn how to ask "why"… and mean it; to help students learn to find an answer based on evidence and understanding and to hold such conclusions tentatively pending better evidence. And above all, we need to make this open minded scepticism a habit of mind. My research leaves no doubt that even this will prove a difficult task. Asking 'why' can be uncomfortable; it can even seem unprofitable. It occurred to me during my interview

with Jim, that children arrive at school eager for new experience, and full of questions about the world. They ask 'how' questions, and 'why' questions almost unceasingly. When I asked Jim if he remembered any of this in his own life, he recounted an anecdote that I found interesting:

> *…I love this… I guess I never shared this. My cousin who came to visit… oh what grade was it? Fourth grade? And she stayed with us for a year and she said "There's no answer for why?" And we just kept going "Why" and asked her that question. And I realized there really is no answer for 'why'?*

I replied that there were indeed answers for 'why' questions; we know 'why' the sky is blue; we know 'why' things fall. He insisted again that there is no answer for why:

> *No, no there isn't… Like, "Why did your phone ring?" Because my partner called me. "Why did they call?"*

I responded that doesn't mean there's no answer to 'why' it just means there's a never ending supply of 'whys'. Jim continued:

> *Right, and it just made me "well because he wanted to talk to me"…"Well why did he wan to talk to you?" And you can do that forever. You never run out of 'why'. I love it. But I have to tell you it plagued me. It drove me nuts. I could have been the next person in an insane asylum. I obsessed about it. And I still do, as a scientist- and I still consider myself a scientist- I keep doing it. "Why did I come back to university to get an education degree? Why am I still working on my arts degree? Why did I just apply to Medicine? I could get a job and be done with university? Why? Why?*

To my mind, Jim's anecdote is illustrative of two principles; first that inquiry is natural and ongoing in people, and second that unless it is directed and purposeful, it is unlikely to produce useful results. A child's insistence on responding to every answer with another 'Why?' can be enormously frustrating to a parent or teacher; the key is to channel what we might call the 'why game' from a time waster to a starting point in harnessing the child's natural curiosity. Children arrive at kindergarten eager and willing to ask 'why', and yet by the time they reached the high school classroom, they often want to learn facts and skills, and regurgitate the facts and demonstrate the skills in order to win a mark.

It is time to rekindle curiosity in our students, and instil alongside it Russell's habit of open-minded scepticism about the answers that await them. This is the essence of useful, purposeful, critical thinking- to go where the question leads, and to formulate and hold tentatively answers based on carefully weighed evidence.   My thesis research, in tandem with my day to day experiences in my own classroom, suggest that it is possible to help students learn to think more deeply, more reflectively, more critically. It is, clearly not an easy task, but my profoundest hope is that it is not an insurmountable one. After all, as Jim reminded us, "You never run out of 'why'".

REFERENCES

Adu-Febiri, F. (2002). Thinking Skills in Education: Ideal and Real Academic Cultures. *CDTL Brief: Centre for Development of Teaching and Learning 5* (4). 1-5.

Alberta Learning. (2003). *English Language Arts(Senior High School))* Retrieved 8, 12, 2004 from:

http://www.education.gov.ab.ca/k_12/curriculum/bySubject/english/srhelapofs.pdf .

Alberta Learning (2002). *High School Needs Assessment Studies Report*. Retrieved 8, 12, 2004 from:

http://www.learning.gov.ab.ca/k_12/curriculum/bySubject/social/needsass/needs_1.pdf.

Alberta Learning. (2003). Responding to Text and Context in *Senior High School Language Arts Guide to Implementation*. (35-53 and relevant appendices). Retrieved 8, 12, 2004 from:

http://www.learning.gov.ab.ca/k%5F12/curriculum/bySubject/english/ela10/4_respond.pdf.

American Sociology Association. (2005). Gordon Sumner. Retrieved 10, 11, 2007 from: http://www2.asanet.org/governance/sumner.html.

Arnold-Forster, H.O. (1918). *The Citizen Reader: With a preface by W.E. Forster.* London: Cassell & Company.

Aukerman, M. (2006). "Who's afraid of the big bad answer". *Educational Leadership.* 64, 2. 37-41.

Bacon, R. (1268). "On Experimental Science". Medieval Sourcebook. Retrieved 12, 11, 2007 from: http://www.fordham.edu/halsall/source/bacon2.html

Barlow, M & Robertson, H. (1994). *Class Warfare: The Assault on Canada's Schools.* Toronto: Key Porter Books.

Barnett, M.A. (2000). Promoting Students' Intellectual Growth. Teaching Resource Center Publications, Fall 2000. Retrieved 25, 10, 2006 from:

http://trc.virginia.edu/Publications/Teaching_Concerns/Fall_2000/TC_Fall_2000_Barnett.pdf.

Baumeister,R. Campbell, J., Krueger J., and Vohs, K. (2005). Exploding the self-
 esteem myth. *Scientific American Mind.* 16, 4. 50-58.

Beyer, B.K. (2001). Teaching thinking skills- defining the problem. In Arthur L. Costa,
 (ed.) *Developing Minds: A Resource Book for Teaching Thinking.* pp.35-41).
 Virginia: Association for Supervision and Curriculum Development.

Bozik, M (1988). Critical Thinking through Creative thinking. ; A paper presented at
 the annual meeting of the Speech Communication Association (73rd, Boston,
 MA. November 5-8, 1987). (Eric Document reproduction Service No. ED
 290173).

Brandt, R. (2002). Forword. In Arthur L. Costa, (ed.) *Developing Minds: A Resource
 Book For Teaching Thinking.* Virginia: Association for Supervision and
 Curriculum Development.

British Columbia Ministry of Education. (2003). *English Literature 12: Integrated
 Resource Package.* Retrieved 8, 12, 2004 from:
 http://www.bced.gov.bc.ca/irp/englit12.pdf#nameddest=elit12lo.

Brock, C.H., Boyd F.B. and More, J.A. (2003). Variation in Language and the use of
 language across contexts: Implications for literacy learning. In J.Flood,
 D.Lapp, J.Squire & J. Jensen (Eds.) *Handbook of Research on Teaching the
 English Language Arts.* Mahwah, New Jersey: Lawrence Erlbaum Associates,
 Publishers.

Cadeiro-Kaplan, K. (2002). Literacy Ideologies: Critically engaging the Language Arts
 Curriculum. *Language Arts.* Vol. 79, no.5. May 2002. 372-381.

Cantor, N. (1994). *The Civilization of the Middle Ages: A Completely Revised and
 Expanded Edition of Medieval History.* New York: HarperPerennial.

Carr, K. (1990). *How Can We Teach Critical Thinking*? Urbana, IL. ERIC
 Clearinghouse on Elementary and Early Childhood Education. [ED326304]

Carroll, R. (2004). *Becoming A Critical Thinker.* Pearson Custom Publishing. (2nd ed).
 New York.

Case, R. & Wright, I. (1997). Taking seriously the teaching of critical thinking. In R.
 Case & P. Clark (1997) (eds.) *The Canadian Anthology of Social Studies: Issues*

and Strategies for Teachers. (pp. 179-193). Vancouver: Pacific Educational Press.

Chomsky, N. (2003). *Democracy and Education.* C.P Otero (Ed.), New York: Routledge Falmer.

Clayton, M. (2003) Rethinking thinking. Christian Science Monitor Online. Retrieved 24, 10, 2004 from: www.csmonitor.com/2003/1014p18s01-lehl.html.

Columbia Encyclopedia, 6th edition. (2002). William Graham Sumner. Retrieved 4, 12, 2004 from: http://www.encyclopedia.com/html/S/Sumner-W1.asp.

Comber, B. & Kamber, B. (1997). Critical literacies: Politicising the language classroom. Retrieved 24, 10, 2004 from: http://www.schools.ash.org.au/litweb/barb1.html.

Costa, A.L. (2001). Teaching for, of and about thinking. In Arthur L. Costa, (ed.) *Developing Minds: A Resource Book for Teaching Thinking.* 354-358. Virginia: Association for Supervision and Curriculum Development.

Cotton, K. (1991). Close-Up #11: Teaching Thinking Skills. Retrieved 10,11,2007 from: Northwest Regional Educational Laboratory's School Improvement Research Series Web site: http://www.nwrel.org/scpd/sirs/6/cu11.html

Council of Canadian Ministers of Education, Canada. (2002). Secondary Study: Students' habits of mind. Retrieved 25, 08, 2007 from: http://www.cmec.ca/saip/scribe3/public/08StudentHabits.en.pdf.

Dewey, J. (1910). *How we think.* Lexington, Mass: D.C. Heath.

Dewey, j. (1920). *The School and Society.* Chicago, Illinois: University of Chicago Press.

Dialectic. (1995). In *The Oxford Companion to Philosophy.* (p. 198). Oxford: Oxford University Press.

Eggan, P. & Kauchak, D. (1999). *Educational Psychology: Windows on Classrooms.* (4th ed.). Merrill, an imprint of Prentice Hall, New Jersey.

Ennis, R. (2004). A super-streamlined conception of critical thinking. Retrieved 15,11,2007 from: http://faculty.ed.uiuc.edu/rhennis/.

Fedje, C.G. (1999). Program misconceptions: Breaking the patterns of thinking. *Journal of Family and Consumer Sciences Education,* 17, (2), 11-18.

Foss, A. (2002). Peeling the Onion: Teaching Critical Literacy with Students of
Privilege. *Language Arts.* Vol. 79, no.5. May 2002. 382-392.

Foundation for Critical Thinking. (1997). A brief history of critical thinking. Retrieved
7, 10, 2004 from:
http://www.criticalthinking.org/aboutCT/briefHistoryCT.shtml

Foundation for Critical thinking. (2007). "Our concept of critical thinking". Retrieved
18, 11, 2006 from: http://www.criticalthinking.org/aboutCT/ourConceptCT.cfm

Fox, C. (2002). The race to truth: Disarticulating critical thinking from Whiteliness.
*Pedagogy: Critical Approaches to Teaching Literature, Language, Composition
and Culture.* 2 (2). 197-213.

Franklin, B. (1749). *Proposals Relating to the Education of Youth in Pennsylvania.*
(Original work published 1749) Schoenberg Center for Electronic Text and
Image: University of Pennsylvania Library. Retrieved 30, 10, 2007 from:
http://dewey.library.upenn.edu/sceti/printedbooksNew/index.cfm?textID=frankli
n_youth&PagePosition=1.

Gee, J.P. (n.d.). What is Literacy? Retrieved November 3, 2004 from:
http://www.ed.psu.edu/englishpds/articles/CriticalLiteracy/What%20is%20Liter
acy.htm .

Gee, J.P. (1988). Literacy, discourse, and linguistics: Introduction. *Journal of
Education.* V.71, 1. 5-25.

Gee, J.P. (2001). Critical Literacy/Socially Perceptive Literacy: A study of Language in
Action. In H. Fehring & P. Green (Eds.), *Critical Literacy: A Collection of
Articles from the Australian Literacy Educators' Association.* (pp. 15-39).
Newark: International Reading Association.

Giancarlo, A., Blohm, S. & Urdan, T. (2004). Assessing secondary students' disposition
toward critical thinking: Development of the California measure of mental
motivation. *Educational and Psychological Measurement.* 64 (2), April 2004.
347-364.

Groarke, L. (2006). Ancient scepticism. *The Stanford Encyclopedia of Philosophy
(Spring 2006 Edition)*, Edward N. Zalta (ed.) Retrieved 10,11, 2007 from: URL
= <http://plato.stanford.edu/archives/spr2006/entries/skepticism-ancient/>.

Halpern, D.F. (1993). Assessing the effectiveness of critical thinking instruction. *The Journal of General Education.* 50 (4), 271-286).

Hare, W. (2002).   Bertrand Russell on Critical Thinking. *Journal of Thought.* 36 (1). 7-16.

Hatton, N. & Smith, D. (1995). Reflection in Teacher Education: Towards Definition and Implementation. Retrieved 1, 11, 2004 from: http://alex.edfac.usyd.edu.au/LocalResource/originals/hattonart.rtf

 Hays, L. (2001). Thinking skills for the information age. In Arthur L. Costa, (ed.) *Developing Minds: A Resource Book for Teaching Thinking.* pp. 7-10). Virginia: Association for Supervision and Curriculum Development.

Hess, D.E. (2004). Controversies about Controversial Issues in Democratic Education. Retrieved 3, 11, 2004 from: http://www.apsanet.org/PS/april04/hess.pdf.

Hobbes, T. (1651). *The Origin of the Commonwealth.* In A. Rubenstein & G. Thumm (Eds.). (1965). *The Challenge of Politics: Ideas and Issues.* (2nd ed.). New Jersey: Prentice-Hall Inc. (218-223).

Hutton, E. *The Franciscans in England 1224-1538.* London: Constable and Company, 1926.

Illig, D.C. (1996). Reducing Class Size: A Review of the Literature and Options for Consideration. Retrieved 25,08,2007 from: http://www.library.ca.gov/CRB/clssz/.

Janas, M. (1998). Shhhh, the dragon is asleep and its name is resistance. *Journal of Staff Development, Spring, 1998. 19* (3).

Kagan, D. (1992). Professional growth among preservice and beginning teachers. *Review of Educational Research.* 62,2. 129-169.

Keeley, S.M .& Shemberg, K.M. (1995). Coping with Student Resistance to Critical Thinking: What the Psychotherapy Literature can tell us. *College Teaching, Vol. 43, (4).* Retrieved 1,11, 2004 from the EBSCOHOST Research Databases.

Kennedy, M. (1991). Policy issues in teaching education. *Phi Delta Kappan.* May 1991. 659-665.

Kingwell, M. (2000). *The World We Want: Virtue and the Good Citizen.* Toronto: Penguin Books.

Livingston, J. (2003). *Metacognition: An Overview*. Eric Document Retrieval Service
no: 474273.

Marasco, J. & Torres, Nena. (n.d.) Building critical literacy through the social sciences.
Retrieved 3, 11, 2004 from:
http://www.nssa.us/nssajrnl/NSSJ2003%2021_1/html/09Marasco_Joanna.htm

Martin , D.S. and Michelli, N. (2001). Preparing teachers of thinking. In Arthur L.
Costa, (ed.). *Developing Minds: A Resource Book for Teaching Thinking.* pp.
11-117). Virginia: Association for Supervision and Curriculum Development.

 Mis-assignment of teachers in the public schools. (1986). Eric Document reproduction
Service no: ED279634.

Merriam-Webster Online Dictionary. (ND). Definition of schema. Retrieved 10, 11,
2007 from: http://www.m-w.com/dictionary/schema.

Moore, A. & Ash, A. (2002). Reflective practice in beginning teachers: helps,
hindrances and the role of the critical other. Retrieved Nov 3, 2004 from:
http://www.leeds.ac.uk/educol/documents/0002531.htm.

Mooreman, J. (1968). *A History of the Franciscan Order From its Origins to the Year
1517.* Oxford: Clarendon Press.

Mooreman, J. (1974). *The Franciscans in England.* London: Mowbrays, 1974. Ontario
Secondary School Teachers Federation (n.d.) Ten things wrong with high stakes
testing. Retrieved 15, 11, 2004 from:
http://www.osstf.on.ca/www/issues/ssr/tenthings.html.

Paul, R. (1995). Why students-and teachers- don't reason well. In J.Willson & J.
Binker (eds.) *Critical Thinking: How to Prepare Students for a Rapidly
Changing World.* Santa Rosa: Foundation for Critical Thinking.

Paul, R & Elder, L. (2004). Critical Thinking: Distinguishing between inert information,
activated ignorance, activated knowledge. From: *Critical thinking: Tools for
Taking Charge of Your Learning and Your Life.* Richard Paul and Linda Elder.
Retrieved 8, 12, 2004 from:
http://www.criticalthinking.org/resources/articles/distinguishing-inert-
information.shtml.

Paul, R. & Elder, L. (2005). *A Guide for Educators to Critical Thinking Competency Standards: Standards, Principles, Performance Indicators and Outcomes with a Master Rubric.* Dillon each, California: Foundation for Critical Thinking.

Paul, R. & Elder, L. (2007). "Our concept of critical thinking." Foundation for Critical Thinking. Retrieved 18, 11,2007 from: http://www.criticalthinking.org/aboutCT/ourConceptCT.cfm

Peirce, W. (1998). Understanding Students' difficulties in Reasoning. Part one: Perspectives from Several Fields. Retrieved 18, 11, 2004 from: http://academic.pg.cc.md.us/~wpeirce/MCCCTR/underst.html.

Petruss, K. (2004). Critical thinking: An extended definition. *Education*. 124, (3). 461-466.

Philips, R. (1974). *Teaching for Thinking in High School Social Studies*. Don Mills: Addison-Wesley Publishing Company, Inc.

Pigliucci, M. (2004). A Brief History of Skepticism. Retrieved 14, 12, 2004 from: http://life.bio.sunysb.edu/~massimo/essays/skepticism-history.html.

Popham, W.J. (1999). Why Standardized Tests Don't Measure Educational Quality. *Educational Leadership.* 56,(6). March, 1999. 8-15.

Potts, B. (1994). Strategies for teaching critical thinking. *Eric Digests.* ED385606.

Rossi, P., (2005). "Kant's philosophy of religion". Retrieved 10,11, 2007 from: *The Stanford Encyclopaedia of Philosophy (Fall 2005 Edition)*, Edward N. Zalta (ed.), URL = <http://plato.stanford.edu/archives/fall2005/entries/kant-religion/>.

Russell, B. (1928) Freedom versus authority in education. In Bertrand Russel, (2004) *Skeptical Essays.* (pp 157-172). London: Routledge Classics.

Russell, B. (1928). Free thought and propaganda. In Bertrand Russell, (2004) *Skeptical Essays*. (pp 124-143)*.* London: Routledge Classics*.*

Russell, B. (1935). Education and Discipline. Retrieved 30, 09, 2004 from: http://humanum.arts.cuhk.edu.hk.humflp/E-text?russell/educatio.htm.

Russell, B. (1979). *A History of Western Philosophy*. (Counterpoint edition) London: Unwin Paperbacks.

SAIP Writing III ASSESSMENT 2002: THE PUBLIC REPORT (2003). Retrieved
    from 8, 12, 2004 from: *http://www.cmec.ca/saip/scribe3/public/indexe.stm*.

Saint Francis (n.d.). "Admonishment 7". Retrieved 10, 1, 2005 from: The Franciscan
    Archive. www.home.ici.nct/customers/panther/francis/index2.

Saint Francis (n.d.). Letter to Saint Anthony. Retrieved 10, 1, 2005 from: The
    Franciscan Archive. www.home.ici.nct/customers/panther/francis/index2.

Sandwell, R.W. (2003). Reading Beyond Bias: Using historical documents in the
    secondary classroom. *McGill Journal of Education 38* (1). 168-186.

Saskatchewan Education. (1988.). *Understanding the Common Essential Learnings*: *A
    Handbook for Teachers*. Regina: Saskatchewan Education.

Saskatchewan Education. (1994). Social Studies 20: World Issues. A Curriculum Guide.
    Regina: Saskatchewan Education.

Saskatchewan Education. (1992). *Social Studies 10: Social Organizations: A
    Curriculum Guide.* Regina: Saskatchewan Education.

Saskatchewan Education. (1997). *Social Studies 30: Canadian Studies: A Curriculum
    Guide.* Regina: Saskatchewan Education.

Saskatchewan Education. (n.d.). Psychology portal: Dialectical reasoning: A process
    approach. Retrieved 10,11,2007 from:
    http://www.saskschools.ca/~psychportal/Psych20/dialectical_reasoning.htm

Saskatchewan Learning. (2003). 2002 Provincial learning assessment in Critical and
    Creative thinking. Retrieved 09,10,2006 from:
    http://lrdc.sasked.gov.sk.ca/branches/aar/afl/docs/plap/creative/cctreport.pdf.

Shankar, T. (2002). "Reporter's notebook; on tour with Rumsfeld, the jacket stays on
    and the monkeys stay away." *New York Times.* Retrieved 03,02, 2008 from:
    http://query.nytimes.com/gst/fullpage.html?res=9B0DE1DA103CF935A25755C
    0A9649C8B63.

Shermis, S. (1999). Reflective thought, critical thinking. In ERIC digest D43. Eric Clearinghouse on Reading English and Communication. Bloomington, IN. (ED436007).

Shermis, S. (2004) Social Darwinism. From: *Introduction to Social Justice for the Shermis Website*. Retrieved 13, 12, 2004, from http://www.ioa.com/~shermis/socjus/socdar.html.

Socratic Method. (1995). In *The Oxford Companion to Philosophy*. (pp. 837-838). Oxford: Oxford University Press.

Sokolofsky H. (2003). Class Size Overrated Research Suggests. National Post, September 17, 2003. Retrieved 15, 11, 2004 from: http://www.fcpp.org/publication_detail.php?PubID=632

Tamas, M.C. (1989). Critical Thinking: Promoting it in the Classroom. ERIC Document no: 306554. Retrieved 25, 10, 2004 from the ERIC DIGEST Clearing House on Reading and Communication Skills. Bloomington, IN.

Teaching Resource Center. (n.d.). Teaching a diverse student body. Retrieved 9, 12, 2004 from: http://trc.virginia.edu/Publications/Diversity/II_Classroom_Dynamics.htm.

Temple, C. (2007). Critical Thinking and Critical Literacy. Critical thinking International. Retrieved 25, 08, 2007 from: http://www.criticalthinkinginternational.org/archives/2005/06/critical_thinki.html.

Torf, B. & Sessions, D. (2006). Issues Influencing Teachers' Beliefs about Use of Critical-Thinking Activities with Low-Advantage Learners. *Teacher Education Quarterly*. Fall 2006. Retrieved 18, 11, 2007 from http://findarticles.com/p/articles/mi_qa3960/is_200610/ai_n17197619/pg_1

Trosset, C. (1998). Obstacles to open discussion and critical thinking: The Grinnell College study. *Change*. 30, 5. 44-49.

van Gelder, T. (2004). Cultivatin expertise in informal reasoning. *Canadian Journal of Experimental Psychology*. 58, 2. 142-152.

van Gelder, T. (2005). Teaching critical thinking: Some lessons from cognitive science. *College Teaching*. 45, 1. 1-6.

Ward, A.,Waller, A. Trent, E., & Erskine, J. (1907). *The Cambridge History of English and American Literature: An Encyclopedia in Eighteen Volumes*. New York: G.P. Putnam's Sons, 1907–21; New York: Bartleby.com, 2000 (www.bartleby.com/cambridge/). Retrieved 24, 11, 2008 from http://bartelby.com/br/211.html.

Wilson, V. (2000). "Can thinking skills be taught? A paper for discussion". *Scottish Council for Research in Education*. Retrieved 07, 03, 2008 from http://www.scre.ac.uk/scot-research/thinking/thinking.pdf.

Woodhouse, H. (1983). "The concept of growth in Bertrand Russell's educational thought. *The Journal of Educational Thought*. 17, 1. 12-22.

Wright, I. (2003). The centrality of critical thinking in citizenship education. *Canadian Social Studies. 38, 1*. Retrieved 24,10, 2004 from http://www.quasar.ualberta.ca/css/Css_38_1/ARcentrality_critical_thinking.htm.

APPENDICES

APPENDIX A

Ethics Approval

APPENDIX B

Informed Consent Form: Adult Pre-Service Teachers

You are invited to participate in a study entitled *Pre-service teacher understandings of Critical thinking processes*. Please read this form carefully, and feel free to ask any questions you might have.

Study Supervisor   Dr. Richard Julien

                          Department of Curriculum Studies

                          College of Education

                          University of Saskatchewan

                          Tel: 306-966-7568

Researcher   Dave Luukkonen

                          Graduate Student: Department of Curriculum Studies

                          College of Education

                          University of Saskatchewan

                          Tel: 306 384-2842

                          Email: dwl714@mail.usask.ca

Purpose and Object of the Study. This study seeks to describe, in several ways, the understanding that pre-service teachers have of the processes of critical thinking. The study will attempt this in two phases: First, through, your participation sample evaluation exercise that demonstrates your ability to judge critical thinking in student writing, we seek to illuminate the skills you have accumulated in your education thus far. Second, should you agree to do so, you may be selected for an interview of not more than one hour in length- in which you may share your reflections on your experience with critical thinking processes thus far. It is hoped that such interviews will lead to an understanding of how, when, and where pre-service teachers first encounter and then construct their understandings of the critical thinking process. It is important to understand that while the interview may be recorded, complete transcripts will not be available. However, a copy of any recording made, along with my interpretation of it will offered for your review prior to its inclusion in order that you may approve, add, alter or delete parts or all of it from the study.

Possible Benefits of the Study. There is no direct benefit to the participant for participating in the study. This study may provide parents, teachers, school administrators, senior administrators and curriculum designers with a fuller understanding of the experience of students in the development of critical thinking skills and specifically that of pre-service teachers. Additional benefits may occur if educators and administrators can apply this understanding to help shape future actions in schools.

Confidentiality. I intend to use the data collected in both phases in a written thesis. The phase one data will be interpreted quantitatively and described in combination with an interpretation of the interview data. Some of the interview data may be presented in the form of narratives and direct quotation. This interpretation of the combined data may also be submitted in journal articles or presented at conferences in the future. Consequently, this will be available to others for their interpretation and use. Although direct quotations will be reported from the interviews, each participant will be asked to choose a pseudonym. All identifying information such as the names of individuals mentioned in the interviews, the names of the city, the names of schools attended, and of the larger school divisions will be removed from the report, so that it will not be possible to identify individuals. This is to safeguard the confidentiality and anonymity of participant responses. Because the participants of this study have been chosen from a small group of people, some of whom might be known to each other, it is possible that a participant may be identifiable to others on the basis of what he or she has said. You may choose to withdraw at any point in the study process prior to the data's inclusion in the final report. Should you choose to participate in the interview phase, and if you are selected to do so, you will be given the opportunity to review the interpretation of your interview and add, alter, or delete information from it, prior to its inclusion in the final report.

Right to Withdraw. You may withdraw from the study for any reason at any time without penalty or consequence of any sort. As well, during your interview, you may decline to answer individual questions. If you withdraw from the study at any time, any

data that you have contributed will be destroyed and no information from your interview or your participation in the evaluation exercise will be included in the report.

Future Contact. If you have any questions concerning the study, please feel free to ask at any point. You are also free to contact me at the numbers proved above if you have questions at a later time. The University of Saskatchewan Behavioral Science Research Ethics Board on _____ has approved this study on ethical grounds. Any questions on your rights as a participant may be addressed to that committee through the Office of Research Services (306-966-084). Out of town participants may call collect. You may contact the researcher if you wish to receive a copy of the findings and the publications resulting from the study.

Consent to Participate. I have read and understand the description provided above: I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I consent to participate in the study described above, and understand that I may withdraw this consent at any time. A copy of this consent form has been given me for my records.

Phase I: Writing evaluation exercise:

_____   _____

(Signature of Participant)   (Date)

_____   _____

(Signature of Researcher)   (Date)

APPENDIX C

Interview Tape and Written Interpretation Release Form

I, _____ have reviewed the completed tape and the subsequent interpretation of my interview for the study entitled Pre-service teacher understanding of critical thinking,, and have been provided with the opportunity to add, alter and delete information from it as appropriate. I acknowledge that this interpretation accurately reflects my understanding of what I said in my interview with Dave Luukkonen. I hereby authorize the release of this interpretation to Dave Luukkonen to be used in the manner described in the consent form. I have received a copy of this Interview Tape and Interpretation Release Form for my own records.

_____   _____

(Participant)   (Date)

_____   _____

(Researcher)   (Date)

APPENDIX D

Interview Protocol:

Questions for Individual Interviews with Pre-service and In-service Teachers

1. Tell me a bit about yourself? Where did you grow up and go to school? Where are you in your teacher education?

2. How would you define 'good thinking'? What skills are involved?

3. Why is it important or unimportant?

4. Do you think most people think deeply? If so when and why? When should we think deeply?

5. How do you think most people arrive at their opinions? How do we know what we know?

6. Critical and creative thinking is one of the common essential learnings in Saskatchewan education- do you remember any specific lesson or class in your K-12 education in which you were taught critical thinking methods? Can you give an example of such a class?

7. Can we teach good thinking? If so, why? If not, why not?

8. Did a teacher or other influential person guide you in becoming a better thinker? How? Do you recall an example?

9. Tell me about reflective thinking; how would you explain it to a student or a person who isn't a teacher?

10. When and how do we use critical thinking in our lives?

11. When did you first understand some elements of purposeful thinking?

12. Who helped you learn these elements? How? Do you remember learning to evaluate issues or ideas or arguments critically at home?

13. At school?

14. Were any of these skills taught to you? Where? How?

15. Tell me about a typical Social Studies class in high school; was critical thinking encouraged and taught in routinely?

16. What about other classes- a science class for example?

17. What do you think are some obstacles to teaching and learning reflective or critical thinking in school?

18. Do you think you came to university prepared to think the way you feel is expected here? Do classes at the university level often require deep thinking?

Can you think of a class in which you felt encouraged to reason through multiple perspectives?

19. Do you feel prepared to help your own students with critical thinking in the future?

20. How might you approach critical thinking in your own classes?

21. Is critical thinking stressed in professional practice?

22. Has it always been stressed? In the teaching community? In your division? Your school?

23. How do you help students learn to think critically?

24. Describe an event that stands out in your experience as a teacher of critical thinking

25. What does a critical thinking class room look like?

26. What does it sound like?

27. If you could give beginning teachers (or parents) one piece of advice on teaching these skills, what would it be?

APPENDIX E

Definitions

CT: An abbreviation commonly used for critical thinking.

Dialectic: *The Oxford Companion to Philosophy* defines it as An ancient greek form of reasoning that:

> Proceeded by question and answer, used by Plato. In later antiquity and the Middle Ages, the term was often used to mean simply, logic, but Kant applied it to arguments showing that principles of science have contradictory aspects. Hegel thought that all logic and world history itself followed a dialectical path, in which internal contradictions were transcended, but gave rise to new contradictions that themselves required resolution. Marx and Engels gave Hegel's idea of dialectic a material basis; hence: "dialectical materialism'.

For the purposes of this thesis, the dialectical process generally means the consideration of multiple sides to an argument with a view to resolving the contradictions between them and achieving a synthesis that most nearly approaches truth. Some of this derived meaning stems from what is found in Saskatchewan learning sources, such as that which follows this entry.

 Dialectical reasoning (as defined by Saskatchewan Learning) : This term was originally understood to mean the process of deciding problems through skilful questioning. Socrates and Thomas Aquinas are two famous dialectical thinkers. Today we use it more broadly to cover the process of reaching conclusions by considering multiple sides of an issue; drawing conclusions by reasoned comparisons of positions. Its use in an essay is a fundamental student skill in Saskatchewan senior social studies (Social Studies 20, Saskatchewan Education, 1994). Saskatchewan Education (n.d., *Psychology Portal*) defines it thus:

> Dialectical reasoning refers to critical thinking about problems and evaluating conflicting viewpoints. Dialectical reasoning is best applied in resolving controversial issues and assessing opposing positions. Often times, there are several possible ways of resolving questions and understanding issues, rather than one single right answer. We may have situations where information is incomplete, where many approaches may compete, and we have to decide which

one is most reasonable based on what is known, even though there is no clear-cut solution.

Dialectical reasoning consists of moving back and forth between contrary lines of reasoning, using each to cross-examine the other. This is what juries are supposed to do in arriving at a verdict: consider arguments and evidence for and against a case, point and counterpoint. It is a process in which opposing facts and ideas are weighed and compared for the purposes of determining the best solution, resolving differences, and coming to the most reasonable conclusion based on the evidence and logic.

Discourse: For the purposes of this thesis, I used discourse in the sense that James Gee uses it- capitalized and meaning a learned paradigm of behaviours and knowledge that one develops for a specific social, educational or professional milieu. James Gee has written extensively on learned discourse as a sort of 'identity kit' (1988) that establishes its user as an accepted member of an identifiable group.

Metacognition: Literally, thinking about thinking. Of course, as J. Livingstone (2003) notes, it is not quite that simple. As she explains it, "metacognition refers to higher order thinking which involves active control over the cognitive processes engaged in learning" (p.3). Thus, metacognition is the process of understanding how we construct our knowledge. Eggen & Kauchak (1999) define it similarly and simply as "knowing about and having control over cognitive processes" (p.243).

Schemata: Frameworks of understanding that people use to order their thinking about the world. Merriam Webster Online Dictionary defines it thus:

1**:** a diagrammatic presentation; *broadly* **:** a structured framework or plan

: <u>OUTLINE</u>.

2**:** a mental codification of experience that includes a particular organized way of perceiving cognitively and responding to a complex situation or set of stimuli.

The second definition best describes schemata in the sense in which is it used in this thesis.

Skeptics: Skeptics: An early Greek school of philosophy whose members argued that all knowledge must be examined; Final answers may not be possible, but some answers are superior to others. Pyrrho of Elis is reckoned to be the originator of the school. He

argued that nothing can be known with certainty, and that one should therefore withhold final judgment (Groark, 2006).

Sophists: An early Greek school of thinkers who specialized in arguing questions from multiple sides and did so for hire- which made them objects of contempt for later thinkers like Plato (Russell, 1979, p.55).