Investigating Critical Thinking Across the Curriculum:

A Portfolio for Educational Improvement

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Declaration of Originality

This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration except where specifically indicated in the text.

The dissertation does not exceed the regulation length, excluding footnotes, references and appendices.

Acknowledgements

I could not have completed this dissertation without aid and assistance from countless individuals, only a few of whom I will be able to explicitly acknowledge here. I hope that these words convey some of my deep gratitude for their contributions, without which this report would have suffered in direct proportion to their loss.

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I hope that this document demonstrates adequate respect for the faculty, students, and administrators, as well as researchers and theoreticians whose thinking and actions are examined herein. The advancement of in-depth qualitative empirical research relies on individuals willing to open their practice and their views to critical analysis and evaluation. It is the responsibility of researchers, practitioners, and other agents of change to use the data in authentic, substantive, and fairminded ways in conducting further experimentation or engaging in public discourse about critical thinking in education.

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the early 21st century.

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The aid of these individuals and groups notwithstanding, any limitations or weaknesses within this dissertation are no one’s fault but my own. I have designed and overseen this project from conception to conclusion, and I have ultimately decided on whether to incorporate or pass by suggestions made by others.

To my friends who can read this, and those who cannot. To the community of living souls with an interest in a healthier, happier, more critical and creative humanity: this work is for you most of all; so that you may perhaps encounter, or your imagination may spark, a possible alternative future worth fighting for.

Abstract

Structure of This Report

Chapter one covers some of the history of critical thinking from hypothetical beginnings to the first explicit use of the phrase 'critical thinking' in the 20th century. Its purpose is to establish some of the breadth and depth of the concept of critical thinking implicit in the long history of human intellectual development.

Chapter two investigates three important strands of theory necessary for understanding the literature on critical thinking. Philosophy is identified as an ancient contributor to the field, through a focus on systematic analysis of reasoning, as well as on languages of truth and meaning. Critical theory is most significant for its insistence on the primacy of human emancipation. Psychology is highlighted because of its focus on intrinsic barriers to critical thought, as well as on advancements in understanding thinking and learning processes. Finally, the Paulian conception of critical thinking, which underpins the professional development program at the heart of this research, is briefly introduced and critiqued.

Chapter three, while continuing to broaden the concept of critical thinking, primarily focuses on questions two and three at the beginning of this section. Though critical thinking seems to be almost unanimously valued by teachers at all age levels, in every subject, on every continent, we appear to be far less successful at fostering critical thinking in students than we claim. However, there is hope: institutions around the world are increasingly seeking to improve teaching and learning for critical thinking. Further, there is a developing unity in successful faculty development approaches, which common principles are in this chapter distilled and explicated.

Chapter four details the decision-making involved in designing and implementing the data collection, analysis, evaluation, and presentation in this report. It argues for an integrative methodological approach (especially including student thinking and performance) in assessing the impact of professional development.

Chapter five presents the most significant findings emergent from the original empirical investigation contained within this text. The results show that the on-campus critical thinking enhancement plan has improved teaching and learning of critical thinking (to various degrees and in different directions) within specific subjects, across disciplines,

as well as in personal and professional life. These examples of improvement for critical thinking are presented first, in section 5.1. Following this, factors that seemed to aid the development of critical thinking are explored (5.2). For participating students, the most significant aids were: 1) access to high quality resources on critical thinking, 2) being required to systematically apply theory of critical thinking to issues of academic, personal, or professional significance, and 3) working collaboratively in groups.

Finally, impediments to critical thinking are considered (5.3). The most significant obstacles appeared to be products of the difficult nature of substantive change for critical thinking. This investigation found that for faculty, staff, and students, improving in critical thinking was slow, complex, and somewhat against the grain of previous habits and traditional academic culture. Previous experience with superficial or negative reform processes was a barrier for some on campus. These university members seemed unable to separate present reform efforts on campus from their previous experience with superficial approaches. The university initiative appears to have contributed somewhat to this impediment, as evidence was found that not all elements of on-campus faculty development were high quality.

In terms of fostering critical thinking, then, what we find illuminated in this study are contributing factors as well as obstacles within the university. This should naturally be expected from any professional development program aimed at substantive change. It is hoped that the details gathered regarding these found aids and impediments will be useful to other individuals and communities interested in documenting and/or furthering conditions of reform toward fairminded critical thinking.

Preface

I like baseball. What I like most about baseball is pitching, and the art of pitching offers a clear viewpoint into the act and experience of critical thinking. Let me explain.

One of my favorite baseball announcers, Mike Krukow, is a former pitcher, an all-star, and a 20-game winner. Kruk (as he is affectionately called in the San Francisco bay area) combines the childish enthusiasm central to loving baseball with a running stream of insights into what he thinks is happening (or should be happening) in the minds of the pitchers throughout the game.

One of Kruk's major concepts is that of 'making adjustments'. This concept can be helpful in understanding critical thinking. Even before the first pitch, Kruk is talking about all the important conditions he thinks might be relevant in decisions facing the two starting pitchers, and how they might 'adjust' accordingly: is it hot or cold, rainy or dry, windy or calm? And how might the weather affect the carry of the ball, the amount of action or 'bite' on off-speed pitches like the curveball and slider? Which of their pitches have they commanded best over the past few games?

As the game starts, and we begin to see for ourselves the skill of each pitcher, Krukow focuses on specific things he sees as either particularly effective or ineffective: is the pitcher consistently using the same motion, or does the 'release point' of the ball vary? Is the pitcher closing off his body too much, or is his back shoulder staying open? Is his body too far 'out in front', causing him to be 'under the ball', and therefore leaving the pitch higher and easier to hit? In each case, Kruk talks us through how the pitcher and pitching coaches are thinking (or how he believes they should be thinking) about the performance to 'make the adjustments' necessary to 'find the right rhythm' [1]. In these 'adjustments', we can see a direct connection to critical thinking.

Each 'adjustment' results from a three-part move of the mind: the first is analytical (e.g. focusing on the position of the torso in relation to the legs and the ball – on that particular part of the process); the second evaluative (e.g. 'my body is too far out in front of my arm' – assessing the movement of the body) and the third creative or improving (e.g. 'I will try shortening my stride to the plate').

[1] Of course, many of the most spectacular individual performances occur precisely when the athlete has so internalized this process, through usually many years of practice, that skill can be employed intuitively. Sometimes this mental state is called being 'in the zone'.

This tripartite division is a useful way of thinking about critical thinking while also highlighting its inseparability from creative thinking: critical thinking involves analysis and evaluation whose purpose is often to create or improve upon something we are thinking and/or doing. It often entails the conscious effort to reflect and improve upon our thinking and/or actions as we are thinking and/or doing.

Of course, there are many ways to think about and engage in critical thinking, not all of them as explicit or deliberate, and not all of them focused on assessing or improving one's own thought (as in the baseball analogy).

One purpose of this dissertation is to provide the reader with a sense of the breadth implicit in various conceptions of critical thinking now extant, and the differing viewpoints of critical thinking connected with those conceptions. We might first begin with an exploration of the roots of the phrase 'critical thinking', as Paul et al. (1997, 2) write: The word 'critical' derives etymologically from two Greek roots: 'kritikos' (meaning discerning judgment) and 'kriterion' (meaning standards). Etymologically, then, the word implies the development of 'discerning judgment based on standards'… applied to thinking, then, we might provisionally define critical thinking as thinking that explicitly aims at well-founded judgment and hence utilizes appropriate evaluative standards in the attempt to determine the true worth, merit, or value of something.

However, etymological exploration is not sufficient. 'Given the complexity of critical thinking – its rootedness in 2500 years of intellectual history as well as the wide range of its application – it is unwise to put too much weight on any one 'definition' of critical thinking. Any brief formulation of critical thinking is bound to have important limitations. Some theoreticians well established in the literature have provided us with a broad range of useful 'definitions'…' (Paul, Elder, and Bartell, 1997, 4). Let us consider, then, a few of the more widely known definitions of critical thinking, in no particular order, each of which offers a slightly different perspective. Collectively they begin to formulate a substantive conception of critical thinking:

- 'Thinking that devotes itself to the improvement thinking' (Lipman, 1984, 51)
- 'Reasonable and reflective thinking about what to believe or do' (Ennis, 1989)
- 'Critical, when applied to persons who judge and to their judgments, not only may, but in very precise use does, imply an effort to see a thing clearly and

truly so that not only the good in it may be distinguished from the bad, but also that it as a whole may be fairly judged or valued' (Webster's Dictionary of Synonyms, 1951)

- 'A critical thinker is…one who is *appropriately moved by reasons*…critical thinking is impartial, consistent, and non-arbitrary, and the critical thinker both acts and thinks in accordance with, and values, consistency, fairness, and impartiality of judgment and action.' (emphasis in original; Siegel, 1990, 23, 34)
- 'The ability to participate in critical and open evaluation of rules and principles in any area of life' (Scheffler, 1973, 62)
- 'Critical thinking is, in short, self-directed, self-disciplined, self-monitored, and self-corrective thinking.' (Paul and Elder, 2012b, 3)

'Each of these definitions, as many others in the field, cut in fundamentally the same direction. All deal with the problem of up-grading the quality of human thinking by the cultivation of special skills, abilities, and insights that enable the thinker to take mindful command of his or her thinking. What is most obvious from a serious examination of these multiple characterizations of critical thinking is how much they share a common set of concerns and objectives – quite in line with the history of the concept…' (Paul, Elder, and Bartell, 1997, 7).

Unfortunately, debate in what we might refer to as the emerging field of critical thinking studies often centers on disagreements between theoreticians rather than on their agreement, obscuring core common ground. Though theoreticians emphasize different aspects of critical thinking, virtually all would agree that it entails analysis and evaluation with a view towards improvement, that it includes the development of intellectual traits, and that it should be applied to one's own thinking, the thinking of others, and thinking within subject disciplines (For examples, see Ennis, 1995; Nosich 2009; Passmore, 1972; Paul and Elder, 2002; Peters, 1974; Scheffler, 1993; Scriven and Fisher, 1997; Siegel, 1990).

Thus, given the literature on critical thinking, we might divide critical thinking into these broad categories:

- **Understanding of intellectual analysis**, ability to divide important intel-

lectual constructs[2] into constituent parts.

- **Understanding of intellectual evaluation,** ability to evaluate the quality of each part or element of thought.
- **Seeking intellectual improvement,** to correct weaknesses and improve strengths identified through analysis and evaluation.
- **Seeking to develop intellectual traits,** or characteristics of mind that are both necessary for the development of critical thinking and need to be developed through critical thinking. These guard against sophistic or manipulative thinking.
- **Seeking knowledge of the problematics of thinking,** or natural tendencies, such as egocentrism and sociocentrism, which cause deep and systemic problems in human life.

Furthermore, these dimensions can be applied in various contexts:

- To thinking generally (one's own thinking, the thinking of a professor, colleague, friend, politician, theoretician, parent, lover…)
- To subject disciplines (each of which has its own forms of analysis and evaluation)
- To personal life, both in terms of significant decisions (such as purchasing a car or choosing a university to attend), as well as day-to-day activities (such as health, diet, and exercise, parenting, voting and politics, managing finances…)

These lists are not exhaustive, but illustrate some of the many ways critical thinking can be applied. Much of this dissertation consists in the analysis and evaluation of different forms and manifestations of critical thinking, historically (chapter one), theoretically (chapter two), empirically (chapter three), and originally (chapter five).

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[2] Here I use the concept 'intellectual construct' as Paul (2012, 8): "All of the following are intellectual constructs of potential importance in critical thought: essays, theories, knowledge claims, assumptions, math problems, cases, world views, concepts, information, inferences, novels, poems, plays, schools of thought, critical analyses, critical evaluations, editorials, news articles, news stories, budgets, financial plans, axiomatic systems, accounting documents, architectural designs, engineering designs, number systems, classificatory systems, intellectual distinctions, histories, experiments, critiques of art of whatever sort, background logic, understandings, interpretations, and so forth".

With the remaining space of this preface I would like to focus on three important points - one in relation to the baseball example and two which transition us to a broader view of critical thinking.

Regarding baseball: what is explicitly critical thinking to me is only implicitly so for Mike Krukow, and I suspect many if not most baseball experts and pitchers. I have never heard Kruk use the phrase 'critical thinking', yet I suspect that if I talked to him about it, as I talk to many experts in many subjects about their critical thinking, he would see some overlap and might even appropriate the term into his thinking.

This brings us to the first important point: *critical thinking is happening in many places throughout human life and virtually everyone at least sometimes thinks critically*. Baseball pitchers and cricket bowlers, carpenters and painters, mothers and voters and friends and lovers, researchers and scholars, anyone who wants to improve at a complex set of skills must actively study the qualities that constitute such skills (in thought or action) and systematically apply them to their own work, life, and thought. Critical thinking, in part, is the process of comparing what one is against what one might be and developing a plan for moving from the former towards the latter.

This positions us nicely for a turn from these specific examples to view critical thinking from a globalized perspective, an approach which brings us toward what I believe should be, and what rhetorically is, at the heart of formal systems of education.

Of course, as an oral historian, I have to again start with a story. I recently had a conversation with a very sharp and insightful man who graduated with a B.A. in creative writing from Harvard. After committing himself to a life of poverty while pursuing his creative work, he found that he couldn't stomach the editing process, which he viewed as destroying his creations. He then shifted fields dramatically, and is now learning computer programming through online courses at MIT. As we were trading life stories and personal interests, the subject came to education, and he made a comment which, though he didn't know it, places the broad development of critical thinking first in the educational hierarchy. He said, "The curriculum should be methods for determining what is right or wrong in any subject or domain of life". This statement is a useful possible definition of critical thinking.

This man's life story highlights the second important point in this preface, a reality often overlooked and almost always underappreciated in discussions on educational

reform or critical thinking: much of the explicit training which formal systems of education offer is perceived by students to be not centrally relevant to their immediate and long-term concerns. To many students, then, much of the training they receive appears to be unrelated to their life's goals and obstacles. These feelings are not entirely baseless. How many creative writing majors will go on to be poets? How many philosophy graduates will use metaphysics or formal logic to reason through life's problems? After we complete formal schooling, how many times are we asked to answer a question or solve a significant problem without access to any sources of information or computational assistance?

On the other hand, how many people will need to protect themselves from predatory advertising, misleading labels, political propaganda, police intimidation or apathy, personal tragedy and hardship? These issues are doubly confounding given the pace of change and the concomitant need to adapt both professionally and personally. How many will experience medical problems and, while physically suffering, need to navigate dauntingly complex healthcare systems? This cannot be stressed enough: *our deepest trials, our greatest causes of suffering and elation, those issues that most affect our humanity, arise in circumstances which are most divorced from the conditions of the typical classroom*. Our second point, then, is that training in specialized forms of criticality should not take precedence over practice in thinking critically through everyday complex problems (such as diet and exercise), as well as rarer but still central issues like conflict resolution and personal loss. These situations demand skills and abilities rarely if ever confronted explicitly in formal classroom settings.

Finally, and by contrast (important point #3), it is essential in my view to conceptualize critical thinking as a broad collection of practices, concepts, abilities, and dispositions that can be powerfully employed in practically any context. Richard Paul describes critical thinking as a 'system-opening system' – a system of ideas (e.g. purposes, questions, assumptions, conclusions) whose purpose is to open other systems of intellectual structures (such as biological systems, chemical systems, historical systems, etc.).

In sum, this preface introduces three important understandings:

1) Critical thinking is a broad concept which virtually everyone engages in, to some degree, at least some of the time.

2) Much critical thought resulting from explicit training lies within specialized do-

mains or areas of expertise; critical thinking on fundamental human issues is therefore often neglected.

3) Critical thinking as an interest of educators seeking to help students cultivate skills they need for reasonable judgement, self-improvement, self-empowerment, and self-liberation demands an approach to teaching for critical thinking that is explicit, systematic. fairminded and cross-curricular.

The rest of this dissertation opens a discussion about the rich nature of critical thinking. The hope is that, by the end, the reader will have a clearer and more accurate view of:

1. The idea of critical thinking, some of its breadth and depth.
2. The present status of teaching and learning for critical thinking, mainly within English speaking higher education institutions.
3. The present state of attempts to improve teaching and learning for critical thinking across the curriculum.
4. Some important lessons derived from one U.S. research university's attempt to improve teaching and learning for critical thinking across the curriculum.

Abbreviations:

AfL = Assessment for Learning

CPD = Continuing Professional Development

LHTL = Learning How To Learn

LC = Learning Community

FCT = The Foundation for Critical Thinking

The lead team = the group who maintain the on-campus critical thinking enhancement plan

The University = the research site

Abbreviations within data presentation:

… = break in text

Student = Student

LT = Lead Teacher

Prof = Professor

Introduction

This project rests on three foundational premises:

1. **Developing critical thinking in students is a primary goal of higher education.**
2. **The higher education sector, on the whole, is not sufficiently effective at fostering critical thinking in teaching and learning.**
3. **Cross-curricular and systematic improvement in teaching and learning for critical thinking is possible; if we are to cultivate more fairminded critical societies in the long run, it is necessary.**

The first two points above are examined in the empirical literature review, in the section titled 'The Gap between Rhetoric and Reality' (3.4). Though surveys indicate nearly unanimous faculty agreement on the importance of developing students' critical thinking (ranging from ~90-99%), evidence is mounting that teaching practice, in general, is not in line with these values. As stressed in the most recent and highly visible report on this issue: '…99 percent of college faculty say that developing students' ability to think critically is a 'very important' or 'essential' goal of undergraduate education...however, commitment to these skills appears more a matter of principle than practice...the end result is that many students are only minimally improving their skills in critical thinking... during their journeys through higher education' (Arum and Roksa, 2011, 35).

The third premise, that systemic reform is possible and necessary for the development of more critical societies, brings us to this dissertation. Its purpose is two-fold: 1) to collect in one document literature relevant to the cross-curricular and systemic improvement of teaching and learning for critical thinking, and; 2) to contribute to our understanding of how critical thinking can best be fostered through an empirical investigation of one university's attempt at reform of this sort.

It is important to explain two key concepts in premise three: 'cross-curricular' and 'systemic'. 'Cross-curricular' refers to improvement across the disciplines and into student support services (such as advising, health services, etc.). 'Systematic' refers to improvement across institutions.

Improvement should be cross curricular because the realities of life and livelihood

in the 21st century demand citizens skilled in thinking critically about a broad range of significant issues. In this 'buyer beware' world, students must not only be aware of the implicit dangers and risks inherent in navigating the world as humans is not enough. Students must also be skilled in critically analyzing important issues and in pursuing alternative possible futures within them.

The need for systematic improvement emerges from a concern for equity, as well as quality: it is not enough that students are graced by one or a few teachers who significantly foster their critical thinking in formal education. All students deserve regular opportunities to develop critical thinking skills and dispositions. Hence, if we are to cultivate critical thinking in students, we must take a systematic approach to teaching for critical thinking, and therefore a systematic approach to reform.

Realizing change requires that we have a view of 1) the ideal, 2) an accurate understanding of present reality in relation to that ideal, and 3) a practical plan for moving from where we are (the real) to where we want to be (the ideal). This agenda is manifest in the following three questions, each of which parallels the three premises above:

1. **What is the ultimate goal of teaching for critical thinking? (the ideal)**

Achieving change towards critical thinking assumes that we have some clarity regarding the kinds of thinkers we ultimately wish to develop. Unfortunately, as empirical research indicates (3.4.2), the overwhelming majority of professors have difficulty explicitly communicating clear and substantive conceptions of critical thinking, neither can they explain how they go about teaching for critical thinking. In other words, the phrase 'critical thinking', though in common usage, is not commonly spelled out, elaborated, or exemplified. A primary purpose of this dissertation is to sketch out some of the territory implied by the idea of 'critical thinking', and to color it in with as much detail as possible in the space allowed. The preface, chapter one, and chapter two, as well as parts of chapter three and the majority of chapter five are largely composed of analysis (and some evaluation) of different ways of thinking critically (or 'forms of criticality') as well as examples of critical thinking (or 'manifestations of criticality'). Each entry explores alternative frameworks for critical thinking, any one of which may serve as an ideal given a particular purpose or need.

2. **How effectively do we presently foster critical thinking in teaching and learning? (the real)**

Improvement must target real weaknesses while maintaining or even upgrading strengths. Reform must therefore begin with a careful analysis and evaluation of present practice. Evidence increasingly mounts that critical thinking is not systematically taught in higher education. Some of this evidence is examined in section 3.4.2 of this dissertation. Reform efforts at the research site emerged from the interests of the on-campus community, and due to an identified gap between teacher and student perceptions of the amount and quality of critical thinking opportunities in the classroom. As interest in critical thinking is likely to grow, it is a prime candidate for reform efforts at any university (or within any department).

3. **How can we improve teaching and learning for critical thinking? (the practical)**

Once teaching for critical thinking has been targeted as a goal of professional development, a broad, long-term, and substantive plan should be designed and implemented based on conditions specific to therelevant context Again, we must figure out how to go from where we are (question 2) to where we want to be (question 1). It is question three, that focuses on narrowing the gap between the ideal and the real, that stimulated the original research contained in chapter five.

The Research Gap

This research project seeks to contribute to current understanding of how to improve teaching and learning for critical thinking across the disciplines at university level, a convergence of interests little researched. In fact, substantive research on faculty development in higher education is rare. As Clement and McAlpine, editors for the *International Journal for Academic Development* write, 'the field of academic development is an emerging one, where 'there does not exist an agreed upon body of knowledge, let alone a shared set of convictions or research methods' (2008, 1; see also Macdonald, 2003; Little, 2008). My own investigations support this view. To begin, the literature is not effectively cross-referenced, and there appear to be few attempts to synthesize it. Most reports on higher education faculty development initiatives are conducted internally using unclear and often questionable methodology, or are published in minor journals or local newsletters. Consequently, 'there is little evidence for the effectiveness of any higher education [faculty development] programme' (Lycke, 1999, 126).

Further, data gathered in these studies is usually indirect (subjective), focused on surveys of faculty and student opinion. As Stes, Clement, and van Pategem (2007, 102) write, 'Little is known about the real impact of staff development on day-to-day teaching practice and evaluations are generally limited to measures of participants' satisfaction' (see also Weimer and Lenze, 1997; Gilbert and Gibbs, 1999). Where more direct measures are employed, this almost invariably consists in the use of standardized and machine scorable tests, which target a narrow range of critical intellectual abilities. In the words of Tsui, 'Virtually absent from the research literature on the development of critical thinking is direct input by participants. For example, we know little about how college students, faculty, and administrators feel about this skill, what activities they perceive as contributing to or impeding its development, and why students do or do not engage in such activities. Instead, research on critical thinking has used a quantitative approach almost exclusively, in which statistical analysis identifies significant correlates of student scores on such standardized multiple-choice tests as the Watson-Glaser Critical Thinking Appraisal and Cornell Test of Critical Thinking' (Tsui, 2000, 422). If we truly value fostering deeper and more practical forms of critical thinking in students, we must create measures and/or methodology which appropriately target and test them.

The Study

Chapter five presents the results of a qualitative and exploratory investigation into the effects of an institutional enhancement plan whose purpose is to infuse critical thinking within all elements of the undergraduate experience within a large research university. The empirical report gathers data relevant to the following three questions:

1) What improvements in understanding and practice of critical thinking can be documented at the research site?

2) What primary factors have supported the improvements in teaching and learning for critical learning found in this study?

3) What obstacles emerge when attempting to improve teaching for critical thinking across the disciplines within a research university?

To address these questions, multiple sources of data were collected over the course of the semester Fall, 2011. These included interviews with faculty, staff, and stu-

dents, as well as observations of classrooms and professional development activities. The methodology is detailed in chapter four.

The Critical Thinking Initiative at the Research Site

Though we must be careful not to provide too many details of the research context so as to compromise anonymity, it is important to make clear its basic elements. The institutional improvement plan investigated in this dissertation began seven years ago during the course of regulary scheduled re-accreditation, which occurs every ten years. Accreditation guidelines state that all members of the campus community must be allowed input on the focus of the reaccreditation plan. After several months of open solicitation of ideas, 'critical thinking' emerged as the centerpiece of reform, due to it being the most often suggested idea. The quality enhancement plan at the research site includes workshops, faculty discussion groups, an annual 3-day seminar on critical thinking led by a theoretician of the FCT, grants for improvements in teaching, university-wide 'teaching celebration days', conferences, lunch discussions, and more.

The core feature of faculty development is the 'learning community' model. These were voluntary: participants were either invited or applied. The course lasts a full semester, with meetings every two weeks. Each session focuses on learning some theory of critical thinking and integrating that theory into classroom practice. In the two weeks between meetings, participants tested their new strategies. They then share their successes and struggles in the following meeting. The program was carefully developed, both logistically (e.g. about scheduling, providing food, etc.) and substantively (i.e. regarding selected aspects of critical thinking theory); further, it was flexible and collaborative. Participants worked together with lead teachers to infuse critical thinking into a project which teachers chose. These sessions were led by a local (on-site) team of teachers and administrators who are themselves participants in the process of change.

To inform attempts to more deeply infuse critical thinking across the curriculum, the University selected the Paulian framework for critical thinking. This theory has been developed by Richard Paul, Linda Elder, and Gerald Nosich, senior fellows at the Foundation for Critical Thinking. The theory was selected from a short-list of sixteen approaches based on six criteria (see appendix C). It was vetted by the Philosophy department on campus as the best global approach to critical thinking, and was finally overwhelmingly

approved by the University steering committee. Some of the basics of this theory are outlined in section 2.4. More can be found online: www.criticalthinking.org.

Chapter One: A (very brief) History of Critical Thinking

"Critical thinking, as it is exhibited in the great traditions, conjoins imagination and criticism in a single form of thinking; in literature, science, history, philosophy, or technology the free flow of the imagination is controlled by criticism and criticisms are transformed into a new way of looking at things." (Passmore, 1967, 201)

The purpose of this chapter is two-fold: 1) to provide the reader with a number of diverse examples of both theories of critical thought and examples of critical thinking in human life, and, in so doing; 2) to mark out some of the intellectual territory which must be explored if a bona-fide field of critical thinking studies is to emerge and flourish. As this chapter will hopefully make clear, the history of critical thinking needs vast expansion with contributions from scholars within potentially every subject and discipline.

First, let us explore some key problematics. In the construction of any history, an inevitable question one must consider early and often is: 'of all available data, what must I include, what should be included if possible, and what can reasonably be excluded?' Given the broad conception of critical thinking outlined in the preface of this dissertation, the quantity of potentially relevant literature is overwhelming. We cannot examine every instance of criticality, nor can we cover all or even a small portion of critical thinking theoreticians. This would entail, to start, a history of the methodology of every discipline and sub-discipline. To grasp the extent of this literature, consider just some of the strands relevant to an encompassing review of critical thinking theory:

- Intellectual History
- History of Social Critique
- Methodology (in every discipline)
- Pedagogical critique
- Argument analysis
- Rhetoric
- Dialogue
- Linguistics
- Social critique

- Metacognition
- Fallacy theory
- Political critique
- Theories of personal enlightenment
- Economic critique
- Collected wisdoms and sayings
- Literature
- Psychological critique
- Epistemology
- Utopia writings
- Personal anecdotes

By taking this broad and inclusive view of criticality, we begin to see it subtly at work in countless dimensions of human thought and action. All of these strands (as well as others) require investigation and documentation in order to develop the history of critical thought and critical thinking. Hence, all disciplines, implicitly if not explicitly, contribute to the history of critical thinking. Detailing the history of critical thinking will require expert contributions across disciplines, professions, and specializations.

Another obstacle to the construction of a history of critical thinking is the lack of secondary source material. Few histories of critical thinking, per se, have been written. Each of the few of which I am aware are contained within works whose primary focus is not historical (e.g. Thayer-Bacon, 2000; Paul, Elder, and Bartell, 1997). They are, therefore, almost inevitably constructed for a relatively narrow purpose: to point out one or a few particular aspects of criticality.

As historian for the Foundation for Critical Thinking, I began writing a history of critical thinking roughly five years ago. The following is a compressed version of what is still just an outline. It is very much *a* history of critical thinking. It consists mainly in circumscribed investigations of particular instances or theories of criticality. This has left little room for discussion of the implications of historical conditions for the development

of critical thinking, or for investigating the extent of critical thought within society generally. Documenting social conditions which aid or hinder criticality will be a primary focus in developing the history of critical thought. This may shed light on how to construct societies that more systematically foster of fairminded critical thinking

DISCLAIMER: What follows is constructed primarily from my personal knowledge and understanding of human history. Therefore, it is limited to that which has been introduced and taught to me as an American student of history at the public school and undergraduate level, as well as my own private investigations on the subject. It may be seen, therefore, as biased in the 'Euro-centric' direction. I have made some effort to include viewpoints from other parts of the world, but the perspective in this chapter (chapter one) emerges to some extent from my still limited world-view. The purpose here is not to consider all possible connections, but to explore some of the intellectual territory implied by the concept of critical thinking.

1.1 Homo Sapiens: The Thinking Being

There are many possible beginnings of critical thought in the human species, as early *homo sapiens* had much to gain through its development and employment. In everything that requires skill, there is incentive for critical thought. Whether the task is shelter construction, food gathering or hunting, basket or clothing weaving, success is in large part determined by the degree of conscious understanding and self-criticality on the part of the actor. No doubt much was discovered or developed by accident or happenstance. However, the reproduction and spread of these practices or ideas would require explicit and critical thought. Individuals would require explicit and critical thought. Individuals would need to, in other words, teach and learn the critical skills necessary for skilled performance.

The development of language is a great aid to critical thought. Early humans looking to improve their ability to work stone into effective tools, for example, would have benefited from explicit discussion with a more skilled craftsman on the important micro-skills and standards required for success (for example, standards for the selection of stone, principles for effective knapping, as well as determiners for when a tool is finished and a consideration of its quality). Skilled creation results from many hours of explicit critique and improvement.

Human needs, among them food and shelter, encourage the critique of old methods and the creation of new solutions. For example, when Captain Cook sailed to Tahiti in the 18th century, he took on a native Tahitian named Tupaia, whose feats of navigation stunned the European sailors:

> Soon after [joining the crew], the Polynesian wowed the crew by nagivating to an island unknown to Cook, some 300 miles south, without ever consulting compass, chart, clock, or sextant. In the weeks that followed, as he helped guide the *Endeavour* from one archipelago to another, Tupaia amazed the sailors by pointing on request, at any time, day or night, cloudy or clear, precisely toward Tahiti…' (Dobbs, 2013, 44).

Tupaia's methods are not made clear in the article, neither is it clear how his skill developed. However, assuming that he does not possess some biological advantage (such as the 'inner compass' some birds possess), it is obvious that the framework for sailing is using is superior to Cook's.

No doubt the development of new human skills produced tension between novel alternatives and our native desire for security, stability, familiarity. Discussions may have emerged in which various sides articulated divergent visions of how to proceed, giving reasons as to the strength of their ideas and highlighting the weaknesses of others. This may have been the beginning of critical but manipulative (or Sophistic) thought.

Whatever the specifics, there can be no doubt that at some point in human history the first 'critical thoughts' emerged and began to be explicitly articulated. Since then, countless individuals from countless cultures have produced reasoned treatises on alternative conceptions of thinking and being. We know that many have been lost. The rest of this section explores some of those extant.

Some questions for future research:

- What forms of critical thinking would have most benefited pre-literate peoples?
- What evidence exists of the criticality of pre-literate peoples?
- What are some impacts of critical thinking on human development and evolution?

- What are some impacts of development and evolution on critical thinking?

1.2 Some Examples from Ancient Moral Texts

Analysis of the oldest known texts reveals proto-critical frameworks for encouraging certain types of behavior within human groups. I say proto-critical because, though they contain explicit guidelines or principles for thought and action, people in these groups have sometimes been encouraged, or even required, to accept these frameworks uncritically. In innumerable historical cases these 'guidelines' have been interpreted as 'sacred rules' and enforced at the point of the sword, or over the fire, as the 'ruling' word and the 'divine' word were increasingly perceived as one.

At the same time, a cursory investigation of the **Bible**, the **Torah**, and the **Qur'an**, as well as many **Buddhist** and **Confucian** texts reveals numerous imperatives, principles, and proverbs that can serve as critical constructs if critically analyzed and evaluated. For example, Muslims are required to give a portion of their income to the poor; Christians are commanded to avoid greed; Buddhists are taught to critically examine all authority, even that of the Buddha.

Buddhism in particular appears to be a fairly evolved system for the analysis, evaluation, and improvement of thought. My initial explorations of Buddhist works (almost wholly within the Mahayana or 'Great Vehicle' school[3]) have convinced me that there is much overlap in purpose and even process between Buddhism and critical thinking. Of course, there are undeniable aspects of un-criticality within Buddhism as well, most notably in such beliefs as the divine and re-incarnate nature of the Dalai Lama.

Some questions for future research:

- What explicit principles for critical thinking can be derived from ancient moral and spiritual texts?
- Which spiritual principles in these texts impede the learning of critical thinking and the living of a critical life?

[3] For an accessible description and brief history of Buddhism, and the Mahayana tradition particularly, see *Essence of the Heart Sutra: The Dalai Lama's Heart of Wisdom Teachings* (2005) (edited by Geshe Thupten Jinpa)

1.3 Some Examples from Greece and Rome

Many start their history of critical thinking in fifth century b.c.e. Athens (e.g. Paul, Elder, and Bartell, 1997; Lipman, 1995; Thayer-Bacon, 2000), and for good reason: here we find written proof in abundance of critical thinking in multiple directions. In fifth century Athens (b.c.e.), we find humans applying reason to uncover truth rather than relying on base instinct, or resorting to the metaphysical or theological. As a result, critical discussions and inquiries began to coalesce around common themes, forming the basis for many of the subjects we still study today. Following are a few examples.

1.3.1 Socrates: The Historical Model for Strong Sense Critical Thinking

As Paul and Elder (2006, 68) have succinctly put it, '**Socrates** was an early Greek philosopher and teacher (c. 470–399 b.c.e.), and is perhaps the single most original thinker in the history of critical thinking. In his life, we see something exceedingly rare in human history: an almost universal display of critical thinking abilities and traits'. Indeed, it is difficult to overemphasize Socrates' contribution to the idea of critical thinking. Consider this list of core qualities (not at all exhaustive) of an ideal critical thinker. Ideal thinkers:

1. advance the ideal of freedom of thought in their lives and in human societies;
2. avoid debating unsettleable (i.e. metaphysical) questions;
3. work to become intellectually disciplined;
4. are systematic in their approach to problems and issues;
5. understand that the mind can reason and through reason figure out the nature of things;
6. routinely reason within multiple points of view;
7. work to develop intellectual humility;
8. attempt always to think for themselves using the highest standards of quality;
9. have courage to speak out against injustice;
10. consistently work to cultivate their own reasoning skills;
11. routinely engage in explicit and rigorous self analysis;

12. apply intellectual skills to important human problems to alleviate suffering and pain;
13. think within a wide range of subjects, and apply knowledge from these subjects to everyday life problems and issues;
14. are concerned to understand how human thought, especially their own, can be flawed or problematic; and
15. are committed to lifelong learning and intellectual growth.

Of course, there are no 'ideal thinkers', but Socrates comes close. Socrates displayed all these qualities at a high level, with the possible exception of number two. In one of the very first recorded examples of criticality, then, we see a near-paradigm critical thinker. Unfortunately, Socrates – like many great thinkers – was more engaged in *practicing* criticality than in making his system explicit. Indeed, we have no extant record of any attempt by him to formalize his questioning process. He seems content to teach by example.

That Socrates did not write about his art is regrettable. It is entirely possible that had he done so, his ideas might have had a far greater impact on teaching and learning than we see today. It seems that few teachers practice the art of Socratic questioning in the form implied by Socrates' practice, perhaps because it has been little examined from the point of view of critical thinking.

Paul and Elder (2006), in a systematic analysis of the Socratic dialogues, make clear that Socrates questioned for a variety of purposes and, in the pursuit of these purposes, routinely employed foundational and powerful analytical and evaluative concepts and tools. This system, once explicitly grasped, provides a flexible framework for exploring the logic of virtually any intellectual agenda. Here is a brief excerpt of the Socratic dialogue with Euthyphro, which has been marked by Paul and Elder (blue text) to highlight the implicit critical thinking moves made by Socrates (2007, 77-78):

> 'Socrates: And what is piety, and what is impiety? (Socrates asks Euthyphro to explicitly state the fundamental difference between two concepts. This is an important early step in conceptual analysis.)
>
> Euthyphro: Piety is doing as I am doing; that is to say, prosecuting anyone who is guilty of murder, sacrilege, or of any other similar crime—whether he be your father or mother, or some other person,

makes no difference—and not persecuting them is impiety...

Socrates: May not this be the reason, Euthyphro, why I am charged with impiety—that I can not away with these stories about the gods? ...For what else can I say, confessing as I do, that I know nothing of them? I wish you would tell me whether you really believe that they are true.

(Here, Socrates is saying that Euthyphro, since he purports to know a lot about the gods, should tell Socrates of his knowledge. Socrates refers to the indictment against him—that he believes in gods different from those sanctioned by the state. Socrates is demonstrating intellectual humility, while implying that Euthyphro is intellectually arrogant in purporting to know what the gods believe.)

Euthyphro: Yes, Socrates; and things more wonderful still, of which the world is in ignorance.

Socrates: And do you really believe that the gods fought with one another, and had dire quarrels, battles, and the like, as the poets say, and as you may see represented in the works of great artists? The temples are full of them. Are all these tales of the gods true, Euthyphro?

(Socrates is now directing Euthyphro to think about whether the stories one hears of the gods can be logical.)

Euthyphro: Yes Socrates, and, as I was saying, I can tell you, if you would like to hear them, many other things about the gods which would quite amaze you.

Socrates: I dare say; and you shall tell me them at some other time when I have leisure. But just at present I would rather hear from you a more precise answer, which you have not as yet given, my friend, to the question, What is "piety?" In reply you only say that piety is, doing as you do, charging your father with murder?

(Note that Socrates is using two intellectual standards in his last comment—he is asking for a "more precise answer," and in doing so, he is redirecting the dialogue back to what is relevant. He is pointing out that an example is not a definition, that if someone asks for a definition, an example does not complete the intellectual task.)

Euthyphro: And that is true, Socrates.

Socrates: I dare say, Euthyphro, but there are many other pious acts.

Euthyphro: There are.

Socrates: Remember that I did not ask you to give me two or three examples of piety, but to explain the general idea which makes

all pious things to be pious. Do you not recollect that there was one idea which made the impious impious, and the pious pious?

(Here Socrates is again asking for Euthyphro's definition of pious in order to determine whether his definition is reasonable. He wants Euthyphro to stay focused on the task.)

Euthyphro: I remember.

Socrates: Tell me what this is, and then I shall have a standard to which I may look, and by which I may measure the nature of actions, whether yours or anyone's else, and say that this action is pious, and that impious?

(Socrates is implying that once he has a clear definition of pious, then he can use that definition to determine whether anything is or is not pious. He refers to this as a "standard" by which he can judge.)

Euthyphro: I will tell you, if you like.

Socrates: I should very much like...'

Socrates' contribution to the idea of critical thinking, then, is foundational. His impact on human life and emancipation, however, is less satisfactory, as subsequent generations of scientists, philosophers, and theologians, rather than illuminating the critical thinking implicit in the Socratic dialogues, have tended to focus on Plato's later metaphysical and political works, and on the scientific thought of Aristotle. Both Plato and Aristotle made important contributions to the history of ideas, but arguably less to the history of critical thinking, than Socrates.

Some questions for future research:

- What can rigorous study of Socratic thought reveal about critical thinking?
- What do different texts, including those by Plato and Xenophon, reveal about the Socratic method from a critical thinking perspective?
- How is Socratic critical thought manifest in human life?
- What conditions (historical, psychological, sociological, biological, etc.) encourage Socratic critical thought?
- How has Socratic critical thought alleviated human pain and suffering?
- How can we teach students to become more fairminded critical thinkers?

1.3.2 Sophists: A Paradigm Case of Weak Sense Critical Thinking

In the Socratic dialogues, one key motivation for Socrates is the pursuit of truth. Socrates devoted his life to his own intellectual and ethical development of himself as well as that of others. It appears that he refused to accept payment for his 'teachings', insisting that he possessed no special knowledge (an exemplar of intellectual humility). For this he was was ultimately executed by the very people he was trying to help. The Sophists, on the other hand, were itinerant scholars who charged high fees for instruction in the art of winning arguments; these scholars sought dialectical victory over truth, and emphasized external, rather than internal (self-) critique (an unfortunate holdover which still permeates much of the philosophical literature on critical thinking).

Thus, we see at this early stage in human recorded history one of the most fundamental divides in the literature on critical thinking: the extent to which it emphasizes self-reflection and a concern for the rights of others or rather promotes the use of intellectual skills to advance any agenda, including unethical ones. Richard Paul (1981) is widely credited (e.g. Bedecarre, 1994; Thayer-Bacon, 2000; Moseley et al., 2005; Perkins, cited in Paul, 2011) with identifying and naming this distinction, which two forms he labeled 'weak sense' and 'strong sense' critical thinking. 'Weak-sense [or 'sophistic'] critical thinkers are those who use the skills, abilities, and to some extent, the traits of critical thinking to serve their selfish interests; [they are] highly skilled but unfair or unethical critical thinkers...Strong-sense [or 'Socratic'] critical thinkers, on the other hand, are not simply highly skilled but fairminded; they are 'characterized predominantly by the following traits: 1) the ability and tendency to question deeply one's own views; 2) the ability and tendency to reconstruct sympathetically and imaginatively the strongest versions of viewpoints and perspectives opposed to one's own; 3) the ability and tendency to reason dialectically (multi-logically)…[and]; 4) the ability and propensity to change one's thinking when the evidence requires it, without regard to one's own selfish or vested interest' (Elder and Paul, 2009, 70-74).

Some questions for future research:

- What can rigorous study of Sophistic thought reveal about critical thinking?
- What do texts reveal about these sophistic philosophers from a critical thinking perspective?

- How does Sophistic critical thought manifest in human life?
- What conditions (historical, psychological, sociological, biological, etc.) encourage Sophistic critical thought?
- How has Sophistic critical thought contributed to human pain and suffering?

1.3.3 Thucydides and Livy: Critical Historians

Thucydides (ca. 460–ca. 395 b.c.e.), it appears, was the first historian to produce a purely humanistic history. That is, his *History of the Peloponnesian War* is the first history which features no divinities, with all of the successes and follies resulting from human action. For this he has been called 'the first truly critical historian of the world' (Gay and Cavanaugh, 1972, 55). Histories adhering to this one principle are very different from those that do not, such as Homer's *Iliad* and *Odyssey*. Though Thucydides' thesis was never made explicit (perhaps due to the fact that he died before he could complete his work), a close reading brings to light certain key themes, among them: that clever, sophistic orators are able to sway uncritical mobs to actions which ultimately are not in their own interest, and that this can be fatal in a democracy.

The contribution to critical thinking by Thucydides, and, to a lesser extent **Livy** (59 b.c.e.– c.e. 17) with his *History of Rome*, is in their exemplification of essential critical thinking traits, such as: thinking within multiple points of view; striving to write without unfair bias towards one's own frame of reference; having the goal of alleviating suffering (through historical lessons); and attempting to understand and develop the ability to think historically.

Some questions for future research:

- When we look at recorded history from a critical thinking perspective, to what extent and in what ways and at what periods has critical thought been implicit in common thought and in the work of historians?
- What forms of critical thinking are important in the field of history?
- What historical insights are most crucial to living an examined life?

1.3.4 Hippocrates and Galen: Critical Physicians

Hippocrates (460–370 b.c.e.) and Galen (129–200 c.e.) took major steps in the field of medicine by focusing on the scientific logic – as opposed to the metaphysical logic - of sickness and disease. **Hippocrates'** ideas, though never synthesized or expressed by him in these terms, are based on the following two critical premises: '(a) Health is the natural state, disease is unnatural; and (b) Disease, no less than health, is governed by natural causes, which it is the task of the physician to understand. (Wheelwright, 1966, 262-266). Those who explained sickness as inflicted by angry gods were denounced by Hippocrates as 'magicians, ritualists, charlatans, and excorzists [sic].' Hippocrates asserted that the reason these people 'called [maladies] sacred [was] to conceal their ignorance of [them]'. Though much of Hippocrates' work has since been lost, his philosophy and method of inquiry has survived. Physicians who accept these principles practice medicine much differently than those who do not, such as shamans and herbalists. Consequently, he is considered 'the father of medicine,' and it is he after whom the Hippocratic Oath is named.

Galen, following Hippocrates' doctrine, produced more than 500 tracts on medicine, philosophy, and ethics. Some of his most notable discoveries include proving that different muscles are controlled at different levels of the spinal cord, and that the body metabolizes to produce energy. Further, he identified the functions of the kidney and the bladder. His understanding of medicine was so advanced that he was able to treat patients in ways that would not be duplicated for more than 1000 years (for example, he successfully performed surgeries to remove cataracts from the eyes; Wheelwright, 1966).

The significance of Hippocrates and Galen to the history of critical thinking lies in their questioning of metaphysical and theological approaches to medicine, their belief in the power of the human mind to solve problems using reason, and the systematic and disciplined nature with which they approached the study of medicine. In essence, they pioneered and largely formulated the concept of a 'critical' physician.

Some questions for future research:

- Looking at the history of medicine from a critical thinking perspective, to what extent and at what periods in history has critical thinking been implicit in medical practice?

- To what extent, and in what ways, is critical thinking important in the field of medicine?
- What medical insights are essential to living an examined life, and therefore represent an important contribution to critical thinking?

1.3.5 Epicureans and Stoics: Concerned with Living Ethically

Epicurus (341–270 b.c.e. - founder of the Epicurean school of thought) and the Stoics (Stoicism was founded in 309 b.c.e.) were concerned primarily with formulating a system for living an ethical and happy life. While differences between them certainly exist, it is this similarity which makes them significant in the history of critical thinking. Subscribers to these doctrines sought to use their rational capacities to overcome the inevitable pains of living a human life. They stressed the power of the mind (as Milton would write centuries later) to 'make a hell out of heaven, or a heaven of hell.'

Epicurus believed that the main cause of disturbance in the mind resulted from a lack of sufficient understanding of the natural world. As he put it, 'A man cannot dispel his fear about the most important matters if he does not know what is the nature of the universe but suspects the truth of some mythical story.' For Epicurus, the ultimate goal was to avoid pain and fear and to promote pleasure. It is for this, and because of a superficial understanding of his ideas, that he was slandered by some Stoics as a hedonist. But this view was far from the truth. Epicurus defended himself, writing, 'For it is not continuous drinkings [sic] and revellings [sic], nor the satisfaction of lusts…which produce a pleasant life, but sober reasoning…and banishing mere opinions, to which are due the greatest disturbance of the spirit.' Epicurus argued that the path towards a happy life was to be found in promoting the well being of others and acting fair-mindedly. He wrote, 'It is not possible to live pleasantly without living prudently and honorably and justly, nor again to live a life of prudence, honor, and justice without living pleasantly'; and 'the just man is most free from trouble, the unjust most full of trouble (Oates, 1940, 32-36).'

Marcus Aurelius (121 to 180 c.e.), is the most famous of all Stoics. Aurelius viewed critical self-reflection as central to living a happy life, writing: 'Through not observing what is in the mind of another, a man has seldom been seen to be unhappy; but those who do not observe the movements of their own minds must of necessity be unhappy.' He saw the critical mind as one which 'sees itself, analyses itself, and makes itself such

as it chooses; the fruit which it bears itself enjoys…it obtains its own end, wherever the limit of life may be fixed.' He concluded that 'Tranquility is nothing else than the good ordering of the mind', which should be a space into which one can retreat: 'Remember to retire into this little territory of thy own [the mind], and above all do not distract or strain thyself, but be free, and look at things as a man, as a human being, as a citizen, as a mortal.' (Aurelius, *Meditations,* II, IV, and XI). Aurelius argued staunchly for freedom of speech, for the need to act justly, and for the importance of holding oneself to standards as least as high as those to which one holds others.

Some questions for future research:

- To what extent is critical thinking manifest in the history of stoicism and epicureanism?
- What forms of critical thinking are essential for reasoning well about ethical issues?
- What insights necessary or useful for human life can be gained from analysis of ethical doctrines like Stoicism or Epicureanism?

1.4 Scholasticism

Scholasticism (roughly 10th-14th centuries c.e.) was a school of thought whose contributors held that the revealed truths of God would naturally be consistent with the insights of reason, and thus that reason could be used to create a fully integrated system of knowledge (connected with the orthodox image of God).

The main goal of **Scholasticism** was not to find new knowledge but to integrate existing knowledge. This marks a significant difference between Scholastic and Renaissance thinkers who were to come (14-17th centuries c.e.). Renaissance thinkers were intent on developing new ideas, new creations, new art forms. Scholastic thinkers assumed revelation was the word of God, and hence allowed it to overrule reason in the case of contradictions. Reason, then, was considered to be at the service of theology. The authorities—the great thinkers of Greek and Roman antiquity and the early Fathers of the Church—were routinely cited as infallible guides. Aristotle was considered the premier authority in reasoned thought, St. Augustine the premier authority in theological matters. The scholastics, then, were somewhat uncritical in their blind acceptance of authority.

[4]Other key scholastics include: Anselm, Peter Abelard, Roscelin, Maimonides, Roger Bacon, St. Bonaventure, Duns Scotus, William of Ockham.

Nevertheless, the Scholastics established the practice of critical reading (by developing careful commentaries of texts they were studying) and the practice of extended rational thought through refined dialectical reasoning. **Thomas Aquinas**[4], in particular, constructed powerful arguments against his own belief in God as a method for making his dialogical reasoning explicit. His life and work offer insight into the important disposition of critically-minded individuals to empathize fair-mindedly with their antagonists.

1.5 Examples from Europe and North America from Renaissance to Present

The proliferation of forms and manifestations of critical thinking beginning in what is generally called 'the Renaissance' is remarkable. Here are some few examples from various disciplines and human endeavors.

1.5.1 *Utopia*, *Follies*, *Idols, Emile* and *The Prince*: Re-envisioning Society

As the power and authority of the Church and King began to hold less sway over human minds, room emerged for the imagination and articulation of alternative visions of how to live, govern, and educate themselves and their children. **Thomas More's** *Utopia* was an attempt to structure a more harmonious and non-violent community; **Rousseau** worked in a similar vein to conceptualize a better system of education in the *Emile: or, On Education*; **Erasmus'** *In Praise of Folly* and **Bacon's** *Idols of the Mind* critique social and personal norms, targeting some of the negative consequences of self-deception and unexamined assumptions; **Machiavelli's** *The Prince* is a how-to guide on governance in a corrupt and selfish world.

Let us examine some of Bacon's *Idols* for insight into the nature of these works:

> 'The *Idols of the Cave* take their rise in the peculiar constitution, mental or bodily, of each individual; and also in education, habit, and accident. Of this kind there is a great number and variety...
>
> Men become attached to certain particular sciences and speculations, either because they fancy themselves the authors and inventors thereof, or because they have bestowed the greatest pains upon them and become most habituated to them. But men of this kind, if they betake themselves to philosophy and contemplations of a general character, *distort and color them in obedience*

> *to their former fancies;* a thing especially to be noted in Aristotle, who made his natural philosophy a mere bondservant to his logic, thereby rendering it contentious and well nigh useless. The race of chemists again out of a few experiments of the furnace have built up a fantastic philosophy, framed with reference to a few things; and Gilbert also, after he had employed himself most laboriously in the study and observation of the loadstone, proceeded at once to construct an entire system in accordance with his favorite subject...
>
> There are found some minds given to an extreme admiration of antiquity, others to an extreme love and appetite for novelty; but few so duly tempered that they can hold the mean, neither carping at what has been well laid down by the ancients, nor despising what is well introduced by the moderns...these affectations of antiquity and novelty are the humors of partisans rather than judgments; and truth is to be sought for not in the felicity of any age, which is an unstable thing, but in the light of nature and experience, which is eternal. These factions therefore must be abjured, and care must be taken that the intellect be not hurried by them into assent'

Utopia, In Praise of Folly, Emile and *The Prince*, all take a similar approach. They each explicate systems described either as problematic or as desirable (a not dissimilar approach may be seen in Goffman and Fromm, section 2.3.1). Each offers useful critical insights into particular issues. Naturally, these works must be critiqued from the point of view of critical thinking. All have weaknesses. For instance, Machiavelli basically lays out an integrated philosophy for weak-sense critical thinking in The Prince, not withstanding the strengths in the more democratic *Discourses*. From the *Discourses* (Machiavelli, 2003, 112-122):

> 'Men never do good unless necessity drives them to it; but when they are too free to choose and can do just as they please, confusion and disorder become rampant…One should take it as a rule that rarely, if ever, does it happen that a state, whether it be a republic or a kingdom, is either well-ordered…unless this be done by one person….The organizer of a state ought further to have

> sufficient prudence and virtue not to bequeath the authority he has assumed to any other person, for, seeing that men are more prone to evil than to good, his successor might well make ambitious use of that which he had used virtuously. Furthermore, though but one person suffices for the purpose of organization, what he has organized will not last long if it continues to rest on the shoulders of any one man, but may well last if many remain in charge and many look to its maintenance. Because, though the many are incompetent to draw up a constitution, since diversity of opinion will prevent them from discovering how best to do it, yet when they realize it has been done, they will not agree to abandon it….'

Each of the works in this section (1.5.1) is the product of careful analysis and evaluation, and themselves contain original forms of analysis and evaluation.

1.5.2 Copernicus, Galileo, Bacon, Darwin, and Goodall: The Scientific Method in Theory and Practice

Copernicus, and later **Galileo**, employed the scientific spirit of rigorous observation to determine and popularize the sun-centered (rather than earth-centered) view of the solar-system and universe. **Francis Bacon** produced the *Nova Organon* (a replacement of Aristotle's system of observations described in his *Organum*), which is often credited as a major foundational critical framework often called the 'scientific method'.

The resulting impact of the 'scientific' framework for critical thought (not to mention the specific insights which emerged as a result of its employment) sparked what is commonly referred to as a 'revolution' in human thinking and living. Perhaps the pinnacle of achievement in this new form of critical thought did not occur until hundreds of years later, when **Charles Darwin** devotedly submitted his own orthodox and theologically-educated mind to the rigors of scientific criticality, consequently producing one of the most groundbreaking insights in all of human history: that humans, far from being 'divine', evolved from much simpler organisms. Darwin's life is therefore illustrative of the power of explicitly critical processes to effect change in human thinking and behavior.

Jane Goodall's work also importantly contributes to critical thought through her

highly accessible analyses of the thinking and behavior of some of our closest relatives: chimpanzees. By examining some of the roots of humanity, Goodall provides insight into some of our primitive underlying fears and motivations. One touching example of the importance of intimate connections can be seen in the chronicling of the decline and death of Merlin, a young chimp who was unable to recover from his mother's death (Goodall, 1988, 225-229):

> 'Just over three months later [after Merlin and his mother Marina disappeared] Merlin reappeared…goodness knows what had happened to his mother…
>
> It appeared that the chimpanzees who were at the feeding area when Merlin returned had not seen him for a long time; they hurried to greet him, embracing and kissing and patting the infant…
>
> Later on that morning Miff [his sister] arrived…from that moment Miff, to all intents and purposes, adopted her little brother. She waited for him when she went from place to place; she allowed him to share her nest at night; she groomed him as frequently as his mother would have done…
>
> Gradually, as the weeks passed, Merlin became more emaciated, his eyes sank deeper into their sockets, and his hair grew dull and staring. He became increasingly lethargic and played less and less frequently with the other youngsters. Also in other ways his behavior began to change…he behaved like a small infant that does not yet appreciate the signals of impending aggression in his elders. Yet before this Merlin, like all normal three year olds, had always responded instantly and appropriately to signals of this sort…time and again he was dragged or buffeted by displaying males because he ran towards them instead of away…
>
> A year after his mother's death, Merlin's behavior had become quite abnormal. Sometimes he hung upside down like a bat… hunched up with his arms around his knees, he often sat rocking from side to side with wide-open eyes that seemed to stare into

> the far distance…
>
> That is why we were in many ways relieved when polio put an end to his sufferings.'

We see in the scientific tradition, then, beginning in the 17th century, an explicit and systematic framework for analyzing and assessing ourselves and our surroundings. Scholars working within this paradigm have produced wide-ranging texts on the [critical] thinking necessary to conduct scientific research; they have developed a world of countless specific insights (such as Darwin's and Goodall's, above) important to understanding human nature and human potential.

1.6 The Emergence of the phrase 'Critical Thinking'

One of the most influential texts in the history of higher education, John Henry Newman's *The Idea of a University*, outlines a vision of the 'philosophical mind', which description is a powerful and deep theoretical contribution to critical thinking. Newman says, for instance (note my labels in brackets):

> 'It is education which gives a man a clear conscious view of his own opinions and judgments [intellectual humility], a truth in developing them [intellectual integrity], an eloquence in expressing them [implying important intellectual standards such as clarity, significance, and logic], and a force in urging them [intellectual courage]. It teaches him to see things as they are [accuracy, precision], to go right to the point [relevance], to disentangle a skein of thought [skill in analysis], to detect what is sophistical [having a concern for fairness; strong-sense critical thinking], and to discard what is irrelevant. It prepares him to fill any post with credit, and to master any subject with facility. It shows him how to accommodate himself to others, how to throw himself into their state of mind [intellectual empathy], how to bring before them his own, how to influence them, how to come to an understanding with them, how to bear with them … he knows when to speak and when to be silent; he is able to converse, he is able to listen; he can ask a question pertinently, and gain a lesson seasonably

> [openmindedness], when he has nothing to impart himself' (1996, 126).

An early sociologist, William Graham Sumner (*Folkways*, 1906, 633), explored some implications of a society filled with such critical minds (again with my labels added in brackets):

> The critical habit of thought, if usual in society, will pervade all its mores, because it is a way of taking up the problems of life. Men educated in it cannot be stampeded by stump orators [intellectual autonomy]... They are slow to believe [confidence in reason]. They can hold things as possible or probable in all degrees [openmindedness], without certainty and without pain [intellectual perseverance]. They can wait for evidence and weigh evidence [skilled use of intellectual standards], uninfluenced by the emphasis or confidence with which assertions are made on one side or the other. They can resist appeals to their dearest prejudices and all kinds of cajolery [intellectual integrity]. Education in the critical faculty is the only education of which it can be truly said that it makes good citizens.

The oldest known use of the phrase 'critical thinking' proper comes, I believe, from John Dewey's *How we Think*, originally published in 1910:

> The essence of critical thinking is suspended judgement; and the essence of this suspense is inquiry to determine the nature of the problem before proceeding to attempts at its solution. This, more than any other thing, transforms mere inference into tested inference, suggested conclusion into proof.' (Dewey, 1997, 74).

A more current, commonly referenced, articulation of critical thinking comes from one of the first systematic studies of critical thinking conducted by Edward **Glaser**:

> 'A critical thinker maintains "(1) an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences, (2) knowledge of the meth-

> ods of logical inquiry and reasoning, and (3) some skill in applying those methods."' (Glaser, 1941, 5-6)

In the past century, countless conceptions and frameworks for the improvement of thought have been imagined and explicitly articulated. Each sheds light on unique elements of criticality. Few have been examined from the perspective of a broad view of critical thinking and educational reform. Three key questions provoked by this chapter form a long-term empirical and theoretical research agenda:

- How have critical thinking concepts been articulated and employed by humans, and what has been the effect?
- What historical conditions aid the development and use of theory of critical thinking in human societies?
- Which conditions are hindrances?

Unfortunately, these questions cannot be addressed further here. In the next chapter I will more closely examine three bodies of critical thinking scholarship: philosophy, critical theory, and psychology. I will then briefly introduce and critique the theory of critical thinking at the heart of this dissertation.

Chapter Two: An Overview of (Some) Critical Thinking Theory

Since the turn of the 20th century, an increasing number of scholars have become interested in the idea of critical thinking (though often without reference to the phrase 'critical thinking') from a variety of perspectives.

To this point, our goal has been to make clear some of the breadth and depth implicit in the history of criticality. The next two chapters continue to develop the concept of critical thinking; Chapter two focuses on some of the important 'schools' of critical thought as well as contributions from other disciplines to the field of critical thinking studies. Chapter three focuses on empirical research on critical thinking within established systems of education. These chapters will hopefully serve as a scaffold for conceptualizing the empirical investigation at the heart of this dissertation.

In pursuing methods for fostering critical thought in educational settings, either in stand-alone courses or across the curriculum, three loose associations have historically dominated, at least in terms of number and visibility of critical texts published for cross-disciplinary educative purposes. These three categories are: philosophers, critical theorists (often philosophers themselves), and psychologists.[5] A careful reading of their recent histories suggests their interest in the idea of critical thinking: **philosophers** have historically been concerned with theory of reasoning and argumentation, as well as on truth and language; **critical theorists** seek to emancipate human minds from established power structures, one of their main targets for critique (as well as vehicles for improvement) being educational systems; **psychologists**, purusing a range of issues, loosely attempt to 'improve' human behavior by understanding the brain and mind and their implications for thought and action.

Though largely divergent, these three orientations have nevertheless united in their interest in the concept of critical thinking. Each has profoundly influenced the evolution of the field of critical thinking studies. Those wishing to understand the field of critical think-

[5] Any field of study can potentially contribute to critical thinking because any field of study might advance powerful concepts which, if taken seriously, can transform human thought and action. For example, one field deeply not analyzed in this dissertation is English. There are many approaches to improving inter- and intra-disciplinary reading a writing skills, which often serve as critical thinking frameworks.

ing studies should have some sense of these perspectives. Hence, we will briefly consider each in this chapter, highlighting some key theoretical texts. Again, we only have room in this section to scaffold these ideas.

2.1 Philosophy

We should begin with Philosophy for two reasons: its contributions to critical thinking have the longest running history, and it still generally controls stand-alone courses in critical thinking (at least, in English speaking countries). In the U.S., undergraduate courses in 'critical thinking' are taught primarily by philosophers. In the U.K., the A-level subject 'critical thinking' is founded upon the tools of formal and informal logical analysis; and across the world, in over 8,000 institutions, Cambridge International Examinations claims to offer training in the same (Lim, 2011a).

We have touched on some of the history of philosophy in terms of critical thinking in chapter one, but let us now make explicit the relevant thread connecting the ancients to the eventual development of formal logic in the late 19th and early 20th centuries. We may begin with **Aristotle's** *Organon,* which sought to formalize the structural or formal rules of argumentation (e.g. 'all A are B; all B are C; therefore all A is C' or 'if no B is A, but some C is B, it is necessary that some C is not A'). However, the focus on the *form* of argument began to have less currency during the Renaissance, as 'big-system' philosophers such as **Locke, Descartes, and Kant** constructed all-embracing theories which sought to explain the nature of truth, consciousness, and reality.

2.1.1 Formal Logic

At the turn of the 20th century, **Bertrand Russell** and **Albert North Whitehead** returned the focus in philosophy to the *form* of the argument as opposed to its *content* (hence the name: 'formal logic'). These scholars, having just finished their groundbreaking *Principia Mathematica*, lent their weight and intellectual predispositions to a group which was already theorizing in this direction. Over the next half-century they developed what is now called 'formal logic'. Formal logicians believe, still, that the truth of arguments can be determined merely by investigating the logical (or illogical) manner in which component parts are arranged and connected. In the words of **Schlick**, 'All knowledge is such only by virtue of its form. . .everything else in the expression is inessential and accidental material' (1957, 55).

Formal logicians have been, from the beginning, opposed to the kind of thinking done by previous 'big system' philosophers, whose works they dismissed as 'personal idiosyncrasies'. In the words of **Carnap**, 'all philosophy in the old sense, whether it is connected with Plato, Thomas Aquinas, Kant, Schelling, or Hegel. . .proves to be not merely materially false, as earlier critics maintained, but logically untenable and therefore meaningless' (1957, 134). Or, as Russell put it, '[formal logic] has, in my opinion, introduced the same kind of advance into philosophy as Galileo introduced to physics, making it possible at last to see what kinds of problems may be capable of solution, and what kinds must be abandoned as beyond human powers. And where a solution appears possible, the new logic provides a method which enables us to obtain results that do not merely embody personal idiosyncrasies, but must command the assent of all who are competent to form an opinion' (1924, 363).

The method employed by Russell and Whitehead was to reduce all arguments to a series of logical connections embodying every essential component of the argument in the same order: 'Every element in the [logical form] must correspond to one and only one element in the [real argument], and the elements of the two must be similarly arranged. They must be related to each other as a figure to its projection or as a gramophone record or the musical thought or the score or the waves of sound are related to each one another, so that they can be deduced from each other mutually by means of a kind of law of projections' (Joergensen, 1951, 18).

To get a clearer picture of the nature and roots of formal logic, let us consider one example from *Principia Mathematica* (*54:43). It presumably proves, using symbolic representation, that 1 + 1 = 2:

$*54{\cdot}43.\quad \vdash :. \alpha, \beta \in 1 . \supset : \alpha \cap \beta = \Lambda . \equiv . \alpha \cup \beta \in 2$

Dem.

$\vdash . *54{\cdot}26 . \supset \vdash :. \alpha = \iota`x . \beta = \iota`y . \supset : \alpha \cup \beta \in 2 . \equiv . x \neq y .$

$[*51{\cdot}231] \qquad \equiv . \iota`x \cap \iota`y = \Lambda .$

$[*13{\cdot}12] \qquad \equiv . \alpha \cap \beta = \Lambda \qquad (1)$

$\vdash . (1) . *11{\cdot}11{\cdot}35 . \supset$

$\vdash :. (\exists x, y) . \alpha = \iota`x . \beta = \iota`y . \supset : \alpha \cup \beta \in 2 . \equiv . \alpha \cap \beta = \Lambda \qquad (2)$

$\vdash . (2) . *11{\cdot}54 . *52{\cdot}1 . \supset \vdash .$ Prop

From this proposition it will follow, when arithmetical addition has been defined, that $1 + 1 = 2$.

It seems clear now that formal logic, designed to solve problems in mathematics which can ultimately be reduced to 'yes/no' and 'true/false' type dichotomies, could never live up to Russell's expectations. As **Gilbert Ryle** noted: 'Formal logic came to be not only mathematical in style, but also mathematical in subject-matter; to be employed, that is, primarily in order to fix the logical powers of the terms or concepts on which hinged the proofs of propositions in pure mathematics.' As a result, Ryle argued, the system was ill-suited for the complex and messy nature of multi-logical problems as they exist in the real world: 'No philosophical problem of any interest to anyone has yet been solved by reducing it to [formal logic]…[and] now we have learned, what we should have foreseen, that questions which can be decided by calculation are different, *toto caelo* different, from the problems that perplex…where the philosopher concerns himself with full-blooded concepts like that of *pleasure* or *memory*, the Formal Logician concerns himself only with meatless concepts like those of *not* and *some*…' (1953, 113-114). In fact, Russell himself abandoned his fundamental views on formal logic as expressed in *Principia Mathematica*, as he came to realize, increasingly over time, the (often great) difficulties implicit in changing human thought and behavior.

Despite these weaknesses, formal logic has tremendously influenced the field of critical thinking. To start, one of the **earliest textbooks in Critical Thinking** (Black, 1946) was written almost wholly from the perspective of formal logic. The legacy lives on, as pieces of it (usually the **formal logical fallacies**) still find their way into texts and courses on critical thinking. I myself was taught some basic formal logical skills when I took a critical thinking class as an undergraduate.

[7] Informal logical argumentation generally takes the approach of formal logic (focusing on the form), but, instead of symbols, uses statements, as in the three examples taken from Ennis's text.

2.1.2 Ordinary Language Philosophy

Just as formal logic was something of a reaction to a previous paradigm, so too did Ordinary Language Philosophy emerge as a reaction to formal logic. Hence, these latter philosophers defined themselves principally in terms of *not being* formal logicians. In contrast to the attempt to create a technical language to supersede ordinary, or natural, languages (such as English, French, Chinese, Hindi, etc.), this group of scholars (including J.L. Austin, Gilbert Ryle, John **Wisdom**, and, by association and intent, **Noam Chomsky**) followed **Wittgenstein's** later work, in which he argued for the superiority and flexibility of natural languages over technical languages in their ability to describe an unlimited set of circumstances. Among other key insights were that truth is not relevant in all possible utterances (e.g., the statement: 'I would like to go biking') and that determining where 'truth' is relevant requires investigating the specifics of a given claim or question at issue. Later, these were named by Paul to be 'validation conditions' (for assertions) and 'settlement conditions' (for questions) respectively (Paul, 1967)[6].

Scholars in the ordinary language tradition argued, and continue to argue, that the range of human experience is too diverse, and the functions of language too multitudinous, to be reducible to a rigid set of rules. According to this school of thought, if we are to understand a sentence or claim, we must look at its *content* and its context rather than its form. Much of the contribution of this group, therefore, lies in investigation of language and its intimate relationship with human thought. Another important contribution from ordinary language philosophy is the development of systems for question and concept analysis. For example, one useful system for conceptual analysis proposed by John Wilson (1963) is to think through the logic of key concepts by analyzing: 1) *paradigm* cases; 2) *opposite* cases; 3) *borderline* cases, and; 4) *related* cases.

2.1.3 Informal Logic

Over the past half-century, informal logicians have had some influence over a rela-

[6] According to Paul, one seeks the settlement conditions when reasoning through the logic of questions at issue in a given field. It is that "material" logic that drives reasoners forward, grounding themselves in questions whose settlement moves the subject field forward. So the logic of (say) biological thought is given in the logic of that thought, namely, in the (biological) questions that arise during the intellectual work in the field (of biology). Parallel points can be made for the thinking that captures any given form of knowledge. Thus, most scholars are attracted to an approach in their field that illustrates and exemplifies content through "live" questions. They recognize that it is their content that is embedded in the questions they are asking and seeking to settle.

tively small group of philosophers, especially through the journal *Informal Logic*. As Lim puts it: 'Ever since the publication of Robert Ennis's highly influential paper, 'A concept of critical thinking' (1962), the literature surrounding both the nature and the application of the subject has been dominated by an almost singular focus on mastering the skills of logic and argument analysis' (Lim, 2011b). Though Lim may overstate the point, in both the U.S. and the U.K., a considerable number of textbooks on critical thinking are written by informal logicians.

One philosopher commonly named in connection with critical thinking in the U.S. is Robert Ennis. His approach contains a list of skills and dispositions, as well as an acronym (FRISCO, for Focus, Reasons, Inference, Situation, Clarity, and Overview) to help remember the approach he suggests for the analysis and evaluation of arguments. This approach, though not lacking altogether in strengths, suggests an oversimplification of critical thinking and offers an unintegrated 'list-like' conception of critical thinking. Further, implicit in Ennis's work are holdovers from traditional logic, where students are asked, for instance, to identify validity or invalidity in informal logical arguments.[7] Here are a few examples from his textbook (Ennis, 1995):

1) Terry lied about her age, if she got into the blue room; Terry did not get into the blue room; therefore, she did not lie about her age.

2) If junipers are poisonous, then the cattle are in danger; the cattle are in danger; therefore, junipers are poisonous.

3) Tom is slow, if Tom is a turtle; Tom is slow; therefore, Tom is a turtle.

An apt Rylesian comment points out the lack of practicality in such an approach: 'no philosophical problem of any interest to anyone has yet been solved by reducing it to [in] formal logic'. As Lim argues, 'problems steeped in discourses of logic and argument analysis, [maintain] little consideration of notions of [ethical] rightness/wrongness. . . [such an approach is] morally indifferent and emotionally apathetic. . .. What is privileged is a particularly narrow conception of rationality that accepts as logical only the standards of truth/falsity and validity/invalidity' (Lim, 2011a, 783, 788).

The impact of informal logic on critical thinking, then, is likely mixed: on the one

[7] Informal logical argumentation generally takes the approach of formal logic (focusing on the form), but, instead of symbols, uses statements, as in the three examples taken from Ennis's text.

hand, some students undoubtedly learn some critical thinking abilities; however, many no doubt are discouraged by studying informal logic, failing to see its significance to either thinking within academic disciplines or to living one's every day life.

Further, informal logicians have recently served as a kind of living straw-man, as their arguments in favor of 'critical thinking' (as they narrowly define it) are easily shown, by critics from a broad range of backgrounds, to be limited and potentially damaging to the emerging field of critical thinking studies (see e.g. Doddington, 2007; Evans, 2011; Yañez, 2012). These 'debates' (if that is an appropriate term, for these scholars rarely interact deeply with their perceived antagonists) distract from the development of critical thinking theory in directions that would be agreeable to virtually all. The concept, I believe, broadly encompasses the best of these seemingly divergent views.

2.2 Critical Theory

Today, the phrase 'critical theory' is used broadly, capturing multiple strands of scholarship united by a deep commitment to human emancipation. In this section I will briefly focus on a few of these strands, along with some of their important implications for a critical theory of education.

Critical theory was originated by a group of prominent interdisciplinary thinkers whose meetings began at the University of Frankfurt. The tradition developed by these thinkers came later to be called 'The Frankfurt School' of social research. Their 'members' include Max **Horkheimer**, Theodor **Adorno**, Herbert **Marcuse**, Eric **Fromm**, and Jurgen **Habermas**.

The interests of these intellectuals soon broadened into an attempt to build a theory of critical action capable of guiding a political, economic, and intellectual revolution. The result is to be an eventual egalitarian society built firmly on human-centered concepts such as social justice, interpersonal respect, universal rights and global citizenship. These principles can be seen emergent from an early articulation by Marcuse of some fundamental assumptions and important implications of critical theory: 'That man is a rational being, that this being requires freedom, and that happiness is his highest good are all universal propositions whose progressive impetus derives precisely from their universality. Universality gives them an almost revolutionary character, for they claim that all, and not merely this or that particular person, should be rational, free, and happy' (Marcuse, 1937).

The concept of 'praxis' is central to work in this tradition. In the words of Freire, praxis constitutes 'reflection and action upon the world in order to transform it…to achieve this goal, the oppressed must confront reality critically, simultaneously objectifying and acting on that reality' (Freire, 2005, 52). Freire argues that the aim of critical theory is not simply to develop theory, but to continually develop and revise theory over time *through intervention*. That is, 'theory' is developed through multiple cycles of change. As conditions of emancipation emerge, documentation of these conditions allows the creation of new theory; the development of new theory supplies tools for achieving deeper change, which, when employed, establishes new and documentable historical conditions, in a presumably ever deepening, ever broadening, ever more sophisticated circle of critical development.

Critical theorists, self-perceived 'outsiders' empowered by the force of sweeping critique, begin to lay bare, in earnest, the contradictory realities of modern societies. Nothing is spared, nothing concealed. For example, Paolo Freire, in a withering assault on much traditional educational practice, writes that such education 'will never propose to students that they critically consider reality. It will deal instead with such vital questions as whether Roger gave green grass to the goat, and insist upon the importance of learning that, on the contrary, Roger gave green grass to the rabbit' (Friere, 2005, 74). Re-reading the few examples of 'critical thinking problems' proposed to students by Ennis, immediately above, it seems that Freire's remark may not be exaggerated.

Or examine this list of assumptions that Freire sees embedded in the traditional educational paradigm, which he calls 'banking education' (because it views the student as a receptacle into which knowledge may be 'deposited'). In Freire's words, 'Banking education maintains and even stimulates…the following attitudes and practices, which mirror oppressive society as a whole:

a) the teacher teaches and the students are taught;

b) the teacher knows everything and the students know nothing;

c) the teacher thinks and the students are thought about;

d) the teacher talks and the students listen – meekly;

e) the teacher disciplines and the students are disciplined;

f) the teacher chooses and enforces his choice and the students comply;

g) the teacher acts and the students have the illusion of acting through the action of the teacher;

h) the teacher chooses the program content and the students (who were not consulted) adapt to it;

i) the teacher confuses the authority of knowledge with his or her own professional authority, which she and he sets in opposition to the freedom of the students;

j) the teacher is the subject of the learning process, while the pupils are mere objects.

In contrast to this 'bankrupt' approach to education, Freire, a Brazilian and native speaker of Portuguese, proposes a system whose main aim is fostering 'conscientazacao': the ability of students to accurately perceive social, political, and economic contradictions (e.g. the contradiction between the vastly differently rewarded 'hard' work of field laborers versus bankers and politicians). The educative process is mutual, with both teacher and student playing the role of teacher and student; further, and on this point Freire is urgent and explicit, critical pedagogy is to be developed *with* students, not *for* or *on* them.

Like much theory developed by high-powered intellectuals in this tradition, Freire's approach is spelled out in multiple volumes, making it difficult to neatly package here. The roots are explained in chapter three of his *Pedagogy of the Oppressed*: issues emerge from students' prior concerns about their lives; education occurs by comparing student descriptions of these concerns with alternative conceptualizations provided by the educator. Through a process of continual comparison, students are encouraged and supported to deeply analyze and evaluate their own lives from multiple perspectives. In this way, 'The students – no longer docile listeners – are now critical co-investigators in dialogue with the teacher. . .Students, as they are increasingly posed with problems relating to themselves, will feel increasingly challenged and obliged to respond to that challenge. Because they apprehend the challenge as interrelated to other problems within a total context, not as a theoretical question, the students' resulting comprehension tends to be increasingly critical' (Friere, 2005, 80-81).

Thus, conscientazacao is gradually achieved: a growing capacity to critically examine the conditions which shape students' living experience, thereby allowing the development of greater insight into, and ultimately the ability to more significantly control, underlying systems of power.

2.3 Psychology

The field of Psychology is one of the most diverse and fractious of all academic disciplines. Thinkers pursuing divergent questions within psychology have contributed theory relating to multiple dimensions of critical thinking. Here we will only be able to briefly canvass two broad theoretical groupings: self- and social-psychological analysis (2.3.1), and cognitive psychology (2.3.2). The divergent foci and methods of these groups and some implications for critical thought are discussed.

2.3.1 Self- and Social-Psychological Analysis

Jean **Piaget** has contributed significantly to theory of critical thinking in numerous directions, including exposing the roots of egocentricity and sociocentricity in human thought and action. Let us here examine some of his interviews with children and the insights they provide into sociocentrism:

> 'Marina [age] 7 (Italian): If you were born without any nationality and you were now given a free choice, what nationality would you choose? *Italian.* Why? *Because it's my country*. *I like it better than Argentina, which is where my father works, because Argentina isn't my country.* Are Italians just the same, or more or less intelligent than the Argentineans? *The Italians are more intelligent!* Why? *I can see the people I live with, they're Italians*…If I were to give a child from Argentina a free choice of nationality, what do you think he would choose? *He'd want to stay an Argentinean*…Now who was really right in the choice he made and what he said, the Argentinean child, you or both? *I was right.* Why? *Because I chose Italy*. '
>
> 'Maurice, [age] 8 (Swiss): Now look, do you think the French and the Swiss are equally nice, or the one nicer or less nice than the other? *The Swiss are nicer.* Why? *The French are always nasty*.... if I asked a French boy to choose any nationality he liked, what country do you think he'd choose? *He'd choose France*. Why? *Because he is in France*....Now you and the French boy don't real-

ly give the same answer. Who do you think answered best? *I did.*
Why? *Because Switzerland is always better*.

As Piaget discovered, and as we can see from these quotes, from an early age children internalize beliefs about the superiority of their group over others (sociocentrism). Richard Paul, in his development of explicit theory of critical thinking, cites Piaget and these specific interviews as a significant influence, especially on his conception of human nature (see Paul, 1992).

On the other hand, humanist psychologists, such as Eric **Fromm**, emphasize the emancipatory capacity of the field to help people take greater command of their lives. The result is profound analysis and assessment that sheds light on important dimensions of human life, such as love and marriage ('The Art of Loving', Fromm, 1956) and human fulfillment (*To Have or To Be*; Fromm, 1976). We can see some of the approach in this passage from Fromm's *The Art of Loving* (1956, 1-2):

> 'Is love an art? then it requires knowledge and effort. Or is love a pleasant sensation, which to experience is a matter of chance, something one 'falls into' if one is lucky? This little book is based on the former premise, while undoubtedly the majority of people today believe in the latter...This peculiar attitude is based on several premises which either singly or combined tend to uphold it. Most people see the problem of love primarily as that of being loved, rather than that of loving, of one's capacity to love. Hence the problem to them is how to be loved, how to be lovable. in pursuit of this aim they follow several paths. One, which is especially used by men, is to be successful, to be as powerful and rich as the social margin of one's position permits. Another, used especially by women, is to make oneself attractive, by cultivating one's body, dress, etc...the active character of love becomes evident in the fact that it always implies certain basic elements, common to all forms of love. These are care, responsibility, respect, and knowledge… Love is the active concern for the life and the growth of that which we love…'

We see in the above an extended conceptual analysis of the idea of 'love' and 'lov-

ing'. The aim is to raise the conceptual sophistication of the reader, thereby encouraging critical self-reflection of one's own thinking and action on the subjects of love and loving.

Another classic example of the analysis of dysfunctional human behavior can be found in **Goffman's** *The Presentation of Self in Everyday Life* (1959). The book is concerned with ways in which humans present themselves to others, highlighting several modes of human pathology. From the introduction:

> 'As an example of what we must try to examine, I would like to cite at length a novelistic incident in which Preedy, a vacationing Englishman, makes his first appearance on the beach of his summer hotel in Spain… He took care to avoid catching anyone's eye. First of all, he had to make it clear to those potential companions of his holiday that they were of no concern to him whatsoever. He stared through them, round them, over them - eyes lost in space. If by chance a ball was thrown his way, he looked surprised; then let a smile of amusement lighten his face (Kindly Preedy)… [and then it came] time to institute a little parade, the parade of the Ideal Preedy. By devious handlings he gave any who wanted to look a chance to see the title of his book - a Spanish translation of Homer, classic thus, but not daring, cosmopolitan too - and then gathered together his beach-wrap and bag into a neat sand-resistant pile (Methodical and Sensible Preedy), rose slowly to stretch at ease his huge frame (Big Cat Preedy), and tossed aside his sandals (Carefree Preedy, after all). The marriage of Preedy and the sea! There were alternative rituals…' (Goffman, 1959, 4-5).

This fictional scene highlights the power of just a few of the subtle and unconscious forces which influence, or even determine, our behavior. In Goffman's description we must surely see something of Preedy in ourselves - ever seeking to influence the image others have of us. By highlighting the nature of this self-presentation 'in everyday life', Goffman emphasizes the common nature of this behavior. He encourages us to examine our own inner motivations in light of the insights he offers in his study of human behavior.

Another prominent psychological framework for critically managing one's own

thinking and emotion is 'Rational-Emotive Behavioral Therapy', created and developed by Albert **Ellis** (REBT; Ellis, 1962). Ellis originally trained as a Freudian and spent a number of years utilizing its indirect methods. This primarily analyzed present cognitive and emotional disturbances as symptoms of abuse, neglect, or other appaling maladies in childhood. Treatment mostly consisted in talking about and reliving those experiences. But, over time, Ellis came to perceive these indirect methods as inferior to an approach that directly targeted clients' thinking as it manifests *in the moment*. In his words 'there is no question that therapeutic methods, such as abreaction, catharsis, dream analysis, free association, interpretation of resistance, and transfer analysis, have often been successfully employed...the question is: are these relatively indirect, semi-logical techniques of trying to help the patient change his thinking particularly efficient? I doubt it.' (Ellis, 1952, 49).

For Ellis, and for other psychologists such as Vygotsky, much of human emoting and thinking 'takes the form of self-talk or internalized sentences' (Ellis, 1952, 50). Ellis argued that self-talk is both a manifestation of thinking and emotion, and that it also produces thinking and emotion. Thus, 'it appears almost impossible to sustain an emotional outburst without bolstering it by repeated ideas. For unless you keep telling yourself something on the order of 'oh, my heavens how terrible it would have been if that car had hit me!' your fright over almost being hit by the car will soon die' (Ellis, 1952, 49).

This phenomenon – self-talk – is thus the primary target for Rational-Emotive Behavioral Therapy. As Ellis explains 'it would appear that one may appreciably control one's emotion by controlling ones thoughts. Or, more concretely, *one may control one's emotions by changing the internalized sentences, or self-talk,* with which one largely created these emotions in the first place' (Ellis, 1952, 52; my emphasis). In other words, clients in REBT therapy are encouraged to take command of their lives through making explicit, critiquing, and changing harmful and inaccurate internal words and sentences into self-talk that is more precise and productive.

2.3.2 Cognitive Psychology

Cognitive Psychology has made and is making a continually growing contribution to the field of critical thinking studies. Scholars in this field use experimental (often neurological) research methodologies to develop theories of thinking embodied in a wide spectrum of modes of teaching and learning. In this section (2.3.2), we will focus on two cognitive psychologists who have contributed explicit theory of critical thinking for educa-

tional settings: Diane **Halpern** and Robert **Sternberg**. Additionally, I will briefly mention the work of Elizabeth Loftus as it bears upon our understanding of human memory.

Halpern's focus on intellectual skills can be seen in her operational definition of critical thinking, which is 'the use of cognitive skills or strategies that increase the probability of a desired outcome' (Halpern, 1997, 4). To render this view more intuitive, Halpern (1984) provides a list of dozens of skills grouped under headings like 'memory skills' (e.g. 'developing an awareness of biases in memory'), 'argument analysis skills' (e.g. 'identifying premises (reasons), counter arguments, and conclusions'), and 'creative thinking skills' (e,g, 'how to redefine the problem and goal in different ways').

Sternberg's approach is similar. Perhaps best known for his 'triarchic theory of intelligence', he has added 'memory' to propose a four-part categorization of thinking skills: memory, analytical, creative, and practical. For example, Sternberg's category of 'analytical' skills (which he also refers to as critical thinking skills) contains items such as 'compare/contrast' and 'identify and classify'. His most recent works (e.g. Sternberg 2007, 2009a) emphasize the concept of 'successful intelligence', by which he means a combination of skills and knowledge employed successfully within a given context. For Halpern and Sternberg, instructors should create activities that help students to practice these skills within their unique classroom contexts.

One criticism of work within this tradition is that it often confuses intellectual processes with intellectual skills. For example, 'comparing and contrasting' is something humans naturally do every day (as in, 'this banana looks nicer than *that* banana'). The same can be said of Halpern's suggested skills of 'judging the credibility of an information source' (as in, 'that guy is just off on a rant'). The question is: what standards or criteria are used in comparing and contrasting? When considering critical thinking, the point is not whether any given intellectual process is taking place but rather the extent to which it is taking place *critically*. It is therefore the 'criterion' part of 'critical' which is sometimes missing in this tradition. Thus we can add a criterion (an intellectual standard) onto each of these processes to make them more critical: 'compare/contrast *accurately*' or 'judge the credibility of an information source *fairly*'.

A number of cognitive psychologists focus their research on specific problems in human thought, on uncovering important implications for how we might live differently. For example, Elizabeth Loftus has spent decades studying human memory and discover-

ing problems in how eyewitness testimony is perceived in courtroom proceedings in the United States of America. She points out in her work, for instance, that 'leading questions can introduce new information that actually alters a person's memory of the event' (Loftus, 1991, 7). Research such as this makes an important contribution to our understanding of the human mind and, hence, to critical thinking.

Far more can be said about significant contributions from philosophy, critical theory, and psychology, as well as many other disciplines and specializations to the field of critical thinking studies. Every bona fide field makes some potentially important contribution. We have examined a mere few in the past two chapters. In any case, to do justice to a history and theoretical literature review on critical thinking would require an enormous amount of research, encompassing at least some representative examples from virtually all subject fields. My hope in this section has been to begin this necessary theoretical discussion and to offer some scaffolding for it.

2.4 A Brief Critical Analysis of the Approach to Critical Thinking used at the Research Site

This section (2.4) briefly introduces and critiques the approach to critical thinking adopted at the research site, an approach developed by scholars at the Foundation for Critical Thinking (FCT). Richard Paul has been the primary developer of this theory, and has been supported by Gerald Nosich and Linda Elder. Minor contributions have emerged from others. This theory is referred to in a few ways: as the 'Paulian Approach', the 'Paul/Elder Framework', 'Foundation for Critical Thinking Theory', or other near-synonyms. In this paper, there is little to be gained from detailed discussion of the nuances and differences between these labels, so we may here regard them as interchangeable.

The limitation on space in this dissertation precludes a comprehensive explication and assessment of Paulian theory. FCT theory contains hundreds of pages in various media (see section 2.5.5 for more details on the nature of these publications), while critiques of the work consist in hundreds of pages more. A broad introduction and critique of Paul's work has recently been produced by Paul himself, in an invited two-part self-reflection in the journal *Inquiry: Critical Thinking Across the Disciplines*. In these articles, Paul repeatedly calls for more and better research in the field of critical thinking (Paul, 2011 and 2012).

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8 'critical pedagogy' being the educational subset of 'critical theorists', Paolo Freire being the most influential, see section 2.2 for some description

A number of scholars have analyzed the work of Paul *et al.* (as opposed to other critical thinking theoreticians) because they consider it to contain ideas that directly link with, and support, their own academic traditions. In particular, Paul's conception of 'strong-sense critical thinking' (detailed in sections 1.3.1 and 1.3.2) has garnered broad support (e.g. Moseley et al, 2005; Perkins cited in Paul, 2011). For example, leading critical theorists Burbules and Berk (1999), in an analysis of the separate traditions of 'critical thinking' and 'critical pedagogy'[8] write that, in the idea of strong-sense critical thinking, 'we see Paul introducing into the very definition of critical thinking some of the sorts of social and contextual factors that Critical Pedagogy writers have emphasized' (Burbules and Berk, 1999, 5). That is, these authors consider Paul to be the critical thinking theoretician most concerned with human emancipation and social justice.

Some feminist philosophers have also credited Paul for his emphasis on dialogue, fairmindedness, and empathy –though they often follow this praise with calls to stress these elements even more. For example, Bedecarre, in an attempt to construct a feminist philosophy of critical thinking, builds on the foundation established by Paul: 'My work takes Richard Paul as its starting point because his theory attempts to articulate several features which, I maintain, need to be present in any coherent account of strong sense critical thinking, feminist or otherwise.... [Critical Thinking in the] strong sense is uncontroversially one of the most significant contributions to critical thinking theory, influencing the course of the field permanently, though perhaps securing his place in the vanguard of the movement only temporarily...[as some of Paul's] account is predicated upon assumptions which are antithetical to feminist concerns.... [As a result, I try in this work] to pursue a notion of feminist strong sense critical thinking which, in contrast to Paul's notion of strong sense, is explicitly ideological and which incorporates the methodology and beliefs of feminism...' (Bedecarre, 1994, xi-xiv).

Another theoretician in the feminist tradition, Thayer-Bacon (2000), follows a similar plan, writing that: 'A strength of Paul's theory is that his definition of critical thinking includes what Ennis, McPeck, Lipman, and others (e.g. Glaser and Black) are concerned about, as well as aspects of critical thinking that have not been included before... Paul's more nurturing strong-sense critical thinking, in emphasizing the need to understand other people's perspectives and world views, leans in the direction of relationships and caring. It leans toward stressing interconnections and relatedness and toward a more qualified relativist position...one can find the potential of a constructive thinking perspec-

tive in Paul's critical thinking theory' (Thayer-Bacon, 2000, 61-62). However, Thayer-Bacon continues, the work falls short of fully satisfying these concerns: 'Paul recognizes that there is a thinker and that this thinker is a subjective being. Unfortunately, he recognizes the critical thinker's subjectivity in a negative way... (Thayer-Bacon, 2000, 62-63).' Instead of the 'individual', 'solitary' thinker, which she perceives Paul (and the critical thinking movement at large) to be following, Thayer-Bacon proposes a 'quilting bee metaphor', which 'describes the role of individual quilters as individuals-in-relation-with-others' (Thayer-Bacon, 2000, 63).

Paul has been critiqued by more mainstream philosophers on the opposite charge: that his emphasis on empathetic and dialogical thinking leads to an intellectually subjective epistemology. Harvey Siegel (1988), for example, argues that 'there are troubling aspects of Paul's conception of 'strong sense' critical thinking as 'dialectical/dialogical,' according to which critical thinkers transcend atomistic analysis and endeavour to comprehend the issue at hand from the point of view, the 'world view,' of their 'opponents.;…This suggests that the criteria of evaluation of informal arguments, and the criteria of critical thinking, are ultimately grounded in world views…[if this is so], we are left with a vicious form of relativism in which all 'rational' disputes boil down to unanalyzable differences in world view' (Siegel, 1988, 13-14).

Hale (2008), in a critical exegesis of Paul's work, notes that, unfortunately, these reviews are predicated on a circumscribed analysis of Paul's work, a criticism that Hale says also applies to other, minor, analyses of the work of Paul and his colleagues. In some cases these critiques are based on only one or a few articles. In addition, the vast majority were written before, or curiously do not engage, the significant theoretical developments of the last decade and a half (a partial list follows).

The broadest and most accurate review of FCT theory (by far) is that in *Frameworks for Thinking* (Moseley et al., 2005), a review of some 41 theories with implications for thinking (broadly defined). In the Moseley *et al*. review, most major pieces of FCT theory are described, including all of the theory discussed in sections 2.4.2 - 2.4.4, though several essential theoretical constructs are missing from this analysis, for example:

- Theory of Mind, including:
    - The connection between thinking/feeling/wanting

    - Egocentric mechanisms and sociocentric pathologies that serve as barriers to critical thought

- Elder's Critical Thinking Developmental Stage Theory
- The critical thinking primary and secondary school handbooks, which contain dozens of lesson plan redesigns (three sample lesson plan redesigns are available in Appendix E). These handbooks contrast lessons that explicitly foster critical thinking with traditional lessons that do not. These handbooks are contextualized by age level and subject (language arts/literature, social studies, math, science, and specialized subjects).
    - The Handbook for grades K-3 contains 69 remodeled lessons;
    - The Handbook for grades 4-6 contains 52 remodeled lessons;
    - The Handbook for grades 6-9 contains 37 remodeled lessons; and
    - The High School Handbook contains 64 remodeled lessons.
- The *Thinker's Guide* series, which details the connection between FCT theory and specific disciplines or issues, including:
        - Active and Cooperative Learning
        - Analytic Thinking
        - Art of Socratic Questioning
        - Clinical Reasoning
        - Critical & Creative Thinking
        - Critical Thinking Competency Standards
        - Critical Thinking Reading & Writing Test
        - Critical Thinking, Concepts & Tools
        - Engineering Reasoning

- Ethical Reasoning
- Fallacies: The Art of Mental Trickery
- Historical Reasoning
- How to Detect Media Bias & Propaganda
- How to Improve Student Learning
- How to Read a Paragraph
- How to Study & Learn
- How to Write a Paragraph
- Scientific Thinking
- Taking Charge of the Human Mind
- The Art of Asking Essential Questions
- A Critical Thinker's Guide to Educational Fads
- Thinker's Guide to Intellectual Standards
- Glossary of Critical Thinking Terms and Concepts

Due to numerous compounding factors, some already mentioned, all critiques of which I am aware fail to address what I believe to be some of the most important unanswered questions in the work of Paulian scholars, most specifically in terms of its utility in promoting critical thinking in formal systems of education. To consider some of these issues, as well as to make clear those theoretical understandings essential to this dissertation, this section (2.4) combines explication of Paulian theory with my own critical commentary.

Three major theoretical constructs from the Paulian Approach have most significantly informed efforts at the research site. We will therefore limit our consideration of FCT theory to these three conceptual sets: the 'elements of thought' (or 'parts of think-

ing'), 'intellectual standards' (or 'intellectual criteria), and 'intellectual traits' (or 'intellectual virtues' or 'intellectual dispositions'). Given the focus of this treatise, the perspective taken here will be that of the practice-oriented educator seeking cross-curricular improvement in teaching and learning for critical thinking.

Immediately below (2.4.1) is a brief analysis of the conceptual nature of FCT theory. In the rest of this chapter, each primary theoretical set will be introduced and critiqued separately (2.4.2-2.4.4). The chapter will close with expanded pedagogical critique (2.4.5) as well as critique from two additional viewpoints: the empirical, 2.4.6; and the historical/theoretical, 2.4.7. Each critique will be followed by one or more questions to be pursued in future theoretical and/or empirical research.

My goal in this short analysis is not to give an adequate evaluation of the strengths and weaknesses of the Paulian approach. Instead, what I emphasize is that much empirical and conceptual research still needs to be conducted.

2.4.1 The Conceptual Nature of the Paulian Approach

Before we proceed, it is important to note a salient feature of the Paulian approach to critical thinking: that it is focused on concepts rather than rules, methods, or procedures. Gerald Nosich (2008), a senior fellow at the Foundation for Critical Thinking, draws out some of the implications of this fact for the student of critical thinking:

> 'Paul's articulation is built on concepts. Not rules, not guidelines, not procedures, not methods or models, really, but concepts.
>
> One way to distinguish the two is that the concepts of CT are designated by single words, or by terms, not by full sentences. Thus, "purpose" (an element) is a concept; by contrast, "Identify the author's purpose" is a rule, a command. "Accuracy" (a standard) is a concept; by contrast, "Check the accuracy of your information" is a guideline, one step in a method…
>
> Rules and guidelines are built out of concepts, and those concepts are much more widely applicable, more flexibly usable for thinking critically, than the guidelines assembled from them.
>
> [For example] In teaching someone to think critically about a

book, it is a good guideline to have the student "Identify the author's purpose"....But *purpose*—the element, the concept—is automatically more widely applicable than the guideline. Even if we confine ourselves to thinking critically only about a book, there is a host of other questions about *purpose* that are also relevant: What is *my* purpose in reading this book? What are the main goals or purposes *my instructor* has in mind in suggesting that I read it? Maybe I need to *evaluate* the author's purpose - Is it a purpose worth achieving? How does this author's purpose fit in with the purpose of this other author?

...But the concept *purpose* is more flexibly usable even than this, even if we still confine ourselves only to thinking critically about a book. I can ask in addition:

- Is the author's purpose clear?
- To what extent is it significant or trivial?
- How comprehensive is it—does it take into account multiple points of view?
- How deep is it—what problems or complications arise as part of achieving that purpose?

...in thinking in terms of the concept *purpose*, I can (and often should) combine it with any of the other elements and standards, and apply it in different venues as well. None of this richness of thought emerges from the guideline to "Identify the author's purpose."

But, of course, we started from the guideline to "Identify the author's purpose", and as a result we have been confining ourselves to thinking critically only about books, about writing. It is not just authors who have purposes, and the concept-based nature of

> Paul's articulation encourages us to open other such paths of inquiry as well. We can insightfully ask about the purpose of an experiment, a theory, a piece of music, a method of inquiry, about the social purpose of cricket or baseball, about the purpose of the Baroque in the Counter-Reformation, about the purpose of the Oxford Tutorial, the purpose of the university, the purpose of life...'

With this in mind, let us begin to examine the nature of some of these critical thinking concepts and tools.

2.4.2 Elements of Thought

One set of foundational theoretical constructs within Paul's framework is referred to as the 'elements of thought' (or 'structures of thought', or 'parts of reasoning'). With these, Paul argues that human thinking, wherever it exists, is composed of, or presupposes, eight elements. In the words of Paul and Elder: 'Each of these structures has implications for the others. If you change your purpose or agenda, you change your questions and problems. If you change your questions and problems, you are forced to seek new information and data. If you collect new information and data…' (Paul and Elder, 2009, 5).These elements are often illustrated in the form of a circle (Diagram 1) to emphasize their non-linear nature as well as their interdependence:

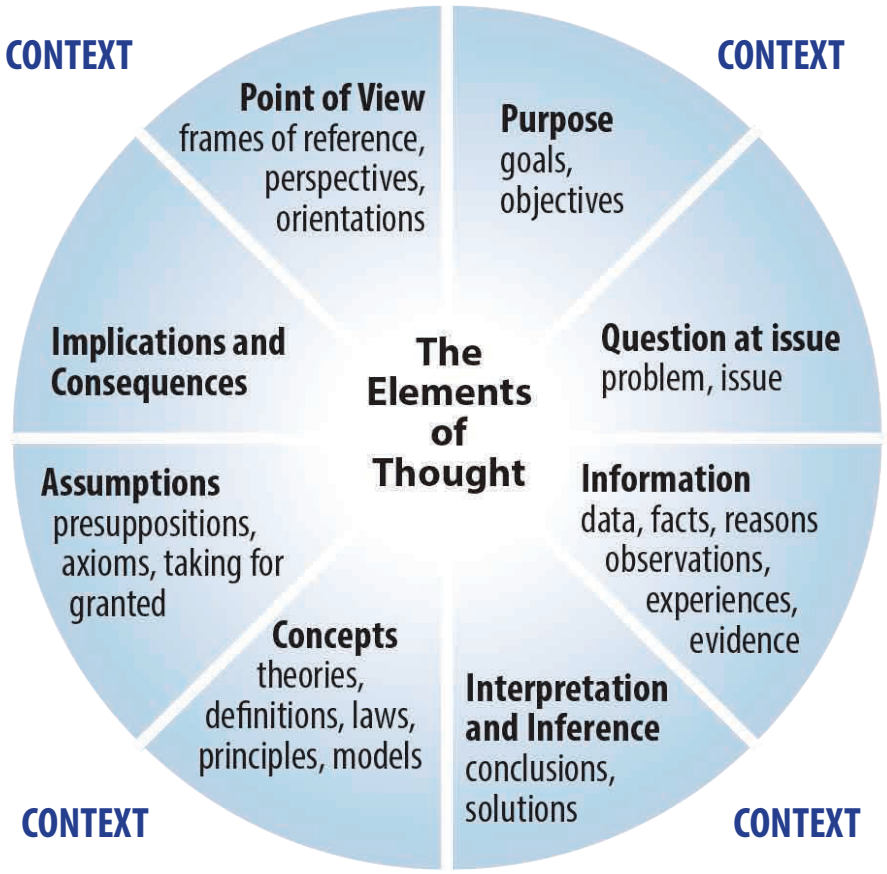

Diagram 1: Elements of Reasoning Wheel

Critique: The elements of thought are now employed by instructors across subjects and disciplines, across grade levels and in the professions, in government and business, by police force and intelligence agencies. The basic logic of their use has been published in FCT material for many subjects and most grade levels. However, extended analyses are necessary to help students and teachers incorporate critical thinking effectively into their teaching and learning. The Foundation for Critical Thinking has long recognized the need for broader and deeper explication of the elements of thought (as well as much of the rest of its theory), and has recently been successful in collaborating with content area experts to produce deeper critical analyses of specific subjects, such as the Thinker's Guides to *Engineering Reasoning* (Paul, Niewoehner and Elder, 2007), *Clinical Reasoning* (Hawkins, Elder, and Paul, 2010), and *Historical Thinking* (Elder, Gorzycki and Paul, 2011). These works establish a grounding for critical reasoning within these subjects, but detailed work remains. If the elements of thought are to play a significant role in students' criticality, much more empirical research is needed to determine how to best foster internalization of

these elements in teaching and learning.

Some questions for future research:

- How useful are the elements of thought for understanding the logic of any given intellectual construct [9] as against some other form of analysis?
- How important is it for students and experts in the range of human disciplines to learn how to construct the logic of the disciplines they study?
- Are there any other intellectual constructs that should be added as 'elements of thought' and highlighted in foundational critical thinking theory? For example, Nosich (2012) argues that 'context' and 'alternatives' function in a manner similar to the elements of thought (p49) - should these two constructs be given prominence in analyzing the foundations of human thought?

In addition to fostering a global approach to intellectual analysis it is important that we help students develop context-specific analytical abilities and dispositions. Virtually everything humans study and make or do contains peculiarities or unique features whose navigation is vital to success. For example, the *Thinker's Guide to Clinical Reasoning* identifies several important analytical categories to probe in the taking of a patient history: 'A careful history of a patient's presenting signs and symptoms, current medical conditions, previous surgeries, illnesses or medical problems, use of medications, vitamins, and supplements, lifestyle behaviors, and perceptions of health and disease is rarely achieved skillfully and comprehensively.... is that history taking is not always guided by careful, critical thinking. As each piece of information is gathered during history taking, the clinician should [analyze the case] by asking the following types of questions...' (Hawkins, Elder, and Paul, 2010, 14). Very little work has been completed by the FCT in the direction of identifying subject- or context-specific analytical categories.

---

[9] Here I use the concept 'intellectual construct' as Paul (2012, 8): All of the following are intellectual constructs of potential importance in critical thought: essays, theories, knowledge claims, assumptions, math problems, cases, world views, concepts, information, inferences, novels, poems, plays, schools of thought, critical analyses, critical evaluations, editorials, news articles, news stories, budgets, financial plans, axiomatic systems, accounting documents, architectural designs, engineering designs, number systems, classificatory systems, intellectual distinctions, histories, experiments, critiques of art of whatever sort, background logic, understandings, interpretations, and so forth.

Some questions for future research:

- What context-specific analytical tools are important for thinking critically about any given intellectual construct or within a given intellectual context?
- How do these context-specific analytical tools relate conceptually to the overarching elements of thought?

2.4.3 Intellectual Standards

Consistent high-level reasoning requires not only critical analysis but also critical evaluation and critical reconstruction. The intellectual standards, as conceptualized by the Foundation for Critical Thinking, are principle-based standards viewed as essential to the assessment of thought and the quality of intellectual products. The list of intellectual standards in diagram 2 (Paul and Elder, 2002) is not exhaustive. Indeed in the most recent development of this theory, Elder and Paul (2008) have called for experts to articulate intellectual standards relevant to reasoning within their own disciplines.

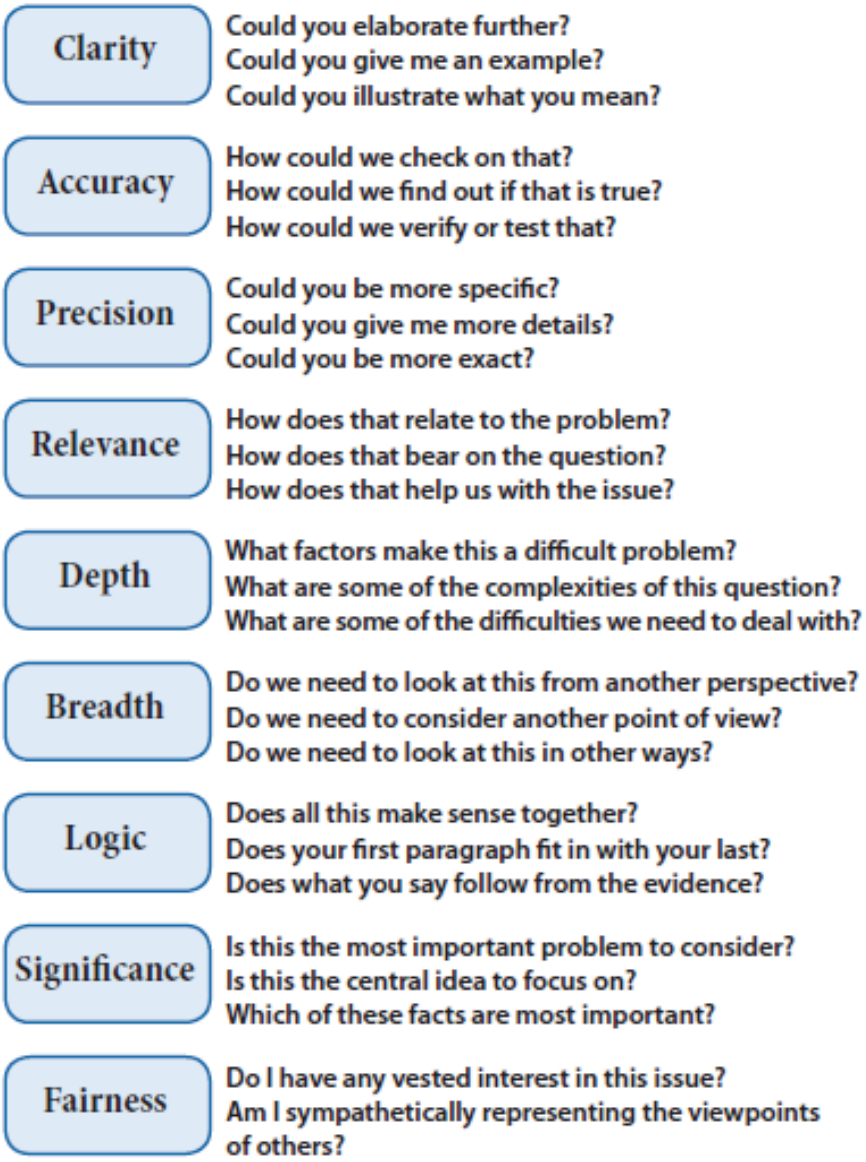

Diagram 2: Essential Intellectual Standards

Critique: The intellectual standards, perhaps because of their deep theoretical interactions with the elements of thought, have been elaborated and exemplified by Paulian scholars nearly as much as the elements of thought. In many documents that contain detailed elaboration and/or exemplification of the elements of thought, there is a corresponding development of the intellectual standards of similar breadth and depth. Further, Elder and Paul (2008) have recently significantly expanded this theory in the *Thinker's Guide to the Intellectual Standards*. This guide connects core intellectual standards theory with synonyms (e.g. for 'precise': 'detailed, exact, painstaking, methodical, specific, meticulous, particular'); adds several core standards (e.g. 'feasible', 'consistent', and 'sufficient'); bifurcates the standards into 'macro-' (e.g. 'cogent', 'forceful', 'reasonable') and

'micro-' (e.g. 'clear' and 'accurate'); and elaborates the relationships among the standards. However, much work remains. Each standard must be contextualized, as each has a slightly different meaning depending on context. Clarity and accuracy, for example, will serve different functions in physics than in art critique. These meanings and uses need exploration and documentation.

Some questions for future research:

- What roles are played, and what meanings are produced, by each of the essential intellectual standards in the context of any given intellectual construct?
- How useful are the intellectual standards in the assessment of any given intellectual construct?
- What other intellectual standards, if any, are so centrally important to high quality reasoning, that they should be considered essential overarching intellectual standards?

In addition to overarching intellectual standards, context specific intellectual standards must be identified that are necessary for determining quality within specific domains. For example, the *Thinker's Guide to Engineering Reasoning* includes the intellectual standard of 'efficiency': 'efficient use of paper or screen frequently requires the careful integration of graphical elements and data in ways that boost clarity and breadth, and enhance the relation of complex interactions (e.g. causal relationships or contrasts)' (Paul, Niewoehner, and Elder, 2007, 27). Subject- or context-specific standards should be linked conceptually with the essential intellectual standards.

Some questions for future research:

- What context-specific intellectual standards are important to consider when assessing a given intellectual construct or product?
- How do these context-specific intellectual standards relate conceptually to other intellectual standards?

2.4.4 Intellectual Traits

The important distinction between Socratic (or 'strong-sense') and Sophistic

(or 'weak-sense') critical thinking has been elaborated previously (in sections 1.31 and 1.3.2). Richard Paul articulated this distinction in his first published article in the field of critical thinking studies (Paul, 1981). The concept of '*strong-sense critical thinking'*, therefore, is central to the work of scholars in the Paulian Tradition: 'It is possible to develop as a thinker and yet not develop as a *fairminded* thinker...the striking characteristic of strong-sense critical thinkers is their consistent pursuit of what is fair and just. These thinkers strive always to be ethical - to behave in ways that do not exploit or otherwise harm others...' (Paul and Elder, 2012b, 1-3).

Some of the characteristics of strong-sense critical thinkers are articulated in the final foundational theoretical set we will consider in this introduction – the Intellectual Traits or Virtues:

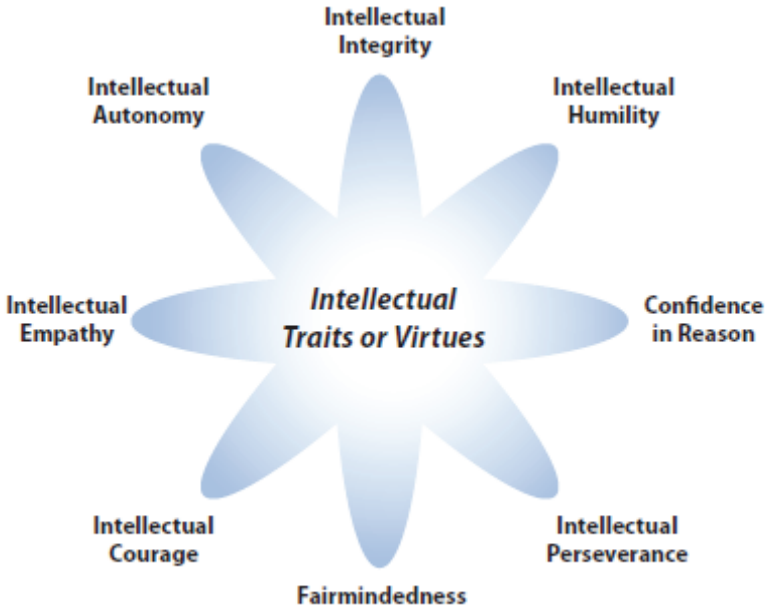

Diagram 3: Intellectual Traits or Virtues

Paul and Elder argue that schooling which does not foster the above habits of mind often tacitly encourages their opposites. For instance, when teachers fail to foster intellectual humility (the habit of distinguishing what one knows from what one does not know), they might inadvertently foster intellectual arrogance (the tendency to believe one knows more than one does in fact know); similarly, when teachers do not explicitly teach for intellectual empathy (the habit of thinking empathetically within the viewpoints of others), they might inadvertently foster narrow-mindedness (the tendency to inappro-

priately favor one's own viewpoint). This concern is not hypothetical: one finding in the research I conducted on the tutorial system at the University of Oxford (Cosgrove, 2011a; Appendix F) was that many students are learning skills of rhetoric at the expense of intellectual depth and fairminded critical inquiry.

Critique: The idea of 'strong-sense' or 'fairminded' critical thinking underlies all of Paulian theory. The 'intellectual traits', however, have not been as broadly or deeply developed as the elements of thought or intellectual standards. More resources are needed that help teachers better foster these virtues in instruction. Due to structural similarities between the intellectual standards and the intellectual traits (they are not exhaustive, they are evaluative tools, and they can be grouped on multiple levels – e.g. 'macro' and 'micro'), the same approach taken in the *Intellectual Standards* guide (Elder and Paul, 2008) might be used to develop theory of 'intellectual traits'. Indeed, such a work is in progress at the FCT.

Some questions for future research:

- What role is played, and what meaning is produced, by each of the intellectual traits within a given context?
- What other, if any, essential intellectual traits should be articulated and developed (e.g. 'patience' or 'intellectual respect') as part of foundational critical thinking theory?
- How are intellectual virtues best fostered in teaching and learning?
- How do the intellectual virtues interact with and interrelate with one another?
- How do intellectual virtues interface with the proper use of intellectual standards and elements of thought?

Paulian scholars have not deeply elaborated many specialized intellectual dispositions that, in addition to overarching intellectual traits, may be important for skilled performance within specific domains. Some examples exist, such as those found in the *Thinker's Guide to Historical Thinking* (Elder, Gorzycki and Paul, 2011, 75). 'The historian who thinks critically and fairmindedly:

1) Presents assertions and reports of the past in reference to their original

context, and calls attention to the often subtle features of that time and place to increase the reader's sensitivity to detail and accuracy...

4) Refrains from moralizing and from insisting that facts and events conform to a particular ideology or world view..

7) Avoids distorting or misrepresenting primary and secondary sources...'

Development of intellectual trait theory has benefited as a result of these collaborations between FCT scholars and content experts. However, only a few such publications are extant. The FCT might consider establishing a 'wiki' like approach, which would significantly expand the ability of individuals to identify subject- or context-specific traits, and to link these with the overarching 'intellectual traits'.

Some questions for future research:

- Which intellectual traits are essential to high quality reasoning within a given intellectual context?
- How do such context-specific traits relate conceptually to other the overarching intellectual traits?

2.4.5 Critique from a Pedagogical Perspective

The Foundation for Critical Thinking has developed a broad range of critical thinking resources for teachers. Those freely available on their website alone is impressive. In fact, the breadth and depth of material provided by the FCT was one of the reasons it was selected at the research site.

However, as has been noted in the critique developed in previous sections, much research remains. For every transformative idea there must be a corresponding network of resources aimed at helping interested individuals and groups better understand and integrate that idea into their teaching, thinking, and learning. These resources should be organic, contextualized, high-quality and, ideally, free. In order to begin collecting such resources, I have devised and am preparing to launch a broad scale empirical research project (details in section 6.3).

Some questions for future research:

- How can we effectively foster student learning and use of any aspect of

criticality within a given intellectual context?

- How can we assess students' ability to do or demonstrate any aspect of criticality within a given intellectual context?
- What does high quality student work demonstrating the use or exhibition of any aspect of criticality look like within a given intellectual context?

2.4.6 Critique from an Empirical Research Perspective

Research on the FCT's approach has been conducted (Reed, 1998; Scanlan, 2006; Crook, 2006; Connerly, 2006), but not necessarily by researchers who maintain deep understandings of FCT theory. Much more empirical research is needed. By not conducting empirical research on the efficacy of the FCT's approach, an opportunity has been missed both to improve theory and to impact educational practice on a broader scale. This dissertation is a modest beginning to this end.

Countless questions, targeting countless issues, might be formed pursuing one or more concepts from the theory described in sections 2.2-2.4 (or any other element of Foundation for Critical Thinking theory) within specific intellectual contexts.

Some questions for future research:

- To what extent are students learning to use Foundation for Critical Thinking concepts accurately and effectively?
- Are some elements of thought 'easier' to teach (e.g. 'purpose' and 'question') than others (e.g. 'assumptions' and 'concepts')? Are some intellectual standards or intellectual traits 'easier' to teach than others?
- Does experience with some some elements/standards/traits make it easier to learn others?
- To what extent do cultures, large and small, encourage or inhibit the use of critical tools, or the development of intellectual traits?
- To what extent does students' prior development (or lack of development) of intellectual traits influence their ability to learn and develop as critical thinkers in the present?

- Does pedagogy based on the elements, standards, and traits foster in students a 'deep' approach to learning (see section 3.5.1 for more on 'deep vs. surface' approaches)?
- Does learning any aspect of FCT theory help people live, work, and play in more healthy, fulfilling, and successful ways?
- How are students best taught[10] so that they become highly focused on central questions, problems, or issues?
- How are students best taught so that they learn to write papers with a clear and precise intellectual goal?
- How are students best taught so they routinely seek out opposing viewpoints where relevant?
- How are students best taught so that they are able to accurately articulate and deal with complexities within a question or issue?
- How are students best taught so that they base assumptions on sound reasoning rather than on hearsay, base intuition and conventional wisdom? How are students best taught to critically examine, and alter where necessary, their deeply ingrained beliefs?
- How is independence of thought best developed? Intellectual courage?
- How are students best taught to thoroughly inspect and evaluate information used in their reasoning?

2.4.7 Critique from a Historical/Theoretical Perspective

The work of the Foundation for Critical Thinking explicitly mentions connections to the work of other individuals or groups. Chief among those referenced are C. Wright Mills, Bertrand Russell, William Graham Sumner, Socrates, John Stuart Mill, Albert Einstein, John Wisdom, J.L. Austin, R.S. Peters, John Passmore, John Henry Newman, Karl Marx, Ludwig Wittgenstein, Jean Piaget, and Sigmund Freud. For example, Freud's work on defense

[10] I assume here that multiple overlapping as well as divergent strategies would be discovered in each case, rather than some monolithic set of 'best practices'.

mechanisms, self-delusion, and the primitive self (which Freud called the 'id') significantly informed Paul's conception of human nature. This, in turn, permeates all of the work but can be seen most clearly in the *Miniature Guide to the Nature and Functions of the Human Mind*. Paul's doctoral research under the supervision of John Wisdom brought him into contact with some of the deepest views of Wittgenstein and others. This experience cemented in Paul two insights that significantly underlie his theory: first, that a broad approach to conceptual analysis and the logic of questions can be much more effective in thinking deeply about ultimate and foundational questions than can analysis based on traditional formal philosophical presuppositions; second, that the broad range of human experience and thinking cannot be articulated by using technical language such as that employed by formal and symbolic logic; rather, natural languages are required (for more on these distinctions, see sections 2.1.1 - 2.1.3).

Theoreticians should make clear their intellectual influences, so that scholarship may be appropriately interconnected. Nevertheless, with few exceptions, these historical/theoretical relationships are not investigated in detail by the Foundation for Critical Thinking. Much historical/theoretical work therefore remains to make clear the nature and strength of the connections between FCT theory and practice on the one hand, and any theoretical concepts underpinning the work

2.5 Conclusion

The purpose of the last two chapters has been to identify a sampling of important threads of scholarship in the history of critical thinking. Chapter one explored some of the beginnings of criticality. Chapter two covered some theoretical texts central to understanding the broad literature on critical thinking developed in the past century and before. This chapter has also introduced the theory of critical thinking at the heart of the continuing professional development project under investigation in this research. The next chapter considers some important empirical investigations into the status of teaching and learning of critical thinking, as well as the state of attempts to *improve* teaching and learning of critical thinking.

Chapter Three: An Overview of Empirical Research on Critical Thinking

Chapters one and two were largely *theoretical* – examining frameworks for critical thinking; they highlighted the diversity of ways in which people have thought critically, or have thought about how to think critically. This chapter will relate what is known empirically about the status of teaching and learning for critical thinking in formal systems of education at present. A range of research will be examined, some of which are explicitly about critical thinking and others in which the concept is only implicit. In each case I will attempt to make the relevance as clear as possible.

Of course, the same is true of this chapter as the past two: there is far more activity surrounding critical thinking than can be captured here. For example, a recent internet search for 'critical thinking' found 117,000,000 entries. Investigation of these entries reveals that more and more educational institutions and systems across the world are becoming focused on fostering critical thinking. The quality of these resources is highly variable, as is their purpose, rendering the literature difficult to penetrate. There is much duplication in the field, and so I have attempted here to select representatives from important research traditions and insights.

The knowledge represented in this chapter is the product of at least four years of explicit and systematic reading (much of this occurring during work for two master's degrees in education) and a further four years of less formal study; additionally, I have recently conducted a database search and have analyzed the last five years of publications in which the phrase 'critical thinking' appeared in either the title or the abstract (in ERIC, as well as the Australian and British Educational Indexes; totaling 1,634 articles).

The search began slowly, but accelerated at an exponential rate: after two full (12hr) days I had only progressed to entry #12; as I became more familiar with the literature, however, I was able to progress through nearly 100 entries a day. This was due to my analytical strategy, which has many facets of the 'grounded theory' approach (Glaser and Straus, 1967), as well as to my reading strategy, which was a combination of 'deep' and 'structural' (Paul and Elder, 2005).

In ordinary language, the search can be explained as follows: in each case where I encountered an article which seemed unique - and in any way relevant to the teaching

and learning of critical thinking - I read it closely; further, I looked carefully at relevant citations in these articles, chasing up and deeply reading them as well. As I began to be familiar with these emerging categories, and with the most influential thinkers and theories in each, I was able to read more 'structurally'. This involved closely reading the 'introduction' and 'summary' paragraphs in each main section (e.g. the abstract, introduction, literature review, results, findings, conclusion) to discover similarities or differences with already analyzed articles. Where new or pertinent ideas were found, my reading strategy changed again to the 'close reading' approach. After about three weeks I began to approach what grounded theorists refer to as 'saturation': no new categories were emerging, nor was much of substance being added within existing categories (as far as I could tell).

The articles were sorted by descending date, and I had at this point progressed through the last two and a half years of publications. I decided to continue my search through to the year 2006 (that is, covering everything from 1/1/2007 up to but not including 20/4/2012). As mentioned above, this totaled 1,634 non-duplicated entries (or rarely duplicated, in any case).

3.1 Research that treats 'Critical Thinking' as little more than a buzzword

In much of the found empirical reports, the phrase 'critical thinking' seems to have been added into the abstract or title as an after-thought, or perhaps to increase its apparent relevance and visibility. Upon investigation, however, these studies either maintain no aspects which are recognizable as critical thinking even in the broadest sense, or have insufficiently clear methodology to judge the implications for critical thinking. Most of these focus on development of technical skills, and usually involve some sort of technology (e.g. Watson and Pecchioni, 2011; Barlow-Jones and Van der Westhuizen, 2011). These studies often give little to no attention to the concept of critical thinking being used in the study, and often use assessment tools which are themselves ill-explained, especially in terms of critical thinking.

For example, a recent issue of *Medical Education* contained a study which purported to assess the effects on critical thinking of video-based versus text-based pedagogical case studies. Barely 250 words are used to describe the theory of critical thinking to be used, which is based on a five-part model developed by Garrison (1991) and based on

Brookfield (1987), which categories are '(i) problem identification; (ii) problem definition; (iii) exploration; (iv) applicability, and (v) integration' (Roy and McMahon, 2012, 427). The authors continue their methodological reasoning, 'Within each of the critical thinking domains, utterances are classified as deep (xd) or superficial (xs). For example, the student utterance 'Slow growth velocity would have shown up before now' was coded as a deep utterance within the problem exploration domain (category iii). 'I have absolutely no idea how it does it' was coded as a superficial utterance within the same domain. The code focuses only on critical thinking and is not influenced by the correctness of the discourse' (Roy and McMahon, 2012, p 429).

Let me point out just two major problems in this study. First, the 'critical thinking categories' are in fact all intellectual processes which can be done well or poorly, critically or uncritically. Thus, we may 'define the problem' inaccurately or superficially; we might 'explore' irrelevant or tangential issues; we might 'apply' our thoughts in arrogant or manipulative ways (or apply information inappropriately). Second, though the methodology claims to 'only focus on critical thinking and not on the correctness of the discourse', the only example offered is actually a classification of 'subject knowledge' versus 'subject ignorance', rather than of 'critical thinking' versus 'not critical thinking'. In other words, the student exclamation 'I have absolutely no idea how it does it' does not necessarily imply a lack of critical thinking. On the contrary, it could be interpreted as evidence that this student has engaged in critical self-reflection and is now demonstrating intellectual humility (i.e. being aware of limitations in one's thinking), one of the most important critical intellectual dispositions (and rare in student thought).

Though 'critical thinking' is a broad concept which covers a wide swath of literature (some of which is explored in chapters one, two, and three of this dissertation), its meaning can be diluted (and therefore, in essence, lost) when researchers try to stretch it too far. Research on critical thinking must be clear about exactly which forms of criticality are intending to be taught and precisely how they will be assessed.

3.2 Research on Critical Thinking within Specific Academic Disciplines and Grade Levels

Where identifiable aspects of critical thinking do appear in empirical research, the overwhelming majority of reports investigate a single and highly specialized or highly contextualized strategy for teaching critical thinking. This can be seen clearly in

many of their titles, as in:

- 'Using academic journals to help students learn subject matter content, develop and practice critical reasoning skills, and reflect on personal values in food science and human nutrition classes' (Iwaoka and Crosetti, 2008)
- 'Learning methods for teacher education: the use of online discussions to improve critical thinking' (Szabo, 2011)
- 'Competency-based integrated practical examinations: bringing relevance to basic science laboratory examinations' (Shafi, Irshad, and Iqbal, 2010)
- 'Beyond decoding: political cartoons in the classroom' (Hammet and Mather, 2011)
- 'Argument diagramming and critical thinking in introductory philosophy' (Harrell, 2011)

This category (3.2) is populated mainly by teachers, representing highly diverse subjects and grade levels, who develop an interest in educational philosophy or pedagogy and subsequently conduct what is often called 'practitioner research': research wherein the teacher and principal investigator are one and the same. These reports are limited in use for many reasons. Most significantly, they are largely uninformed by, nor do they seem to significantly inform, other research. Because of this, there is much duplicated discovery (or 'wheel reinvention') of insights and barriers which are better investigated and articulated in other, higher-quality research (such as that examined in section 3.5).

Other research is broader, but still focused within specific disciplines. For a good review, see Bowers' (2006) 'Instructional support for the teaching of critical thinking: looking beyond the red brick walls'. Some of the better studies of this sort found, and their relevant discipline or context, are:

- Health professionals: (Snodgrass, 2011)
- English as Foreign Language: (Abdel and Safaa, 2011)
- First Year Book Reading Program: (Goldfine *et al.*, 2011)
- Post-secondary writing: (National Writing Project, 2011)
- Children's Art Investigation: (Herz, 2010)

- K-12 Science Contexts: (Cavagnetto, 2010)
- Primary mathematics: (Mueller and Maher, 2010)
- Political science: (Marks, 2008)

Some of these projects, such as the Guggenheim's project to help children become 'art investigators' (http://www.guggenheim.org/new-york/education/school-educator-programs/learning-through-art), and the UC Berkeley-affiliated National Writing Project (http://www.nwp.org/) offer an array of high-quality resources, including sample lesson plans and classroom video. For example, the Guggenheim project establishes partnerships between artists and local schools. 'LTA [Learning Through Art] teaching artists encourage each student to think like an artist by modeling their own artistic process as well as exposing them to works of art and a variety of ideas and approaches…. Reflection is an integral component of every LTA residency and can take the form of group discussions of student artwork, individual sketchbook reflections, and checklists of goals generated by students….'

The Learning Through Art website provides a collection of teaching resources, such as detailed lesson plans with reflective prompts. One possible lesson design for a 9th grade class is below:

Pablo Picasso painted this image in 1900, shortly after he arrived in Paris for the first time. Picasso and many other artists were intrigued by turn of the century Parisian cafes, nightlife, and dance halls.

Questions for Investigation

- What do you notice?
- Would you like to be one of these people? Why? Why not?
- If you had to talk to one of these people who would you choose? Why?
- What do you think Picasso and other artists found to be so interesting about this subject matter?
- What can you learn about people in 1900 by looking at this painting?

(Optional)

- Compare this painting to Renoir's Moulin de la Galette (1876).
- What more can we learn about people in 1900 from Renoir's depiction?

It is exciting to see these new projects that, though receiving far less attention than they deserve, are undoubtedly having a positive impact on participating teachers and students. One small note here is that the 'critical thinking' concepts are often more implicit than explicit in these studies. Though the above reflective questions will undoubtedly stimulate children's thinking, the specific concepts provided are not as deep as they could be, in light of substantive theory of critical thinking (in italics): 'What do you *notice*?', 'what would you *like to be*…?' '*had to talk* to one of these people…*who…?*' *'What do you think…interesting*?' 'what can you *learn*?' '*compare*….'. These questions might be significantly upgraded by including more explicit tools of critique, such as is suggested by research on *Assessment for Learning* (see section 3.5.3): as in: 'what *conclusions* might Picasso be attempting to convey, and what are some important *implications and consequences* of those ideas?', or, 'what is Picasso's *purpose* in painting people *vaguely*?'

This research and reporting of subject specific and contextualized critical thinking is important: it begins to illuminate the sheer quantity of work necessary to develop high-quality resources for educators in all the diverse settings within systems of educa-

tion the world over. Further, it forms a counterpoint to the slew of recent research (see section 3.4) which highlights a broad failure to teach for critical thinking: though we may not be successfully teaching generalizable critical thinking skills to the majority of students, still, it is also clear that many teachers around the world, across the curriculum, and spanning every age range, are beginning to take this challenge more seriously and are working more explicitly and effectively to teach critical thinking skills, traits, and understandings to their students.

Finally, research on subject-specific critical thinking suggests that there is no 'one' or 'best' way to teach critical thinking. While this research is not without limitations, it illuminates myriad important critical thinking skills, traits, and understandings that can be fostered using multitudinous approaches and strategies. What seems most significant is not the creation of a definitively 'correct' list, but simply that we begin to make more explicit those aspects of critical thinking important to reasoning within subjects and disciplines, and that we labor to find new and better pedagogical strategies for fostering understanding of these skills and subjects.

Questions for future research:

- What forms of critical thinking and teaching for critical thinking can be documented within specific disciplines, specializations or grade levels? What effects do these have on student learning?
- What obstacles emerge for critical thinking and teaching for critical thinking within specific disciplines, specializations, or grade levels?
- What motivating and supporting forces emerge for critical thinking and teaching for critical thinking within specific disciplines, specializations, or grade levels?
- What is the relationship between the above subject-specific and more universal forms of obstacles and motivating factors to thinking critically and teaching for critical thinking?

3.3 Evaluating Critical Thinking Evaluation

A much smaller, but still significant, portion of the search results consisted in analysis and assessment of how to evaluate critical thinking and critical thinking development

in teachers and students. These were of two types: 1) those analyzing the quality of extant instruments for assessing critical thinking in students and teachers (though primarily focused on students), and; 2) those focused on external oversight and the associated jargon of 'accreditation', 'accountability' and 'transparency'. The first type (e.g. Sawchuck, 2010; Hatcher, 2011) is a highly active area of research and theorizing, but one that has been largely unsuccessful in designing constructs which effectively and selectively target important aspects of critical thinking.

The Collegiate Learning Asessment (CLA), for example, has been lauded as 'the best creative thinking of the academic research and psychometric community' (Grosso de Leon, 2007, 3), and 'among the most comprehensive national efforts to measure how much students actually learn at different campuses' (U.S. Department of Education, 2006, 23). Still, it has significant detractors (e.g. Basken, 2008). Additionally, it is subject to the same problems inimical to all broad scale tests of critical thinking: its quantitative elements use proxies which are only weakly related to students' tendency and ability to engage in deep and genuinely critical thought, while its qualitative elements are time consuming and expensive to administer; further, and more importantly, it is difficult to achieve reliability among assessors at high student *n*. Solving the problem of system-wide assessment for critical thinking is a significant challenge, beyond the scope of the research contained within this dissertation. The focus in this project is on documenting the improvement of teaching for critical thinking; assessment has been confined to in-depth qualitative study of a few dozen cases.

The second category, that focusing on the 'evaluative state' or 'managerialism' relates to the politics of change. For an overview, see the collection of papers entitled 'The Evaluative State Revisited' in the *European Journal of Education*, 33(3), September 1998. The key point illuminated in these papers is this: human beings are cautious about change and sensitive to critique; at times we are lazy or obstinate. As Frederick Hess, director of education policy at the American Enterprise Institute points out, these qualities are not unique to academics: 'left to their own devices, most employees in any line of work will resist changes that require them to take on more responsibility, disrupt their routines, or threaten their jobs or wages' (Hess, 2006, 79).

It is important here to emphasize that resistance is not always negative. Skepticism and questioning may be signs of a healthy intellect (remember the example of Socrates).

Further, in many cases, some of which are discussed by faculty interviewed for this project (section 5.3.1), mandates imposed upon educators at every level are unreasonable and without substance, serving purely bureaucratic purposes. Added to this, faculty 'burn-out' and dissatisfaction with past professional development experiences can make it difficult to appreciate higher quality intellectual resources and experiences when they do appear.

On the other hand, this does not imply that external accrediting bodies are always superfluous or distracting, nor that they have no role to play in transforming higher education (or of education more generally for that matter). It seems clear from empirical research that teaching and learning for critical thinking is inadequate given the resources allocated to education (see section 3.4.2). To the extent that accrediting bodies pressure educational institutions to better foster critical thinking, they can serve as positive influences.

Some questions for future research:

- What types of accrediting processes positively impact teaching and learning for critical thinking across the curriculum at all levels of ability?
- How can accrediting standards contribute to fostering fairminded critical educational institutions throughout the world?
- What types of accrediting processes negatively impact reform, therefore hindering teachers' attempts to foster critical thinking in students?

3.4 Research on Present Practice Regarding Critical Thinking

The first part of the last section (3.3) highlighted the difficulty in accurately evaluating the critical thinking ability and development of students. *What is clear, however, is that by virtually all measures yet devised, we appear largely unsuccessful at teaching critical thinking to students.* A number of diverse studies from the literature search (e.g., from just 2009-2011, excluding 2007-2008: Belluigi, 2009; Choy and Cheah, 2009; Papadopoulos, 2010; Krupat *et al.,* 2011, Hilker, 2011; Shields, 2011; Tian and Low, 2011; Cleary and Raimon, 2009; Le and Kazis, 2009) all maintain the same central conclusion: that educators of all stripes profess to value and teach for critical thinking far more than can be documented in their classrooms. This basic idea – that there is a yawning chasm between institutional rhetoric and practical reality when it comes to teaching and learning critical

thinking across the curriculum – has been confirmed in many countries and contexts. Let us now briefly investigate the rhetoric, and then move on to examine the reality.

3.4.1 The Rhetoric

There is no doubt that 'critical thinking' and its derivatives and similitudes are highly visible in the academic world: it seems that virtually no university mission statement, department evaluation procedure, or course outcome outline is complete without at least a casual reference to critical thinking (Arum and Roksa, 2011). Studies show overwhelming faculty support (between 92 and 99%) for critical thinking in instruction (e.g. Thomas, 1999; Gardiner, 1995; Paul et al. 1997; HERI, 2009). Indeed, as distinguished educationalist and former president of Harvard University Derek Bok, has said 'with all the controversy over the college curriculum, it is impressive to find faculty agreeing almost unanimously that teaching students to think critically is the principal aim of undergraduate education' (Bok, 2006, 109). Further arguments for the importance of critical thinking can be seen in government reports and mandates (e.g. Dearing, 1997 and North, 1997 in the UK; by President Obama in the US; San Jose Mercury News, 2010); in the writings of prominent educational leaders (e.g. Barnett, 1997 and 2011; Ramsden, 2007); and from the business community (e.g. Casner-Lotto and Benner, 2006).

3.4.2 The Reality

What do we know about the extent to which critical thinking values, skills, and traits are actually being fostered in higher education? To answer this question, we might begin with two recently published investigations into, among other issues, the state of critical thinking in higher education in the United States. One large scale study, *Academically Adrift* (Arum and Roksa, 2011), collected longitudinal data from 2,322 students attending a wide range of institutions using the Collegiate Learning Assessment (CLA)[11]. These researchers concluded that, though '99 percent of college faculty say that developing students' ability to think critically is a 'very important' or 'essential' goal of undergraduate education…commitment to these skills appears more a matter of principle than practice…The end result is that many students are only minimally improving their skills in critical thinking, complex reasoning, and writing, during their journeys through high-

[11] The CLA is a writing assessment in widespread use in the United States. It maintains a variety of critical thinking elements and standards within its evaluation procedures.

er education.' (Arum and Roka, 2011, 35). For example, nearly half (45%) of students in the sample showed no statistically significant gains in critical thinking after two years of college experience.

Another recent study conducted by the Wabash National Review (Blaich, 2007) on first year students produced similar results. The sample in this study was somewhat larger, including over 3,000 students from 19 different institutions. Using a variety of standard multiple choice methods, the results showed no measurable improvement in critical thinking ability during students' first year in university.

Arum and Roksa (2011) have an explanation for this state of affairs: though higher education is being scrutinized internally and externally like never before, little of it is focused on pedagogy, the quality of teaching and learning:

> 'No actors in the system are primarily interested in undergraduate student academic growth, although many are interested in student retention and persistence. Limited learning on college campuses is not a crisis because the institutional actors implicated in the system are receiving the organizational outcomes that they seek, and therefore neither the institutions themselves nor the system as a whole is in any way challenged or threatened'
>
> - Arum and Roksa, 2011, 125

Though Arum and Roksa may be overstating the point, let us investigate more closely the specifics of this broad failure to teach critical thinking: how is it that highly skilled critical minds often fail to foster critical thinking in their students? Though there are, of course, many complex contributing factors, recent research combined with historical understandings goes some way towards explaining this apparent contradiction.

The best empirical investigation of this discrepancy that I have found is the study conducted by the California Commission on Teacher Credentialing (Paul, Elder and Bartell, 1997). It provides evidence not only *that* professors, by and large, are not effectively teaching for critical thinking on a daily basis, but also *why* this is so.

Participants in the study were selected from 57 universities—28 public, 29 private— including highly prestigious universities such as Stanford, UC Berkeley, and UCLA.

In order to find faculty from diverse subject matter, representatives were randomly selected from the areas of English, Government, History, Life Sciences, Physical Sciences, Mathematics, Social Sciences, and Multiple Subjects Preparation. Education as a field is overrepresented, partly on purpose and partly due to a higher response rate (84% for education faculty vs. 65% for other subjects), resulting in 101 education faculty and 39 'subject matter faculty' being interviewed.

One basic premise underlying the study's methodology was this: faculty who are knowledgeable about critical thinking and who effectively foster it in their students are able to adequately articulate the basic idea and accompanying pedagogy. To illustrate, physics instructors should be able to talk intelligently about the core meaning of Physics and how to conduct experiments in the field. To exemplify the importance of physics, they might tell personal stories about how they apply their understanding of physical laws and properties to the natural world. If, as it turns out, they cannot articulate clear understandings of physics, true experts will spot the flaws or limitations in their explanation. The same holds true for critical thinking: those who have studied the idea explicitly and applied it to their life or their work are able to talk about those investigations and applications. Others, who have undoubtedly developed tools for critical thinking throughout their lives, but who perhaps have done so implicitly, often 'along the way' towards other goals and ends, demonstrate less facility in articulating its core principles and even less success explaining how to *do* critical thinking. This same premise undergirds the methodology in this dissertation (described in chapter four).

The interview protocol in the Paul *et al*. study was designed beginning with a series of 'close-ended' questions followed by another group of 'open-ended' questions. Some of the former areas follows (note interviewer prompts in italics):

1. 'How important is critical thinking to your instructional objectives?
    a. Of little or small importance
    b. Of secondary importance
    c. Of primary importance
2. My concept of critical thinking is:
    a. A product of my own thinking

b. A product of one or more particular theories of critical thinking to which I explicitly subscribe
(if they say "b" or 'both', say 'Could you please tell me which theories you subscribe to and/or which theorists you have read)

3. Do you feel that students come to your classes with well developed intellectual standards to use in assessing thinking?
    a. In general yes, or
    b. In general no
4. Which of the following four descriptions best represents your assessment of the degree to which your department's graduates develop the ability to think critically as a result of their course work:
    a. Little or no development of critical thinking ability
    b. A low level of development of critical thinking ability
    c. A good level of development of critical thinking ability
    d. A high level of development of critical thinking ability'

(Paul, Elder, and Bartell, 1997, 106-107)

'Some of the open-ended questions were as follows:

1. Would you explain to me your concept of critical thinking? Perhaps you could begin by completing the following sentence: 'To me, critical thinking is_____"
2. Is there anything you do on a daily basis that you believe fosters critical thinking?
3. What particular critical thinking skills do you believe are most important for your students to develop?
4. What is your personal conception of intellectual criteria or standards?'

(Paul, Elder, and Bartell, 1997, 108-110)

In all cases the open-ended questions were followed up by requests for elabora-

tion and exemplification. Participants were encouraged to describe critical thinking and how to teach for it in their own terms.

The results are sobering. From the executive summary (18-19):

> Since the samples were constructed so as to be representative in a statistical sense of all faculty involved in teacher preparation in California, the results can in fact be generalized to teacher preparation faculty in the state as a whole. The results of the analysis were as follows:
>
> **1)** Though the overwhelming majority (89%) claimed critical thinking to be a primary objective of their instruction, only a small minority (19%) could give a clear explanation of what critical thinking is. Furthermore, according to their answers, only 9% of the respondents were clearly teaching for critical thinking on a typical day in class.
>
> **2)** Though the overwhelming majority (78%) claimed that their students lacked appropriate intellectual standards (to use in assessing their thinking), and 73% considered that students learning to assess their own work was of primary importance, only a very small minority (8%) could enumerate any intellectual criteria or standards they required of students or could give an intelligible explanation of what those criteria and standards were.
>
> **3)** While 50% of those interviewed said that they explicitly distinguish critical thinking skills from traits, only 8% were able to provide a clear conception of the critical thinking skills they thought were most important for their students to develop. Furthermore the overwhelming majority (75%) provided either minimal or vague allusion (33%) or no allusion at all (42%) to intellectual traits of mind.
>
> **4)** Although the majority (67%) said that their concept of

critical thinking is largely explicit in their thinking, only 19% could elaborate on their concept of thinking.

5) Although the overwhelming majority (81%) felt that their department's graduates develop a good or high level of critical thinking ability while in their program, only 20% said that their departments had a shared approach to critical thinking, and only 9% were able to clearly articulate how they would assess the extent to which a faculty member was or was not fostering critical thinking. The remaining respondents had a limited conception or no conception at all of how to do this.

6) Although the vast majority (89%) stated that critical thinking was of primary importance to their instruction, only a very small minority could clearly explain the meanings of basic terms in critical thinking. For example, only 8% could clearly differentiate between an assumption and an inference, and only 4% could differentiate between an inference and an implication.

7) Only a very small minority (9%) mentioned the special and/or growing need for critical thinking today in virtue of the pace of change and the complexities inherent in human life. Not a single respondent elaborated on the issue.

8) In explaining their views of critical thinking, the overwhelming majority (69%) made either no allusion at all, or a minimal allusion, to the need for greater emphasis on peer and student self-assessment in instruction.

9) From either the quantitative data directly, or from minimal inference from those data, it is clear that a significant percentage of faculty interviewed (and, if representative, most faculty):

- do not understand the connection of critical thinking to intellectual standards.
- are not able to clarify major intellectual criteria and standards.
- inadvertently confuse the active involvement of students in classroom activities with critical thinking in those activities.
- are unable to give an elaborated articulation of their concept of critical thinking.
- cannot provide plausible examples of how they foster critical thinking in the classroom.
- are not able to name specific critical thinking skills they think are important for students to learn.
- are not able to plausibly explain how to reconcile covering content with fostering critical thinking.
- do not think of reasoning within disciplines as a major focus of instruction.
- cannot specify basic structures essential to the analysis of reasoning.
- have had no involvement in research into critical thinking and have not attended any conferences on the subject.
- are unable to name a particular theory or theorist that has shaped their concept of critical thinking.

The picture looks even more grim when looking at the interview profiles provided in the study, below are a few typical responses which illuminate the above statistics (Paul, Elder, 22-25):

Professor A:

"Critical thinking means to think analytically and be aware that everyone thinks for himself. All thinking is critical to some extent. Anyone who thinks intelligently. Reflectiveness."

When asked what critical thinking skills are most important for students to develop, he says, "I can't answer this. I can't identify skills."

When asked for his personal conception of intellectual standards, it is clear that he does not have one: "That's a hard question to answer. I don't think I see an answer to it."

In addition to his general lack of clear thinking about critical thinking, it is apparent that he is also confused about the basic concepts in critical thinking. When asked to explain the difference between an assumption and an inference, he says, "An inference is something based on information. An assumption is based on feeling and a lack of thinking." (ignoring the fact that we can make empirically well-founded assumptions and infer something based on prejudices or stereotypes)

Professor G:

Professor G is a good example of one who equates critical thinking with thinking for oneself and, beyond that, applies no discernible intellectual standards. She in general assumes that if students are actively engaged and "thinking for themselves", they are *ipso facto* thinking critically. Nowhere does she mention that students can actively construct prejudice as well as knowledge, poor thinking as well as sound thinking. Nowhere does she mention the importance of students thinking clearly, accurately, precisely, relevantly, logically, etc…

> When asked for her personal conception of intellectual standards, she says: "(I would look for them to) take their own positions. I don't know that I would apply general standards."

The full study can be found online[12]. I encourage anyone seriously interested in the development of critical thinking in students across the curriculum to read it carefully. From this study, which methodology was duplicated by Thomas (1999) with secondary school teachers in San Diego producing nearly identical results, we can see that *one of the main impediments to the development of the critical capacity of students is that many professors and teachers do not have much experience investigating the idea (critical thinking) explicitly and deeply, and have not dedicated significant time and energy to the consideration of how to foster it within their classrooms*.

This should not come as a surprise: teachers, in their first day on the job, already have 17 to 20 or more years of classroom experience (representing thousands of hours) as a student. These experiences lead to deeply ingrained beliefs about teaching and learning which do not necessarily prioritize students' critical thinking. Viewed in this light, it seems unreasonable to expect that new teachers or professors will shake off these habits (which, it must be pointed out, have served them in good stead in their effort to achieve status and prestige) and somehow manifest a new paradigm based on critical thinking and student autonomy rather than information transmission and student passivity.

I have firsthand experience researching this disconnect between teacher belief and pedagogical practice in the tutorial system at Oxford University, the full results of which can be found in Cosgrove 2011a (see Appendix F). Below are two exchanges from that study which demonstrate the implications of implicit (rather than explicit) instruction in critical thinking, or 'hoping students pick up critical thinking along the way'. The first comes from an interview with a tutor in the field of political philosophy, and the second is from an interview with one of his students:

> RC: and when you have your students critique other arguments, what kinds of criteria do you see them using?
>
> Tutor B: Well I think that's much more ad hoc. They tend to assess in terms of what they agreed and disagreed with. That's probably

[12] http://www.criticalthinking.org/pages/center-for-critical-thinking/401

less helpful...I think it would be helpful to have them try to use similar criteria to ones that I use so that they get to understand the criteria that I'm using to assess their work and to start using it themselves on other people's; and then they'll start using it on theirs. That's kind of the ultimate goal. I would then have to produce a criteria sheet for them [pause] I should probably do that really [pause], because it tends to be more sort of, "well you know I agree with x. y, z, but I disagree with a, b, c"…

RC: So you don't actually say "ok when you're critiquing this person, you need to use these criteria"?

Tutor B: No but I think I should do [pause] just thinking about it [pause] now you ask it, I probably should say "look, you know, what do you think are the criteria that I use? You should use the same sorts of things" Because part of the whole formative assessment technique that I use is to try and get them to realize what it is that I'm looking for in a good essay. And so they can work out the criteria by applying it themselves. And that would be a good thing to do and I haven't really integrated that technique into formative assessment. I was using it for something else. I was using it to produce an immediate agenda.

RC: right

Tutor B: and also just to get them to work on their critical skills, so they can look at it and think "ok, what's wrong with this?" but obviously your implicit point is right in that they should do it with criteria.

Previously in the interview this professor had discussed some of the standards he uses to critique his own and others' professional work[13], but he apparently had never thought to discuss these ideas with his students. Accordingly, his pupils' responses regarding criteria for intellectual evaluation exhibited considerable confusion and anxiety:

Student G: I find it really hard to read someone's essay and critique it. I don't know why, it's like impossible – it's like gibberish

> I don't know why!... But in the end I just kind of [go] through the plan of [an] essay and then just underneath in a different color pen, just say like whether I think this is a good or bad idea, but I think that's a bit sort of childish.
>
> Student F: yeah well you often just get a - it sounds really like stupid but it's almost just sort of what you think sounds right. It's almost like an impulse. It's almost an impulse decision. It's just what seems more convincing…

We can see here frustration on both sides: by the tutor for his students' infrequent critical thinking, and by students for not knowing how to engage in critical thinking; and all for lack of explicit understanding and communication of explicit tools of analysis and evaluation, tools which the tutor clearly possessed but did not effectively communicate.

The research covered thus far has focused on instruction generally, not of specific teachers. It should perhaps again be pointed out that there are many individuals and groups around the world working to improve teaching and learning for critical thinking. Yet, because the cultivation of critical thinking is complex and, in essence, a life-long process, it therefore depends on regular and sustained encouragement and support. Supporting this notion, recent research (Jacob, Legfren, and Sims, 2010) suggests that gains in student learning caused by top teachers fade within a year. We cannot be satisfied with the development of a few excellent teachers, nor a few excellent students. To raise the common level of thinking (and of critical thinking), the majority of students should be exposed throughout their education to teachers knowledgeable about critical thinking and effective at fostering it in the classroom.

This brings us to my present project. To reiterate, I hold that *for critical thinking to be developed to a significant degree among a significant portion of students requires that a significant portion of teachers within an educational institution have a significantly well-developed understanding of critical thinking as well as how to teach for it*. Given the impoverished state of teaching and learning for critical thinking at present, *any institution seeking to improve in this direction should design a substantive and long-term profes-*

[13] Just a few of the questions he proposed were: 'Is it properly structured?' 'Does it flow logically?' 'Is it supported by evidence?' 'Is it coherent, rather than contradictory?' 'Is it persuasive?'

sional development plan aimed at deepening professors' understanding and broadening their practice of critical thinking.

Fortunately, we are not now in as dark a position as we were when Black and Wiliam first began investigating the 'black box' of the classroom over a decade ago, and we are a far sight removed from Glaser's (1941) initial experiment seeking to determine whether critical thinking could be taught at all. The next section details some important empirical investigations of improvements in critical thinking across the curriculum.

3.5 Research on Critical Thinking Across the Curriculum

It is fortuitous that, given our interest in critical thinking across the curriculum, some of the best educational research has been conducted on this issue. While previous sections have focused on the present state of teaching and learning for critical thinking, research presented in this section sheds light on some significant dimensions relevant to the *improvement* of teaching and learning for critical thinking.

What follows is an investigation, to the degree possible given limitations of space, of four deeply interconnected areas of scholarship. Each represents— or at least approaches — what I consider to be the 'Gold Standard' in educational research: they are each the result of decades of careful thinking and experimentation by teams of scholars working in cross-continental partnerships seeking to discover insight into fundamental elements of teaching and learning.

Each of the four research groups supports the others in offering insights into how to effectively teach and learn from different perspectives. It is important here to point out two lessons implicit in these reports which might be overlooked: 1) they highlight the significant overlap in learning processes in humans of practically all ages; and, 2) they highlight those important *transferable or trans-contextual skills* and *habits* essential to high quality critical thought.

3.5.1 William Perry and Deep/Surface Learning

This section combines two bodies of scholarship which, inexplicably, rarely cite or make mention of each other. They are both essentially epistemological in focus, though from slightly different angles. Both are now decades old, with Perry's work beginning in the 50's and Marton and Saljo's work following in the 70's. Not only have they withstood

the test of time, they have consistently been re-discovered in almost every setting to which they've been applied, at virtually every level and on every continent. As Paul Ramsden (1997, 53) concludes, 'the deep (meaning) and surface (reproducing) components show impressive stability across age groups and national boundaries. There is little room for doubt that they describe a primary difference in how our students learn'. The essential insight here is that how we approach learning affects how we learn, and that maintaining a 'deep' approach to learning (which is essentially a 'critical' approach) results in more learning, better learning, and longer-lasting learning.

Perry's work is best accessible in the updated original from Jossey-Bass: *Forms of Ethical and Intellectual Development in the College Years: A Scheme* (1999). The subtitle, 'a scheme', emphasizes Perry's important contribution of a hierarchical model to use in understanding students' epistemological development – or lack thereof. The basic idea is this: students' thinking regarding the complexity of knowledge during their college experience progresses along a continuum stretching from basic dualism (things are either true or false), passing through subjective relativism (nothing can be called 'true' or 'false'), and moving towards commitment based on reason (truth is assessed critically and approached by degree). To say this again without using these labels, when students are asked how they view knowledge, they tend to respond in one of three fundamental ways:

> 1) 'There's basically a right answer to academic questions, and the procedure for finding them is to ask the appropriate authorities. They will 'give' the answer, and what I need to do is 'remember' it'…
>
> 2) 'The world is far more complex than I imagined it, so much so in fact that I don't think it's possible to answer any question with absolute certainty; the truth, therefore, is fundamentally subjective'…
>
> 3) 'Though the world is complex, and we may not be able to say much with *absolute* certainty, we can approach the truth to a greater or lesser degree depending on the question being asked, and if we wait to act until there is no longer any room for doubt then we will never get anything done.'

Perry's scheme is much more nuanced than this. It includes nine stages: 1) basic duality; 2) multiplicity pre-legitimate; 3) multiplicity subordinate; 4) multiplicity cor-

relate or relativism subordinate; 5) relativism correlate, competing or diffuse; 6) commitment foreseen; 7) initial commitment; 8) orientation in implications of commitment; and 9) developing commitments. Each stage is devoted between 10 and 20 pages of description and explanation. Further, there are three mechanisms for backward or lateral movement, termed 'temporizing', 'escape', and 'retreat'.

Perry's publication in 1970 influenced a multi-generational group of scholars who have sought to further test, develop and extend these categories. One highly important branch formed to investigate the extent to which students' epistemological approach correlated with academic success. An early publication by Ryan (1984, 248) confirmed the link, concluding that in a sample of 90 undergraduates: 'students reporting the use of [committed reason] criteria earned better grades than those reporting the use of [dualistic] criteria…these data suggest that one's epistemological beliefs may dictate one's choice of comprehension standards, and that these epistemological standards, in turn, may control the effectiveness of one's text processing efforts'. To say this another way, students' evaluative capacity is inherently interconnected with their ability to understand and make meaning (i.e. their analytical capacity): students who use weak or vague standards are not able to draw profound inferences, and therefore cannot come to deep understandings. Those who employ more powerful criteria are, through their use, able to develop more complex and sophisticated understandings.

Around the same time that Perry was developing his theory, another group led by Swedish researchers Ference Marton and Roger Saljo began investigating what they called 'deep' vs 'surface' approaches to learning, which closely align with the poles in Perry's scheme. The collection of papers entitled *The Experience of Learning* (Marton, Hounsell and Entwistle (eds.) 1984) is, in my view, a must-read for anyone in the field of education. Even today the essays have currency. Instead of analyzing students' understanding of knowledge, this literature focuses on students approaches to *learning*. This tradition creates a parallel continuum (to Perry's scheme) moving from a surface/atomistic approach (where learning is conceptualized as the act of reproducing already discovered, unorganized, and largely static knowledge) to a deep/holistic one (in which students see themselves as knowledge creators, therefore recognizing the role played by their own thinking in the de-construction and re-construction of knowledge; knowledge is viewed as integrated). In other words, Marton and Saljo found that the critical tools students use while learning determines the quality of that learning. For example students without

clear questions produce vague answers. On the other hand, those who are able to focus on that which is relevant and significant are better able to understand and utilize what they are learning.

Compare these descriptions to those on surface/atomistic and deep/holistic provided originally by Marton and Saljo (1984, 40), my labels in brackets: 'The [surface/atomistic] way of setting about the learning was characterized by a blind, spasmodic effort to memorize the text; these learners seemed, metaphorically speaking, to see themselves as empty vessels, more or less, to be filled with the words on the pages. In the [deep/holistic approach], the students tried to understand the message by looking for relations within the text [logic, concepts, questions] or by looking for relations between the text and phenomena of the real world [information, implications], or by looking for relations between the text and its underlying structure [purpose, assumptions]'.

The deep/holistic and surface/atomistic divide is almost perfectly synonymous with the difference between critical and uncritical thinking. Uncritical students are not aware of themselves as thinkers and learners. They consequently do not routinely or systematically critique their study habits or their understanding of subject content, except to memorize important facts or 'go over' key notes before a test. They do not routinely look for interconnections between what they are learning in one class and their other classes. If aware, they are largely unconcerned that almost all of this 'knowledge' is inaccessible just a few weeks later. Students who have developed critical habits of thought, however, view every subject as a system of thought related to other systems of thought. They possess intellectual tools (such as the elements of thought, section 2.4.2) to open the logic of the discipline. They recognize that they do not 'know' something unless they deeply understand it, and routinely employ criteria (such as the Paulian intellectual standards) to test their understanding.

This basic surface/deep bifurcation has been re-discovered, and the continuum has been developed and extended, by researchers around the world (see, e.g.: Martin and Balla, 1991; Samuelowicz and Bain, 1992; Gow and Kember, 1993; Marton and Booth, 1997; Prosser and Trigwell, 1997; Saljo, 1997; Akerlind, 2003; Ashwin, 2005 and 2006). What is more, these researchers have firmly established not only *that* these categories exist, but that students who attempt to learn by making personal and deep connections between new content and previous knowledge are more successful in their academic pur-

suits than those whose main strategy is populating their short-term memory with free floating facts.

The difficulty has been in using this knowledge to successfully move students from immature and undesirable views of knowledge and learning towards those which are more nuanced and powerful. As it turns out, simply prompting students with 'deep' questions does not guarantee they will answer with depth. In fact, when Marton and Saljo first attempted to do this it backfired, resulting in what they called 'an extreme form of surface learning' wherein 'the participants invented a way of answering the interspersed questions *without* engaging in the kind of learning that is characteristic of a deep approach…they knew that they would have to answer questions of this particular kind, and this allowed them to go through the text in a way which would make it possible to comply with the demands without actually going into detail about what was said' (Marton and Saljo, 1984, 48). This points out one major difficulty in fostering critical thinking: even with appropriate knowledge of the problem and the desired alternative, engineering an effective solution is not always straightforward; it may require a creative approach that takes into account the relevant context, and is aided by considering foundational concepts and principles (such as those entailed in the 'elements of thought', section 2.4.2; the 'intellectual standards', section 2.4.3; and the 'intellectual traits', section 2.4.4).

In sum, this research (3.5.1) highlights the importance of the epistemological in learning to think critically: if we don't understand that knowledge can be complex, or if we take complexity too far so as to leave all knowledge baseless, then it is unlikely that we will be motivated to deeply consider the criteria by which knowledge may be considered more or less sound, more or less reasonable, more or less certain – a key habit and skill of the critical mind. If we view assigned reading as an already-organized structure to be re-produced at the appropriate time (that is, when called upon), then we are unlikely to recognize the role played by our own analytical and evaluative processes in deconstructing and reconstructing those insights in our minds.

3.5.2 *Thinking Together* through 'Exploratory Talk'

Over the past decade and a half, a group of researchers led by Neil Mercer (1995, 2000), Lyn Dawes (2001), and Rupert Wegerif– themselves building on decades of previous research (e.g. Barnes and Todd, 1977; 1995; as well as the work of Piaget and

Vygotsky) – have analyzed children's language use from a sociocultural perspective. Their key discoveries so far: 1) 'the research provides clear evidence that there is a link between the development of language skills and the improvement of critical thinking' (Dawes, Mercer, and Wegerif, 2004); 2) that such development occurs better in groups, providing that they are cooperative rather than antagonistic; 3) that this type of cooperative interaction, which these researchers call 'exploratory talk', is rare in most educational institutions; and, 4) the instances and depth of exploratory talk can be increased, provided that teachers and students are properly supported to come to a rich understanding of what this entails.

For Mercer *et al.*, students' language use should develop through engaging in 'exploratory talk'. In the words of Mercer, Wegerif, and Dawes 'Exploratory talk is that in which partners engage critically but constructively with each other's ideas. Statements and suggestions are sought and offered for joint consideration. These may be challenged and counter-challenged, but challenges are justified and alternative hypotheses are offered. In exploratory talk, knowledge is made publicly accountable and reasoning is visible in the talk' (Mercer, Wegerif, and Dawes, 1999, 97). Successful exploratory talk occurs when participants behave in accordance with certain 'ground rules'. These ground rules generally combine intra-disciplinary with trans-disciplinary (because the research is interdisciplinary) critical thinking skills and traits; here is an example set, from Mercer *et al.* (2004, 362), with my own labels added to connect this theory with Foundation for Critical Thinking theory:

- All relevant information is shared; [relevance, information]
- All members of the group are invited to contribute to the classroom; [openmindedness]
- Opinions and ideas are respected and considered; [intellectual empathy, fairmindedness]
- Everyone is asked to make their reasons clear; [clarity, conclusions, information, confidence in reason]
- Challenges and alternatives are made explicit and are negotiated; [breadth, inferences, implications, intellectual empathy]

- The group seeks to reach agreement before taking a decision or acting; [fairmindedness]

These researchers suggest that the idea of ground rules should be approached slowly (Dawes, Mercer, and Wegerif, 2004, 26-31): first, the concept of 'ground rules' should be discussed in various contexts other than the classroom (for example, behavior in a train; in a shop; at the cinema, etc.); next, students should work through some important 'talking words' in groups (such as 'relevant', 'challenge', 'alternatives', 'critical') to deepen conceptual understanding and to ensure that everyone is using language in a similar fashion. Throughout, the teacher should move about gently helping students to better articulate their ideas and/or confusions in appropriate ways.

Through engaging in these various activities, students process the idea of 'ground rules' on multiple levels and through multiple lenses and perspectives. Mercer (2000) provides an explanation of the petagogy behind this approach: when humans effectively think together, their collective consciousness is able to solve problems that would be impossible individually. This is partially an insight from Vygotsky and the zone of proximal development (ZPD), but here the emphasis is on co-construction by students rather than improved construction by a student as a result of interaction with a teacher or other student. Mercer calls this process 'interthinking', and suggests that effective exploratory talk occurs in a hypothetical space called the 'Intermental Development Zone' (IDZ). The IDZ names the combined mental abilities of members in a collaborating group. Mercer *et al*. have collected data to show that when students experience such interthinking successfully, each individual participates in a learning experience deeper than they might experience on their own, leading to greater contextualization in their lives outside of school (a bibliography of the full body of research can be found on the *Thinking Together* website[14]).

This research, which continues (e.g. Mercer, Dawes, and Staarman, 2009; Dawes *et al.*, 2010), is primarily on children but it supports and is supported by the research examined in sections 3.5.3, and 3.5.4. The unique contribution here is the sociological and linguistic focus: *Thinking Together* illuminates the fact that learning is improved by working in groups composed of critical minds engaged in substantive and cooperative dialogue

[14] http://thinkingtogether.educ.cam.ac.uk/publications/

with the help of expert guidance. Further, it emphasizes the important role played by words in shaping our thinking and learning: we must learn to control our words rather than them controlling us. This approach has similarities to Ellis (2.3.1) as well as Paul (in the conceptual nature of his approach, and the stress on precise language use).

3.5.3 *Assessment for Learning* and *KMOFAP*

One important trait of the critical mind is the use of intellectual criteria (such as clarity, accuracy, relevance, depth, breadth, etc.), rather than egocentric criteria (such as 'I like/dislike it', or 'this is true because it supports my position'), whenever and wherever such criteria are appropriate. One important thread already mentioned in the history of critical thinking concerns the articulation and development of disciplinary as well as trans-disciplinary criteria for judging intellectual products of various kinds. An important body of research, which this section (3.5.3) explores, is that demonstrating that learning is significantly improved— indeed, transformed— when students understand important intellectual criteria and regularly use them to judge their own work, the work of peers, as well as textbooks and other intellectual constructs.

Though they did not originate the term nor initiate the empirical research, Paul Black and Dylan Wiliam (1998a) produced the monumental meta-review that illuminated 'formative assessment', and encouraged the adoption of '*Assessment for Learning*' practices in schools and universities around the world. The 70-page review, to which was devoted an entire issue of *Assessment in Education*, drew from over 250 empirical studies on 'formative assessment', a concept which was deliberately defined to be more, rather than less, inclusive:

> The boundary for the research reports and reviews that have been included has been loosely rather than tightly drawn. The principle reason for this is that the term formative assessment does not have a tightly defined and widely accepted meaning. In this review, it is to be interpreted as encompassing all those *activities undertaken by teachers, and/or by their students, which provide information to be*

[15] Importantly, it is also available through Phi Delta Kappan, Volume 80, issue 2.

> *used as feedback to modify the teaching and learning activities in which they are engaged'* (Black and Wiliam, 1998a, 7, my emphasis)

The part in italics, above, offers a possible definition of critical thinking. In other words, AfL practices *are* critical thinking practices. Of course, the quality of these interactions, as well as the depth of their criticality, is highly variable across contexts in substance and intent. As this passage above suggests, like 'critical thinking', 'formative assessment' is a complex concept which cannot be captured in a single phrase or even a paragraph or two; both take many forms depending on the context and content of the investigation. Based on this review, Black and Wiliam distilled their most important findings and recommendations into a more accessible, and subsequently highly successful, book [15] *Inside the Black Box: Raising Standards through Classroom Assessment* (1998b).

Inside the Black Box is structured around the consideration of three questions: 1) Is there evidence that improving formative assessment raises standards? 2) is there evidence that there is room for improvement? and 3) is there evidence about how to improve formative assessment? In short, these researchers found that, to a significant degree, improving formative assessment practices aids pupil understanding. Regarding the first question, Black and Wiliam found that, in studies with age groups ranging from '5-year olds to university undergraduates', across several school subjects and over several countries:

> 'The mean effect sizes for most of these studies were between 0.4 and 0.7: such effect sizes are among the largest ever reported for sustained educational interventions. The following examples illustrate some practical consequences of such large gains:
>
> - An effect size of 0.4 would mean that the average (i.e. at the 50th percentile) pupil involved in an innovation would move up to the same achievement as a pupil at the 35th percentile (i.e. almost in the top third) of those not involved.
> - A gain of effect size 0.5 would improve performances of students in GCSE by at least one grade.

- A gain of effect size 0.7, if realized in international comparative studies in mathematics, would raise England from the middle of the forty-one countries involved into the top five.' (Black and Wiliam, 1998b, 140-141)

Perhaps equally importantly, though learners of all abilities improved, gains were particularly noticeable among lower-ability students. After discussing room for improvement (question #2), Black and Wiliam move on to their central findings regarding how to improve formative assessment practices, (question #3) which they claim is inevitably linked with student self- and peer-assessment:

> 'The main problem is that pupils can assess themselves only when they have a sufficiently clear picture of the *targets* that their learning is meant to attain'. (Black and Wiliam, 1998b, 143; my emphasis)

In other words, students find it difficult to produce critique because they do not understand the qualities that make something of high or low quality: they use no (or few) explicit intellectual criteria (such as those proposed by Paul, section 2.4.2). The AfL strategy counters this problem by encouraging explicit classroom dialogue between teachers and students on the intellectual standards used to determine quality: "Sharing criteria with learners enables them to develop a clear sense of what they are aiming at and the meaning of quality in any particular endeavour, which coupled with self and peer assessment helps students learn not only the matter in hand but also to develop metacognition" (Swaffield, 2011, 443).

According to this research, explicitly discussing with students the characteristics constituent of high and low quality intellectual products (by whatever standards are contextually relevant) helps students engage in more substantive and helpful forms of critique: 'feedback has been shown to improve learning when it gives each pupil *specific guidance on strengths and weaknesses,* preferably without any overall marks' (Black and Wiliam, 1998b, 144; my emphasis). Students must have a clear (or at least, clearer) picture of the standards towards which they should be reaching, so that they can internalize and, in turn, apply those standards to their own thoughts and the thoughts of others.

However, as Black and Wiliam were quick to point out, it is not enough to sim-

ply 'have discussions with students' or 'make explicit' intellectual criteria: successfully embedding substantive formative assessment practices at every level of teaching and learning requires a paradigm shift in the epistemological stance of teachers, student, and school leaders from the surface to the deep (see section 3.5.1) or, in the parlance of the critical thinking movement, from the largely uncritical to the primarily critical.

Such a transformation will not occur overnight, as Black and Wiliam concluded:

> '*The improvement of formative assessment cannot be a simple matter. There is no 'quick fix' that can be added to existing practice with promise of rapid reward*. On the contrary, if the substantial rewards of which the evidence hold out promise are to be secured, this will only come about if each teacher finds his or her own patterns of classroom work. This can only happen relatively slowly, and through sustained programmes of professional development and support. This does not weaken the message here – indeed, it should be a sign of its authenticity, for lasting and fundamental improvements in teaching and learning can only happen this way. - (Black and Wiliam, 1998b, 15, original emphasis)

Out of this recommendation was born a research project which was eventually titled the *King's Medway Oxfordshire Formative Assessment Project* (KMOFAP). The purpose was to test out the hypotheses resultant from the AfL review: that sharing criteria with students would increase pupils' ability to think critically about their own work. It supported teachers in six schools with professional development 'aimed at encouraging the teachers to experiment with some of the strategies and tactics suggested by the AfL research, such as rich questioning, comment-only marking, sharing criteria with learners, and student peer- and self-assessment. Each teacher was then asked to draw up, and later refine, an action plan specifying which aspects of formative assessment they wished to develop in their practice and to identify a focal class with whom these strategies would be introduced' (Black *et al*., 2003, 20). The purpose was to test out the hypotheses resultant from the AfL review: that sharing criteria with students would increase pupils' ability to think critically about their own work. The KMOFAP was successful: students' reading improved at the rate predicted by the AfL review.

To conclude, this research demonstrates that raising teaching and learning to a 'second-order' or 'critical' level - through the explicit communication of intellectual standards for use in the assessment of thought - has significant positive effects on learning, even when the measures used are high-stakes and at the national level. Further, this 'critique-oriented approach' improves learning outcomes in students of all abilities, at all levels, across national borders, and importantly helps close the gap between low and high achievers.

3.5.4 *Learning How To Learn*

The *Learning How to Learn* (LHTL) project is an extension and development of AfL and KMOFAP. Many aspects of LHTL inform this dissertation, both in terms of its success and its limitations. First let us consider the concept of 'Learning How to Learn' and how it positively impacts teaching and learning. This will be followed by a discussion of the limits of its success, and a consideration of how to respond to these limitations.

Drawing on insights from the AfL Review, the *KMOFAP*, as well as *Thinking Together* research, a few key realities are clear: 'Pupils' learning is more productive if it is reflective, intentional, and collaborative, practices which may not come naturally but which can be taught and can lead to pupils taking responsibility for their learning' (Black *et al*., 2006, 126). However, as with all good research, this state of knowledge prompted further questions:

> 'For example, how does one spread knowledge and promote changes in these specific practices across teachers and schools? How can one achieve 'leverage' using minimum resources for maximum impact? The teachers in KMOFAP were provided with exceptional levels and quality of training and opportunities for peer exchange. This could not be replicated across the system as a whole. Thus there were important sustainability issues to be addressed, associated with the 'rolling out' or 'scaling up' of innovations." (Black *et al.*, 2006, 102)

The *Learning How To Learn* project was therefore an attempt to improve teaching and learning at the national system level (in the UK). LHTL research has been motivated by a 'bottom-up' approach, and so rather than providing faculty and students with ideas to

consider (such as is the case in the faculty development under investigation in this dissertation), the LTHL project encouraged faculty and students to develop their own conceptualizations of Learning How To Learn.

> '…a clear understanding of the meaning of Learning How To Learn (LHTL) was not something with which the Project started. Rather…the significance of the 'how to' in the Project's title arose from our interest in the development, by teachers and pupils, of valuable learning practices and in the implications for teaching and learning of such development' (Black *et. al*, 2006, 120)

In the LHTL project, teachers and students were encouraged to develop and practice their own explicit theories of how one 'learns how to learn' or, in other words, how one learns to think critically through ideas or theory of critical thinking. This project was 'awarded one of the largest grants in the portfolio of the UK's Teaching and Learning Research Program', and gathered data over more than a decade on many important links in the educational reform chain, including data on leadership, conditions of effective professional development activities, internal and external personal and school networking, teachers' and students' beliefs about learning as well as teachers' and students' classroom practices.

The initial publication developed by the LHTL team earned an entire volume of *Research Papers in Education* (21(2), 2006); more recent publications include James and Pollard (2011), James *et al.* (2006), and James *et al.* (2007). The project has had a significant impact on teaching and learning within the UK. It has been included as a key component of the UK National Curriculum, and has spread to institutions at all levels across the world. It has raised the status and rigor of educational research, setting new standards for duration, breadth, and complexity. Further, the establishment of the *Teaching and Learning Research Programme*, headed and staffed with numerous LHTL leaders, has gone a long way towards bridging the gap between educational research and classroom practice: their 'research briefings' are accessible summaries of significant (usually broad) research, with clear implications drawn for policy and practice.

In the classroom, success in promoting LHTL is most significantly explained by two teaching practices: **making learning explicit**, and **promoting learner autonomy** (Pedder, 2006). In other words, *teachers must clearly communicate important learning prin-*

ciples to students (critical thinking theory), and they must employ pedagogical strategies that *encourage students to deeply engage with these principles on their own terms* as they develop greater independence and control over their own learning and thinking processes.

Learning How To Learn research further identifies important conditions of effective professional development (which are also supported by broad meta-reviews of professional development literature, mostly on primary and secondary education, but including some university studies). This broad empirical base allows powerful generalizations. For example, regarding teachers' professional development, which is considered to be the key vehicle or medium of change, successful schools conceptualize **learning as inquiry** (a deep rather than surface approach, see section 3.5.1). Such institutions **value learning at all levels of the school** (Training and Development Agency for Schools, 2005), including by leaders and head teachers as well as students. These institutions, therefore, prioritize **on site professional development** (Lave & Wenger, 1991; Brew, 1995; Webb, 1996; Bolam and Weindling, 2006) **with a long-term view** (Ofsted, 2002; Cordingley et al., 2005; Robinson and Sebba, 2005). Teachers should be included in **deciding and acting together** as they **develop a sense of where they are going**, and that **local (within school) expertise should be recognized and effectively networked**. Faculty which are given the opportunity to observe and receive feedback from their colleagues within **faculty discussion groups** achieve higher rates of change with longer lasting impact than faculty not given this opportunity (Cordingley *et al*., 2005; Ofsted, 2006; Pedder, 2006; Little, 2008).

All of these findings are powerful and important. However, much work remains, as these beneficial conditions, important as they may be, are evidently not sufficient to bring about long term and broad scale changes in education. To begin, the LHTL project was only effective in promoting substantive pedagogical transformation among one fifth of its participants, despite the presence of many of these conditions. As the researchers put it:

> 'Some [teachers] appear content with 'going through the motions' of trying out new practices but a small proportion (about 20%) 'took them to heart' and, with a strong sense of their own agency, tested and developed these ideas in their own classroom in creative ways.' (James and McCormick, 2009, 977)

Presumably, the other 80% who were 'going through the motions', had not positively changed their teaching practice to promote students' Learning How To Learn, or critical thinking. This suggests a significant limitation in 'scaling up'.

This research team is not the only one to have difficulty reproducing or broadening implementation of strategies found beneficial in research. As Opfer and Pedder point out in a recent smashing paper in *Review of Educational Research*, in most cases professional development research can only support correlative, not causative relationships, as researchers do not connect specific teaching activities in professional development with specific changes in teaching practices and/or student learning.

Further, as Opfer and Pedder demonstrate, contradictory research exists, showing that many of the elements considered foundational to successful professional development may sometimes produce negative or non-change. For example, though, much research supports the idea that teachers should relate collaboratively in workshops, as discussed above, if taken too far this can create an 'in-group/out-group' phenomenon counterproductive to teachers' and students' developing criticality: 'too much collaboration can emphasize conformity to group norms at the expense of inventiveness and initiative. As a result, the predominant conclusion that increased collegiality will lead to improvement is unwarranted' (Opfer and Pedder, 2011, 385-6). Similar analyses may be conducted of the other 'qualities of effective professional development', leading Opfer and Pedder (2011, 381) to conclude that: 'In different combinations, circumstances, and sequences, the same causes that may produce teacher learning and change may also lead to intellectual stagnation and inertia. The invariable principle in our conceptualization is therefore *variation* (citing Tilly, 2008, 76).'

How should we respond to these complex phenomena? Opfer and Pedder draw out suggestions for research, specifically that it should not focus solely on the activities teachers engage in during professional development time, but that two additional 'systems of learning' should be considered: 1) the individual teacher's background and beliefs, and 2) the learning orientation of the institution and the various groups within it. Opfer and Pedder argue that a full understanding of teachers' professional learning must take these factors into account, and that research that does not is inherently 'biased'. These systems are no doubt significant, and their consideration will likely improve the quality of research.

Opfer and Pedder open up many potential questions about the design of professional development. For example, given that teachers' previous beliefs about learning will greatly effect, perhaps dominate, their perception of professional development activities, how should lead teachers respond? How can institutional or departmental (or other educational group) approaches to learning be altered or improved?

In short, *how should lead teachers respond to the variety of possibilities and challenges inherent in designing, implementing, evaluating and improving a broad plan for fostering change in teaching and learning for critical thinking across the disciplines?*

One hypothesis of this investigation is that to best foster the development of critical thinking in others, we must first develop it in ourselves. By implication, for lead teachers to foster its development in their colleagues, they must begin with their own self-analysis and improvement. Another hypothesis is that having an explicit, substantive theory of critical thinking can help improve the quality and efficiency of thought. For example, one salient finding of the California Commission on Teacher Credentialing (Paul, Elder, and Bartell, 1997; detailed in section 3.4.2) was that faculty, even at elite universities, do not possess or cannot communicate principles of criticality to their students. From this perspective, it is little surprise that such a low percentage of LHTL participants (~20%) were able to effectively transform the idea of 'Learning How To Learn' into effective pedagogy, for a similarly low percentage (19%) of faculty in the California Commission Study (and the duplicated study by Thomas, 1999) were able to articulate principles of criticality and demonstrate how they teach for critical thinking on a daily basis.

In short, it makes sense that from a critical thinking perspective, the majority of LHTL teachers did not succeed in producing critical thinking theory, because the majority of teachers generally have not deeply or broadly investigated the idea of critical thinking. To say this another way, because teachers have not themselves been taught in an explicitly critical manner, nor have they (in general) received deep training in critical thinking and how to foster it in credentialing programs, it is predictable that they will be largely unable to reform their practice without help in the form of alternative examples. Hence, this dissertation investigates cross-curricular professional development based on an explicit theory of critical thinking, and measures the impact of that theory on teachers' and students' ability to think, act, and communicate critically. Its findings may suggest a path forward in advancing LHTL practice and research.

3.6 Conclusions and Contributions of this Research

This chapter has explored some empirical literature relevant to critical thinking and continuing professional development. Empirical research on critical thinking was found to be multitudinous and diverse, but largely unintegrated. Much of it is focused on superficial aspects of critical thinking (3.1) or substantive but subject specific critical thinking (3.2). Consequently, it is difficult to draw a cohesive overview. Further, some of the best research on critical thinking is not named as such, making it likely that much of importance will be missed by the uninitiated reader.

In this chapter we have documented the gap between rhetoric and practice regarding critical thinking (3.4). Here the problem of educational reform was starkly illuminated: though critical thinking appears to be a nearly universally held value among educators at all grade levels, educational systems across the world do not seem to be broadly fostering depth of understanding of important critical thinking skills and abilities.

In reference to potential solutions for reform, we have investigated four significant bodies of research on critical thinking across the curriculum. The first, section 3.5.1, was focused on epistemology and student learning approaches. It documented the close connection between students' thinking about knowledge and their success in deeply internalizing lessons learned in class: students with more critical skills and dispositions achieve more and retain understandings longer than those who approach learning and knowledge atomistically and uncritically.

The second examination of research on critical thinking across the curriculum focused on the *Thinking Together* approach of Mercer *et al.* This literature describes the important correlation between students' increasingly sophisticated language use and improved critical thinking skills: the better students understand and utilize concepts to convey and interpret meaning, the greater their critical command over their own thinking and learning. Further, conceptual development occurs most deeply within small and collaborating communities.

Our investigation of the *Assessment for Learning* (3.5.3) project established that one key part of pupils' intellectual development is their understanding and use of specific criteria for intellectual evaluation. Teachers who routinely discuss standards for assessment with students and who support pupils' attempts at self and external critique are significantly more successful in fostering students' learning, autonomy and criticality than

are those teachers who leave these practices implicit.

Finally, we discussed the massive project under the umbrella title ‘Learning How To Learn’ (3.5.4). This research highlights several important realities: that reform is difficult and slow, but that it is possible and profound when substantive. Perhaps most importantly, LHTL emphasizes the need to deeply support teachers’ attempts at reform through long-term, rigorous and collaborative professional development. Faculty development should respond to local needs and be led by local people, should include opportunities for both learning and applying theory, should be conducted on site, and should be centered around faculty discussion groups.

In documenting what is currently known empirically of critical thinking and its development, this research review has identified cross-disciplinary reform toward critical thinking in higher education as an area in need of greater research.

Chapter Four: Methodology

This chapter details the methodological decision-making behind the original empirical investigation at the heart of this dissertation (chapter five). It is an exploratory case study whose purpose is to begin to uncover: 1) a range of possibilities for bringing a substantive conception of critical thinking into higher education instruction; 2) a collection of factors aiding improvement in teaching and learning for critical thinking across the curriculum, and; 3) a complex of obstacles and problems one faces in attempting to bring critical thinking more effectively across the curriculum at the university level.

The continuing professional development initiative at the chosen research site is a promising candidate for investigation because it has the earmarks of an 'exceptional' or 'unique case' (Yin, 1994), or what Schofield (1993) aptly calls 'studying what may be'. Practically speaking, what this means is that the combination of conditions in this university's faculty development initiative is rare, a long-term (ten year) plan centered on a robust and substantive concept of critical thinking, being voluntary and internally guided, cross-disciplinary and collaborative; it is therefore a prime candidate to investigate as a potential source of macro-insights into the problematics of and possibilities for educational reform at the university level.

Schofield suggests that researchers should 'think about what current and social and educational trends suggest about likely educational issues for the future and design our research to illuminate such issues to the extent possible' (Schofield, 1993, 102-103). Valuing and attempting to develop critical thinking in students (at virtually all levels) is, seemingly, just such a trend (see section 3.4.1). If this trend continues, it is likely that more institutions will seek to establish long term critical thinking continuing professional improvement in the future, especially if a robust body of research on critical thinking emerges which discloses important and practical ways to bring critical thinking into the ethos of the campus.

To contribute to this emerging body of research, this project seeks to gather data relevant to the following research questions:

1) What improvements in the understanding of, and practice of, critical thinking can be documented at the research site?

2) What primary factors have supported the improvements in teaching and learning for critical learning found in this study?

3) What obstacles emerge when attempting to improve teaching for critical thinking across the disciplines within a research university?

To answer these questions, and the multiple sub-questions entailed within them, divergent research strategies have been employed. What follows is an explanation of these strategies.

4.1 Exploratory and Qualitative

An ultimate assumption underlying this study is that students deserve to learn, in their formally required education, how to take critical command of their own lives. This assumption demands that we investigate conditions of change that are genuine and significant. It also demands that we not be satisfied with measures of criticality that, though appearing to have face value, cannot be tied to important decisions and issues in peoples' (pupils') real lives.

One advantage of a qualitative approach is that it offers a more detailed, rich, and contextualized view of what change for critical thinking looks like than can a purely quantitative approach. Interviews with faculty, staff, students, and lead teachers and administrators, together with observations of classrooms and critical thinking workshops allow a view that test scores and surveys alone cannot provide. In these, the crucial thinking and actions of teachers and students is highlighted: their internalization of critical thinking concepts over time, their struggles and successes with its implementation, the different ways in which they develop critical thinking abilities, their plans for future improvement. My purpose in this qualitative investigation is to draw out and make clear the thinking of participants in these and other important directions.

The goal of this study is not simply to provide an evaluative judgment on the effectiveness of the initiative under investigation (in fact, 'evaluation' is not a primary mode of operation in this study, see section 4.8 – Data Evaluation and Interpretation); rather, it is to capture authentic and significant moments of change for critical thinking as precisely as possible, and to draw out some important implications for teaching, learning, and research. If the data is of high quality, it should largely 'speak for itself' (Kvale, 2009, 260). This links with the 'naturalistic' approach to drawing conclusions (see section 4.7).

4.2 Methods of Data Collection and Triangulation

The relationships between and among this project's central research questions and its methods of data collection are not entirely direct. Each collection strategy gathers data relevant to multiple research questions, and each research question is addressed by employing data gathered from multiple sources. The data in this project was collected using the following methods:

- Lead Teacher/Administrator interviews (6)
- Teacher interviews (14)
- Student interviews (18)
- Observations of classroom practice (33)
- Observations of critical thinking workshops held on-site (5)

The purpose of employing such a diverse approach is to 'attack [the] research problem with an arsenal of methods that have non-overlapping weaknesses in addition to their complementary strengths' (Brewer and Hunter, 1989, 17). This approach is sometimes referred to as 'triangulation', and is seen as enhancing the rigor of research (Robson, 2002). In my own modest professional experience, in two previous postgraduate degrees (Cosgrove 2009; 2010), as well as published research (Cosgrove, 2011a; included in Appendix F), this combination of research methods has proven effective in uncovering insights into teaching and learning for critical thinking. It allows us to 'see the thing from multiple perspectives' (Denscombe, 2003, 132), such as the viewpoint of: the administrator's planning, the teacher's perceptions of learning, the teacher's instructional practices, the student's learning experiences in the classroom, as well as others. Through investigating these independent processes and their relationships, the goal is to construct meaningful and verifiable pictures of change. Putting the above viewpoints in the form of questions, we might ask: what is the intention and overall goal of the on-campus quality enhancement plan? Which parts of critical thinking theory have faculty found valuable? Which parts of critical thinking theory have faculty begun to internalize? To what extent do these understandings manifest in classroom practice? Most importantly, which of these practices lead to significant and long-term changes in students' thinking and, therefore, in their lives?

By collecting data from various sources, I am able to assess something of the relationship between them, and therefore shed light on *why* improvements are or are not happening. For example, knowledge of the aims and design of on-campus faculty development influenced how I questioned faculty participants. Similarly, faculty interviews produced targets for the classroom observations. Both, in turn, influenced the questioning of students. By ultimately grounding the study in authentic improvements in people's lives, the study finalizes the link between critical thinking theory and student practice and living.

An example of the richness of this methodology interaction can be seen in the following:

- **Knowledge gained through literature and lead teacher interviews:** One central tenet of the CPD initiative is that critical thinking is much more successfully taught explicitly (rather than implicitly), especially when there is a concern for transfer of learning across the disciplines.
- **Knowledge gained through faculty Interviews:** As a result of experiences in the learning community, one participating teacher, who had previously employed a purely didactic lecture format, made what she referred to as revolutionary changes in pedagogy towards a more active approach based on group work. However, she also decided that it was best to teach critical thinking without telling her students she was doing so (keeping it implicit). The teacher's idea was to use the language of criticality to probe students' thinking, to help them go deeper into the subject matter through critical thinking, and to critically reflect on their thinking about it.
- **Knowledge gained through classroom observations:** During classroom observations it became clear that this teacher's self-vision of practice was largely accurate: students were deeply engaged throughout the class period in small group or whole class discussion. Students in groups were actively working, and those who hadn't done the reading (a small percentage, perhaps 20%) were clearly struggling to catch up, being encouraged and sometimes prodded by their classmates to take responsibility and contribute to the group effort. At no point did the concept of critical thinking emerge explicitly, but the teacher was using the conceptual tools of the elements of thought (2.4.2) and intellectual standards (2.4.3) broadly and effectively.

In short, it was a lively intellectual atmosphere, though the tools of critical thinking were used largely at the implicit rather than explicit level, and primarily by the teacher rather than the students.

- **Knowledge gained through student interviews:** When interviewed, one of this teacher's students stated that the tools of critical thinking and its related pedagogy of active involvement had produced deeper learning as against a standard lecture format, which this student described as overwhelming and not conducive to his learning. The student was deeply grateful for the experience, wanting to take more classes with this professor in the future. At the same time, he expressed a desire to learn a system of critical thinking that could be applied across disciplines and to personal life. He asked me if there was such a system, for, if there were, he thought it would be beneficial to learn it explicitly.

From this data we can see multiple teaching and learning interactions taking place over a number of years; further, each source of data is vital to painting this picture of change. The combination of data sources enable each to be checked against the others. We see that the changes made by the professor have fostered critical thinking development in his student, yet growth has been limited due to the implicit approach to critical thinking.

This multi-logical research design aims to accurately and vividly represent the complexity of improvement in thinking and learning for critical thinking in a complex research university setting.

This, then, concludes the overview of the methodology employed in this study. The rest of this chapter details its most significant elements and their interactions.

Table 1: Qualitative Methods Used in this Study

Method	Number	Purpose
Leader Interviews	6	To investigate the planning and implementation of continuing professional learning at the research site.
Faculty Interviews	14	To investigate teacher learning, understanding, and practice of critical thinking.
Classroom Observations	33	To record examples of critical thinking in action; to investigate the implementation of critical thinking strategies.
Student Interviews	18	To investigate student learning, understanding and practice of critical thinking.
Observations of On-site Critical Thinking Workshops	5	To investigate the on-campus approach to professional development workshops as facilitated by on-site leaders.

4.2.1 Single-Case Embedded Design

Within the broad qualitative framework already described above, this project specifically follows a single-case embedded design (Yin, 1994). Such an approach is most effective when examining 'a contemporary phenomenon within its real life context especially when the boundaries between phenomenon and context are not clearly evident… [and] in which there will be many more variables of interest than data points' (Yin, 1994, 13). This research, then, investigates a single complex case (a continuing professional development initiative focused on critical thinking at a research University in the U.S) and explores multiple relationships within that case (critical thinking theory and teacher learning, teacher learning and classroom practice, classroom practice and student learning, student learning and student practice, among others).

4.2.2 Sampling and the Choice of Participants

Throughout this research project I have reasoned that the highest priority is the collection of high-quality data relevant to the three research questions listed at the beginning of this chapter. Given the energy intensive nature of qualitative research, I chose not to include faculty, staff, and/or student participants who had not interacted deeply with the on-campus initiative. As a result, 'purposive' rather than 'representative' sampling has been used (Robson, 2002).

The process for faculty and staff selection is elaborated in section 4.2.2.1. The purpose behind this sampling decision was to investigate the best of the professional development initiative; to explore the questions: 'When faculty and staff are given appropriate resources and support – what changes in teaching and learning for critical thinking can be documented?' Further, 'What forms of resources and support have been most significant to the intellectual development of participating faculty, staff, and students?' and 'What most hindered their development in critical thinking?'

After collecting data at the research site for roughly eight weeks of the planned semester-long stay, I became aware of a vocal minority on the campus who were openly opposed to the initiative to improve teaching and learning for critical thinking across the disciplines. I perceived this as an important opportunity to document their views. After all, if other institutions are to implement a broad plan of improvement similar to that under investigation in this research, they must be aware of and prepare for the loyal opposi-

tion. Therefore, I reached out to several of these faculty members. Four agreed to be interviewed. The process for their selection is elaborated in section 4.2.2.4. I believe the project has been significantly improved as a result of their participation. I thank them for donating their time, and I hope that my use of their words is respectful and considerate.

4.2.2.1 Selecting Faculty and Staff Participants

To identify faculty and staff attempting to deeply improve their understanding and practice of critical thinking, I worked closely with those lead teachers who have shepherded the critical thinking project at the university. I made clear that there were two criteria for inclusion of participants, and that the first far outweighed the second: 1) demonstrated commitment to change; 2) skill in execution of change. Further, I decided that the best way to highlight a cross-disciplinary initiative was to select faculty and staff from across the disciplines.

After several discussions with key leaders at the university, the list of faculty and staff to be included in the study was narrowed to 20: one each from English, Mathematics, Art History, Chemistry, Anthropology, Music, Justice Administration, Nursing, Dental Hygiene, Psychology, LGBT Services, Health Services, Student Affairs, two from Academic Advising and four from Engineering. These individuals were selected from those who had attended a 'Learning Community' (see introduction for description) and who continued to display commitment to change toward critical thinking. We agreed to begin the research process through a personal email from the lead team (see Appendix B for the template) and to follow this with an email from myself (see Appendix B for template). This approach, we thought, would lead to the greatest number of faculty accepting the invitation to participate in the study.

Following this, six faculty and staff declined to participate (Music, Mathematics, Anthropology, English, Student Affairs, and one from Engineering); three were on sabbatical or were not teaching regular classes that semester, one stated he was "overwhelmed" with new departmental duties, and the other two stated concerns about confidentiality.

Therefore, the project began with nine faculty participants (Art History, Chemistry, Justice Administration, Nursing, Dental Hygiene, Psychology, and three from Engineering), and four staff (LGBT, Health Services, and two from Academic Advising). One faculty (Philosophy) was added three weeks into the semester, resulting from a serendipitous

conversation with one of his motivated (critical thinking) students; this faculty member was invited to join in the same manner as the others.

This report includes all participants' testimony with the exception of LGBT and Health Services, who had not yet implemented their programs and so had no student data. The two from Academic Advising were interviewed together (the only group interview in the project). In Table 1 their interview is included in the 'leader' rather than 'faculty' category, because most of their significance to this study is in their leading of workshops for colleagues in their department. For this reason, there is no 'staff' category in that table. In all, ten professors agreed to participate. This number is added to the 'objecting faculty' in Table 1 to sum fourteen.

4.2.2.2 Selecting Student Participants

Students were selected in collaboration with their participating professors. The intention was to uncover a broad range of student experiences. Hence, I made clear to professors and students that I wanted to especially speak with those students who, through their experiences with critical thinking in instruction at the university, had clear views on these experiences.

Using these criteria, students were contacted in several ways: by the investigator through an open invitation during class, by the professor through an open invitation during class, by the investigator through email, by the professor through email, as well as by word of mouth and happenstance discussion.

One phenomenon relevant to the development of critical thinking emerges here: those faculty most verbal in expressing dedication to critical thinking and most explicit in teaching for critical thinking were easily able to locate more willing students than I had time to interview. For those whose practice was more implicit, (operating more in the background), it was far more difficult to locate student participants. This was certainly the case when I asked for volunteers in the open invitation in front of the class: those classes with implicit critical thinking needed multiple efforts to secure willing student participants, while classes with more explicit and systematic practice in critical thinking produced multiple willing students in a single request.

Further, those faculty who expressed enthusiastic motivation for critical thinking were able to persuade students from previous semesters to participate in the study.

In some cases the students were a year or more removed from contact. This formed yet another methodological tool: I was able to form tentative conclusions about these professors' evolving practice, as students from years past described the manner in which they learned critical thinking from these instructors, and as these practices were compared with current students' views and observations of the same faculty member. Additionally, these student interviews allowed some insight into the conditions necessary for more 'lasting change'; as I was able to probe what has remained of students' practice of critical thinking months or years after required work on it.

In sum, 18 students were interviewed formally, and many more were interviewed informally both within and outside class time. At least one student was included from every faculty member in the study. Perhaps unfortunately for this study, no participating student defined themselves as 'opposed' to critical thinking in any discernible way.

4.2.2.3 Selecting Leader Participants

A significant aspect of this research focuses on the leadership, planning, and implementation of the critical thinking initiative. Given the rarity of such a process, these leaders are pioneers. Indeed, the lead team related much frustration experienced in the beginning of the planning process about the lack of resources available on cross disciplinary or institutional improvement for critical thinking. Given this, it seemed vital to document their major decision-making and problem-solving throughout the faculty development process. Regrettably, due to concern to protect participants identity, much of the specifics of these decisions cannot be revealed.

In the end, five administrators and/or lead teachers were interviewed. With the addition of the group interview from academic advising, this resulted in six leader interviews.

4.2.2.4 Selecting 'Objecting Faculty'

As has been mentioned, it became apparent some time through the data collection process: 1) that there was some opposition to the on-campus professional development that was easy to locate (these faculty members were vocal in their objection) and; 2) that I needed to include their views. It was made clear to me that there were four who were willing to be interviewed to voice their opposition. I emailed each, and all four respond-

ed positively. Their number is included under 'faculty' in Table 2, though none of their classes were observed and none of their students were interviewed. Their critique was somewhat limited, as none made pretense of having a deep understanding of the critical thinking initiative on site. The insights their testimony provides, I believe, significantly enhances the quality of this report.

4.2.3 The Choice of Interviews

Interviews are a principal source of data collected for this research project. As a researcher with some background in oral history, and having conducted a number of interviews (at start of this project, roughly 70 half hour or longer sessions, totaling nearly 200,000 words of transcribed text), I value this method for its usefulness in uncovering the reasoning behind actions which are often otherwise difficult to understand or interpret. Since a primary focus of this research is on the thinking and learning of participants, interviews seemeded vital for data collection (Tuckman, 1972). This project netted an additional 167,897 words.

In keeping with the exploratory nature of this investigation, all interviews were semi-structured. This approach enabled participant questioning in a reliable manner while also allowing for exploration in spontaneous and potentially fruitful directions (Pring, 2000; Rapley, 2004; Rubin and Rubin, 1995; Shank and Brown, 2007). Teacher and student interviews illuminated underlying thought processes and intentions, allowing a comparison of the 'background logic' expressed in the interviews with the 'foreground logic' observed in the classroom. In the case of leaders, interviews provided valuable information about the planning and implementation of the on-campus CPD. All interviews shed light on the crucial issue of sustaining and broadening development of critical thinking for the long term.

Kvale (2009, 17) makes an important point about the conceptual and dialogical nature of the interview: 'interviewing is an active process where interviewer and interviewee through their relationsip produce knowledge'. As a result of knowledge and past experience, in this project I was able to probe and support the thinking of the interviewees - asking questions and tying together threads which the participant may never have considered. Through reading body language and vocal inflection I was able to pause where necessary, or elaborate to clear confusions. All these factors allowed for deeper elicitation of responses than would have been possible with other forms of dialogic inter-

action (such as sending out a form letter with key questions to be answered, or through chatting via text message online).

Of course, well-designed interview methodology is not without its limitations. Most significantly there is a potential for collecting untruthful, biased, deceitful, or otherwise flawed data. To put this another way, not all that is said is grounded in fact and experience. Consequently, Kvale (2009) suggests several tactics for enhancing the quality and validity of collected interview data. First, throughout the interview, it is essential to question the statements of interviewees, to ask for extended elaboration and exemplification. Additionally, wherever possible during the interview, participants' ideas should be explicitly elucidated by the interviewer so that the participant can correct, modify, or add to the analysis. This limits ambiguities, and the potential that the researcher may misinterpret an idea or situation.

Kvale argues further that the validity of each empirical conclusion should be discussed as it is presented, through reference to the quality and quantity of data supporting it. This is because some conclusions are more broadly supported by collected data, while others are more tenuous.

This project attempts to strengthen validity through triangulation: by checking teacher interview statements against teacher classroom behavior and student interviews, the potential for misinterpretation is lessened. Hence, the issue of achieving validity is not superficial. The quality of research rests on every decision made in the process, including those in the theoretical and empirical reviews (Kvale, 2009). Validity is elaborated in section 4.3.

4.2.4 The Structure of Leader Interviews

Interviews were conducted with seven administrative University leaders at various levels, who, as it turned out, had overlapping as well as divergent goals. Questions varied depending on the role played by each individual, but topics for investigation included:

- Personal experience with and contribution to design and implementation of on-campus professional learning
- Explanation of CPD

    - Its component parts and their interrelations
    - The extent of its success
    - Reasons behind successes and difficulties
- Plans for sustaining CPD
- Plans for broadening CPD
- Plans for deepening CPD

4.2.5 The Structure of Teacher Interviews

The primary purpose of teacher interviews was to understand how teachers who express a strong interest in fostering critical thinking articulate their understanding of critical thinking and how they conceptualize the relationship between critical thinking and instruction. Questions included:

- Which aspects of the CPD initiative have you found most helpful? Which least helpful?
- How have you come to understand the concept of critical thinking?
- How would you explain the concept of critical thinking? You might start with "to me, critical thinking is…"
- How important is critical thinking to your teaching? How do you foster critical thinking in the classroom?
- To what extent has engagement with the Paul/Elder Framework for critical thinking helped or hindered your teaching of critical thinking and/or subject content?
- What have been the most significant obstacles you've faced in bringing critical thinking more explicitly and more deeply into your teaching?

As often as possible, following the first articulation in each category, teachers were asked to elaborate and exemplify their answers. The ideal answer was taken to be one which was clearly stated, elaborated, and exemplified; hence, participants were asked direct questions to that end (more on interview strategies in the sub-section 4.2.8 - 'Optimizing Quality of Field Relations and the Conduct of Interviews').

4.2.6 The Choice of Interviews with Students

The ultimate goal of educational reform is to improve student learning and thinking; yet it is a rare educational investigation which seeks out student voices and gives these voices serious consideration, as the literature reveals (see section entitled 'The Research Gap' in the Introduction). Just as we cannot be sure from teacher interviews what teacher practice looks like, neither can we know from teacher interviews or practice whether students are actually learning or practicing critical thinking. Neither do we know how these changes are resonating with students – how it is making them feel.

Vital to this project's methodology, then, is the student interview, since it reveals, to a discernible degree, the impact of critical thinking and critical pedagogy CPD on student learning and thought. The process for their selection is elaborated in section 4.2.2.2. As Lisa Tsui writes: "Virtually absent from the research literature on the development of critical thinking is direct input by participants. For example, we know little about how college students, faculty, and administrators feel about this skill, what activities they perceive as contributing to or impeding its development, and why students do or do not engage in such activities.' (Tsui, 2000, 422).

In this investigation, I have conducted individual, rather than group, interviews for several reasons. Group interviews are often used to counteract potential memory difficulties in young students (an approach used successfully in previous research with secondary school children; Cosgrove, 2010). However, university students should have enough cognitive maturity to recall specific classroom events without undue difficulty. Further, unlike school-age students who have fairly rigid schedules, university students often have far more flexible (though sometimes complex) schedules. Organizing group interviews, then, is potentially more difficult in this case and less vital. A future, broader, study might include group interviews, since some aspects of student thinking may be revealed in groups that are not revealed in individual interviews.

4.2.7 The Structure of Interviews with Students

Student interviews were semi-structured. Primary questions included:

- Were the days I observed your class fairly typical class days?
- Were any aspects of critical thinking covered? If so, which?

- What do you think of critical thinking? How important is it?
- What is critical thinking? Do you practice it? If so how? How do you use it in school, in your life?
- How did you learn about critical thinking?
- Is class with this teacher different from or similar to classes with other teachers? How?

4.2.8 Optimizing the Quality of Field Relations and the Conducting of Interviews

The quality of field relations between researcher and informants is vital to the quality of data collected (Ball, 1990). It is important to develop trust and rapport with faculty, staff and students to enable them to comfortably share their perceived triumphs and successes in teaching or learning critical thinking, and also to uncover and discuss perceived problems or obstacles. For these reasons, an empathetic and supportive research orientation has been employed in this research project (e.g., similar to that adopted by Cooper and McIntyre, 1996). Such an approach is sometimes called Rogerian questioning (Rogers, 1942). It entails attempting to understand participants' accounts rather than evaluating or judging them. This, in turn, requires showing 'unconditional positive regard' for informants, which is a cornerstone of oral historical methodology (which training and experience was formative in my intellectual development as an interviewer).

My first goal in conducting an interview was to make the participant as comfortable as possible: people think best when they are comfortable, and poorly when they are fearful or self-conscious. I therefore began all interviews with easy and polite discussion, to create a relaxing atmosphere. Prior to the recording, I gave some brief and vague description of the purpose and basic structure of the interview and asked if the participant had any questions; my objective here was to allay any fears, and to communicate a sincere interest in hearing what *the interviewees* had to say about their experiences, their thoughts, their frustrations and triumphs. At some point, a discussion about critical thinking and the teaching/learning experience usually organically emerged, and this is when I began recording. Thus, many of the interview transcripts begin with something like 'RC: so let's talk about what you just mentioned…" In cases where this did not occur, I began the interview with a question such as 'So let's start with your first introduction

to the on-campus institutional improvement initiative – when and how did you first hear about it, and what was your reaction?'.

As the conversation advanced, I moved gradually towards a more Socratic form of questioning, seeking more details and exemplification, drawing out more implications, and beginning to integrate threads of the conversation. Thus, each interview began with an open-ended approach designed to draw out the participant's thinking, encouraging her or him to initiate discussion as much as possible. If these questions proved inadequate, or if they failed to lead to a fruitful discussion about critical thinking, more detailed probes were used which focused on specific aspects of critical thinking and classroom practice. Still, throughout interviews my goal was to support the thinking of participants to construct answers to the best of their ability given their knowledge and experience. I attempted to keep the primary focus at all times on a substantive discussion of critical thinking and its application to teaching and learning, and, in the case of leading professors, on the professional development process.

Again, this interview procedure has proven effective in similar studies I have conducted. I found it effective in this study as well, primarily for this reason: *those who have thought meaningfully about critical thinking and have applied it to their lives in some significant way become highly expressive in the interview through detailed elaboration and exemplification*. In many cases, it wasn't necessary even to mention the concept of 'critical thinking' for, without prompting, interviewees began talking about it in ways suggestive of a clear experiential base. They knew the reason for the interview, and came prepared to talk about issues relevant to critical thinking that seemed to be on their minds already.

My role, as I saw it, in all interviews, was to guide conversation to the important topics at the heart of this research project, while allowing a natural flow of discussion. In this way, I hoped to learn each participant's conception and practice of critical thinking, and to probe it as deeply as possible in the time allowed. Interviews with the most enthusiastic and committed participants often went far beyond the agreed-upon duration (15-20 min for students, 30-45 min for faculty and staff).

In other cases, where students were not articulate about their experiences with critical thinking, this open-ended approach generated little of consequence. In these cases, specific and targeted questions were required. These interviews were often far shorter than the discussed limits, suggesting in these cases the absence of a rich experiential

foundation.

4.2.9 Classroom Observations

There is rarely a perfect fit between what we believe we do and what we actually do. While teacher interviews yielded considerable data regarding teachers' beliefs about their classroom practice, these interviews, of course, are not conclusive about the way faculty actually teach. Observations made it possible to explore the extent to which espoused practices were manifest in classroom behavior. Furthermore, observations allowed the identification of critical thinking strategies that, for whatever reason, teachers did not articulate during the interviews (perhaps, for instance, because the strategies were implicit in their understanding). Finally, notes taken during each class provided concrete examples with which to probe students' thinking during post-lesson interviews.

My note-taking strategy primarily entailed confirming or noting the absence of those critical thinking concepts or strategies which teachers articulated in their interviews. This approach has multiple advantages, as it counters many of the common shortcomings of observational studies. For example, Pring (2000, 35) warns that observations are often crippled in three significant areas: 1) objectives are often unclear (just 'taking a look to see what happens'); 2) what is 'observed' is inherently biased as it is 'filtered… through the understandings, preferences and beliefs of the observer and; 3) it is difficult to connect *product* (what is said or done) with *process* (the thinking behind the action).'

This study was specifically designed to limit these pitfalls through the following:

1) the objectives were clear and specific, focused on observing the extent to which a given teacher incorporated critical thinking ideas and strategies in the classroom, as defined and articulated by faculty themselves, in their own language;

2) verifying the critical thinking strategies mentioned in the faculty interviews was the main goal (which limited "filtering" or bias) and;

3) the product can be linked with process, as the interviews highlight and make explicit the thinking leading to the actions (seen through the observations).

While the nature of subjectivity raised in objections two and three can never be fully answered, the steps taken in this research aim to minimize their influence.

Using the lens of Foundation for Critical Thinking theory, I was able to take note

not only of the critical thinking strategies mentioned by faculty, but also ideas and strategies not mentioned, yet nevertheless present and relevant to my research questions. For instance, many teachers reported changes in student behavior as a result of probing their thinking with more Socratic-type questions in a whole-class format. During the observations, I was able to take note of forms of questioning which utilized the language of critical thinking – language focused on the analysis of thought, the assessment of thought, and the cultivation of intellectual traits (see section 2.4 for detail of this framework).

4.2.10 Observations of On-Campus Workshops on Critical Thinking

The majority of faculty development workshops, and all of the learning communities, have been led internally by head teachers. Observing such workshops was vital to understanding the approach of the University to critical thinking across the curriculum. Here I was focused on gathering data relevant to three questions:

- How is critical thinking being framed and introduced?
- How subtle are the critical thinking understandings of the presenters?
- How is the audience being engaged and their criticality fostered?

4.3 Validity

Validity is approached by degree depending on the issue. Validity has been assessed according to clarity and depth, as well as by triangulation.

Regarding clarity and depth, responses have been considered valid to the extent that they were articulated, elaborated, and supported by genuine and complex examples. Responses which were vague, poorly- or un-elaborated, which lacked specific examples, were hypothetical, and/or are about someone else have been considered less valid (more on the quality of data in section 4.2.8).

Validity is re-enforced by multiplication and triangulation: conclusions supported by more and clearer examples from different sources have been considered the most valid. In each case, the strength of the conclusion depends on the extent to which it is supported by the data and relevant theory.

4.4 Data Analysis

My mode of analysis was both deductive (i.e. 'knowing what to look for' as a result of previous knowledge and experience with critical thinking) and inductive (i.e. 'keeping eyes open' for emergent themes). Rather than dividing and presenting the data according to a technical feature (e.g. corresponding with the methodological tool with which the data was gathered), the sections and sub-sections which structure my results have been formed thematically.

Analysis was conducted in multiple phases:

1. In the first pass through the data, I was looking for any response which corresponded with my previous understanding of critical thinking (e.g. 'subject specific critical thinking'), as well as anything which occurred twice in the data (e.g. 'diversity of learning communities aids understanding'). In my notes, I attached each point to the group of people who expressed or exemplified them (e.g. 'faculty' or 'students').

2. Following this, I examined these notes to locate where faculty, staff, and students' experience was convergent. Conceptually related categories were merged. This initial framework contained some 120+ sections and sub-sections.

3. In the second pass, I used this created structure as a lens, looking for evidence in support of, or evidence against, each finding. I continued simultaneously to note new analytical categories.

4. This finished, I repeated step two above, continuing to condense and to refine the relationships between each category.

5. In the last pass through the data, my purpose was to locate the transcript and page number for every relevant piece of data under each analytical category. I then copied and pasted each quote into the framework. This resulted in 75,000+ words of usable text. No new categories emerged in this final pass, and this confirmed that I had 'reached saturation' (Glaser and Straus, 1967).

6. Next, I examined this block of quotes and attempted as vigorously as possible to make its size more manageable. This primarily entailed editing to

remove superfluous commentary – keeping depth while decreasing length of text. In some cases, the quotes were simply not very strong and so could be cut entirely. This resulted in ~67,000 words of very usable text.

7. Lastly, I again condensed and refined the categories into their final form. The decision-making involved in the final selection of categories and quotes to support them is elaborated in section (4.8 – Data Presentation).

4.5 Data Interpretation

The purpose of this study is not primarily evaluative; it is exploratory (though evaluation is a necessary part of exploration). This has been said many times already in this dissertation, but it has particular implications for the manner in which the collected data has been interpreted: my goal was to document real instances of positive change and the conditions under which that change occurred; negative change or neutral or non-change has been my focus only to the extent that it represents a significant obstacle to positive change. As a result, many instances of such non-positive change (such as misunderstandings of theory of critical thinking, or misunderstandings of the intent or nature of the on-campus CPD) have been left out of this report.

In other words, my goal is not to compare faculty, staff, and student understandings and practice of critical thinking against some sort of critical thinking 'ideal' or 'master' teacher or student. Rather, the intention is to understand how each person sees their experience of learning critical thinking (either by faculty and staff in the 'learning communities', or by students in the classroom) impacting their study, their work, and/or their life. In short, the focus is on *improvement* - the movement between where they were b.c.t. (before critical thinking) and where they are now.

In addition to my personal desire and research interests, there is an ethical motivation to focus on positive rather than negative change, elaborated in the next section (4.6 Ethics).

4.6 Ethics

This project has been designed in accordance with BERA's ethical guidelines (2004). The specific choices made, especially regarding sampling and data presentation, guard against potential ethical concerns. First, all participants were adults who have

attained at least enough mental maturity to be accepted into a fairly prestigious university. Second, the topic of each interview was confined to teaching, learning, and practice of critical thinking. Though some interviews progressed into deep and emotionally turbulent territory, this was done at the initiative of the participants. In these cases, the process of re-constructing periods of difficulty seemed therapeutic rather than oppressive. Third, all participants volunteered for the study.

This said, participation in this study may have negative consequences for all participants, due to the possibility that evidence collected and presented in this report may be used against participants. Of course, anonymity may only be approached by degree (Walford, 2008). This issue is especially significant for this project: the CPD initiative on-site is somewhat controversial. Thus it is possible that motivated persons might use this report to negatively affect the personal or professional lives of participants, especially faculty, staff, and administrators (students will almost universally have moved on by the time of publication, and final grades will long have been submitted and solidified). I have taken several measures to increase anonymity, which are elaborated in section 4.8 – Data Presentation.

I have also made an ethical decision that has, perhaps significantly, impacted the results of this study: I have made the decision not to publish any material that I believe might be used to critique any participating individuals. Consequently, a few significant issues have had to be dropped entirely, such as: difficult decisions regarding planning and implementation of CPD, as well as critique of specific individuals, departments, or other groups. Though this has in some ways diminished the clarity and specificity of the project's conclusions, it has, in my view, been essential to protecting those who volunteered for the study.

4.7 Generalizability

It is, of course, difficult to generalize from a sample of 38 people among a university populations in the tens of thousands. Indeed, the concept of "generalizability" and how it should be applied to a given situation is not always clear. It seems that the final decision regarding the 'generalizability' of research is ultimately in the hands of the reader, not the researcher. In other words, people, through their reason, decide whether to consider something to be generally true. Even some of the best examples of research, which often include large sample sizes, have been dismissed on various grounds by those who do not

wish to accept their conclusions. Even without critique, research is often simply ignored, therefore minimizing its impact on educational practice. The literature on 'deep and surface learning', which is canvassed in this dissertation (section 3.5.1), seems a prime example. This is an idea which has been tested and verified in virtually every level of education and on every continent, an idea which has many and powerful potential implications, yet is referenced only rarely in research or policy documents, and does not seem to have significantly penetrated the practices of most teachers.

Though the amount of qualitative data collected in this project is significant (167,897 transcribed words), its purpose is not to be representative; rather, it is to capture clear, accurate, precise, deep, broad, and significant examples of improvement toward critical thinking. Readers may ask themselves the extent to which the data collected and presented are helpful in their own contexts. This is sometimes called 'naturalistic' generalization (Stake, 1995).

4.8 Data Presentation

There are multiple considerations in the presentation of data of this report, some of them conflicting: the report attempts to represent a broad diversity of issues while keeping within limitations on space; further, it seeks to accurately and precisely document individual viewpoints without compromising anonymity. As a result, the data is presented in this report in some creative ways.

For each conclusion there is far more supporting or clarifying text than can be included. Consequently, I have had to make difficult decisions using the following criteria: significance, concision, depth and breadth. In other words, I have chosen the most profound, sophisticated, diverse, and brief statements to support each finding. Many other examples will be made available in an appendix, but this data has not been made appropriately anonymous at this time.

As an oral historian, I take seriously the importance of fairly and accurately representing the views of the people who have given their time and energy to this research. The words of the participants are not mine, nor is their thinking. And it is not for me to bend or twist these words to suit some desired objective. As a result, I have devoted as much space as possible for the inclusion of participants' thinking in their own words. Further, each participant's voice is represented at multiple points in the data presentation.

In order to maximize anonymity, I have taken multiple measures: I have removed the name and department of the speaker, identifying each only as, e.g., 'professor', 'administrator', or 'student'. I have omitted specific details or examples which would identify the speaker, and have used subject-specific examples in few places and always to make positive points.

Lastly, let me mention two technical notes about the presentation of results. The first is that specific individuals are used only once in each category in chapter five. That is, in cases in which multiple relevant comments on one subject were elicited from a single individual, these comments have been merged to create one coherent statement. The second is that in order to save space I have, where possible, omitted the question or prompt.

4.9 Methodological Reflection

There are three categories of items within this reflection that I wish to distinguish: the first focuses on methodological decision-making throughout the research process, the second on some of the difficult realities of 21st century research, and the third on mistakes I made during the research process.

As is common in exploratory studies, this study's research methodology evolved over the course of its design and implementation. This involved several decisions that each uniquely impacted the final product. The first important change occurred in a shift away from a design focused on two or three disparate departments towards a model that highlighted the diverse applications and manifestations of critical thinking across the curriculum. This has ultimately, I believe, strengthened the project through generating multiple examples from across the disciplinary spectrum. At the same time, several faculty in the study were from one department, enabling me to probe the group dynamic of change within this department.

Another change involved the abandonment of quantitative measurements. The reason for this is that the instruments did not measure the kind of deep and personal change I thought essential to capture. As a result, I was concerned that their inclusion would distract rather than aid our discussion. My interest in educational research and critical thinking lies in their ability to improve human life and society, in getting at understandings difficult to effectively integrate into quantitative structures.

The 'difficult realities' which form the second category in this reflection are con-

nected with limitations placed on researchers in the name of subject protection. Due to the length of time required to pass through institutional review at the University of Cambridge as well as the review board at the research site, I was unable to finalize participants or begin to establish contact until the semester was already underway. Interviews with faculty, which could have been conducted in early August, were not completed until almost late September. As a result, every aspect of the data collection process was delayed: I was unable to observe classes (I had hoped to attend most, if not all, of the first day of classes), nor was I able to interview students, until midway through the semester.

A further difficult was my inability to video classes. One aspect of the original design was to identify and record effective pedagogical models. Unfortunately, I felt I had to drop the use of video to strengthen anonymity.

The final category, flat-out mistakes, was thankfully small. The first was a technical error: once, I failed to check the batteries in my voice recorder and halfway through one interview they gave out. I did not notice this until the interview was over. I quickly wrote everything I could remember into my field notebook, but useful data was lost. The second mistake was more substantive: it involved delaying student interviews until the professor interviews and observations were finished. As a consequence, I had to scramble at the end of the semester to find students from each teacher. Though I was able to accomplish this in the end, I no doubt could have persuaded more students to participate had I begun solicitation earlier in the semester. Having multiple student interviews for each professor would certainly have strengthened the project.

Chapter Five: Investigating Efforts at Improvement in Critical Thinking at the Research Site

The presentation of the empirical data will start with a focus on evidence of improvement for critical thinking (5.1). After such examples have been identified and catalogued, we can begin to consider factors that either promote (5.2) or hinder (5.3) these improvements.

5.1 Evidence of Improvement in Teaching and Learning for Critical Thinking Across the Curriculum

Much evidence of change was collected during this project; the majority of passages cited throughout this chapter (including in sections 5.2 and 5.3) either contain or refer to specific instances of improvement for critical thinking. This section, 5.1, places improvement in the spotlight: its purpose is to clarify some of the forms and manifestations of criticality which have been fostered and developed by participating instructors through their engagement with faculty development at the research site.

5.1.1 Ideas about Teaching and Critical Thinking

We start this section on improvement with an investigation of two shifts in background logic discussed by participating faculty members as central to their intellectual development. Each issue is unique and each individual's experience varies considerably.

5.1.1.1 'Learner Centered' Paradigm

Six professors discussed shifting from a didactic towards a more dialogic pedagogy:

> Prof: …In content rich courses there is a tendency to want to hammer in knowledge and understanding – and some application. What gets left out are higher forms of application and analysis and evaluation and synthesis…
>
> **RC: what are the implications – if you just teach the content without teaching the critical thinking – what does that mean for students?**
>
> Prof**: it means they can develop [an] understanding [of] certain concepts but they don't necessarily know them well enough to apply them to a problem. They definitely don't know how to evaluate what they're reading.** And the problem is that all information that students are given has flaws in it – or they develop misconceptions based upon prior experience. Therefore, even though the material may not be flawed, their absorption of it is. and without developing critical evaluative skills, both the in-

formation that they are using and their own internalization of the information – you are letting air seep into what they're learning. **So critical evaluation – teaching critical evaluative skills is a – in a sense a necessity in order to produce in a sense 'air-free' classes, for example.**

For this professor, and five of the other participating ten professors, the extent to which students can reason successfully in a discipline depends in large part on their ability to critically analyze and evaluate the theories and data at the heart of the discipline. In these professors' eyes, teaching students how to think critically about their learning is therefore vital to the quality of their understanding and its future employment.

This shift is described by one participating faculty in the context of her course on art history:

Prof: One of the problems I think in academia in general is that it, (laughs) attracts and can sometimes be said to kind of promote an almost narcissistic and solipsistic personality type...So you've got the people who are up there in the classroom and they know a lot and they are (inaudible) and pontificating. And I'm not leaving myself out of that either. I can sometimes do that. But it did make me think about 'you know, how much does that make students learn?' and I was already aware of that, but it did make me think about that more, and think about – **how can you step back from that and worry less about what *you're* saying and worry more about what *they're* saying and getting *them* to think?**

RC: So have you noticed that your interactions with students have changed very much as a result of bringing in this framework?

Prof: yes I think so. I think I'm more sensitive to them and their needs and trying to think of each student individually and as a group – can you get them to be thinking and talking? And sometimes to be almost taking over the lecture from me? That they're going to learn more if they do that than me just talking more.

RC: Interesting. Elaborate. How do you mean 'taking over the lecture'?

> **Prof: well, even at the beginning of the class, but definitely as class goes on, I sometimes, more than I used to before this class say "ok, you're trained art historians, I've seen what you folks can do, I'm kind of tired of talking – you're tired of hearing me talk. Can you tell me – so we're going to start at this image – you know you tell me what – Alison, tell me what's going on here and what's going on with this artist?" and it's kind of, you know, let them talk about it or let them think up the questions about what *they* think is interesting or scandalous or controversial about the work of art.**

Leaving the scandalous, unfortunately, aside, the change this professor describes marks an important pedagogical shift. She described her previous approach as primarily lecture-based, and articulated a gradual evolution towards a student-centered pedagogical orientation. Classroom observations revealed an active pedagogy, including lecture, whole group, small group, pairs, and individual writing and reflection. This professor's practice was observed three times. As the semester progressed, I increasingly witnessed instances of healthy intellectual analysis and evaluation guided by the teacher and practiced by the students: vague student answers were followed with invitations to be more specific or to articulate their thoughts in other words. Students, after observing over time the process modeled explicitly and precisely by the professor, were increasingly called upon to analyze and evaluate paintings on their own (as before, in many different formats, from individual to whole group). Most recorded instances of class-level critique of specific works of art were lively and rich: virtually all students joined the dialogue, which was sophisticated, nuanced, and specific.

Participating students, for their part, attested that this emphasis on *thinking within the subject* resulted in deeper and longer-lasting content understanding. One student offers his opinion, below:

> RC: And for you, as a student, how do you experience the classes differently? Either intellectually or emotionally.
>
> Student: Actually, it's kinda good you're talking about this class because the way that those classes are structured – there's two [name removed] classes. Each one has two professors. So he

taught like one fourth of the class... so I effectively had four professors for the same thing I can compare to. Most of the classes I've had [pause] – **Like take the other three [name removed] classes, for example. They teach, "Do you know this fact?"** which to me is incredibly boring, since I can sit down and read the book and like, memorize it. But [this professor] he'll a lot of times teaches – Like, the questions he asks – you have to know the knowledge, you have to know the actual facts to answer them, but a lot of time he's asking things that help like "figure this out from what you know"...**'Cause I can tell you I remember the stuff from his portion of [the class] better than the people – than the other portions. 'Cause in the other portions I just sat down the night before and learned it [pause] learned it. And uh, his stuff definitely helps you remember it. And [pause] I don't [pause] does that make sense?**

RC: Yeah, absolutely. And why do you think that is?

Student: Hmm [long pause] First, I think [pause] we knew what to expect. He told us he was going to ask questions like that. So in a way, it kinda [pause] you could say that part of it was I was scared about the test so I studied a lot more, but I think the big thing is that – **Like other teachers, I know they're just gonna test me on facts. Which means, if I ever read something in the book, and I don't understand it, I don't need to worry about if I don't understand it, I just need to be able to write it back down on a piece of paper later. Which is basically what all of the tests are.** If I didn't understand something while going through the book in [this] class, I realized that that was a problem. Because if he asked me a question on it, he's gonna know if I just wrote down verbatim from the book. **Most teachers would be like, "Oh my goodness, you wrote down what's verbatim in the book," but [this professor] would probably be like, "Well that's great, you memorized something, but... you don't really know it."** Which, personally, I want [people] to be like the

> latter. I don't want to be full of facts so much as full of facts and knows how to use 'em.

This student response is brutally honest about intellectual gamesmanship; because he possesses a powerful short-term memory, he is highly successful on standard rote-recall tests by perfectly reproducing textbook answers - without understanding them. He also is not in denial that this approach is not conducive to deep learning in the long-term, yet he continues to study in that fashion. In short, there is some evidence that many teachers within this project are moving more towards student- and idea-centered pedagogy (rather than teacher- and fact-oriented pedagogy).

5.1.1.2 'Lifelong Learning' and 'Professional Reflexivity'

> Prof: One of the things that's exciting to me – I like to consider myself a life-long learner, which is a big buzz-word for engineers – ABET outcomes, the Accrediting Board of Engineering and Technologists, is life-long learning. I think critical thinking gives me a pathway for life-long learning that's incredible. The things that it challenges me as a teacher to keep bringing up encourages me to stay as a life-long learner.

'Lifelong learning', 'professional reflexivity', and related terms were often invoked as contributing factors to teachers' embracing the tools of critical thinking. In other words, all participating professors (including 'objectors') commented on the importance of continued learning for disciplinary or professional success, and on the vital role of critical thinking in that process. As can be seen in the passage above, and elsewhere in comments throughout this dissertation, professors regularly assume that it is essential for students to learn skills for adapting to life's complex circumstances; note that in the quotes both above and below, the term 'critical thinking' is assumed to entail the elements of reasoning, intellectual standards and intellectual virtues as articulated in the Paulian Approach.

> RC: ...how do you see that idea of as you said, students if they try one thing, if it doesn't work trying something else – how important is that for them as their careers develop over perhaps decades?

Prof: I guess that's one of the things we're teaching them now is to be lifelong learners. And that **what we're teaching them today is going to change.** And we're looking at how to promote oral health, how to expand our careers in health promotion, and so this gives them – the **critical thinking helps them to make these changes and adapt to the evolving profession.** Because we do stress that part of the excitement of this career is that it is always changing and that what you learn here will be changing and you have to adapt and evolve and be a lifelong learner. And to research and to remain current in the literature, and to practice - using evidence based practice to support what you do and what you recommend to your patients. **So critical thinking is going to be very important to them. Not just in the classroom but when they leave, in practice and everything.**

…I think my first year here of teaching the research methods I just came in thinking 'I've got to teach them what sampling is, I've got to teach them the facts' and that was my approach. Everything was kind of separate 'this is what research is, this piece and that'... **Maybe 1% will go on and do some research**, become researchers, and that was kind of the approach I think that I had when I first came in is teaching them how to do research. That's not what my students need to know. They need to be able to say 'oh I can take that out of the book, journal, library; and I can have some sense of – well that's a lousy sample, so why should I care about their research?' or 'well all they did was ask some questions, they don't really have a good measurement.' And that's what's important. **Because they need to be able to question all the way through their career. If someone is saying 'this is the way we should handle arrests, this is the way we should handle corrections, this is the way we should…' that they have something inside of them that questions 'where did you get that from? Why is it so important? And how grounded is it?' My course is to give them something that they can establish in their future career**

and keep asking questions about it.

5.1.3 Improving Learning of Critical Thinking

The following three sub-sections highlight some of this development in faculty and student thinking. I want in this section to paint clear pictures of alternative practices and their real-life implications for faculty, staff and students, as well as relatives and co-workers of participants in this study.

5.1.3.1 Subject Specific Critical Thinking

Interviews and observations yielded a rich variety of examples of disciplinary critical thinking. Many of these arose from the application of the elements of thought and the intellectual standards to discipline-specific issues and ideas (more examples are in sections '5.2.4.1 - learning through systematic application'). Consider the following student example:

> RC: Talk to me about that.
>
> Student: We actually chose... [pause] We actually chose to be very blatant with it and basically state the critical thinking framework was our blueprint for this project. Because 'dissociative fugue' isn't something that many people understand, so, uh, we had many hurdles to overcome, and [pause] the critical thinking chart actually helped us overcome those hurdles. **So literally in our project we show the critical thinking wheel and we pull it piece by piece, and we say, y'know, "this is our information, these are our inferences, this is what – these are the further implications for future research, these are our assumptions, these are our purposes".** So the audience understands what we're talking about, and isn't confused there. It's kind of [pause] it keeps the audience into the whole project, and because we went through the whole wheel and literally typed out, word for word, every single thing that fell under that part of the wheel, we were able to [pause] well for one thing, it changed the structure of our video that, um, will be more understandable to the audience...

...And when I first came in contact with it I thought, "Oh, I know how to critically think." But I think that's because the word is thrown out in so many places, so many times, that nobody really understands how to critically think until they see something like this framework, and then they realize they haven't been critically thinking.

Another student shared her use of the elements of thought in analyzing problems within dental hygiene with an emphasis on how the process helped her take issues apart and deal with those parts individually (rather than being overwhelmed by the whole):

RC: ..do you think that sort of framework might be used to focus on other aspects of dental hygiene?

Student: Most definitely. Actually, one of our other classes we are using the – we have a little booklet on critical thinking – it's like the eight elements of critical thinking. And for next semester we actually have to do a case study on a patient kind of using those eight elements and going through it and discussing that. And so we did kind of a practice one this semester where it wasn't as detailed as it would be next semester, per se, but it gave us kind of some hands-on practice with what to put under each heading, and how to think about the patient in that way. So that was very helpful, like, and we shared it in front of the class. We just went through, like – and this was actually the patient I had that one day who needed certain treatments and we weren't able to give her all of them. So I used her for this project, and basically just went through, like, one of them was like: problems that you had; and so obviously her insurance and seeing how that related to the treatment we were able to provide versus the treatment she needed, and how we were going to kind of handle that, and, like, to think critically about how we were going to handle this, and what's our next best option. So that was very helpful, and then we shared those with the class. So we got to hear a lot of different situations where students had to take a different approach to things besides,

you know, the textbook way of doing things – we had to kind of think outside of the box and apply those critical thinking skills to a practical, clinical situation.

RC: And how do you feel that the specific tools that were in the little pamphlet – is it the little blue book?

Student: Yeah, it is.

RC: How do you feel that those tools helped you to engage in that process?

Student: Sure. They were a very good outline – very helpful. And I think just like being able to – and we used the little blue book, and then also our professor gave us a sheet that had some, like, sample questions that would fit under each category, and so that really helped me to see those examples and then like listing, like, **"how would you measure your success?". So like, in my certain situation, like my success is measured by, you know, "did the patient understand what I was telling her?" So it really helped outline it and break it down, as opposed to having one big situation and kind of looking at it as a whole.** It helped to break it down into components and be able to just kind of focus on little chunks, and really just break it down for me. So it was very helpful for me.

I can supplement this student response with observational data. By coincidence, the patient she referred to in her example came in on one of the days of my observation. I was able to witness some of the interaction between budding dental hygienist (student) and patient, and talked with both her and her professor about the case immediately afterwards. It was a difficult situation involving a patient whose treatment options were limited due to allergies and insurance. The student admitted to some anxiety regarding the experience and to feeling frustrated by her inability to help the patient. After using the elements of thought to deconstruct the logic of the situation, she claimed to have come to a better understanding, enabling the drawing of a plan of action. The above passage recounts these details. Though I was unable to view the student's written work, her story, especially in context with the rest of her interview (available in Appendix D) and

observed behavior, provided credible evidence that her learning, at least within this one case, has been improved through explicit use of critical thinking concepts.

We might relate these student experiences with one professors' account of his use of the same concepts to move students to more deeper personal reflection in philosophy:

> RC: so let's say before you had this language, you're teaching somewhat the same ideas – what's the difference?
>
> Prof: well the difference is that, you know not everybody's into these people who've been dead for 2,500 years, right? So I start busting out some Plato and people say 'well, ok', you know? And they can relate, you know I mean Euthyphro isn't crazy. But maybe if I'm not religious maybe I don't know why we care about piety, I don't even know why we would bother with this. And at the same time I don't care about argument structure, so I don't know why we're bothering about this, and I don't care about old dead guys, so I don't know why – it just goes on and on. With [the Paulian framework] at least, it gives them something to go back to. Now when we start going to locate that with these texts and getting to some of the meat of the course, wherever it might be, if it starts to unravel out there for them somewhere they can bring it back to that. Because I'm using the same language. Right? **And when I'm talking about what Socrates is doing in the Apology, you know, he's demonstrating intellectual humility here, he's demonstrating intellectual autonomy here, he's calling out someone on accuracy over here, he's talking about point of view, he's talking about assumptions, he's talking about the inference, the way that we're interpreting this information.** I mean, that way, if I use that same language, which is language that's already in philosophy anyway, then it becomes very easy for me to continue the conversation to sort of reinforce a standard. I think the students should come out of college – maybe not my class – but certainly out of college, with an understanding of how they think. Some tools for self-reflection and self improve-

ment should they choose to engage in that. And what this does is it gives them pocket-sized books worth of standards and characteristics that they can continue to roll with in any of their classes.

This professors' view of his own practice is in broad accordance with observational data as well as with interview data from his students. His approach was primarily engaged lecture, with continual encouragement for questioning and discussion. He clearly communicated many examples of critical thinking, and employed formative assessment techniques based on the tools of FCT theory. His assessment was based on the 'intellectual standards' which he applied to the short essays students produced for every class. The 'engaged lecture' style seemed to be effective in activating students thinking for 45 minutes to an hour. When his classes were longer than this, attention began to wane significantly, and student participation, active listening, and note taking all dramatically decreased. However, as a result of his deepening understanding of critical thinking and dialogical pedagogy (mostly through his attendance at the 32nd International Conference on Critical Thinking and Educational Reform hosted by the Foundation for Critical Thinking this past summer), this professor has since dramatically shifted his orientation to a more 'learner-centered' model based on group work.

5.1.3.2 Cross-Disciplinary Critical Thinking

One hope of the faculty development at the research site is that, by using a common language of critical thinking across the disciplines, students will begin to transfer skills across the curriculum. A sizeable minority of students (six) within this study claimed to be using critical thinking skills learned in one class into their other classes. For example, let us look at one student response. Over a year had passed since this student had been introduced to FCT theory by one participating professor. He claimed to regularly return to the *Miniature Guide for Critical Thinking Concepts and Tools* for help in studying:

RC: …So have you had any other teachers work with the guide?

Student: Not with the guide specifically, but with ideas from it, so it's easy to draw back to when they mention something, to have a little template because **I still have it saved on my desktop on my computer. And I just open it up every once in a while.**

RC: …Cool. Do you, do you now use it, uh, in your, I mean, obviously the class is over. Are you using it in your studies in other classes?

Student: **Um, there's a little section, where, um, lets you analyze the logic of an article or chapter. That's how I study. Anytime I have to read a chapter for class or something I use that template as I go through the chapter because it's just a nice little guide and helps you draw out the useful information**. So issue spotting it helps, and organizing thoughts, like, it's just structure. And I appreciate it.

RC: And what does that structure do for you? Why is that useful?

Student: Well, if you're trying, like if you're trying to build a house and you have the general idea of you know what a door is like, you know what the frame is like, but if you've never gone to the carpentry or something and you don't know the actual way to do it, you would get lost. So when you try to study – **like I'm reading 'Cato's Letters' right now; I'm sure you know about those – so I'm reading those and if I didn't have this little framework or the experiences I've had with my education so far, it would just be like I'm reading a really funny document that has these weird r's that are s's.**

RC: [laughs]

Student: So it just gives you – it makes things make more sense. Like it just clears the fog a little bit.

RC: Sure, sure.

Student: Is how I would put it.

This student response overlapped with five others who claimed to keep the *Miniature Guide to Critical Thinking Concepts and Tools* (Paul and Elder, 2012b; appendix A) in their backpack or saved on their computer, and who said that they often returned to it as a guide when approaching learning within their other classes. In some cases these claims were only tenuously supported by elaboration and exemplification. However, some interesting examples emerged of the use of specific tools of criticality in cross-disciplinary

contests. One student described a particularly broad and systematic approach to thinking critically in other subjects based on the miniature guide:

> RC: Sure. And how did you respond to [being introduced to the Paulian framework]?
>
> Student: Well [long pause] I guess at this point at this point in my – at the point I was taking this class in my college career – I was looking for some sort of organization way to, organizational way to go about doing my school work, especially with writing, and papers, and thinking things through. Because I was a math major for two and a half years, and we didn't focus on a lot of writing and communication, things like that. We did, we did math. We did proofs, and things like that. So I hadn't really had the background in writing. So I didn't have a lot of instruction from teachers in high school, even some of my really general courses in college that I needed to go into my new major, which was in Latin, Greek, and history – history in particular because I had to write papers and things like that. So I needed some sort of structure that I could run my answers through to produce [pause] an actual coherent and logical paper. And the model actually gave me [pause] it gave me the tools, I guess, to do that. **So when I'm reading an article for a class I can look at the Miniature Guide** [pause] I think it's like a ten point kind of questionnaire, **like, what is the purpose?,** what is the author saying, what is [pause] – so I can go through that to [pause] when I'm looking at an article, **and then when I'm actually trying to write my paper I can look at the elements of thought and the wheel, and I can use those to make my paper**. In class, what [our professor] actually had us do was to write a paper, using, with each paragraph, being part of the wheel. But in my actual papers for other classes I don't actually say 'my point of view is blah, blah, blah.' I've kind of made it – I've adapted it a little bit where I leave out certain parts of it, but I'll still go through, '**what is my purpose?" "what is my conclusion?" "what are the implications?" And so I try to assess my writing using the**

critical thinking wheel [pause] And I thought that was really useful because I'm not [pause] I'm not good at writing and verbal communication. So –

RC: So that helped you frame your, uh, frame your thoughts in a way that allowed you to communicate them better?

Student: Exactly. I was able to separate out the things I was thinking and put them into these little categories.

RC: Cool. So, um, well, do you think that – let's say that you didn't have this framework. How do you think you might be approaching your classes?

Student: Well, uh [pause] looking back I had some writing courses before I had "Introduction to Critical Thinking," and [pause] **my papers really, I'll say they were bad.** Because my teachers couldn't really follow them because it had too many things going on in the paper and it was kind of like, broken, I guess, if you want to say that. [pause] Even when I was trying to do like a '3.5 essay' where you have an introduction, and then three points, and then your three paragraphs in the body are the three points, and then the conclusion. Even when I was doing something like that it would – they were kind of difficult to understand and I would have a kind of jumble of things in my paper...

RC: Interesting. So then you say you've continued to do this in your other classes as well?

Student: Right. I've, I keep the – well I actually just took it out because I had a paper – but **I keep "The Miniature Guide" in my backpack with me so that... And I'm still, I'm still pulling new things out of it, too, as I keep reading it. But I do keep it with me and I'll look at the wheel whenever I'm in the real formative stages of coming up with an answer to a question.** I recently did a project with [pause] it was with another movie, like, uh, the film review that we did in [this] class and I used the

wheel for that.

RC: So have you had, um, well, could you give me an example of the, maybe the last time or a recent time where you, where you used the framework in a specific, uh, a specific essay or assignment?

Student: Uh, let's see [long pause] I used the "Miniature Guide" when I was looking at sociocentrism, and [pause] I didn't actually use the wheel like, um, I mean I'm sure I used the wheel, but I didn't go through all the steps and answer everything, like "what's your point of view?" "what's your implication, conclusion, and your data." I didn't actually go through and list that all out, but **I used their ideas for a critical society and I was able to assess the movie's thinking, and I was able to say: 'this is an example of critical – not critical thinking – this is an example of sociocentrism on critical thinking using this criteria.' So those were, I guess, the standards, I think, the standards of critical thinking. So I was able to apply that to their thinking.**

RC: So you, um, yeah. Interesting. And do you think that was effective?

Student: Yes, I think it was effective because I was able to specifically point out this idea that they were non-verbal –in this instance it was non-verbal communication. They weren't actually saying it, they were non-verbally communicating.

Though showing some confusion about the theory, this student example was profoundly moving. Here was a student who progressed through primary and secondary education without developing requisite skills for writing well. A previous, though highly circumscribed, framework for criticality had already been introduced to him (the '3.5 essay') apparently unsuccessfully. He said that he's 'not very good at writing and verbal communication' and his papers were 'a jumble' and 'broken'. As a result of engaging with the tools of critical thinking articulated by Paul and Elder and presented by an enthusias-

tic professor with a systematic pedagogy, he has apparently been able to develop a more critical and effective approach to learning. It was in this particular interview that my recording device ran out of batteries, and so many of the details provided by this student about his new process and its implications have been lost. However, he did tell me that on this film project he received an 'A' for his work, and that his papers have been better received by his professors in the year and a half since his explicit introduction to critical thinking (he related that one teacher pulled him aside and commented that his paper was particularly good).

5.1.3.3 Critical Thinking in Professional and Personal Life

In on-campus professional learning, lead teachers and training facilitators have emphasized to participating faculty the importance of applying tools of critical thinking in their own living and professional practice, and not simply as teachers. Those who committed to this process most deeply produced multiple and diverse examples of critical thinking in interviews, observations, and in conversation. Some of the process of 'making thinking personal' is discussed in the context of educational leadership, section 5.2.2.1. Here we will examine just a few of the ways in which participants in this study have changed their thinking and (in some cases) their lives through thinking critically:

> RC: Interesting, interesting. So then what is - so then what is your thinking on the framework now?
>
> Student: Um, I actually – now that I know it, I use it more often. **I'm very cognizant of it all the time - for instance, as a leader here in the student government at University, whenever I'm making decisions it's one thing I need to think of. What are other people going to assume in this situation? Um, [pause] what information do I need to know to handle this situation best? What is my purpose for this meeting?** What, what [pause] And - I think it [pause] **I think it helps me overcome difficult situations such as racial situations where I'm dealing with a person of another race or of another group of another race** [pause] And it helps me critically think about how I need to approach this situation. How I need to - How I need to [pause]

understand the way that the other group is thinking. Not necessarily cater to that, but um [pause] understand it, and be able to react to that, to that type of situation.

RC: Sure. So could you give me an example of when you used it?

Student: Yes, actually. Recently there was a diversity [event]... Um, it's where we um [pause] we're facing different stereotypes, and um [pause] When talking about it, I actually, um, I actually used the critical thinking framework to say, "Well, um, this - this is, in general, the information I know about these stereotypes, and this is what I know people assume... **And, as far as some of the different parts of the chart, such as 'information' and 'assuming', it helped me become aware of those things.** In that way, I can then kind of change the way I was thinking.

RC: Okay, so then in what ways did you find yourself shifting in terms of how you were thinking?

Student: Um, there's [pause] as far [long pause] uh [longer pause] What – At the event, there was a lot of representation from the National Panhellenic Council, which is, um, the majority of the African American sororities. And so, um, and so [pause] at that point in time there's a big event here on campus called [name removed] it's very popular, but **I realized using the critical thinking framework that one of the stereotypes and what I was assuming was that the members of the National Panhellenic Council – the only thing they did was [name removed]. But after critically thinking about, and using the wheel, in that situation I realized there were other things they did. And so I, uh - y'know, basically I guess using the framework – the only information I had was that that was the only thing they put on. I was assuming that they weren't very active, that they didn't do any service, service learning opportunities. I was [very long pause] And basically I approached it as, "Is this the only thing that you do?"**

RC: And how did that color your thoughts about them generally and about -

Student: Well in general I thought – I thought I - In general I thought that they weren't very active and it was more of a social type of thing than anything else, and um [pause] and [pause] and **to be honest, I had a, um - general bad outlook about the African American sororities on campus because I thought they didn't do anything. And the critical thinking framework helped me understand that they did more than just that.**

In the above quote we see explicit use of two critical thinking concepts: 'information' and 'assumption'. As the student put it, 'the only information I had was that [name removed] was the only thing they put on. I was assuming that they weren't very active, that they didn't do any service, service learning opportunities..' However, through explicit use of the elements of thought ('after critically thinking about, and using the wheel[17], in that situation I realized there were other things they did'), this student was able to question the basis of this assumption. By becoming more informed on the broader activities of the African-American sororities, faulty thinking was replaced with more informed thinking.

Another student used the idea of 'assumptions' to change his teaching practice as a drum teacher, as well as his interactions with his children:

RC: Sure. So could you give me an example of how you used one or more of the principles [of theory of critical thinking], either in class or elsewhere?

Student: Sure, sure. Um, well I'm a parent of three boys, and so I'm constantly teaching them how to do everything, whether it's life skills, or homework, or anything like that. **And so one thing that it's caused me to do is – like I said before – stop and reflect on how I'm about to deliver the information, and am I assuming that people know something, or that my child knows some-**

[17] the wheel' refers here to the circle diagram of the elements of thought (see section 2.4.2)

thing, before I actually, you know, build on top of that. And so it's been really great for that because it makes me reevaluate things, and try to deliver it in a way that's, uh, more sensitive to where the person that I'm speaking to is at – rather than where I'm at.

RC: Interesting.

Student: Whereas before I might just plow through something and not even think about 'how am I delivering this?' 'Are they in a place where they can receive the information that I'm giving them?' You know, 'are we defining words as the same thing?' Because oftentimes you've got, you know, I'm telling you that this word means 'a,' but where you're from it actually means 'b.' And so, kind of like, metacognitive. So it's helped me a lot with that. **I also teach music**, so I teach music, **drumming students**, and it's been great because that's more practical things, like **reading music, reading rhythms** and stuff, and **sometimes I assume that they already know how to read these certain rhythms, um, but sometimes they don't.** I need to actually take a step back and say, well, "rather than working through this complex rhythm, let's talk about what each of these notes mean. How much time do they actually take?" You know, taking a step back. So it's helped me to do that…

I think this would be a great thing to even – I mean my kids are the perfect age right now just to start talking to them about how they're receiving information. I'm studying human development as well, and it's really cool. **One of my sons is six years old and he's right at just this beautiful ripe age of where he's starting to figure out how he thinks**. And he's starting to actually question how he thinks about things, and it's the perfect time to start talking to him about this kind of thing so that he can go through and challenge the things that he sees, or says, or reads, you know. **I even did it the other day. Someone told him in school that if**

he, uh, looks in the mirror in our bathroom and says "Bloody Mary" three times that a ghost is going to come out and kill him. And so like we actually kind of used some of the principles just challenging this – what evidence do we have to this? Has the other person done it? Well, if they had done it, how come they are still alive?

RC: [laughs]

Student: You know, and just asking these questions. So how would he ever know because whoever did it would have died and couldn't tell anyone. So, like just getting my children to work through it – it's been really cool, it's been fun. And so, yeah.

Consider the following two similar student examples that show significant application of FCT theory to personal life:

RC: Yeah, and so as you kind of move forward in your life as a person, as a student, as a mom, what sorts of things are you working on as far as applying critical thinking to your own life? What do you see as the kinds of things you would like to improve upon?

Student: One of the things is, you know, I have three children and my youngest is a freshman in high school, my middle child is a senior, so he'll be leaving for college next year. You know, my husband and I aren't too many years from being empty nesters. And so, you know, rearing children is, uh, it drains your resources – not just financial resources – your physical resources. [laughs] And I want to think about what does that mean for our life as a married couple with our children grown? I love watching House Hunters International, and, you know, I find myself saying to my husband these days, you know, we could do that. We could, like, be ex-pats.

RC: [laughs]

Student: You know, I would have never ever, ever, ever, in a million years said that – I wouldn't have thought of going to another country and leaving my children here. But, you know, as I think about

that, will I think about, why not? So, you know, in my personal life, in my professional life I mentor some at risk students at the college. I love training, and so I think about ways that we can take critical thinking into training – into, like I've just completed, or am in the process of completing several training sessions on sexual harassment training. **And I think about not just delivering the material – the training material – to the people, but how do you do that in a way that triggers them to think about it? You know, um, because that's the important part. I mean, critical thinking to me is critical because it can change lives. That's what's important to me.**

RC: So that leads into my next question. So for you both, professionally and personally, what has been the carry over? How are you now working with this theory and these ideas?

LT1: **I think everything that we do comes back to it.** I think a different way now when I'm working with – I'm [a leader] here and I think I work – [to her assistant] you'll be a good judge of this, and feel free to be very honest – I think I'm different with how I work with my staff now.

RC: In what way?

LT1: **I question my assumptions, and I'm trying to look at things with other points of view.** Just just – **the [essential intellectual] traits are there. I'm trying to test myself against them. Y'know, like to give this example, and I told [my assistant] this before, that in order to have a conversation about something, I wanted to do it one way and she wanted to do it another way. In the past I would have said, "Y'know, this is what it's gonna be, and let's move on." But it made me think, maybe, y'know -**

LT2: She woulda gotten pissed. She woulda gotten – let's be honest, she woulda gotten mad.

[laughter]

LT1: "Maybe I do need to look at this." When I looked at this through [my assistant's] eyes, then it did – the light bulb kinda came on for me.

LT2: Yeah, you're better at not getting pissed off at me.

[laughter]

LT2: Very good for a supervisor-employee relation, I must say.

LT1: But yeah, it's – I stop and think about [pause] y'know, my point of view versus someone else. What're my assumptions, what're their assumptions. Y'know -

LT2: That's a really good way to gather meetings and projects too.

LT1: It is, and–

LT2: It is. We've changed the way we do things with that

These statements highlight substantive changes in thinking and behavior, which participants claimed arose from their use of explicit tools of critical thinking. 'Assumptions', and 'information' were among the most often cited concepts employed to make these changes.

Other examples were less profound and/or systematic. Some students focused on one particular idea or concept, such as the student who connected intuitively with the idea of 'point of view'. She had a background in social work, and had recently returned to school after some years away. Being introduced to the concept of point of view as a broad intellectual tool enabled her to bring together many experiences and insights, and to apply them to her new learning opportunities.

5.2 Factors Contributing to the Improvement of Critical Thinking Across the Curriculum

This section attempts to uncover some forces which have either individually or together produced the improvements in critical thinking documented throughout this dissertation.

5.2.1 Organizational Conditions

At the organizational level, two relevant factors for improving critical thinking emerged: accreditation and funding.

5.2.1.1 Accreditation

Faculty development at the University began *because of* accreditation; it is sustained *because of* accreditation; and the future of the project beyond accreditation is unclear:

> RC: I mean, how... What would the process have been like if you had been attempting the same thing – all the same resources et cetera – but accreditation is not even in the picture.
>
> LT: Oh my gosh. I - I think at a research university [pause] I'm trying to imagine how you would do that at a research university. At a teaching college? If they said 'This is one of our pillars,' and had 150 faculty, or - I could see that happening. At a research university? Without that accreditation? I'm not sure how you'd even get a steering committee – high level like deans and associative deans to show up. I really [pause] I don't know how you would do it. And it's funny, because until you asked me that question, I've never really thought about it in those terms. So in some ways, it's the lever to get certain to the table, but it's - It's the carrot to get some people to the table, but it's the stick– Sometimes it's the carrot, sometimes the stick, and sometimes you shouldn't mention it at all. Or not even, because –[with] Faculty [it] has to be about: 'what does this do for me and my students?' It's not about accreditation.

The influence of accreditation can also be seen in the fact that those departments with a history of external accreditation (such as dentistry, nursing, and engineering) were enthusiastic about the on-campus initiative to improve teaching and learning for critical thinking. These departments were standouts on campus, at least in terms of measures such as number of professors ostensibly teaching for critical thinking and number of funded projects to develop CT. For example, every professor in the school of Nursing has integrated the language of the elements of thought and intellectual standards into assess-

ment (at least on paper). In the Dental Hygiene program, every full- and most part-time professors have engaged with faculty development on campus, as have many faculty within the school of Dentistry (which is a graduate program, and therefore not technically within the scope of the critical thinking enhancement project). These facts were reported to me by colleagues and department leaders. The veracity of these claims and the depth of critical thinking understandings and practice has not been probed in this research.

In other departments with less history of external accreditation, there was far more resistance to the on-campus initiative (see section 5.3.1 for passages from these faculty). These faculty saw accreditation not as a potential source of positive unity but rather as a bureaucratic impediment. In this, previous negative experience with educational reform appeared to be a major influence (see section 5.3.1).

5.2.1.2 Funding Change

> RC: so I guess let's start with just, well I guess – when was your first work with the [faculty development on campus]? When did you first hear about that?
>
> Prof: I got an email about a workshop, I guess it was in the fall two years ago. And so I applied, there was a stipend – part timers could apply. And those are kind of rare around here. So I came and I attended the semester long workshop. I guess it was one day a week. And that's where I started...

Funding played two roles for participants in this project. The first was as incentive: enticing professors to attend workshops through stipends and meals. For many professors this was an effective method for getting them to the workshops. One professor talked about attending dozens of lunchtime seminars because 'Actually I love when they have it around lunchtime because being able to eat and listen to something – if it isn't that good, well, at least you had a meal!"

One group of field interviews is relevant here for insight into the dynamics of reform and counter-reform. In the first week of the semester I was invited to a departmental semester opening party, which was attended by several dozen full and part-time professors. It was here that I became aware that some portion of one department on-campus

were opposed to the teaching and learning initiative on campus. I talked with many of them at this social event, both individually and in groups. One part-time instructor, who had previously identified himself as in opposition to the critical thinking enhancement plan, told me privately that he and 'many of the part-timers' had been going to the critical thinking faculty development sessions to receive the stipends – and found the experience worthwhile and enjoyable. He did not relate any 'transformative' or 'revolutionary' experiences, but did say that, in his words (paraphrasing from notes) 'Before going to the learning community, I just thought the theory was simple graphs and charts - students laughed at it. But then the university paid for workshops and, after attending, a lot of us have changed our minds. I use the ideas and have incorporated some of the language, but I don't teach it explicitly.'

The other role played by funding for faculty and staff in this study was in grants for time spent modifying practice. University team leaders have reasoned that, given the already overloaded schedules of most academics, faculty and staff should be compensated for their efforts to actualize change. Grants have therefore been offered for individual, group, and departmental projects to infuse theory of critical thinking into student learning interactions across the curriculum. Three department-level leaders credited these funding opportunities as vital in achieving reform, especially for larger projects such as that undertaken by the Nursing department. That project required virtually all faculty members to work together over the summer to standardize assessment based on the essential intellectual standards and the elements of thought. According to the department chair, this undertaking would not have been possible without substantial grant money.

5.2.2 Leadership

Leaders of the university's accreditation plan have designed the overall schema of faculty development and selected the theory of critical thinking to be its centerpiece. Through several years of attendance at the annual *International Conference on Critical Thinking and Educational Reform*, a lead team has formed who are the de-facto 'on-campus specialists' in critical thinking. It is this group that has conducted workshops on critical thinking for faculty across the disciplines. Leadership is thus an implicit variable in virtually every finding discussed in this chapter. Unfortunately, many of the specifics of these leadership decisions cannot be explored here, due to the need to protect study

participants (see sections 4.6 and 4.8 for more on this decision), but a few important elements can be mentioned.

5.2.2.1 Making Critical Thinking Personal

> Prof: And it was just linking those through homework and then through small group discussions and then large-group, usually exercises of some type. We started making personal connections with this. **The moderators primarily helped us understand the value of it for yourself – and that was really their focus. Was for you the thinker.**
>
> ---
>
> Prof: **So I definitely think for faculty you have to kind of first own it yourself**…certainly the fact that – it's certainly understandable why faculty are kind of like 'I know what I'm doing and this new – I know how to think critically, I know what I'm' – and so if you don't embrace it and try to internalize it as much you'll have a hard time making the translation to students. Because **the biggest thing for me was making it part of something that I use all the time first.**

The personal work of the university lead team is especially significant because it is these people who have led much of the faculty development events and processes. The deeper their knowledge, the deeper they have been able to present critical thinking concepts, and the better they have guided faculty and staff to deeper understanding and practice. Many examples of the breadth and depth of their understanding and practice of critical thinking theory are located throughout this dissertation. As a result of their experiences, and their growing understanding of the depth of critical thinking, lead teachers at the research site have continually pushed for deeper and lengthier faculty development. In short, on-campus leaders recognize to some extent the journey faculty face in effectively translating critical thinking ideas into classroom action (see quotes in section 5.3.2.2).

As discussed in previous sections, there are many ways to frame critical thinking, some more substantive than others. For instance, critical thinking is sometimes presented as a set of strategies to be 'plugged in'. On the contrary, professional development at

the research site has apparently consistently emphasized the depth of the concept of critical thinking, the breadth of changes implied, and the necessity by students (in this case, faculty) to apply critical thinking self-reflectively.

Through first-hand experience with critical thinking theory, lead teachers have been able to empathize with the difficulties in internalizing and contextualizing critical thinking:

> LT: And I remember our saying, "When [we] learned this, we had the same questions you have. We had the same doubts you have. Trust us. It will make sense later."

All faculty and staff within the study who have led workshops on critical thinking echoed this passage. Students of critical thinking want to know that the person teaching it has personal experience applying the tools in various domains of life, study, and work. Students need examples from real life to connect with, as they work to internalize the concepts of critical thinking. Students will ask specific questions, which might require deep knowledge of a particular piece of CT theory. In these interations, the depth and breadth of leaders' practice and knowledge will in large part determine their ability to help others develop their own criticality.

In virtually all of the observations conducted in this study of explicit discussion of the Paul/Elder conception of critical thinking, the educator at some point used a personal example, usually in the domain of professional practice. This invariably captured the attention of the students in the class. These personal examples appeared to ground the discussion in a context and in details which the students considered valuable. One case, in a class with over 100 freshmen students, was particularly dramatic. After roughly 30 minutes of discussion of the idea of critical thinking and its importance to Engineering, students' attention had begun to wane: few notes were being taken, there was some fidgeting, doodling, etc. At a shift in topic, one particular professor (the course was being team-taught) stepped in and said 'this isn't some silly thing. We have all done this and been subjected to it – it's hard. It's not easy.' He then gave a brief example of how he used some of the intellectual standards to critique his professional papers before publication. Thought I was unable to record these words, this professor expressed a similar sentiment during the interview:

> Prof: [The elements of thought and the intellectual standards]

> allow you to clarify and articulate and do some things very effectively. Especially if – and that's what I try to tell these freshmen here – especially when you just don't have any idea what to do. **When it's really helpful is when you're like: 'Well I don't know what to do. Well OK let's pull out the wheel and start thinking about these things' because probably in analyzing and evaluating that's what you need and that's the higher level thinking pieces...And it's always valuable for that.**

These in-class comments appeared to make the students more alert, and many began to take notes. Immediately after this, another professor walked the students briefly but subtly through the logic of a problem in writing a paper on engineering (involving analysis using all of the elements of thought). Students appeared to find this valuable and continued to take more notes than at other observed times.

This pattern (the use of personal examples by teachers of critical thinking to impress upon students the significance and utility of FCT theory) was observed with variation at least once with every participating professor who spoke of critical thinking explicitly in observed classes (eight of ten).

5.2.2.2 Legitimate Authorities

> LT: Having established credibility with faculty peers made our job a lot easier. [A colleague] has won the highest teaching award presented at [the University]. I've won awards from my college as an outstanding teacher, so we have the credibility we needed that some faculty look at. **You know, 'what is your experience in front of the class?', and 'how do you balance content and critical thinking?' Those types of questions.** Because we were saying, 'this is how you revise your teaching. This is how you incorporate critical thinking as the context for your content.' And so they were looking at people who had done it, or in the process of doing it, as opposed to it being a theoretical endeavor. **You know, "it sounds good, but have you ever tried doing this? What happens to your teaching evaluations when you do this?"** And those were the concerns some faculty had. (continued below)

Leaders at the research site reasoned that having the respect of colleagues is key to the spreading of ideas and practice. Participating faculty, for their part, overwhelmingly acknowledged that the guidance of the lead teachers was crucial to their own critical development (for more on this, see section 5.2.4.3). When considering who to invite to the learning communities, positive and influential standing among colleagues was an important factor:

> (continued from above)
>
> LT: [In] the first Faculty Learning Community, the people were hand-picked as being respected by their peers; they were hand-picked – **you know you hear this generality that younger faculty will be more prone to doing new things than older faculty and established faculty. The problem with that is they have no credibility. You know, they don't know the topography of the situation. So [we] wanted well-respected senior faculty to be on the first cusp.** So uh, and uh, it was astounding success. Within the context of getting them to actually design assignments that they used in their classroom – to [go] back and report [to their colleagues] – and it was just amazing.

The passage above focuses on creating 'agents of change': individuals who eventually become 'champions' and promote critical thinking within their social and professional circles. The data collected in this study is not sufficient to allow a conclusion on the effectiveness of these 'change agents' in fostering their colleagues to more deeply and systematically foster critical thinking.

5.2.3 The Learning Communities

> RC: and so – so how useful was that for you? If you had just been given the book [and hadn't gone to the learning community] – what would have been the difference?
>
> Prof: well the difference – I mean essentially I was just given the book for [a] summer [before I went to the learning community]. So the difference really was that I didn't know all the ways it could

be used. I didn't recognize its versatility. **I looked at it very much – again you look at a bunch of textbooks and they give you one way to do it. And I thought 'oh there's a way to use all this' and started doing it. So I didn't recognize the richness, the depth, the diversity, the ways that you could bring it up. And for me it completely changed the way I approach teaching.** Because now I teach somewhere between 8 and 10 classes each semester. And this is key to all of them.

The primary purpose of the learning communities was to support faculty members, like the professor above, in their efforts to analyze critical thinking theory and synthesize it into unique, contextually relevant activities for students' intellectual development.

Unfortunately, none of the learning communities were observed, as they are no longer in operation at the research site. However, five observed on-site workshops led by lead teachers at the University provided insight into how these sessions may have unfolded. Let us now focus on three particularly powerful influences for participating faculty and staff in the learning communities.

5.2.3.1 Openmindedness and Collaboration

LT: [our accrediting board] is going to want us to demonstrate that we have in good faith gotten the faculty on board. And so, there are two ways of going about doing that in the academy: one of them is by telling faculty "you will do this or you're fired", right? Well, that isn't really academic and that certainly isn't the culture – it's not very democratic, right? So the other one, which is harder to do is that you coax them, you support them, and you look for the people who will be your early friends, and you get them on board, and ask them to tell two of their friends and so on. So you do it that way, right? And you provide support, and what I learned was, like, 'assignment-centered' – some people don't dig that. They don't want to hear that from me – all they want to hear is, like, bottom line, "what do you have to have from me?", you

> know? The other thing that people really liked is when I said, you know, "Are these things important for your course? If they're not important for your course, tell me what is".

The above quote sheds light on the fundamental perspective the lead team hoped to foster and follow. In all five observed faculty development sessions led by the lead team, the opening 15-20 minutes were spent on an exercise designed to draw out participants' current conceptions of critical thinking, and then to connect these with the framework as conceptualized by Paul and Elder. The activity began with a discussion of the breadth covered by the phrase 'critical thinking', which usually entailed explicit analysis of two to three popular definitions. Participants were then given time, individually, to consider and write on the idea of critical thinking;, to finish the sentence 'To me, critical thinking is…'. Sometimes this was followed by small group discussion (2-5 people per group). Finally, a whole class discussion was held in which groups were asked to share their ideas. This participant produced theory of critical thinking was then written down either on whiteboard or large poster paper, and the commonalities of all were discussed. The lead team would then present some theory from Paulian framework, highlighting the overlap between its language and that produced in the workshop by participants. This approach seemed, in all cases, to create an inclusive atmosphere that was learning-oriented rather than debate-oriented. Faculty participants in this study expressed gratitude for the empathetic and openminded approach taken by lead teachers in the learning communities, as seen in one professor's reponse:

> Prof: yeah [the learning community] was really key. They were so organized in that class, and yet they were open; it wasn't so programmed that we couldn't talk about how things were difficult at times, and you know working with your fellow teachers and learning from them too. Other professors in different disciplines. It was wonderful to see how this could work across different disciplines entirely. That was very useful.

Besides exemplifying and encouraging openmindedness, the University team also sought out openminded persons to participate in faculty development. By focusing their resources on faculty and staff who would use the opportunity to develop as thinkers and teachers, the University team hoped to maximize the effectiveness and spread of critical

thinking pedagogy.

5.2.3.2 Diversity

Though the interview protocol I used did not explicitly target this particular topic, many faculty and staff participants in the study commented on the unique experience of interdisciplinary faculty development. They said its diversity was a crucial element, not only to their enjoyment, but also to their learning of theory of critical thinking. One faculty member talked at length about this process, saying that on numerous occasions his understanding of a particular concept was clarified through hearing an example of its application in a discipline other than his own:

> RC: yeah that's a good example. I can really see that. So for you in this process, when you first started going to the workshops– did you go with colleagues in engineering? Or –
>
> Prof: yes, definitely. A colleague and I were in that LC together and I think there was one more engineer over there. So we were kind of heavy over there. But **some of the best – we've all remarked – some of the best stuff came from the fact that it was an interdisciplinary group. So while I went with some engineers, I think it was really good that it wasn't all engineers.** I really liked that there were some science people, some arts and some humanities people, English, biology, physical science, pys-ed. **Because sometimes you can see it clearer in another discipline and then you go 'OK'...in a specific discipline you just say 'oh man that makes total sense to me'...**
>
> RC: do you think that it has anything to do with the fact that in another discipline – especially one you might not have a lot of knowledge of – the content fades away -
>
> Prof: definitely –
>
> RC: - and you can focus on the critical thinking?
>
> Prof: yes. Definitely. You can see the trees and the forest instead of

the leaves. Where in your own discipline yeah I think sometimes you really get caught up in the leaves. And it's really hard because you want, like I said, those crisp boundaries that work really well. And you want to talk about the big picture: 'well but REALLY' – when you're in your discipline whatever somebody says you can probably find a reason to flip it over...**when you get farther up into the more detailed parts of the discipline, certainly some of those things start to get blurry. But it's those organizing principles – and so I think you're right it's easier to see in somebody else's discipline sometimes.** So that's one of the things they had us doing is pairing up with people in other disciplines and they were trying to say what their fundamental and powerful concepts were and you would try to help them identify and **it was really helpful to have someone outside your discipline to say 'well here's what I see'.**

RC: interesting. So how do you think that – imagining for a minute – it would be different if they had had workshops only for engineers, let's say, and you had only worked with engineers?

Prof: (pause) well I think one of the things – I think two things – one of them is really kind of a sideline but an observation in academia which is I think you have a lot more of 'this is a student problem' issue versus 'how do we change and rethink and learn what we're doing?' Because when it's all of us in the same unit you tend to fall into recognizing similar traits in students. Whereas when it's not in your discipline it's a little less – you don't tend to try to generalize students beyond your discipline. The other thing I think is it would be much – it would have been a lot heavier on the analytics – we'd have been doing that and we'd have gotten stuck a few times on trying to be overly analytic maybe would be one of the things.

This extended example offers insight into some of the limitations of specialization and departmental segregation. Becoming too 'content-oriented' (focusing on the 'leaves'

instead of 'the trees' or the 'forest') can create an impediment to thinking critically about the most fundamental concepts and issues in the subject. If these professors are correct, maintaining an interdisciplinary audience may somewhat guard against this potential.

5.2.3.3 Integrating Critical Thinking Concepts into Classroom Practice

> Prof: It's been great. No, it's been great. I had some initial, sort of, like, immediate, you know thoughts about how our work fits with critical thinking, or how we can do more, and **the LC I think really kind of crystallizes for people because you actually pick a project, and so you have that sort of support and experience of picking an idea and seeing it all the way through, and building critical thinking into it.**

To help professors convert critical thinking ideas into classroom action, the University team set aside faculty development time to support the process. The focus was on the practical integration of critical thinking concepts into existing syllabi, homework assignments, or anything else central to fostering students'disciplinary and critical thinking. Participants were asked to choose one project to work on throughout the semester-long learning community. This emphasis on theory that translates readily into intuitive implications and consequences oriented faculty development time toward issues of personal significance to the participants, which had a positive effect on faculty enthusiasm and motivation:

> LT: Once they got into it, I think the theoretical part [pause] some of them get into that, some of them don't – **but then when you got into the application part, I think the light bulb really came on for some of them and they really started to get excited about how they could use this for some of their students.**

By focusing participants on one project deeply, the learning community hoped to increase the chance of cementing substantive reform. By going for depth rather than breadth, the university team hoped to convey some of the profundity of critical thinking. Finally, it was hoped that participants might follow this process in the future as they continue to foster learning content through theory of critical thinking (some of these examples are located in section 5.3.2.2).

5.2.4 Conditions which Foster Depth of Understanding

In both the learning communities (for faculty and staff) and classes (for students), there were conditions of the educational experience which participants believed helped to foster greater depth of understanding.

5.2.4.1 Learning through Systematic Application

> Student: In class, what [our professor] actually had us do was to write a paper, using, with each paragraph, being part of 'the wheel**...'** [18]

When asked what was central to their learning of critical thinking, participating faculty, staff, and students often pointed out the importance of learning through practical application of critical thinking tools in multiple and diverse domains. For those students who demonstrated greatest depth of understanding and practice of critical thinking in this study, it was important not only that they practice using explicit tools of critical thinking, but that this was a *systematic* part of their learning process:

> RC: OK. And then, did [your professor] then, uh, did he also walk you through it?
>
> Student: **Yeah, we went through step by step, like we spent a lot of time on the intellectual standards, and, um, went over like exactly what each one of them meant. It took us like two weeks to go through the entire [miniature guide to critical thinking]**, and then there was a test over it… [the professor] was pretty prudent about how we approached it. Like later in the semester and we would go through and **we would point out things like 'this person is displaying fairmindedness', or 'these people are like, ethnocentric',** or just all those little things, like he didn't just, **like we didn't just learn it and then forget about it, like he applied it throughout the course.**

> Student: I know that we spent at least a couple of class periods discussing bit by bit. I'm pretty sure [pause] I can't remember

[18] the wheel' refers here to the circle diagram of the elements of thought (see section 2.4.2)

now. [long pause] This sounds terrible, doesn't it?

RC: No, it's OK. It was a year ago.

Student: Yeah, the thing too being that, I mean, **after we were introduced to it, or he talked about it specifically in class a few times, we were expected to have a copy in whatever medium we preferred, and it was just part of class from that point on.** It wasn't a specific, 'OK, and now we're going to do some exercises', you know, that sort of thing. He would just, depending on what we were doing, if it was a classroom exercise or if it was discussing – we read 1984 – and he would just ask, and basically at that point we were expected to be familiar enough with it from just our own reading that if he asked, you know, "what sort of intellectual traits are being displayed here?", you know, that kind of thing. **He was very good at just making it a part of the classroom discussion, and not a break to, "now let's discuss the critical thinking framework".** It's hard for me to make distinctions as far as when we were doing exercises on the framework, and when we were just [learning for the class].

As one professor mentioned above, critical thinking was emphasized throughout the course. For example, after a typical student question, 'Will we get points off for not writing a whole page?' the professor responded 'No, but you will lose points for lack of depth. That's an intellectual standard. We didn't talk about critical thinking just for fun. Your thinking should be clear, accurate, precise, relevant, etc. They are all there...' Students in this class produced short essays for every class, on which the professor gave feedback using the language of the elements of thought, intellectual standards and intellectual traits (although this feedback was often minimal due to high student n). In every observation, class content was connected explicitly with theory of critical thinking at least five times. In each case, the practical and grounded utility of the concepts was emphasized.

Observations of this professor's classroom practice confirmed these two student remarks. In the beginning of his courses, at least one full week is devoted to explicit reading, discussion, and application of all parts of the *Miniature Guide to Critical Thinking*,

which includes theory beyond the elements of thought, the essential intellectual standards, and the intellectual traits (see appendix A). In observations made of two separate courses ('business ethics' and 'critical thinking'), this professor led whole-class dialogues (between 25 and 60 students in each) in explicit analysis and evaluation of FCT theory. These sessions were entertaining, as they were the first time (along with a similar observation of another professor, discussed immediately below) I have ever witnessed an explicit question and answer session on the theory outside of Foundation for Critical Thinking-affiliated persons. The professor seemed to grasp subtle distinctions, such as the difference between traits and intellectual traits (as in, the difference between 'humility' and 'intellectual humility'), which are often not understood by students after many years of study.

Students in this instructor's class were sometimes required to apply all the intellectual standards to all the elements of thought (producing 64 entries) in reference to various systems, some chosen by the professor and some chosen by students. In one case, the assignment was to do 'the logic of something weird'. In another, students were asked to use the elements of thought to generate questions to probe any process that was someone's job function, ideally someone the students had never talked to and who might be from a different socio-economic group or ethnicity. The object in every case was to use the conceptual tools of critical thinking to better understand something of value or uniqueness to the student.

As a result of this instructor's emphasis on the basic theory of critical thinking, as well as the practice he systematically engaged students in, many of his students appeared to grasp the basic logic of the theory (though this can only be partially assessed through student dialogue), and most seemed to find it valuable in their work throughout the semester. For example, in a late-semester discussion on the theory contained in the *Miniature Guide to Critical Thinking Concepts and Tools* (Paul and Elder, 2012b; available in Appendix A), I noted the following student comments:

- 'Once I figured out this booklet, it spells out all the things I've had in my head. It's a great way to figure out my thought processes';
- 'I was doing a writing assignment on how people have biases in their thinking and, at first I thought it was straightforward. However, after working through some of the things in this Mini-Guide, I've realized that it is not

straightforward, and it helped me sort some of that out';

- 'this made me aware of my own bias when I make decisions';
- 'taking apart arguments it's useful, can apply this to a lot of situations, that's what I've found'.

Another professor also engaged her students in whole-class discussion of critical thinking theory (though analysis was limited primarily to the elements of thought and essential intellectual standards, with some rare inclusion of intellectual traits). One of her students discusses this below:

> RC: And what was different – or, was that different?
>
> Student: Oh, yeah [laugh]. Because we used the actual blue book, and that was like the first thing we had to read when we joined the lab. But I guess what it is is we had to actually sit down and talk about what things – **Because I think a lot of times I think people just say, "Oh, critical thinking is just a thing to get through a problem, or solve a solution," and it's not. It's more than that. And it – he's like – we went around trying to define what it means, and define the terms and talk about what it – like, a lot of attributes of critical thinking that maybe are implied in other people's descriptions, but they don't talk about. And you actually need to talk about 'em because it's important.** And then just the amount of time we spent talking about it. That was different. 'Cause like in philosophy class it's like, "Oh this is critical thinking, this is the Socratic Method," and it's like fifteen minutes. But we have probably literally spent [pause for emphasis] hours [pause] and hours talking about it in [our class].

Observations occurred of three instances of this professor working with all students in the class together explicitly on theory of critical thinking, twice with the same group of students. This professor used a strategy called 'S-E-E-I', having her students 'state', 'elaborate', 'exemplify', and 'illustrate' each of the concepts in the intellectual stan-

dards and some of the elements of thought[19].The professor managed to guide her students – with much effort in some cases – through the S-E-E-I exercise, usually taking a full hour. This observed evidence, together with examples noted in her students' interviews, establishes credibility that her students are learning some skills of analysis and evaluation to be used when conducting in research [in that field].

However, the professor's focus on critical thinking in research and away from all other applications, together with her lack of emphasis on intellectual traits, may be limiting her students' thinking about critical thinking, as the following response from one of her students indicates. After some discussion of how this student uses theory of critical thinking in academic pursuits, I asked about thinking critically regarding other areas of his life:

> Student: [after a long pause] I don't really encounter that many situations in my private life that I gotta think too critically about. That are challenging enough that require enough that I formally sit down to think about something. So I mainly use it in my academic life...

5.2.4.2 Requiring Critical Thinking

> RC: Why do you think you - why do you think you - what happened that made it click? What was it? Did you just find it useful?
>
> **Student: I think that it was the fact that before we didn't know how important critical thinking was. It was one of those that we pushed to the side and we were like, "Ugh, this is like some stupid guideline that she probably won't even look for in there."**...But once we were working backwards we were able to finish the project even earlier. Actually, the critical thinking part made the project even better than it would have been...
>
> **RC: Interesting, interesting. And all of this came about because you were basically forced to do it.**

[19] This professor felt that the intellectual traits would develop naturally, in her words: 'the habits are in a sense a given…your ability to apply them and your rigor to apply them comes out naturally…they are sort of the natural results of repeatedly doing critical evaluation'. This belief contradicts the findings of Cosgrove 2011a, available in Appendix F

Student: Very true, yeah.

RC: So if, if, if [the professor] had simply said, "Well, you can use this, I think it would be useful, try it out." What do you think – how would you thi–

Student: I don't think we would have used it. In that way, I think our project would have suffered. I think that we really wouldn't have a way – a cohesive – I guess a cohesive and coherent message throughout our whole project. Our project would have been jumbled, um [pause] Not that many people would have really understood what we were trying to say. Just because we didn't make everything entirely clear. And as a result I think that, um [pause] all that we did would have been in vain. It was very interesting how [longer pause] we were so frustrated, but if we had sat down and actually really looked at the framework, and possibly sat down with [the professor] and said, "Look, I don't really get this. What do we need to get with this?" We could have saved time, we could have [pause] Who knows? Our project could have been better. Cause I think it's great right now, but [long pause] It um, it certainly would have been [pause**] Actually, when I came into this class I thought I wouldn't learn anything.** Just because we had three weeks where we kind of learned some things I already knew, and then we went into the whole video-making process of the project. **And I was quite pessimistic about the project. I really didn't care for it, I didn't understand why we had to use this framework, and I didn't understand all these different regulations and rules on this project. [long pause] And [pause] I was quite wrong. I was quite wrong**...the biggest thing I got out of this was the critical thinking framework. And without it the class wouldn't have been the same.

Here let us take note of this students' experience: the student was initially intellectually arrogant, saying that she 'wouldn't learn anything' in the course; additionally, she was hostile to the course guidelines requiring the explicit use of a framework for critical

thinking, believing this to be an additional and superficial burden on what was already perceived to be a burdensome group project. Yet, because the instructor was firm in the requirement and supported the group's developing understanding of critical thinking, this student was able to have a humbling educational experience, saying that 'I was quite wrong. I was quite wrong' and, later, that 'I would like to use [the FCT framework] in my honors thesis'.

Another student shared his thoughts on the importance of making critical thinking a required part of the course rather than a suggestion.

> RC: Interesting. So, let me say, how do you think – if, uh, [your professor] had simply just lectured about the material, and maybe said, "this is really important, and throughout this class you should use this book whenever possible," but hadn't continued to emphasize it throughout the course, how do you think your understanding and application of the ideas might be different, if you can even imagine that?
>
> Student: Yeah, I think it would be significantly less. I think actually applying it in real world situations, both outside of the classroom and for the classroom projects, homework, and so forth, has been instrumental in understanding it. Otherwise, it, you know, **especially in a college setting a lot of times we're on survival mode. So you're not actually going to apply principles, concepts, standards, you know, thought processes, unless you're specifically told to.** So if someone handed me this book and said, "you should use this throughout the semester," but doesn't require it, it's very possible I would have done all the things I was required to do first. And then, if on top of that I still had time to spend with my kids, my family, my work, my teaching, and all that, then I perhaps might, but the chances are a lot less. So I think since he mandated that we were to use it to break down and evaluate things, it forces me to use it and understand it more.

Professors employed multiple strategies for prodding their students to engage in critical thinking. Three professors used the tactic of calling on students by name to

answer questions about assigned reading (which should have been completed before coming to class). When this was combined with the language of the elements of thought and/or the intellectual standards (use of intellectual traits language was less observed), the result was often an effective prompt for the student to consider. For example, after a vague student response, one professor said 'be more specific'; after producing a textbook definition, another pupil was asked to 'translate that into your own words'.

We can compare these student statements to one given by a student who had not been required to carefully examine and use the tools of critical thinking in class, but had only been encouraged to do so:

> RC: So you were saying that you had a couple of different professors who have used [the miniature guide to critical thinking] or something like it – some parts of it. And you said one of the professors had, in the syllabus, some of the ideas.
>
> Student: Well, it was actually – I think it's this actual thing as a .pdf of this actual pamphlet... Not necessarily in the syllabus, but available documents on our blackboard website that **we should print out and, you know, take a look at. That's basically what she said.**
>
> RC: But she hasn't had any kind of official class assignment that said you should use this for this?
>
> Student: No. No.
>
> RC: OK. So what's your understanding of it currently?
>
> Student: **Well, to be honest with you, I didn't look at it this semester, except for the fact that when I opened it and saw that it was the same thing that I'd seen before**, you know, either a year ago or sometime in the past while here at our college, and – so **I didn't look at it again because I had already seen it.** And I do remember looking at it in the past and thinking that it had a lot of good concepts as far as – oh, that's funny, the title has "Concepts and Tools." So it had a lot of good concepts [laughs].

As this student response makes clear, it is very possible for students to progress through multiple courses completing the required work while developing little intellectually. This student has apparently interacted with the *Miniature Guide to Critical Thinking* on at least two occasions, having taken two courses where it was required - or at least 'suggested' - reading. Yet the student demonstrates no theoretical understanding, let alone provides any evidence of its employment.

5.2.4.3 Individual Coaching

Individual support through theoretical and practical coaching was cited by all participating faculty and staff as being a necessary component in their learning critical thinking.

> RC: so then you, they asked you to do some work on the syllabus
> or –
>
> Prof: totally, that was one of the very first things. **I thought I had a wonderful syllabus. I thought 'ill just take my research syllabus because it works great' and so forth and so on and then I sent it over there to [the team of lead teachers] and they picked it apart (laughing), you know. And kind of pulled out the flaws and things to me. But in doing that, gave me a framework to really develop my syllabus to be sure that – what is it I want to accomplish out of a class? How am I going to get the students there? What do I need to do to get them there?**

In this example we can see the lead teachers playing the role of critical mentor. In this case, the critical dialogue was at first centered on a course syllabus, which the lead team critically analyzed and evaluated. The suggested changes then became the foundation for a conversation about how to integrate critical thinking ideas into classroom pedagogy. Here we see the University team prodding a faculty member who was self-admittedly over-confident. The professor was encouraged and supported to achieve greater depth of understanding, and some attending implications for instruction.

In other cases, some professors became overwhelmed by the breadth of implications for change provoked by the Paulian framework for critical thinking. To this different faculty response, the University team took a more modest approach to change.

> Prof: And I think one of the good things that – I'm trying to remember [which lead teacher it was] – one of the two of them **because I was having trouble with, this is so broad, and it's so encompassing, if you remotely tried to do all of it, how do you have time to do anything else? And their whole thing was 'Don't try to do it all.** Parts of it – and even just do a small piece to begin with and then let it kind of branch out and basically try to weave into the rest of the fabric. Don't try and do it all at once. Start in different places'. That kind of made more sense to me... because if you do try to do it all you just get overwhelmed and say 'forget it'. But doing bits and pieces made it a little bit better.

In the first case, analyzed in this section (5.2.4.3) the professor needed to be pushed to see where there was more depth and room to grow; in the second, the professor became overwhelmed by depth, and needed support and guidance on how to begin in manageable ways. Yet both needed the advice of someone with deeper knowledge of critical thinking and experience with its implementation - someone who had progressed through multiple cycles of feeling as if one 'has it', to feeling hopelessly stuck in a rut, unable to advance, back to feeling confident, back to feeling inadequate, and so on.

5.2.5 The Paulian Conception of Critical Thinking

Commentary on Paulian theory is implicit in examples throughout this chapter. This section focuses on a few of the ways in which participating faculty, staff, and students talked about this theory in relation to their own efforts to improve their critical abilities and dispositions. The depth of understanding in each response varies significantly.

5.2.5.1 A System-Opening System

> RC: So now, why do you think it is that [the university] made that decision [to use the Paulian framework]?
>
> LT: Because for a cross-disciplinary approach, it is the best. The more I do this – the more I give workshops to faculty, English to Engineering – you can overlay this on exactly what your discipline

thinks is important...

Many of the participants in this study discussed the usefulness of FCT theory for thinking critically across the disciplines (see also section 5.1.3.2), as well as in professional and personal life (5.1.3.3).

> RC: So, so you, you described it a general process of reflection, of thinking about your thinking of the process. And then there's the specific like, language, and model that is the Paul/Elder framework. What does this specific language do?
>
> Student: Yeah. **I think that gives us almost like a set of standards that we can use. You know, when you're studying any different field of study**, there's always different standards – there's theories that people have – there could even be alternate theories and alternate sets of standards, but what this does is provide one that anyone that even gets this for the first time, I think someone could sit down with this book and get an article and get the critical guide to thinking, who has never seen either one before, and he could apply – he or she could apply – the critical thinking guide to the article. **I think it gives just a clear set of standards that are comprehendable, um, that are concise –** short and simple – which is very effective I think. Um, and it helps us evaluate things because of that – because it's so easy to use. And it's an easy set of standards.

Though this last comment sheds light on the use of critical thinking tools in different directions, the comments that they are 'simple' and 'easy to use' may indicate lack of understanding of the depth of possibility in FCT theory.

5.2.5.2 Accessible

For faculty, staff, and students in this study, the Paulian framework clarified and made more accessible the idea of critical thinking:

> **RC: Well, that pretty much covers everything that I wanted to talk about. Is there anything else that we haven't talked about that comes to mind for you?**

Student: All I would say is that I think [the Paulian framework] is something that professors should be encouraged to use. I've had some professors on campus – they were like, "we have to do this critical thinking thing, so we're going to do this activity". And I think when the professor isn't excited about it, it doesn't make it seem like something that's important – it's just something that they have to do. I think it makes it a lot harder for students to get the full benefits of doing whatever the critical thinking activity may be –but I would say that makes a big difference in just encouraging professors to use [the Paulian framework] more as kind of a tool for learning, and not to be – not to kind of shy away from it. Because I know my tendency was to do that, but **I think that breaking it down to the eight elements is really useful. It doesn't make it quite as intimidating, I guess. So I found the blue book, and especially the eight elements very helpful to learning in the classes it's required, and the classes it's not required.**

RC: ok, and so when you were introduced to the Paul/Elder model, how did it change the way you thought about critical thinking? How did you think before and how do you think now about critical thinking?

Prof: by being able to break down critical thinking into identifiable pieces of a process, you make sure – it adds a level of rigor. Because you do not miss anything if you hold to the identification of the elements [of thought] as they term in the P/E model, and apply [the intellectual] standards to them. Or at least – even the awareness, making sure that you're touching everything, adds a level of rigor that you would not normally have...

One instructor talked at length about the utility of FCT theory for easing communication with his students about critical thinking and course content. His response is particularly interesting because it touches on a fundamental belief for some faculty: since most professors have developed the bulk of their critical skills largely implicitly and 'along the

way' during their career as students, many faculty think students should be able to do the same. As a result, these faculty do not feel the need to be more explicit with students about critical thinking, as they believe criticality will develop as a matter of immersion:

> RC: and before that – so your background is philosophy, and philosophers obviously talk a lot about critical thinking, so before you joined the [on-campus initiative], what was your idea of critical thinking?
>
> Prof: umm, I saw critical thinking as a process of analysis primarily, of evaluation, analysis and evaluation of other people's thinking. That was sort of the approach that I took. And a lot of the textbooks that I was working with also took that approach. They really weren't throwing it back on the individual thinker to be responsible for the process. Rather, it seemed the focus as I had come up with was to develop tools and then to apply those tools to arguments and to then – and a lot of it was very formal. **So when I would teach critical thinking, before this, I would do argument analysis, we'd look for fallacies.** We'd try to figure out where the reasoning sometimes would go off the rails. We'd try to figure out – we spent a lot of time looking at assumptions that were being made and how that led us into certain conclusions, that kind of thing. But **we weren't really looking at the process in any sort of methodical or systematic way, the process of the thinker either thinking or looking at his or her own thinking.**
>
> RC: and why is that important for you?
>
> Prof:...**I really felt when I was doing critical thinking prior to this framework I didn't really have an ability to teach students how to think for themselves.** That wasn't something that I was really very good at. And I think that's something that I'm supposed to be doing. And I think that's something that is really valuable for students generally. **I kind of thought that everybody's college experience was going to be like mine was. That**

they were really engaged and really immersed and really trying. And it's not the case. And the more I taught and the more I added other institutions and started really seeing different kinds of learners, it was very clear that a lot of people, unless they really went into it in some detail, it didn't seem supported by their university experience in the way that mine had been – they weren't going to develop this as a matter of immersion....So I mean that's what I really see is this provides a common language that I'm really comfortable with because it represents the kinds of things that I want them to do in a lot of these classes and they're able to pick up on it...

5.2.5.3 Explicit Educational Outcomes

LT: The Paul/Elder framework has been very valuable for assessment because one of the things with assessment is looking at specific, tangible measures. And we're looking for measures that can cross over different disciplines, different fields, different areas, and the framework has been very helpful because looking at the elements - what do we want to assess? We want to assess 'purpose', we want to assess 'point of view'. So the elements [of thought] really help to identify what components we're looking at. And they're very helpful too when I'm talking with faculty about developing assessment. You know, 'what specific aspects of the thinking are you really concerned about in this class?' So it helps them to focus. And then looking at the [intellectual] standards – I mean, the standards are great. And I don't know if I can put my hands on it right away, but the standards are standards for thinking, but they're standards for anything. And they're universal, global standards. So then they really help to quantify what we're looking for – you know, if it's clear, if it's precise, if it's comprehensive...

A major difficulty in developing substantive educational assessments is identifying explicit and deep educational outcomes that can be 'measured' in a valid and reliable

way. At the research site, some commented that the skills, abilities, and traits implicit and explicit in the Paulian framework formed clear and agreeable targets. Two professors mentioned this, one in the abstract, and the other in the concrete:

> RC: So what does it add then, or how does it help you?
>
> Prof: It gives us a concrete framework and set of labels to always use to describe our thinking. Instead of grappling for words when you're trying to talk to someone and using, you know, maybe synonyms. And we have many of the posters in many of our classrooms now – we can always know, if given a choice, to pick one of the words that we're seeing up there. It's kind of like an anchor. It gives us a solid framework to always go back to - to always use if we're stuck in describing our thinking. Go back to those labels because you know that framework and those labels, that's what they're going to hear in their English class, and their gen-ed courses. You know, so it's a way to reinforce and always use a common [pause] common set of words. [A colleague] said it best I thought, the other day, when he was telling them **'when I get stuck writing papers I'll look up like, what have I done this, and this, and this, to use' – sometimes kids think they're done when they get to the end of something. Well, instead of thinking you're done, go back and say, 'OK, what was my purpose in doing this exercise? did I answer the questions? did I use accurate information?' You know, it gives you an accurate way to reflect – it gives you something to go back to to reflect on what you've done.** To give, you know, a sports analogy or something – every day you go to swimming practice, what do you measure against? The clock, right? I did x number of laps in x number of minutes, so you get a time. The time is always – you measure everything against the clock. Well **this gives us something concrete to measure against.** Because a lot of times kids measure against, 'oh, I've got an answer, I'm going to check in the back'. Well, if you don't have an answer in the back,

what can you measure it against? Or if you're stuck on something you're trying to write up?

RC: so how has this particular set of language affected the way that you interact with your work, with your colleagues, with your students?

Prof: oh, - pretty dramatically in some places. I think that – more with – **it's helped with students being, providing me a vocabulary when I'm helping them one-on-one to really quickly kind of pull out that arsenal and say, to stop and say to them 'Clarify what you mean. Be clear on what you are asking me' or you know, and then 'Is what you're asking me relevant?'** but even beyond that just kind of in my life I think it really has helped me be aware of – I think I had reasonably good strategies. But now I regularly point out to people when we disagree about things 'ok well clarify and, you know, are you really being fair here? Is this a fair way to go about this?' so **it's certainly given me some language that I think is sort of disarming to that conflict way that sometimes society wants us to handle disagreements.** You know, like 'you're wrong, you're right'. So certainly I see myself every now and then using it in day to day conversation with lots of people….

The depth of these instructors' understanding and use of these concepts has not been assessed in this research. As previously mentioned, one school at the University attests to have aligned assessment across the program, focused on the Elements of Thought and Intellectual Standards. Formative assessment based on the intellectual standards was observed at least once by eight of the ten participating professors.

5.2.5.4 A Structure for Communication

Some participants related that FCT theory was helpful in communicating their ideas to others (e.g. to colleagues, professors, students, family, friends...):

RC: and do you find that students find that useful having the posters and the boards there visually to refer to?

Prof: I think they want guidance and direction, and it's always helpful for you to give them a clear picture of your expectations. And it helps us to develop – to help plan how we want them to approach it I guess.

RC: it helps you to communicate –

Prof: yes! It helps to communicate! It does help to communicate the ideas. And I think that's what's frustrating the students is they're not clear of what you're expecting or what – or just clear with your explanations. It does help I guess to think about 'what I'm going to say?', 'how I'm going to say it?', so that they have a more clear understanding. Because I think not always do I provide a clear explanation, or I express to them the concept in a clear way. Some things are more difficult to explain. And so if you think about – if you use these models [FCT theory] it helps you to explain it also.

RC: And so, as you were just talking, and you said a couple of times how, how important it is to you - that what you've worked on be communicable not only to experts of the field but also the layman. In what sense do you see the framework being a – um – giving – as being helpful in communication? As a tool to communicate the thoughts you already had, I assume, right? Um, but to put them together in such a way that, that people are better able to understand what is going on.

Student: I think that um [pause] Well, especially in our project, um, the critical thinking framework allows us to [pause] put everything out in the open. And, um [pause] The start is that we key the audience into our purpose for this project. A lot of videos I think [pause] they, um [pause] a lot of different videos, whether commercials or whatnot, kind of brush that aside. **That's certainly a key part to the critical thinking, is queuing your audience into your purpose. Because then your audience is looking for things that match that purpose.** And then, going

further, we present the questions at issue. So what does the audience need to look for specifically? [pause] And then, um - we present our information, uh and [pause] we specifically [pause] we specifically – we specifically state, "This is the information here. This is what you need to know about the disorders that are part of this." And then we go further with assumptions. So **nothing, nothing is ever in our project is ever brushed aside. Or isn't made apparent to the audience. And as the critical thinking framework, the biggest it has to with communication is it standardizes everything.**

RC: In what way?

Student: In the fact that, um, people can understand – people understand what you're talking about. Because, um [pause] you have, um [pause] **you have certain, um [pause] certain key words such as 'purpose', 'information', 'inferences', 'assumptions', 'interpretations', 'point of view', that sort of thing, that clue the audience in**, that um [long pause] um [long pause] it's, um [long pause] it also, um [pause] it also specifically- It shows exactly what – well, like I said before, critical thinking I think is thrown out there very often. And so the framework [pause] um [pause] clears things up about what critical thinking really is. And, um [pause] Thus, I think when, when you don't have multiple ideas about critical thinking, or when there's no question about what critical thinking really is I think that it's easier to communicate. [pause] It's almost like an operational definition. Um [pause] The fact that people can look at it and say, "Oh, okay. This is the purpose, this is the information I need to know", now I'm almost in the conversation, um [pause] eager to - eager to find what [pause] what exactly I'm looking for, and eager to understand the topic.

University lead team members were observed using the language of theory of critical thinking in their communications with each other and with this investigator throughout the data collection process. Though it might be over generalizing to say that this lan-

guage has become 'embedded' in their discourse, it can be said that the language is used by the team often to communicate both significant and mundane ideas. For example, one observed meeting regarding the development of posters of critical thinking began with a discussion of 'the purpose of' the posters – was it to teach the ideas of critical thinking or to remind the students of ideas they have already learned? This was crucial groundwork for later discussion, as the answer had implications for how specific questions would be articulated on the posters [20].

More casual use of FCT concepts was commonly noted in conversation. A prime example emerged during an interview with one lead teacher. After making an error in her characterization of the program, one lead teacher returned to the issue a few minutes later when she realized what had happened. After clarifying the mistake, she said 'So I just wanted to share that with you as a point of accuracy' – and then moved on to make her next point without hesitation. She knew that I would know what she meant because of our shared understanding of the concept of accuracy, and was able to make the point in passing. Such intellectual moves were noted in all the lead teachers and in many participating professors.

5.2.6 Emotions of Change

A number of emotions were mentioned in connection with reform at the research site. Some of these emotions are illuminated in this section.

5.2.6.1 Student Response

> Student: I think it would help if more people took critical thinking – the classes itself, and had it explained to them because i**t seems like the teachers just hand out the book and they're like, "you could use some ideas from this book." And everybody's like, "what the hell is critical thinking?" You know, what does this mean?**

One remarkably consistent finding among participating students was that the experience of change towards critical thinking left them hungering for more – and frustrat-

[20] These posters, mentioned several times in interviews and discussions throughout this chapter, have been placed in many classrooms and common areas across the campus. Each poster targets questions implied by either the elements of thought, the essential intellectual standards, or the intellectual traits.

ed that more professors weren't offering the same opportunity. Almost without exception, participating students wanted more training and practice in critical thinking across their educational experience. One professor reported that one of her students had submitted a letter to her representatives in congress remarking on the power of FCT theory, and requesting more and broader teaching of it in primary and secondary education.

In my final interview question, where I invited the interviewee to talk about anything they wished, nine of the participating eighteen students either returned (if they had already discussed it), or made mention of, their desire for more critical thinking in their classes (if they had not already):

> **RC: Well, that covers everything that I wanted to talk about. Is there anything else that comes to mind for you that we haven't talked about?**
>
> **Student: Um [pause] no. Well, I guess just the concept of instructors actually using the word, like you said. I mean we have talked about it, but I guess I would just like to say that that's an excellent thing for them to do, and if they're not doing it then they probably should, which is I suppose the purpose of this pamphlet and interview.** I appreciate it because not only in school, but in my career later. But like you said, even in my personal life it helps. It makes you kind of a more well-rounded person almost.
>
> ---
>
> RC: Yeah, cool. Um, well that covers all that I, all the categories, the things that I really wanted to talk about. I mean, is there anything that sticks out in your mind for you that we haven't discussed yet that you'd like to say about?
>
> Student: Uh, **I just wish it was taught more. I wish it was how – again I never heard of it until I took this one critical thinking class,** but it's very important, and, again, if you can learn one thing from it it's to stay focused on the question, and answer the one question. Don't get distracted by everything else.
>
> ---
>
> Student: It's kind of like having the window opened and all of a

sudden you realize there is a whole world out there that I've been living next to and I never knew existed.

RC: Interesting. Interesting.

Student: **It was fascinating. It was exciting, and I'm hooked. It's like potato chips – I want more.** [laughs]

One faculty member discussed this latent desire for critical thinking in her experience of changing classroom pedagogy. She had the opposite experience of a faculty member who had backlash from his students (testimony to come in section 5.3.2.3), she described her pupils as being willing to try new things:

Prof: remarkably I think the biggest thing I've noticed is this, and I've shared this with other faculty – **they're remarkably willing to just do what you ask them to do.** And if you kind of lay it out there and say 'I want' – because I regularly said 'I've been working on this workshop and they're having us do this so we're going to try this today and let's just see what happens' – they're fairly willing to embrace that. Probably more so this generation than the past. I don't' really know because I wasn't a teacher then but remarkably how these kids are like 'well you want us to do what? We'll do it!' and that was the biggest impression I got. That was the big empowering thing to me was 'oh I can try some stuff because they're willing to try it' you know? **We all know what the tried and true method of stand up and lecture is about, having gone through the workshop process and trying some of the critical thinking pieces really got me to realize 'I can try some different things in class and students will put their best foot forward for the most part'.**

Again, the extent to which these sentiments are echoed in the campus community at large is unknown. The purposive sampling design has certainly landed a high proportion of positive reactions to critical thinking theory - this was its purpose. On the other hand, many interesting examples of the use of critical thinking emerged during casual conversations I had throughout the semester. These were not always recorded diligently. For example, one student claimed to use the elements of thought, the intellectual stan-

dards, and the intellectual traits to organize discussions in his student study society. I was not able to investigate the details of this claim. Still, the student was enthusiastic and appeared to grasp at least the general thrust of the theory.

5.2.6.2 Community and Collegiality

As discussed previously (see 5.2.3.2), faculty and staff participants seemed to genuinely appreciate working together across the disciplines in the learning communities. These learning communities are no longer in session, and some faculty lamented their end. This was not only because of their desire to more deeply learn critical thinking, but also to re-unite with colleagues from other departments.

> RC: Yeah. Is there anything that comes to mind for you that we haven't talked about?
>
> LT: I have developed friendships and, um, that I never would have, and relationships that are invaluable to me now. I never would have come outside of my little silo [of my department] if I hadn't had this opportunity to do the critical thinking initiative. It's allowed me to appreciate – and I can articulate what it is because of the framework – it's allowed me to appreciate other points of view, other disciplinary points of view. **Since I was only always dealing with [my field], I had a concept - whether it was based in reality or facts or not - about, well, 'those English people are this way', or 'those engineering people – nobody knows the trouble I've seen. Those engineering people have it easy'. I learned a different appreciation of what everyone is required to do.I'm just absolutely humbled at how hard each faculty person I dealt with, no matter what the discipline, works to really do the best that they can.** And I didn't have that appreciation before. Because there was always a discipline that everybody else could beat up on…It goes to show you how starved we were for this to fill that need. We didn't know that this was a need. **None of us knew that this was a need – that we were actually starving, you know, to have this congenial, collegial**

> **experience.** Because one of the things about being an academician [is that] oftentimes it looks like an adversarial relationship. I mean I've got to challenge your ideas. And that shows how smart I am when I pick holes in everything you do. Well, that is sometimes taken to the extreme, and that just becomes a mindset and a perspective that people have toward each other. And this kind of erased all of that.

At the end of the semester, a 're-union' was held for faculty from the first learning community. Though I was unable to observe it, I am told all attended.

5.2.6.4 Making the Process Enjoyable

> RC: so you said you like to teach, how – has this impacted that experience in any way? Has it made teaching easier?
>
> Prof: It's made it a lot easier and a lot more fun! [laughing]

For two professors transitioning from a heavily didactic to a more dialogic pedagogy, 'fun' was the operative word. They said that they enjoyed coming to class more, as the atmosphere was more lively and energetic.

Observations were useful here. There is a marked difference between classrooms in which one person is talking and many people are silent and passive versus those where perhaps half of the classroom may be speaking at any one time, and wherein virtually all are actively engaged, intellectually processing the ideas in various modes. This difference significantly impacts the observer: in didactic classrooms I was unable to speak with or otherwise access the thinking of students (except through their in-class questioning and comments), in active classrooms I was able to move about, briefly talking with students, and capturing key parts of their dialogues in groups. After one lesson observed under these active conditions, I commented to the professor that the experience had been 'a lot of fun'. He beamed, replying 'I'm glad you said that! It is so much fun!!'. Judging by their observed actions, most of the students in the class seemed to agree.

Of course, it is important to temper the above by remembering other comments that are less enthusiastic (such as those in 5.3.1):

> RC: Sure. I mean, what were the kinds of things that they were

saying about it?

Student: They said it was boring. They didn't think it wasn't really applicable to anything, like they didn't understand what it was saying. They just thought it was another lame assignment – you know how kids never want to read something they're assigned. So they just thought it was one of those, even though it's not a big thing at all.

RC: Yeah. Did you ever hear anyone, I mean, uh, any student say, "well I don't like this part," or…?

Student: No, I never heard anybody specifically say they didn't like it. Like I said, some people just kind of I think toss it to the side, but I don't think that's because they don't like it particularly, but maybe they don't care enough.

RC: Sure. Apathy is a big problem.

Student: Yeah.

Student: But, we definitely did use it, or at least I did. Other people in the class, it was kind of a, it was kind of a mixed bag – some of us really liked it, and some of us just, like, flaked it over and didn't really care about it. But those were the people that got like, bad grades, so I don't care much about them.

Let me add to these quotes my observations of classrooms and faculty learning workshops. In all there appeared to be a mix of students who were enthusiastic and engaged, those who appeared less positive and unconvinced, and a broad range in between. Further, the thinking of individuals changed and fluctuated over the course of each observed lesson. These impressions cannot be considered clearly empirical, however, as experience has taught me that sometimes 'positive and enthusiastic' indicates superficial understanding, while 'negative and unconvinced' can signify deeper understanding and an inquisitive mind.

5.3 Factors Impeding Improvement for Critical Thinking Across the Curriculum

This section of the results chapter uncovers impediments to the cultivation of critical thinking, as revealed through the data collected for this project.

5.3.1 Negative or Superficial Experience with the Process of Change

> **RC: And when you first heard about [the CPD initiative on campus], what was your thinking?**
>
> **Prof: Skepticism. My experience, generally, has been that what's happened is that universities in general,** and [this university] in particular **have decided to focus on teaching not by asking teachers what they need, but by creating a bureaucracy of experts who have had virtually no experience in the classroom, who then create an elaborate bureaucracy and a lot of paperwork to justify their own existence. And** that **they're solving problems that often don't exist.** That is, they originally perceive a problem, but in order to keep things going and keep the resources, that's what they do.

As the above response indicates, for some at the research site, perception of the accreditation project was significantly influenced by previous negative experience with educational reform. This was a central theme in all four of the interviews with the 'objecting faculty', and three of their responses are included in this section (one above and two immediately below). For these faculty, 'educational reform' evokes memories of superficial assessment and bureaucratic impositions. Understandably, many faculty become jaded through repeated contact with an ethos of insignificance and negativity. Many come to learn that it is often easier and less stressful to accede (while silently disagreeing) to new mandates:

> **RC: And when you heard about this, what was your initial reaction or thoughts?**
>
> **Prof: One more piece of stuff that we have to take care of that nobody pays for.**

RC: Sure. So you put it in the category of a lot of other issues?

Prof: Yeah, a lot of other issues that in the past nobody really cared about.

RC: OK. So, elaborate.

Prof: We've had these performance improvement, "quality enhancement projects", or whatever they're called, probably every four or five years that I've been here. And each time they're very big when they're pulled out – nobody's ever asked whether they care about them or not – and most of the time they have very little effect. This one turned out to – there's still some controversy because it affects the curriculum, and curriculum is owned by the faculty, but the faculty were never asked to vote on it. So there's still some issues that are going on here at the university. So this has had more impact – not necessarily positive one – on us as a department.

RC: I see.

Prof: Or each department – not just our department.

RC: Right. So maybe in the beginning you and others were thinking, oh, this is just another one of these things…

Prof: It will take us a few hours to fill out a new form, and we'll be done with it.

Prof: Well [pause] I'm a professor. I've been here 20 years. I publish. I've received recognition as a teacher. I think I teach critical thinking in every course all the time. I think that's what the business of [my field] is – at least the business of teaching [my sub-field]. And I don't [pause] **I have bridled at the imposition of requirements, and consequently have tried as best I could simply to make sure that I was in compliance, but not to dedicate myself to this project. It is possible that I've missed something significant. But here's my set of problems: [our accrediting body] is run by people who are by and large not**

line faculty; and where they are line faculty, people who are not in my discipline telling my discipline what to do. I don't have any idea what the education program or school at the University of Cambridge is like, but I can tell you that a lot of the people involved with [our accrediting board] are coming out of education school backgrounds from institutions that are not as good as our own, and I think that they have increasingly over the years imposed mandates on professionals. **Now, part of what it's supposed to be to be a professional is that the professions are supposed to be largely self-governed. And what's happening increasingly is that we're getting pressure from the accrediting agency, from the government, and so forth and so on, to meet a lot – to jump through a lot of bureaucratic hoops that in my view have nothing to do with improving instruction.** Simple example – and I mentioned this to you in my note I think – when I came in I was told that there were some things that should be on my syllabus, and one was course goals. For years I have put course goals on my syllabus. I think about them pretty hard. I think I know what I want to teach, what I want students to learn, and so forth and so on. **But now we have a machinery where I must state these as 'learning objectives', and in fact, if I don't go back and change the term 'course goals' to 'learning objectives', I'm out of compliance with the accrediting agency.** What's worse – because I can do that fairly quickly, it's an annoyance, not a problem – but what's worse is that we have somebody that – we have people down in the office who have to look at this to make sure that everybody did it on every syllabus. And then someone at the accrediting agency does the same thing. This strikes me as a monumental – not only waste of time – but distraction from the mindset of serious intellectual work. **Now it isn't necessarily that the people [at our campus] are part of that party, but their existence is a consequence of that kind of thinking. And it's very hard for me to get excited**

> **about buying into mandates to me about my teaching from people who aren't as qualified as I am to say what I should be teaching.** You don't put – I mean, one of the problems with our medical system is that we increasingly put bureaucrats in charge of doctors. We're trying to do the same thing with the educational system. Professional decisions about curriculum are being taken out of the hands of the professionals themselves, and being put into the hands of regulators who are less qualified than the professionals. **I think that some things that have come out of this are not necessarily bad;** I don't object, for instance, that there should be a culminating project in a major. I think that that's the kind of thing that faculties might very well agree would be useful. [pause] **So I'm not just a naysayer, and I can't really say 'nay' to the particular program that is being pushed [at this university] because I have simply, like many faculty, chosen to ignore it as much as possible because I think I know what critical thinking is, and I think I teach it.**

We can see in these responses underlying frustration and resistence that have significantly impacted perceptions of the on-campus initiative for critical thinking. This last instructor in particular is quite specific about several significant concerns: that his professional agency was being inhibited by bureaucrats, that resources are being wasted, that all of this is a 'monumental distraction from the mindset of serious academic work'. There appears some evidence of intellectual humility, as the faculty member admits to not having a deep understanding of the accreditation project or the theory of critical thinking at its heart. Further, he admits that he 'may have missed something significant' in the on-campus project. One issue mentioned (of being required to change the terminology on this syllabi from 'course goals' to 'learning objectives', and of the bureaucracy required to assure compliance) is a clear example of the manner in which accrediting agencies can distract from and, in essence, impede substantive educational reform (though this example is not a part of the accrediting project in this study; that is, faculty are not required to make this terminological change because of the critical thinking enhancement plan).

I feel it important to make explicit my belief that all participating faculty and staff,

even those who identify as 'objectors', are fostering critical thinking to some degree in their students' thought. All four faculty interviewed in opposition were able to elaborate and exemplify how they taught for critical thinking. These descriptions flowed naturally and suggested deep thinking over perhaps years or decades on how to best develop students' disciplinary and critical thinking. In fact, my perception was that all four are highly capable and caring professors. Further, I believe it likely that, should the potential depth of this initiative become clear to these individuals, they might become powerful allies in the attempt to improve teaching and learning for critical thinking across the disciplines

Another professor related a negative experience with one of the half-day sessions. These sessions were part of the broad umbrella of the professional learning plan, but were not connected with the Paulian tradition:

> RC: What about here in your department? Has anyone engaged with the idea and found it useful?
>
> Prof: **One person engaged and decided to never ever be involved in it again.** But that's unfortunately the experience we had – anybody who has been involved with the [teaching and learning center on campus] has had bad experiences.
>
> RC: Sure. Could you maybe articulate some of those?
>
> Prof: I can tell you my own experience. I went to a talk organized by – well, it was organized by the [University team], I don't know who actually invited the person on how to consider some problems in my fields, and related fields.
>
> RC: Do you remember who the speaker was?
>
> Prof: I couldn't tell you – it was about two years ago in the fall. [A lead teacher] was running the show. She'll remember because I gave her an earful about how bad it was. **It was terrible. I mean, the person made every single mistake that you could make in a powerpoint presentation: from reading it to you, to not having any hands-on experience until the last five minutes of this, pretty much as an afterthought...** Even the examples he

> gave – there was one he handed out – were so complicated that you couldn't do it in the classes he was talking about. **There were several of my colleagues who went with me ... and everybody said it was a complete waste of time and we weren't going to go back.** And that's pretty much what I've heard from most people who have gone over there for one of these more general talks.

I can supplement these comments; I observed an 'invited expert' (though not the particular speaker identified by the professor above) in two such half-day sessions. The workshop facilitator did not connect in any way with the theory of critical thinking being used on campus. The workshop contained some good teaching tips, but they were not presented in any kind of integrated way, and the principles underlying them were not made clear. Participants appeared to enjoy the group activities, and feedback forms afterwards showed high approval ratings. However, a number of suggestions made by the presenter during these workshops may actually impede students' intellectual development if taken seriously by faculty. For example, after concluding a small-group activity and whole-class summary discussion, the presenter said "Now notice that I have never corrected you in this exercise. Instead, I say "that's interesting, how did another group do it? Let's compare and contrast." This statement perhaps implies that it is not the job of the teacher to help students perform analysis and evaluation of their own work or the work of others. Another belief promoted by the 'critical thinking expert' was that 'Socratic questioning is dangerous. It cuts out 60% of the students and is intimidating by firing questions at students.' There was no explanation for why a Socratic approach is inherently intimidating; the '60%' statistic was never clarified or supported with evidence. Few notes appeared to be taken by participants in the observed two half-day sessions.

5.3.2 The Nature of the Challenge

The nature of the challenge of critical thinking is continuous improvement in a never-ending cycle of self-reflection and self-correction. The University in this study is now completing the fifth year of a projected ten-year plan. The future of change is uncertain. The likelihood of change becoming permanent depends in part on how the University handles a number of complexities in going to deeper levels of critical thinking, including: its intellectual difficulty, its required dedication, and (always) its uncertainty. These three difficulties are the focus of this section on 'the nature of the challenge'.

5.3.2.1 Intellectual Discomfort

> Student:-at first, like, **critical thinking has always been something that I'm kind of like, eerrrr, I don't really like. That, you know – more like it's always just kind of scared me…**

> Student: So I think the other thing I want to add personally is that it's been forcing me way out of my comfort zone. Many ways. And um [pause] in ways probably healthy, but difficult. So [pause] it's almost been a kind of, y'know, kicking and screaming – sometimes feeling kicking and screaming a little bit – Or maybe not kicking and screaming, just a lot of anxiety. And- And- [pause] And I don't – And it's hard for me to admit that. It's hard for me to say that. Because I'm used to just really being able to figure things out, and not having a lot of doubt. I dunno if – that probably sounds – I don't know....It's just been uh [pause] And it continues to be uh [pause] Um [pause]Challenging in good ways. Hard in good ways. I'll just leave it at that.

Some faculty and students acknowledged some fear and difficulty in thinking critically. Those participants who appeared to have most deeply committed to critical thinking characterized the experience of attempting to integrate critical thinking into their personal and professional life as profound and difficult. Examining deeply held beliefs can be intellectually and emotionally straining, especially if those beliefs have been constructed uncritically, perhaps at an early age. Another student shared the following thoughts on the difficulty of re-thinking her conceptions of marriage and parenting:

> RC: Being more comfortable with yourself. Does that seem to capture part of it? Or comfortable with your thinking?
>
> Student: I think that it's a journey. It's very – prior to being exposed to critical thinking and the Paul/Elder model, you know, I had my own transformations in life. You know, where you hit those, you know, whether it's death or serious illness, whatever it is, people hit places in their life where they, you know, consciously maybe think about how they define themselves – how they define their world. I have experienced some of that and I embraced

it. You know, I didn't ignore it. Because that would have been an option too, just to dig in and stay with my beliefs. And I chose not to do that, so I think I was kind of primed for being introduced to critical thinking. But even with that previous experience, **it's not easy. I don't think to think about embracing the idea that my children will come home and have children of their own without ever getting married. I'm not saying that it's easy – it's not comfortable. But I am open to that. You know, I'm open to the fact that my children might come home one day with a same-sex partner – something that I've never been up-close and personal to. So is that comfortable? No. Am I comfortable with myself, you know, in coming back to school when I'm clearly old enough to be a lot of people's mom? You know, I'm not. But it opens my thinking enough to make me ask: who do you want to be?** Do you want to pursue the education you always wanted? You know, what assumptions are you bringing into the classroom? You know, what assumptions are you attributing to other people that might not be there? **And I couldn't have done that without exposure to this kind of thing.** It's fantastic. I think people should be reading this stuff when they're in the womb. I think mothers should have to sit in rooms and listen to tapes of this stuff.

This last response is a powerful example of the use of some tools of critical thought (e.g. 'assumptions', 'intellectual empathy' and 'openmindedness')in such a way as to display intellectual perseverance and fairmindedness. A professor commented on the challenge inherent in Foundation for Critical Thinking theory::

Prof: **It really challenges the basis of everything you think you know, and only those with enough intellectual humility to take a deep breath and go under is going to come out on the other side. Are you just entrenched with the way you think – and you're going, "no that's ridiculous, I'm not going to go any further?". And I think that's what happens sometimes.** And the learning community was such a supportive en-

vironment for all of us going through this. **I think anyone going through this alone would not have come out on the other side because you need it – you have to have support. Because at some point you are going to hit the wall – either you yourself with your understanding, or your students are going to say "I don't want any, I don't want anything to do with this". And we were able to circumvent that as a group; we were our own support group. And that's what it was – we were a support group.**

This last passage emphasizes the difficulty of engaging in deep critical thought, and the importance of collegial support to help overcome, or at least mitigate, negative emotions that may accompany the process (see also section 5.2.6.2). For this teacher, it was impossible to envision real improvements in critical thought (for himself) without significant and sustained help from colleagues.

5.3.2.2 The Pace of Change

Perhaps more frustrating than the difficulty of change is the *pace* of change, according to many participants. One of the lead teachers at the research site discussed her long experience with critical thinking and some of its implications for faculty development:

RC: Could you give some rough idea of how long each part took?

LT: Oh my gosh. I would say the first part, where I was really trying to understand the pieces? Took the whole first year. The whole first year. The second part about applying individual pieces – I'd say that's ongoing, cause I get a new situation I'm trying to – But I would say that took, a comfort of doing that, between one and two years to really feel like, confident, that I can figure it out. And I think it was about a year and a half where I started to notice - Yeah about a year about a year and a half I went, "Oh my god," like, there were a couple of things that happened in my life – Small things, where I was like, "Wow!" Like**, maybe I had been doing it before, but it was just like, I was aware of it. I could see my mind us-**

ing those tools…

RC: Yeah. So if we take this seriously, this idea that, I mean, you spoke about, well basically a four to five year process for yourself.

LT: Oh yeah. Four years. Yeah.

RC: Four year process for yourself, um - What we're asking of professors is to [pause] take this long [pause] thing. This long journey -

LT: [laughter] That's exactly right. I've never thought about it in those terms, but you're right. It's an investment, and, um [pause] one of the staff members said, um [pause] who I was – staff had been involved – she said, "The moment you realize it's not in addition, it's part of what you do" Like, the moment it's no longer, "Oh, now I gotta think through–" it just flows into the way you think, that's what she was trying to sell to other staff. This isn't an add-on, this is actually part. Just becomes part and parcel of how you think. But that's [pause] and that had been after two years for her. So yeah, you're right. The faculty – and the people who do it, it's profound...

Most of the participating teachers had completed the learning community two to three years prior to the collection of data, and most are still working to incorporate changes into classroom pedagogy, as one professor related:

Prof: …It was the elements of thought and then they connect to those nice little boards there which I keep handy (points to posters of the intellectual standards, elements of thought, and essential intellectual traits) of the standards. **So I've got to now where I'm reading a paper or giving directions for an assignment, that I can tell the students 'you have given me depth of your understanding'. Or 'you've given me a broad range of your understanding' so I'm using these terms. Or I can say 'I want to see you go deeper with your thought. Tell me more about**

that' so it's just about having these terms and these little handles.

RC: so it seems like that helps you to communicate your ideas.

Prof: it totally helps me. Yes. Yes. And it's becoming more comfortable with me. It's taken practice for me to do that. But it's becoming second nature in a way.

RC: so how long ago was your first work with the elements and the standards?

Prof: this was probably 2006 or 2007, maybe 2007 or 2008. I'm not sure about that. It's been a couple of years

RC: so has it been a slow integration, or how did you begin to change?

Prof: well I began to change simply by the fact that the three of them sat down with me to reshape my syllabus. And rewrite it to be sure that I had a goal and 'how am I getting to the end of that goal?' and that was the beginning of it for me...**And every semester it integrates within me. It's becoming a part of me.**

RC: so how- what role do you see critical thinking playing then for you as a professor?

Prof: oh I'm a challenger. I'm a challenger definitely. I'm always pushing them and it makes it easier to push them.

RC: in what way?

Prof: **because I can ask them some of these things. I can ask them 'well where did you get that information?'** they can make a statement of some issue like 'all delinquents have grown up in broken homes.' so then I can say 'well where did you get that information?' [and they'll say] 'Well I just know it, because that's what I see'. And then I can push them and prod them that the information they have, that they're basing that belief on, has some standard. It's not just hearsay or second-handed but it's grounded in something. **So that's where these things are becoming a**

part of me because it helps me to challenge them constantly.

Those participating faculty and staff with whom I have had the pleasure of continued dialogue have communicated some of their deepening understanding of ideas and breadth of practice. In one case this has been dramatic. After one faculty member came to the 32nd International Conference on Critical Thinking and Educational Reform held this last summer, he has shifted his largely lecture-based class to one that is predicated on group work and active engagement by students.

In other cases shifts have been less dramatic, but still substantive and significant. For example, I observed one lesson wherein students were asked to complete an S-E-E-I (state, elaborate, exemplify, illustrate) of the concepts 'point of view', 'assumptions', and 'concepts'. Afterwards, the professor asked what I thought. When asked this question, I have attempted to tread carefully so as not to influence subsequent lessons. This was a rare case in which I offered a suggestion. I said that, for a first exercise, one primary goal is for students to have some success and feel empowered by the process. I recommended that she focus on more straightforward elements of thought (such as 'purpose', 'question', or 'information'), and to allow more time for the exercise. The instructor appeared to highly value the recommendation, though I have not been able to note if this change was made or any resulting impact on students' learning of critical thinking.

5.3.2.3 Risk

> Prof: Sometimes, you know, one of the things you have to remember when you're trying it on a class of 400, if it doesn't work it can be pure chaos, so we do a lot of things with small, measured steps, and, you know, just continually improve. [Pause] Like, I'm going over to give a talk to the chemical engineering design course. [One faculty member over there] has been to many an FLC and he just [pause] he isn't comfortable teaching the framework. And I said, "Look [name removed], if this is what you've done for 35 years," and he just says, "I just get all nervous and think I'm gonna do something wrong," and I said, "You're not gonna do anything wrong..."

The seemingly risky nature of change for critical thinking was mentioned some

few times by participating faculty. Above, one faculty member touches on the fear of, during the course of trying something new, making an error in front of several hundred people – describing the potential for 'pure chaos'. The question is: 'what do you do if things go wrong?' For this faculty and colleagues, the fear of 'doing something wrong' appeared to be an impediment to the infusion of critical thinking into classroom practice.

Introducing new pedagogical techniques that demand qualitatively different teacher/student as well as student/content interactions can be a source of confusion and frustration, as one instructor articulated:

> Prof: I think, hindsight it was extremely ambitious and not the best – I would have been better served in some respects to have waited a year and then gone into the program because the risk I took as a new faculty was extreme...
>
> RC: so when these difficulties were happening, what – how did you get over the hump? How did you push through?
>
> Prof: One, I got advice. And some of the advice was pushed upon me because some of my colleagues in our department suggested – 'well just teach a standard lecture. Stop what you're doing'. **And my chair had my back, which was very important. He said – but he did say 'make this work'. So he said 'I have your back, but make this work'.** Because I was being highly pushed by colleagues to change my methods. So that first semester especially – trying to do so much all at once, was extremely rocky. I then, based upon advice from those same colleagues, and from actually [a lead teacher in the University team], **I did a mid-term assessment of the students asking them a set of questions about the course, and about what they thought about the different methods being used in the course.** And they were fairly specific. And once I got those responses I shared them right back with everyone. They were given anonymously. And **I tallied them and gave examples and talked to the students about 'alright, this is what I got from you, these are actually the adjustments I'm going to make, or if I'm not going to make adjustments, this**

> **is why'. And that was a suggestion by [a lead teacher] that was extremely helpful because that got a certain amount of buy-in back from the students.** And while some of them were still angry, at being 'oh I've never had a professor have me do this before', it gave me enough buy-in to survive that first semester. And then I looked at the results and I revamped everything into a new course – a survey of [name removed]course – that I taught along with this course the following year. And that course **I was able to refine and apply for a teaching award because of the integration of so many things into one course – which I won.** So as I say, rocky start, it gave me though something in the end that probably would not have occurred without that, jumping full-force.

This detailed comment highlights the essential need for administrators and lead teachers to support all university members during the various stages of change, especially in the beginning. Without such support, any continuing development initiative in critical thinking will be at risk for failure in the long run (for more on the importance of individual support, see section 5.2.4.3).

5.3.4 Faculty Misconceptions about Critical Thinking

This study illuminates some important misunderstandings found at the research site which impede the teaching and learning of critical thinking.

5.3.4.1 'We Teach Critical Thinking Already!'

Intellectual arrogance, believing that one knows or can do what one knows not nor cannot do, is one of the primary impediments to learning. We have already explored some of the empirical literature disclosing the gap between rhetoric and practice regarding critical thinking (section 3.4); faculty responses in this study provide rich material with which to deepen this discussion:

> RC: How important is critical thinking for you as an instructor, and what does it look like in your context?
>
> Prof: I would say it's the most important thing we do, especially in the [lower] level classes. In the upper level classes I think it's

almost automatic… **I think most of our faculty in our department, and talking to the other chairs in [my] field, we've really been doing a lot of this critical thinking even if we didn't call it that; where it seems it's a new thing in some of the other departments where they just had to memorize things, or never had to really critically analyze anything. So we feel like we're being imposed upon because some other departments hadn't been doing their job.** And now all of a sudden there's all this, like - our faculty are supposed to get to training workshops on this.

Prof: Well [pause] I'm a professor. I've been here 20 years. I publish; I've received recognition as a teacher. **I think I teach critical thinking in every course all the time. I think that's what the business of [my field] is – at least the business of teaching [my subject field]**.

RC: …. And when you first heard about it [the professional development program in critical thinking], what was your thinking?

Prof: That **they're solving problems that often don't exist.** That is, they originally perceive a problem, but in order to keep things going and keep the resources, that's what they do.

RC: OK. So then you don't perceive there to be a significant problem in terms of teaching for critical thinking?

Prof: No. I think that's what we do. Now, I don't think we always say we're teaching for critical thinking, and I don't think when you ask a student if they learned critical thinking that they would necessarily say yes or no, but of course that's precisely what we do — in [my] department absolutely.

Several features of these statements are important to highlight. The first is in the belief by all three of these professors that they already teach for critical thinking 'all of the time'. There is no problem in terms of teaching for critical thinking, and therefore no need for improvement. There is no equivocation in these statements, leaving little else to conclude but that these professors believe themselves to be teaching critical thinking at a

sufficient level, a level not in need of raising or even of questioning. The second lies in the departmental bias: to the extent that there is a failure to deeply foster critical thinking in students, the problem lies with *other departments*, not "us." Each faculty member believes their own methodology to be sufficient in inculcating criticality in students. Though disciplinary bias is only implicit in the responses from the last two responses, the first statement directly puts the blame on 'other' departments. The final sentence sheds light on the importance placed in explicit and deep study of critical thinking: 'And now all of a sudden there's all this, like - our faculty are supposed to get to training workshops on this'. For these professors, then, the sociocentric belief in the superiority of their own departments in teaching and learning for critical thinking appeared to be an impediment to their own learning and ability to teach for critical thinking.

> Prof: [Our department] started off with a retreat, and people got a questionnaire where they evaluated themselves and their ability to use critical thinking, and they evaluated the department as a whole. And, you know, 95% of the responses were, "I'm average to good in using critical thinking skills. The department was average to zero as a whole". Same people. And so – which is what we expected to see. So we go through a year-long training, and there were people who had 'ah-ha' moments – clearly there were – but on the whole, the evaluation at the end of the year reflected the exact same thing.

The above response sheds light on some egocentric beliefs held by faculty: that the problem in teaching and learning for critical thinking lies not within them but within their colleagues. This is analogous to the sociocentric beliefs examined at the start of this section: that the problem lies with others, rather than oneself (5.3.4.1). Further, all participating faculty believed themselves to be teaching for critical thinking more deeply and systematically than evidence collected in this study suggests. Of course, only a small percentage of each person's thinking and teaching was documented, making it likely that much learning and practice of critical thinking has not been captured.

5.3.4.2 'Critical Thinking Doesn't Need to be Explicit'

Though some might argue against the need to foster an explicit concept of critical thinking, the pair of responses below illuminates, to me, the important need to be explic-

it with students about critical thinking. The first quote is from a teacher who is clearly confident in his ability to teach critical thinking implicitly. The second is from one of his students, expressing a desire for professors to be more explicit about how to engage in critical thought:

> **RC: so do you talk to [your students] explicitly about the idea of critical thinking?**
>
> **Prof: No. Never. Never. They don't know it. They do not realize what I'm doing. No not at all.** I just use the tools and the techniques that I got from the workshop. But I never say 'we're going to approach this looking at, you know, critically thinking about this process."
>
> RC: and what's that decision based on? (pause) To –to- because some people have different strategies, they either teach it and say they're teaching it or they kind of come through the back door.
>
> Prof: I guess because I don't think my students need to know that's what I'm doing. I feel like they need to be challenged but they don't – they don't have to know that that's what I'm doing.

> **Student: I can't really think of a specific instance that a professor has opened my mind to, you know, critical thinking about a certain topic**, but I think just generally, taking the courses, we have to think critically to do well...**And I don't know what kind of system you could implement to get you to think critically on all issues**, but just going through and just kind of going at whatever the answer or the fact that you're looking at. You know what I mean? Just kind of going through and ruling out it's right because of this, or it's wrong because of this, or, I can't really think of an example, but you know what I mean...

We can compare the response of this student with those responses presented in sections 5.1.2.1 through 5.1.2.3. Participating students whose teachers introduced critical thinking explicitly were given an opportunity to learn a system for 'think[ing] critically on all issues', an opportunity which this student (response immediately above) had not been given.

Another fact relevant here lies in the number of students who volunteered for this project from teachers who taught critical thinking explicitly versus those who taught it only implicitly: far more students volunteered from those faculty who were more explicit. It appeared that these students valued the ideas they had learned, and so were motivated to contribute their time and energy to this project. Though some students may simply have participated to curry favor with their professors, this seems unlikely given that, in many cases, students had completed the course in a previous semester or year. Students who were explicitly taught critical thinking gave responses that were not only longer and more numerous, but filled with clearer, more precise, deeper, and broader examples than those students whose teachers had been less explicit. These latter students spoke in more vague, less precise, more narrow and more superficial language (such as the student above), than students who were explicitly taught critical thinking.

5.3.4.3 'Students need more Subject Specific Knowledge, not Broad Skills'

> Prof: For example, the funding that people are given as incentive to do [the workshops], I could run extra sections. I could send faculty to conferences where they would learn more about their field.
>
> RC: And you think that those would be more valuable–
>
> Prof: Absolutely.

One view expressed by all the 'objectors' in this study, that appears to represent an impediment to interdisciplinary critical thinking, is based in the idea that the primary the job of faculty is to teach students discipline-specific skills and traits, not to foster an integrated view of knowledge and learning. Each found the notion that they should teach in ways that would help students learn in other subjects to be incomprehensible. To them, the function of an academic is to learn to think within an academic tradition. For one faculty member, this induction into the field was intertwined with an industry bias for depth over breadth:

> Prof: We have – in [my subject], if you want to get somebody a job, it's different. The students we're training to go to graduate school in [my subject] or very closely related subjects, there we could actually do it with an honors thesis or something. The problem is, the bulk of our students want to get a job, and if you look at the industry, they want somebody well trained in a very narrow area. So

a culminating experience that's supposed to go broad and bring everything together really sets them back. It's not in their best interest. I mean, we could do culminating in the sense of very vertical. So as far as we're concerned, those are excellent cumulative or culminating experiences. But they don't count because they don't take the whole breadth of classes [in my subject]. They go fairly straight down. Yet it's the best preparation we can give for our students to have a very successful career, to meet local industry demands. That's where we're not very happy with this.

Chapter Six: Conclusions and Implications for Future Research

This dissertation has been constructed to collect deep but self-evident examples of improvement in teaching and learning for critical thinking. The data themselves create the force behind each conclusion. The extent of depth, breadth, accessibility, and significance of the data will largely determine the implications for the reader. In other words, if the data are high quality, and if they resonate with the reader, they may create energy for change (the direction of which will be determined by the reader's perspective and context). If the data are not clear and/or are superficial, the reader will rather envision fewer possible future uses of this study and the empirical data contained within it. The conclusions I will draw here will therefore be minimal. This is the manifestation of the 'naturalistic' approach to generalizing, which has been described in section 4.7.

6.1 Conclusions in relation to Research Questions

Research Question 1: What improvements in the understanding of, and practice of, critical thinking can be documented at the research site?

The key assumption embedded in this question - that some general improvements are indeed occurring at the research site–is in my judgment well founded. Though the picture of change is complex, with multiple overlapping as well as contrasting logics, evidence collected in this study indicates that, as a result of the critical thinking faculty development process, all participating faculty, staff, and students improved their understanding and their ability to think critically, and, for instructors, to foster it in teaching and learning. As has been said, a primary reason some participants contributed their time to this research project may have been a desire to 'give back' in thanks for the opportunity the university gave them to learn critical thinking. This seemed also to be the case with students, who reported appreciating learning critical thinking in their classes. For participating professors, this sentiment was also reported (or implied) for the lead teachers in the learning communities.

On the other hand, participants may have been motivated to over-emphasize their learning and application of critical thinking for any variety of reasons: to curry favor, to appear to be 'one of the team', to feel validated by a 'critical thinking expert'. Or, as is likely

the case, they may simply have fallen prey to their own intellectual arrogance (as do all humans) and hence frequently overestimate their knowledge of critical thinking and critical thinking abilities.

In any case, faculty, staff, and student participants all stated, suggested, or implied that they had developed increased subject- or domain-specific sophistication because of their increased explicit understanding of the concepts and tools of critical thinking (5.1.2.1). Leaders reported their use of critical thinking tools to structure meetings and interpersonal communications (5.1.3.3). Professors were observed translating critical thinking theory into effective instructional design; students were observed engaging in these newly designed activities. Student interviews, in turn, illuminated evidence of the practical impact of these changes – through their improved ability to think critically within academic subjects. For instance, evidence suggests that at least six of the participating seventeen students were attempting to apply critical thinking concepts and principles learned in one subject to other subjects (section 5.1.2.2). This should be considered significant when we remember how rare it is for any students to manifest transference of learning from one subject to another – most especially transfer of critical thinking abilities and dispositions. Each of these six students were taught critical thinking explicitly and systematically, which suggests the potential of the chosen approach at the research site for both thinking critically across the disciplines and application to personal and professional life. Four of these six students claimed to regularly return to the Miniature Guide to Critical Thinking Concepts and Tools (Paul and Elder, 2009, App. A) for guidance in critical analysis and evaluation.

One of the most encouraging findings in this study was that many faculty, staff, and students stated that, through various learning processes, they had improved their ability to think critically in their lives beyond the University (section 5.1.2.3). In all, sixteen of the participants gave at least some evidence of the application of critical thinking to personal and/or professional life beyond the University. Professors and lead teachers, for example, consistently talked about 'owning it for themselves' and 'making it a part of everything they do'. Participants discussed thinking critically about interactions with their children or spouses, and/or in their professional work. Students discussed thinking more critically about their political decisions and in their interactions with other campus community members, or with family members; students, faculty and staff recounted how they had improved their ability to communicate effectively and fairmindedly; they

frequently discussed how critical thinking had helped them think more deeply about complex issues. In some cases difficult subjects were broached. In other cases, issues mentioned by participants were more mundane. These declarations were tested against the empirical observations, which helped to verify or falsify the claims.

In sum, there was substantial evidence that faculty, staff, and students at the research site have indeed improved their abilities to think critically for diverse purposes as a result of the on-campus faculty development program and process. However, we must qualify our praise, since we cannot know the extent to which these advancements are taking permanent hold, or are, instead, unique, 'one-off' improvements. In other words, we cannot be sure to what extent the abilities and dispositions exhibited on the part of participants will continue to develop, or whether, instead, they will stay the same, or decline.

Further, we cannot know without further study whether, and to what extent, participants' views of critical thinking and its role in instruction are shared among faculty at the university more broadly. As always, the force of these generalizations depends on their endurance into the future. This suggests the need for follow-up research.

Research Question 2: What primary factors have supported the improvements in teaching and learning for critical learning found in this study?

Most of the factors identified in this dissertation as positively influencing change toward critical thinking at the research site ultimately resulted from explicit decisions made during the re-accreditation design and implementation. For virtually all participants [excepting the 'objecting' faculty members], the accreditation process represented their most substantive contact with the idea of critical thinking; only one participant articulated significant previous experience with the concept of critical thinking, except as a 'buzz word'.

It appears clear that those leading the faculty development initiative deserve significant recognition for supporting the improvements in faculty, staff, and student thinking documented in this research. Their initial research and planning, and their development of program particulars, resulted in the use of a substantive conception of critical thinking, to be gradually rolled out across the campus in a ten-year plan. This process has been supported by much of the campus community.

The fact that, as they developed the on-campus initiative, these campus leaders also began to routinely apply critical thinking to their own lives appears to have positively influenced many decisions and issues in the process of reform. Because these leaders had personal experience applying critical thinking in their own professional and personal lives, and specifically the challenges this process entails, they knew the effort that would be required if campus community members were to deeply understand and regularly utilize FCT theory in instruction. Hence, these leaders continually advocated for longer-term and more systematic faculty development opportunities (5.2.2.1). This personal commitment on the part of lead teachers seemed to establish credibility with at least a significant number of faculty and staff participants in the learning communities. By achieving a "discussable" level of depth of understanding, the University lead team was able to facilitate workshops on critical thinking and provide more in-depth analysis and support for faculty and staff with particular questions or concerns (5.2.4.3).

Of all the elements in the University's plan to improve teaching and learning for critical thinking, the most positive contributing pedagogical element was the 'learning community' model (section 5.2.3). With the exception of the leaders (who formed a kind of learning community of their own), all participating faculty and staff identified their experience in the learning community as vital to their intellectual development. These regular meetings gave professors and staff sufficient resources and support to consider, plan, and implement substantive critical improvements in their classroom pedagogy or other campus work (5.2.3.3). It is likely that the sampling methodology built into this study contributed to the emphasis on the learning communities (4.2.2): participants were selected based on their demonstrated commitment to critical thinking, the evidence of which was gathered and made explicit in interactions in the learning communities. In the rare cases where participating professors discussed other structural elements (such as financial incentives, half or one-day sessions, or the annual three day workshop with an invited FCT scholar), these elements appeared to play a supporting, rather than a lead, role.

Faculty learning communities were valued for presenting concise, high-quality resources on critical thinking, while also being responsive to suggestions from participants (5.2.3.1). Faculty also frequently said that the diversity of these communities, and therefore the attending breadth of perspective in them, led to deeper understandings of FCT theory than would have been possible without working with faculty across disciplines

(5.2.3.2). The focus of these professional development communities rested squarely on how to apply critical thinking concepts and principles within academic subjects. This enabled faculty to see more vividly the broad cross-disciplinary utility of the concepts, which may have resulted in a richer, more lasting experience.

It is difficult to separate improvements for critical thinking documented in this study from the theory of critical thinking selected for this reform process (5.2.5). In most of the verifiable (or nearly verifiable) manifestations of improvement in critical thinking in this study, the FCT framework seemed to have played a crucial role. Where there are articulations by participants of the concepts and principles entailed in critical thinking, it is those entailed in the Paulian approach that are articulated most clearly and precisely. Further, the best and most well elaborated examples of critical thinking documented in this dissertation connect directly with this theoretical approach. Only one participant discussed theory of critical thinking other than that produced by the FCT, and this theory was used in a supplementary, rather than a primary, way. The most profound and moving examples were driven by application of deeply ethical components of the framework, such as in examples of intellectual empathy and fairmindedness. (5.1.3.3, 5.2.3.1)

Research Question 3: What obstacles emerge when attempting to improve teaching for critical thinking across the disciplines within a research university?

Most of the factors identified in this dissertation as barriers to progressive development in critical thinking are part and parcel of common human dispositions and the realities of higher education in the early 21st century. “Natural” human tendencies and the challenge of building new intellectual habits were the greatest obstacles to positive change mentioned by participants in this study (5.3.2); lead teachers, faculty, and staff alike related difficulty in developing criticality in themselves and, for faculty, in fostering criticality in student thought (5.3.2.1). Participants discussed their learning as taking place over a number of years, and being ongoing (5.3.2.2). Most said that engaging in critical thinking can be intellectually uncomfortable, leaving it, perhaps, an unwelcome visitor when we are stressed, tired, busy, or, alas, when our vested interests or egocentricity are involved.

The most significant impediments to change at the research site (as perhaps everywhere in human life) were intellectual arrogance and self-deception (5.3.4.2). If it

is true that all participants in this study evinced improvements in their critical thinking abilities during this project, it is also true that all participants believed themselves to be teaching and/or doing more critical thinking than evidence collected in this investigation substantiates (5.3.4.1). Yet, at the same time, there was evidence of intellectual humility, as some of those most committed to critical thinking recognized unlimited possible depth in developing dispositions like intellectual humility itself, or fairmindedness.

A significant impediment to critical thinking identified through this research resulted from the decision made at the research site to include some workshops led by invited presenters unconnected to the Paulian tradition (5.3.1). These 'one-off' sessions alienated some members on campus, and, though many others rated them high, the contribution to improvements in critical thinking of these presenters cannot be determined by this research. No participants judged these stand-alone sessions to play a major part in their attempts to better understand and practice critical thinking. A small number of participants said that the yearly three-day seminar led by Gerald Nosich (a senior fellow of the Foundation for Critical Thinking) helped deepen their understanding of critical thinking. Further probing revealed that the learning communities may have played a more central role in their learning. But, again, the influence of these other elements were not as deeply investigated, as was that of the Learning Communities. Further, it is impossible to determine how and to what extent content internalized in these more sporadic (but deeper) critical thinking workshops, led by a critical thinking expert, dovetailed with or impacted learning within the learning communities.

In some cases, experience with previous professional development initiatives was identified as an impediment to bringing critical thinking across teaching and learning (section 5.3.1); some "objectors" perceived the on-site critical thinking professional development program as just another superficial approach to change, one they were unwilling to, in essence, waste their time on. These faculty expected professional development initiatives to come and go, but for their practice largely to remain unchanged (except where they were bothered by the latest "impositions" of such initiatives). Some evidence was gathered to indicate that it is possible to change these beliefs, but this only occured over a semester-length course of learning community (see section 5.2.4.2).

6.2 Original Contributions in this Dissertation

This dissertation contains original scholarship that canvases several bodies of disciplinary literature. Chapters one through three have attempted to establish some clear and significant connections between extant theoretical and/or empirical paradigms and the concept of critical thinking. The material is not new, but the lens and specific focus are. Connections revealed in chapters one through three suggest a core of common interests in what have otherwise been historically divergent camps focused on developing intellectual constructs that can serve as guides for improving human thought and action. If the picture has been inadequately painted, which indeed it clearly has, my hope is that scholars will, increasingly over time, contribute their insights to deepen and broaden our collective knowledge of the state and history of critical thinking.

To the extent that I have been successful, this dissertation helps make a cogent case for a unified field of critical thinking studies, outlines its possible intellectual agendas, and illuminates some of its core concepts and principles.

Chapter four makes a new case for a deeply qualitative, rather than purely quantitative, approach to instigating improvement in critical thinking. It should be viewed as a potential model for researchers focused on documenting the extent to which critical thinking is occurring in teaching and learning; Appendix F contains a report based on a similar, though scaled-down version of this methodological protocol. In both pieces I contend that the assessment of teaching and learning for critical thinking should be conducted by directly investigating the thinking and action of the participating agents of change. A broad methodological approach is suggested, including: interviews with administrators, lead teachers, faculty, staff, and students; observation of classes; documentary analyses of syllabi and student work. Such a holistic approach increases the credibility of conclusions, as each is supported by data from divergent sources.

The empirical findings of this project support and build on extant research. The conditions for positive change in faculty development initiatives, as identified by the Learning How To Learn (section 3.5.4) team (and many others in this important tradition), were present and relevant in this study: faculty development must be long-term, because achieving substantive change requires significant intellectual labor (5.3.2.2); it should be collaborative, because all students deserve to be active participants in their

development (5.2.3.1, 5.2.6.2); the educational reform process should be guided by a dedicated team of administrators and lead teachers who lead by example– submitting their own thinking and action to systematic and explicit critique even as they help others do the same.

The learning community model - wherein faculty and staff meet regularly to learn new ideas and collaboratively discuss their implementation - was identified in this study as perhaps the most effective structure in a multi-various plan of reform. Such a plan should take into account local needs and contexts, as well as established systems, routines, and traditions.

A deliberate focus in this project has been on the role played by an explicit theory of critical thinking in developing and cultivating critical abilities and dispositions. Participants in this study who had been explicitly introduced to the theory of critical thinking used at the research site strongly credit this theory with helping them think and communicate more critically about subject specific and cross-disciplinary, as well as professional and personal concerns. This, in my view, is the most original and potentially powerful contribution of this research -that the introduction of an explicit theory of critical thinking can significantly impact instructors' and students' ability to engage, access, understand, and contextualize critical thinking. This study suggests that without such theory, or with theory ill suited to the purpose, faculty development of critical thinking may be limited. Much empirical research is needed to test the link between the learning of explicit theory of critical thinking and improvement in teaching and learning for critical thinking. Some possible avenues for further empirical investigation will now be briefly explored.

6.2 Implications for Professional and Organizational Development Policy

Data collected in this empirical investigation suggests the need for a well-planned, integrated, long-term, and well-funded approach to professional development that focuses on improving teaching and learning for critical thinking across the institution.

To begin, the organization should choose a substantive, explicit, conception of critical thinking. This dissertation targets such a conception, one that illuminates the analysis and assessment of thought, as well as the cultivation of intellectual traits. Countless other critical thinking theories exist. But it is important to recognize that, when applied to instruction, inadequate, illogical or unintegrated theory can be problematic in any

number of ways. For instance, it can mislead, create confusion, and/or 'add to' the already long list of things students must "learn." Well-constructed theory, on the other hand, that integrates sound critical thinking concepts and principles, can offer powerful levers for change.

One particular challenge should be made explicit and faced from the outset when designing a professional development program in critical thinking - the challenge of inadvertently cultivating weak-sense rather than strong-sense critical thinking. As has been mentioned, knowledge comes in two forms: sophistic and Socratic knowledge. Sophistic knowledge correlates with maintaining beliefs that enable you to get what you want without regard to the rights and needs of others. Socratic thinking, conversely, correlates with fairminded critical thought. It is important, then that the program chosen explicitly emphasizes a conception of critical thinking that, from the beginning, is clear about how to approach the challenge of dealing with the challenge of teaching for fairminded critical thinking

Further, when designing a professional improvement, the institution will need to decide which forms of criticality will be fostered and which specific intellectual (or critical thinking) constructs will be used.

Once clear on the target, reform must take into account specific realities on-site. Yet, if the results in this study are at all generalizable, 'learning communities' should be a primary component of any critical thinking professional development plan (5.2.3). Though inviting critical thinking scholars to conduct workshops for a few days can form an important part of a quality enhancement plan, it is clear that critical thinking is developed only through careful support and collaboration over months and years, not days or even weeks. Students of critical thinking (be they faculty, staff, or pupils) will need opportunities to learn theory of critical thinking while being guided in its contexualization (in teaching and learning) through multiple cycles. Further, a systematic approach should be taken to these learning communities (for instance, work should be required at regular intervals) (see 5.2.4 and 5.2.4.2); the primary focus should be on restructuring course design to place critical thinking at the heart of teaching and learning efforts. Faculty, staff and student "learners" of critical thinking will need to interface with individuals (e.g. lead teachers in critical thinking) who understand theory and application of critical thinking constructs at a higher level than they may themselves presently do. This implies that an

integral part of an effective professional development program in critical thinking entails a local team of dedicated, empowered, and financially supported leaders.

Perhaps we can go further. Given the complexities inherent in actualizing improvement in teaching and learning for critical thinking, it seems essential that reform be spearheaded by a local team dedicated to deeply understanding and infusing critical thinking into their professional and personal lives. This group, considered the 'on-campus specialists on critical thinking', will largely determine the success or failure of the reform initiative. Expertise on site is necessary for leading workshops on critical thinking, as well as for helping faculty to individually incorporate critical thinking concepts into instruction. Leaders of professional development will need to be equipped with numerous examples of critical thinking in context, which only authentic practice of critical thinking produces.

Without such a dedicated team, reform is likely to be superficial, or to stagnate after a period, or to decline or fade away. Further, educational change centered on critical thinking is likely to raise some vexing political issues. During the process of change, especially if it is broad-scale in nature, any weaknesses in the program may be magnified by objectors and, in essence, used as ammunition to reject the reform process. Therefore, a key is to minimize negative politics. This area of problematics is in need of research.

Finally, leaders must understand existing prejudices against the reform process. Many instructors have "lived through" superficial attempts at reform over many years, and will understandably interpret new reform through the lens of those frustrating experiences. This in mind, faculty development should be consistently substantive and rigorous. As was found in this study, even one low-quality workshop can potentially alienate scores of faculty members; one bad experience can be enough to cement the close-minded prejudicial belief that pursuing an explicit conception of critical thinking across the curriculum is not worth the effort.

6.3 Implications of this Research and Implications for Future Empirical Research

This empirical investigation has laid the groundwork for future research in multiple directions, but has been limited due to several factors. Most crucially, due to concerns for anonymity, videotaping of classroom pedagogy and use of classroom material has not been possible. Neither does this study include explicit analysis and evaluation of sylla-

bi or student work. The inclusion of such tangible intellectual artifacts in the research design would not only enhance the rigor of research, but might better aid practitioners interested in making changes along similar lines.

Many questions therefore remain. This research furthers a tripartite agenda, suggestive in the form of these primary questions: 'how do we currently teach for critical thinking?' 'what helps us improve the teaching and learning of critical thinking?' and 'what hinders the development of critical thinking?' The context connected with a given research agenda will significantly influence how these questions are answered: which "improvements" emerge, which aids and impediments will be identified. Documenting these realities – including the ways in which they are combated by agents of change, and ensuing consequences – is essential for the acquisition of critical thinking resources and the development of a more comprehensive theory of critical thinking professional empowerment.

Here we may return to the critical theorists' important idea of praxis: the emergence of conditions of change toward critical thinking (such as those at the research site) allows opportunity for documentation (such as the data collection in this study) and the creation of theory (such as this report) to inform future change (i.e. future attempts to improve teaching and learning of critical thinking) in an ongoing and potentially never-ending cycle of critical development and self-critique.

Questions for future theoretical and empirical development have been posed throughout this dissertation, most systematically in chapters one, two, and three. Nevertheless, such inquiry barely scratches the surface of what remains a vastly under-explored universe of human criticality (actual and possible). Any single variable in this dissertation might become the focus of more pointed research. One might, for instance, focus on the role of assumptions in thinking and their impact on the living of one's life. Any given issue might be compared against any other, or any particular manifestation of these issues or issue combinations might be explored within particular contexts. For example, one might compare Erasmus' *Follies* with Bacon's *Idols* (1.5.1) through the lens of 'assumptions' in asking: to what extent do either clearly illuminate problematic assumptions and their implications for thinking in social life? Or, one might employ either theory as the basis for teaching students critical thinking (which might then be explored experimentally).

Let us now consider three possible specific future research projects, and their potential contribution to advancing theory of educational improvement toward critical thinking.

An immediate and natural extension of the empirical research in this dissertation would be to more deeply investigate the ongoing conditions of change at the research site. The breadth of scale and length of focus at the research site has created unique conditions. Only a few of the many possible lines of inquiry have been explored, and these only partially. First, simply more data could be collected using the same methodology as was used in this dissertation. This additional data would serve to more fully ground and sharpen the research. It would almost certainly identify additional aids and obstacles to improving teaching and learning for critical thinking. It might identify connections between specific activities, factors, or structures and specific improvements of teaching and learning for CT. In an opposite direction, more focus could be given to documenting the obstacles to improvement. Additional types of data might be collected, such as classroom videos and examples of student work. Further and lengthier interviews could be conducted with faculty resistant to change. Finally, the research design could be modified to include a combination of documentation and intervention. Volunteers could be canvassed, such as those found for this project, who would be willing to work closely with researchers oriented toward achieving and document deeper levels of transformative change.

The second research project would be broader in scope. It would employ the same basic methodology used in this dissertation (with some possible amendments along the lines indicated directly above) to investigate attempts to improve teaching and learning for critical thinking at additional research sites. In this, the same tripartite focus could be pursued: what forms of improvements in teaching and learning for critical thinking can be documented at this site? What appears to be aiding improvement? What appears to be impeding improvement?

The third possible research project that I suggest is largely independent of the investigation undertaken in this dissertation and is currently underway. It begins with a need: the need for a high volume of high-quality teaching and learning resources on critical thinking. These should be available freely, categorized by subject and age/developmental level. There should be resources equally for primary history as for secondary mathematics as for post-graduate psychology. To collect such documents, I have devised

two parallel research designs, which are called the 'one semester' and 'one year' research projects. The key question: what can one dedicated teacher do to improve pupils' critical thinking (in contextually relevant ways) over the course of one year (for primary and secondary education) or one semester (in the case of higher education)? Volunteers can be solicited through the website of the Foundation for Critical Thinking (which receives more than 100,000 visits each month), as well as other interested organizations and research groups. Prizes will be made available to encourage entry. Each entry will require documents to be submitted in three categories: classroom planning (e.g. syllabi, lesson plans, unit designs); teaching and learning behavior (e.g. videos of classroom interactions between teachers and students); student work (e.g. class and homework assignments). Finally, a short summary must be included, written by the teacher and students of the class, that explains: their particular context and specific critical thinking focus, the basic pedagogical plan for achieving the stated student critical development goals (with reference to their submitted material), a discussion of the successes and obstacles, and plans for the teacher and students for future development of critical thinking.

I am currently working with one professor and one kindergarten teacher to develop model submissions for this project. These will include examples of practice in each of the three categories mentioned above. In each case, the practitioner will be encouraged to emphasize the 'before and after', or what might be called the 'critical difference'. By this I mean that, where possible, two versions of each artifact will be submitted: the first results from standard practice b.c.t. (before critical thinking); the second results from infusing critical thinking, with the differences highlighted. Teachers, with support, will document the impact on students' development of critical thinking in contextually relevant ways.

With high numbers, which may be achieved over several research cycles, examples should be potentially collectable from a wide range of educational contexts. With this data stored in a high-capacity network and appropriately cross-referenced, teachers and students of all interests and backgrounds should be able to locate appropriate resources to develop their own critical thinking understandings and/or to establish communities of critical thinking.

A Final Synthesis:

Fast forward to the present. For the first time in recorded history, a broad network of buildings across the planet have been constructed and are being maintained for educational purposes; in many cases these buildings are filled with books, desks, pencils, paper; in the most developed nations, it is common for every student to have instant, around-the-clock, high-speed access to the sum of the world's empirical knowledge and calculating power (unfortunately mixed in with the sum of the world's ignorant misperceptions and intentionally manipulative propaganda). In these nations, virtually every child receives the benefit of some dozen years during which they are not required to perform labor. Instead, they receive a place in a communally-funded school, and access to a small group of local educators. A sizeable minority (often greater than 1/3) of young people in these wealthier human communities go on to attend an additional four years at an institution of 'higher' learning, wherein they focus on a more narrow academic tradition taught by 'more knowledgeable' educators.

Each network, each institution, each department, each faculty circle, each individual is unique; each maintains some degree, but not complete, autonomy over their thinking and actions; the intended direction of each, at every level, is therefore widely divergent. For a variety of reasons, and due to a number of forces, many appear now to be striving vaguely toward an idea that is variously named 'critical thinking', 'self-dialogue', 'metacognition', and 'psychological analysis', among others.

However, at present, these efforts at reform are sporadic and un-integrated; they appear largely ignorant of previous attempts, nor does their example seem to significantly inform other endeavors. Consequently, each initiative has seemed almost to blaze its own path. Richard Paul commented on this complexity in 1992 (page iv):

> We are simultaneously put upon by a multiplicity of cultural voices – not to mention an army of academic and professional specialists – and left in ignorance of the tools that could make sense of that multiplicity. We are given no guide to a common ground or to common standards upon the basis of which we might form our judgment and build our vision. We are perplexed and unsure as to how to construct a comprehensive view that would enable us to gain perspective on diversity in culture, language, and knowledge, or worse, we blindly accept hollow models we

> have picked up from platitudes, truisms, and arrogance in everyday clatter as substitutes for a well-reasoned, comprehensive view.

In the intervening two decades, educational researchers have been building some of the 'common ground' or 'common standards upon the basis of which we might form our judgment and build our vision' of a better system of education: a system geared toward empowering students (through explicit theory of critique) to reason dialogically through deep issues as they become more emancipated and fairminded critical beings; this dissertation has attempted to unite some foundational bodies of theoretical and empirical scholarship in the hope of sparking some small fires of reform in this direction.

Throughout history important thinkers and scholars from many fields and perspectives have contributed to our conception of critical thinking and how to foster it in teaching and learning. Each idea or event examined in this dissertation provides insight into some small piece of a much bigger and still largely unexplored whole. Each provides the 'glimpse' Barnett describes as making feasible any particular utopian vision (Barnett, 2011, 4; emphasis in original):

> By 'feasible utopia' I mean this. Our lives and our institutions are played out amid structures of various kinds – social, cultural, international, ideological – but they are not entirely determined: we have options before us. My work, therefore, constitutes an attempt…to identify *positive options* that are available…
>
> The options for which I have argued in my books are utopian, in that they are precisely not the present situation, and probably are unlikely ever to be fully realized, given the structures of power and ideology at work. However, I have tried to show that these utopias are not entirely fanciful for the depictions that I have conjured can already be glimpsed in our daily practices in universities and higher education. They are, therefore, *feasible utopias*. In the best of all *possible* worlds, they could just be realised…

This dissertation contributes to this discussion data that are authentic and empirically verifiable, as well as interpretation guided by a substantive conception of critical thinking.

Throughout history, individuals and communities have envisioned better futures

based on critical thought, or better *systems* for envisioning better futures, and have labored to make them real; an infinitesimally small portion of extant theories, frameworks, and manifestations of critical and creative thinking have been considered in this report. The final article in the appendix contains a small effort I have made previously to synthesize these 'glimpses' into a coherent whole, one possible feasible utopia (Cosgrove 2011b; Appendix G). Many, many, alternative possibilities exist or could exist; if any are to become real, individuals and communities around the world will need to craft their own plans for critical self- and social-improvement. It is to inform and aid these efforts that I have conducted these investigation into critical thinking across the curriculum, and collected and analyzed this data on educational improvement.

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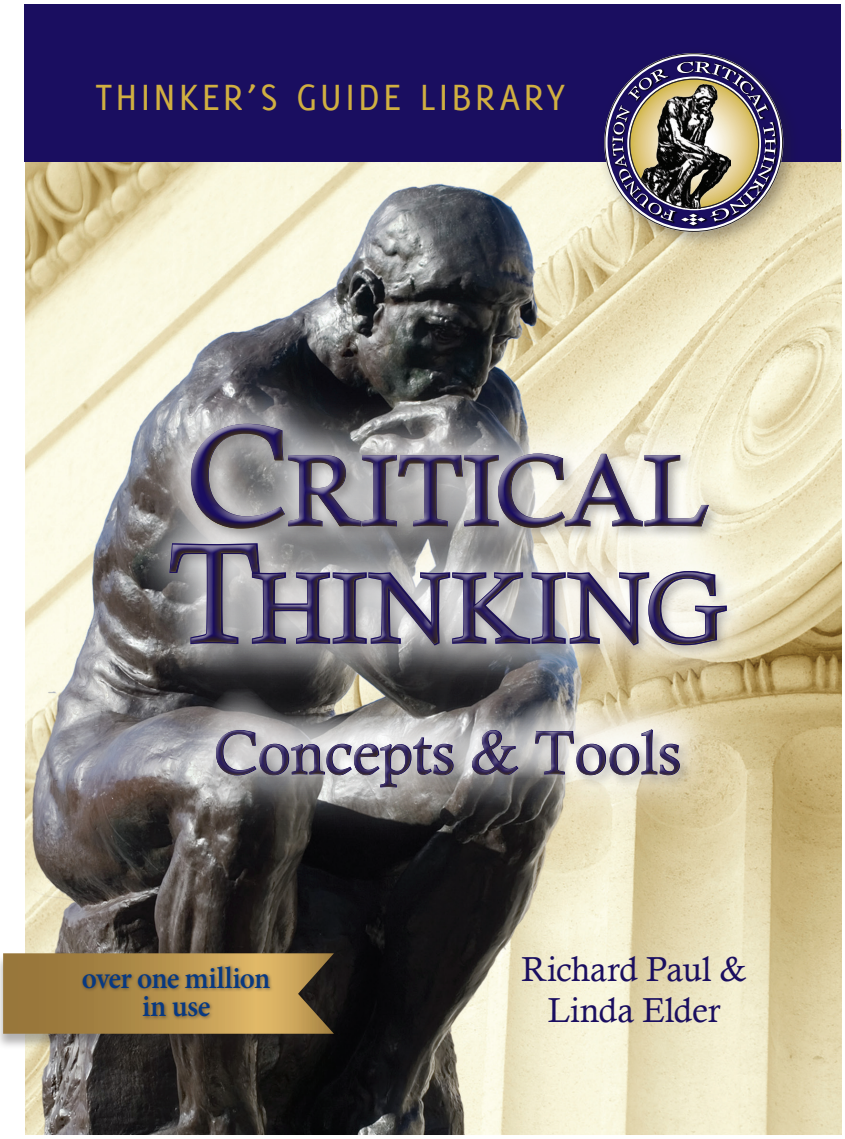
Appendix

A – *The Miniature Guide to Critical Thinking: Concepts and Tools*



Why A Critical Thinking Mini-Guide?

This miniature guide focuses on the essence of critical thinking concepts and tools distilled into pocket size. For faculty it provides a shared concept of critical thinking. For students it is a critical thinking supplement to any textbook for any course. Faculty can use it to design instruction, assignments, and tests in any subject. Students can use it to improve their learning in any content area. Its generic skills apply to all subjects. For example, critical thinkers are clear as to the purpose at hand and the question at issue. They question information, conclusions, and points of view. They strive to be clear, accurate, precise, and relevant. They seek to think beneath the surface, to be logical, and fair. They apply these skills to their reading and writing as well as to their speaking and listening. They apply them in history, science, math, philosophy, and the arts; in professional and personal life.

When this guide is used as a supplement to the textbook in multiple courses, students begin to perceive the usefulness of critical thinking in every domain of learning. And if their instructors provide examples of the application of the subject to daily life, students begin to see that education is a tool for improving the quality of their lives.

If you are a student using this mini-guide, get in the habit of carrying it with you to every class. Consult it frequently in analyzing and synthesizing what you are learning. Aim for deep internalization of the principles you find in it—until using them becomes second nature.

If successful, this guide will serve faculty, students, and the educational program simultaneously.

Richard Paul
Center for Critical Thinking

Linda Elder
Foundation for Critical Thinking

Contents

Sixth Edition *www.criticalthinking.org*

Why Critical Thinking?

The Problem:
Everyone thinks; it is our nature to do so. But much of our thinking, left to itself, is biased, distorted, partial, uninformed or down-right prejudiced. Yet the quality of our life and that of what we produce, make, or build depends precisely on the quality of our thought. Shoddy thinking is costly, both in money and in quality of life. Excellence in thought, however, must be systematically cultivated.

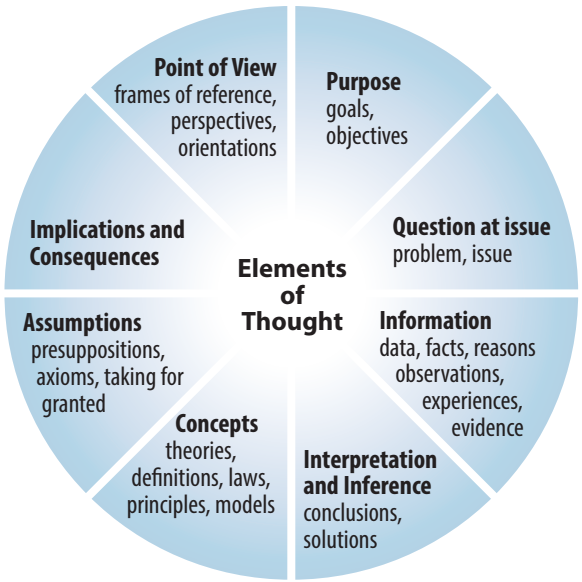
A Definition:
Critical thinking is the art of analyzing and evaluating thinking with a view to improving it.

The Result:
A well cultivated critical thinker:

- raises vital questions and problems, formulating them clearly and precisely;
- gathers and assesses relevant information, using abstract ideas to interpret it effectively;
- comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards;
- thinks openmindedly within alternative systems of thought, recognizing and assessing, as need be, their assumptions, implications, and practical consequences; and
- communicates effectively with others in figuring out solutions to complex problems.

Critical thinking is, in short, self-directed, self-disciplined, self-monitored, and self-corrective thinking. It requires rigorous standards of excellence and mindful command of their use. It entails effective communication and problem solving abilities and a commitment to overcoming our native egocentrism and sociocentrism.

The Elements of Thought



Used With Sensitivity to Universal Intellectual Standards

Clarity → Accuracy → Depth → Breadth → Significance
Precision
Relevance
↓
Fairness

Universal Intellectual Standards:

And questions that can be used to apply them

Universal intellectual standards are standards which should be applied to thinking to ensure its quality. To be learned they must be taught explicitly. The ultimate goal, then, is for these standards to become infused in the thinking of students, forming part of their inner voice, guiding them to reason better.

Clarity:

Could you elaborate further on that point? Could you express that point in another way? Could you give me an illustration? Could you give me an example?

Clarity is a gateway standard. If a statement is unclear, we cannot determine whether it is accurate or relevant. In fact, we cannot tell anything about it because we don't yet know what it is saying. For example, the question "What can be done about the education system in America?" is unclear. In order to adequately address the question, we would need to have a clearer understanding of what the person asking the question is considering the "problem" to be. A clearer question might be "What can educators do to ensure that students learn the skills and abilities which help them function successfully on the job and in their daily decision-making?"

Accuracy:

Is that really true? How could we check that? How could we find out if that is true?

A statement can be clear but not accurate, as in "Most dogs weigh more than 300 pounds."

Precision:

Could you give me more details? Could you be more specific?

A statement can be both clear and accurate, but not precise, as in "Jack is overweight." (We don't know how overweight Jack is, one pound or 500 pounds.)

Relevance:

How is that connected to the question? How does that bear on the issue?

A statement can be clear, accurate, and precise, but not relevant to the question at issue. For example, students often think that the amount of effort they put into a course should be used in raising their grade in a course. Often, however, "effort" does not measure the quality of student learning, and when that is so, effort is irrelevant to their appropriate grade.

Depth:
How does your answer address the complexities in the question? How are you taking into account the problems in the question? Are you dealing with the most significant factors?

A statement can be clear, accurate, precise, and relevant, but superficial (that is, lack depth). For example, the statement "Just Say No", which was used for a number of years to discourage children and teens from using drugs, is clear, accurate, precise, and relevant. Nevertheless, those who use this approach treat a highly complex issue, the pervasive problem of drug use among young people, superficially. It fails to deal with the complexities of the issue.

Breadth:
Do we need to consider another point of view? Is there another way to look at this question? What would this look like from a conservative standpoint? What would this look like from the point of view of…?

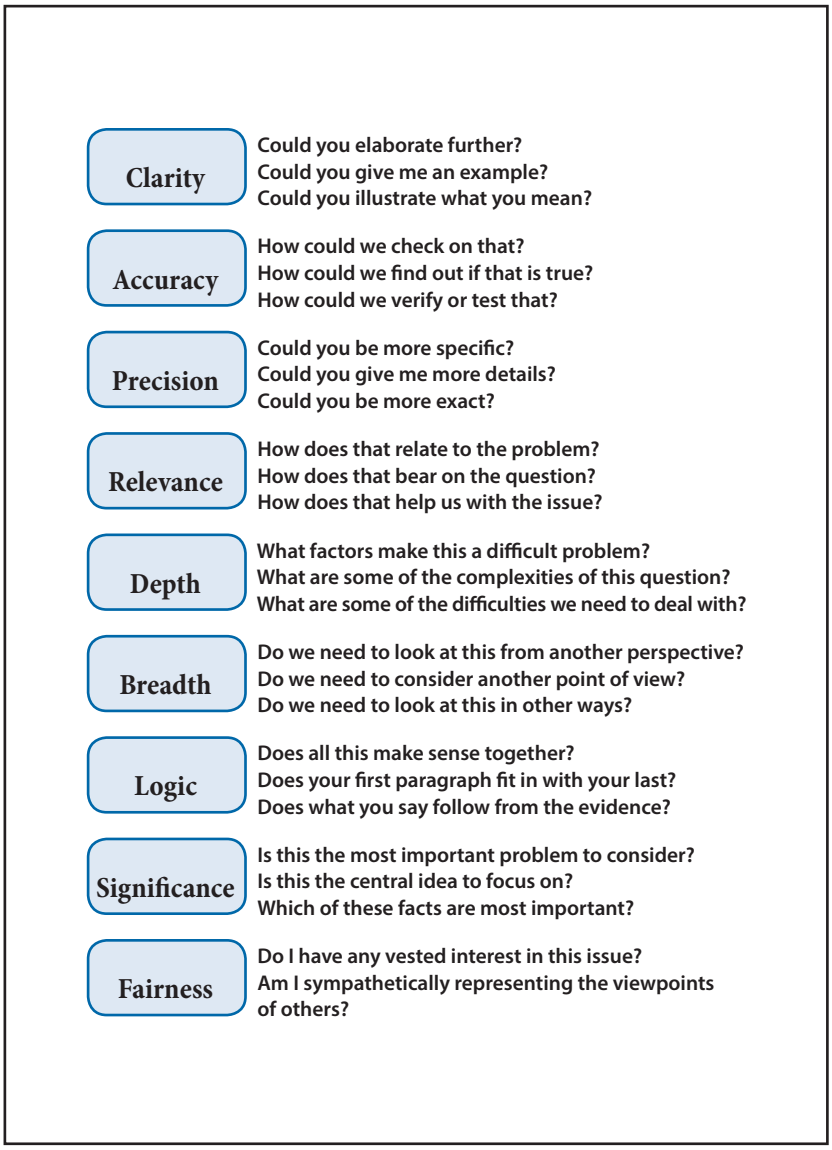
A line of reasoning may be clear, accurate, precise, relevant, and deep, but lack breadth (as in an argument from either the conservative or liberal standpoints which gets deeply into an issue, but only recognizes the insights of one side of the question).

Logic:
Does this really make sense? Does that follow from what you said? How does that follow? Before you implied this and now you are saying that, I don't see how both can be true.

When we think, we bring a variety of thoughts together into some order. When the combination of thoughts are mutually supporting and make sense in combination, the thinking is "logical." When the combination is not mutually supporting, is contradictory in some sense, or does not "make sense," the combination is "not logical."

Fairness:
Are we considering all relevant viewpoints in good faith? Are we distorting some information to maintain our biased perspective? Are we more concerned about our vested interests than the common good?

We naturally think from our own perspective, from a point of view which tends to privilege our position. Fairness implies the treating of all relevant viewpoints alike without reference to one's own feelings or interests. Because we tend to be biased in favor of our own viewpoint, it is important to keep the standard of fairness at the forefront of our thinking. This is especially important when the situation may call on us to see things we don't want to see, or give something up that we want to hold onto.


Clarity
Could you elaborate further?
Could you give me an example?
Could you illustrate what you mean?
Accuracy
How could we check on that?
How could we find out if that is true?
How could we verify or test that?
Precision
Could you be more specific?
Could you give me more details?
Could you be more exact?
Relevance
How does that relate to the problem?
How does that bear on the question?
How does that help us with the issue?
Depth
What factors make this a difficult problem?
What are some of the complexities of this question?
What are some of the difficulties we need to deal with?
Breadth
Do we need to look at this from another perspective?
Do we need to consider another point of view?
Do we need to look at this in other ways?
Logic
Does all this make sense together?
Does your first paragraph fit in with your last?
Does what you say follow from the evidence?
Significance
Is this the most important problem to consider?
Is this the central idea to focus on?
Which of these facts are most important?
Fairness
Do I have any vested interest in this issue?
Am I sympathetically representing the viewpoints of others?

Template for Analyzing the Logic of an Article

Take an article that you have been assigned to read for class, completing the "logic" of it using the template below. This template can be modified for analyzing the logic of a chapter in a textbook.

The Logic of "(name of the article)"

1) The main purpose of this article is _____.
(State as accurately as possible the author's purpose for writing the article.)

2) The key question that the author is addressing is _____.
(Figure out the key question in the mind of the author when s/he wrote the article.)

3) The most important information in this article is _____.
(Figure out the facts, experiences, data the author is using to support her/his conclusions.)

4) The main inferences/conclusions in this article are _____.
(Identify the key conclusions the author comes to and presents in the article.)

5) The key concept(s) we need to understand in this article is (are) _____. By these concepts the author means _____.
(Figure out the most important ideas you would have to understand in order to understand the author's line of reasoning.)

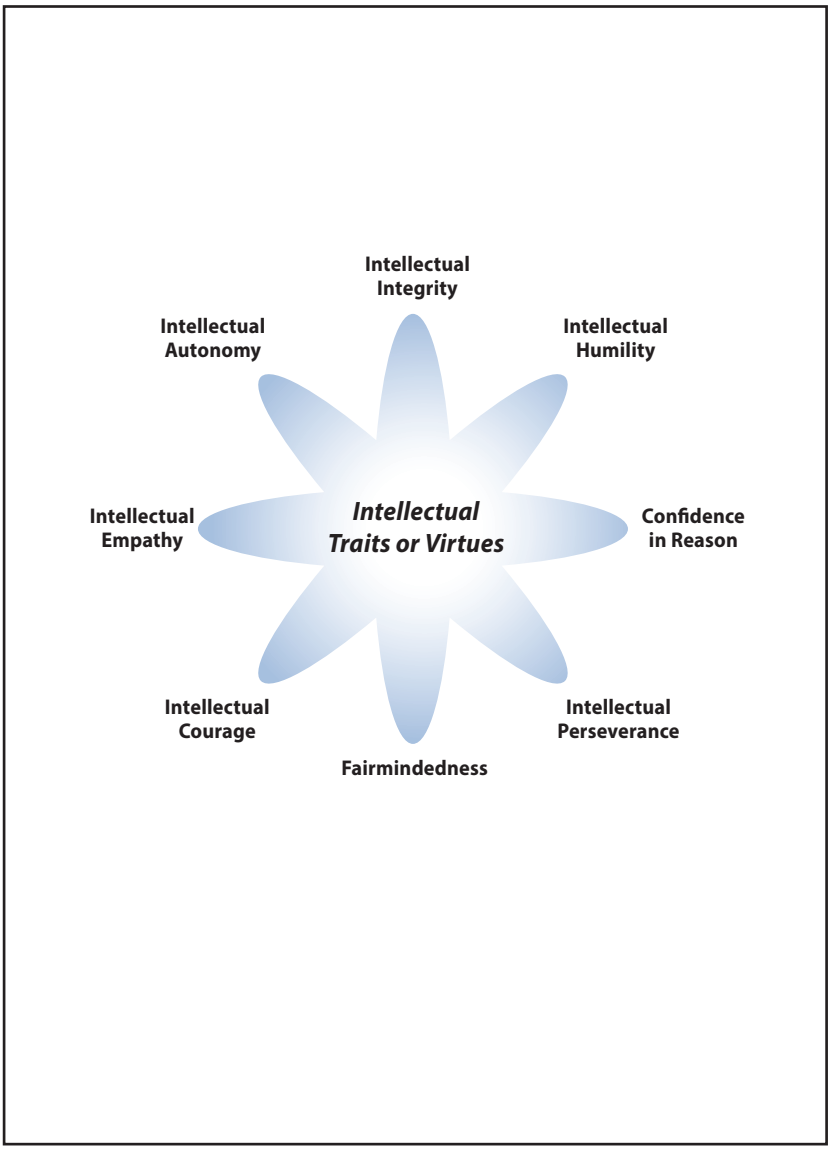
6) The main assumption(s) underlying the author's thinking is (are) _____. (Figure out what the author is taking for granted [that might be questioned].)

7a) If we take this line of reasoning seriously, the implications are _____. (What consequences are likely to follow if people take the author's line of reasoning seriously?)

7b) If we fail to take this line of reasoning seriously, the implications are _____. (What consequences are likely to follow if people ignore the author's reasoning?)

Criteria for Evaluating Reasoning

1. **Purpose:** What is the purpose of the reasoner? Is the purpose clearly stated or clearly implied? Is it justifiable?
2. **Question:** Is the question at issue well-stated? Is it clear and unbiased? Does the expression of the question do justice to the complexity of
the matter at issue? Are the question and purpose directly relevant to each other?
3. **Information:** Does the writer cite relevant evidence, experiences, and/or information essential to the issue? Is the information accurate? Does the writer address the complexities of the issue?
4. **Concepts:** Does the writer clarify key concepts when necessary? Are the concepts used justifiably?
5. **Assumptions:** Does the writer show a sensitivity to what he or she is taking for granted or assuming? (Insofar as those assumptions might reasonably be questioned?) Does the writer use questionable assumptions without addressing problems which might be inherent in those assumptions?
6. **Inferences:** Does the writer develop a line of reasoning explaining well how s/he is arriving at her or his main conclusions?
7. **Point of View:** Does the writer show a sensitivity to alternative relevant points of view or lines of reasoning? Does s/he consider and respond to objections framed from other relevant points of view?
8. **Implications:** Does the writer show a sensitivity to the implications and consequences of the position s/he is taking?


Intellectual Integrity
Intellectual Autonomy
Intellectual Humility
Intellectual Empathy
Intellectual Traits or Virtues
Confidence in Reason
Intellectual Courage
Intellectual Perseverance
Fairmindedness

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Essential Intellectual Traits

Intellectual Humility **vs Intellectual Arrogance**

Having a consciousness of the limits of one's knowledge, including a sensitivity to circumstances in which one's native egocentrism is likely to function self-deceptively; sensitivity to bias, prejudice and limitations of one's viewpoint. Intellectual humility depends on recognizing that one should not claim more than one actually knows. It does not imply spinelessness or submissiveness. It implies the lack of intellectual pretentiousness, boastfulness, or conceit, combined with insight into the logical foundations, or lack of such foundations, of one's beliefs.

Intellectual Courage **vs Intellectual Cowardice**

Having a consciousness of the need to face and fairly address ideas, beliefs or viewpoints toward which we have strong negative emotions and to which we have not given a serious hearing. This courage is connected with the recognition that ideas considered dangerous or absurd are sometimes rationally justified (in whole or in part) and that conclusions and beliefs inculcated in us are sometimes false or misleading. To determine for ourselves which is which, we must not passively and uncritically "accept" what we have "learned." Intellectual courage comes into play here, because inevitably we will come to see some truth in some ideas considered dangerous and absurd, and distortion or falsity in some ideas strongly held in our social group. We need courage to be true to our own thinking in such circumstances. The penalties for nonconformity can be severe.

Intellectual Empathy **vs Intellectual Narrow-mindedness**

Having a consciousness of the need to imaginatively put oneself in the place of others in order to genuinely understand them, which requires the consciousness of our egocentric tendency to identify truth with our immediate perceptions of long-standing thought or belief. This trait correlates with the ability to reconstruct accurately the viewpoints and reasoning of others and to reason from premises, assumptions, and ideas other than our own. This trait also correlates with the willingness to remember occasions when we were wrong in the past despite an intense conviction that we were right, and with the ability to imagine our being similarly deceived in a case-at-hand.

Intellectual Autonomy **vs Intellectual Conformity**

Having rational control of one's beliefs, values, and inferences. The ideal of critical thinking is to learn to think for oneself, to gain command over one's thought processes. It entails a commitment to analyzing and evaluating beliefs on the basis of reason and evidence, to question when it is rational to question, to believe when it is rational to believe, and to conform when it is rational to conform.

Intellectual Integrity **vs Intellectual Hypocrisy**

Recognition of the need to be true to one's own thinking; to be consistent in the intellectual standards one applies; to hold one's self to the same rigorous standards of evidence and proof to which one holds one's antagonists; to practice what one advocates for others; and to honestly admit discrepancies and inconsistencies in one's own thought and action.

Intellectual Perseverance **vs Intellectual Laziness**

Having a consciousness of the need to use intellectual insights and truths in spite of difficulties, obstacles, and frustrations; firm adherence to rational principles despite the irrational opposition of others; a sense of the need to struggle with confusion and unsettled questions over an extended period of time to achieve deeper understanding or insight.

Confidence In Reason **vs Distrust of Reason and Evidence**

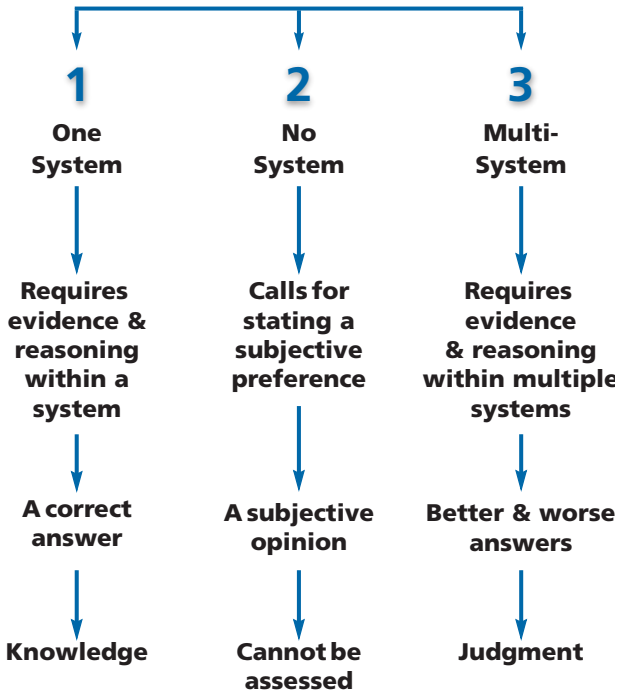
Confidence that, in the long run, one's own higher interests and those of humankind at large will be best served by giving the freest play to reason, by encouraging people to come to their own conclusions by developing their own rational faculties; faith that, with proper encouragement and cultivation, people can learn to think for themselves, to form rational viewpoints, draw reasonable conclusions, think coherently and logically, persuade each other by reason and become reasonable persons, despite the deep-seated obstacles in the native character of the human mind and in society as we know it.

Fairmindedness **vs Intellectual Unfairness**

Having a consciousness of the need to treat all viewpoints alike, without reference to one's own feelings or vested interests, or the feelings or vested interests of one's friends, community or nation; implies adherence to intellectual standards without reference to one's own advantage or the advantage of one's group.

Three Kinds of Questions

In approaching a question, it is useful to figure out what type it is. Is it a question with one definitive answer? Is it a question that calls for a subjective choice? Or does the question require you to consider competing points of view?



A Template for Problem-Solving

To be an effective problem solver:

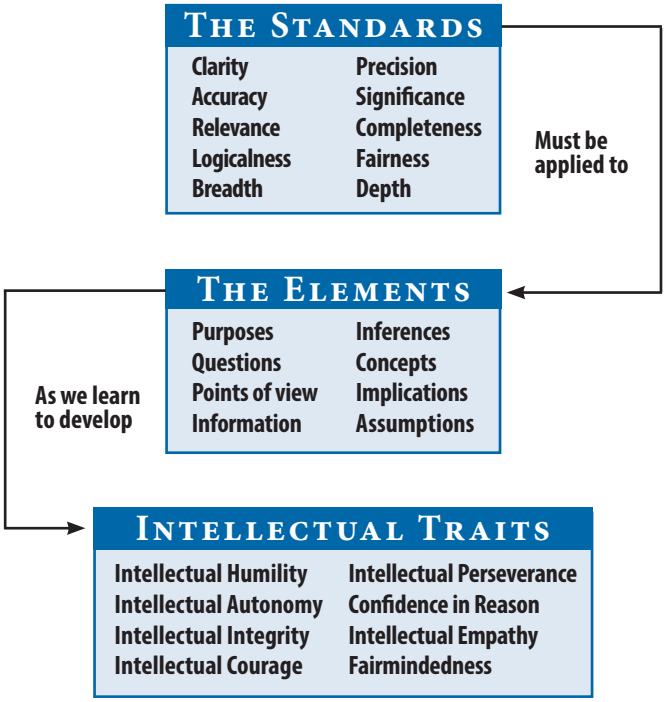
1) Figure out, and regularly re-articulate, your goals, purposes, and needs. Recognize problems as obstacles to reaching your goals, achieving your purposes, or satisfying your needs.
2) Wherever possible take problems one by one. State each problem as clearly and precisely as you can.
3) Study the problem to determine the "kind" of problem you are dealing with. For example, what do you have to do to solve it?
4) Distinguish problems over which you have some control from problems over which you have no control. Concentrate your efforts on problems you can potentially solve.
5) Figure out the information you need to solve the problem. Actively seek that information.
6) Carefully analyze and interpret the information you collect, drawing reasonable inferences.
7) Determine your options for action. What can you do in the short term? In the long term? Recognize your limitations in terms of money, time, and power.
8) Evaluate your options, determining their advantages and disadvantages.
9) Adopt a strategy. Follow through on it. This may involve direct action or a carefully thought-through wait-and-see approach.
10) When you act, monitor the implications of your action. Be ready to revise your strategy if the situation requires it. Be prepared to change your analysis or statement of the problem, as more information about the problem becomes available.

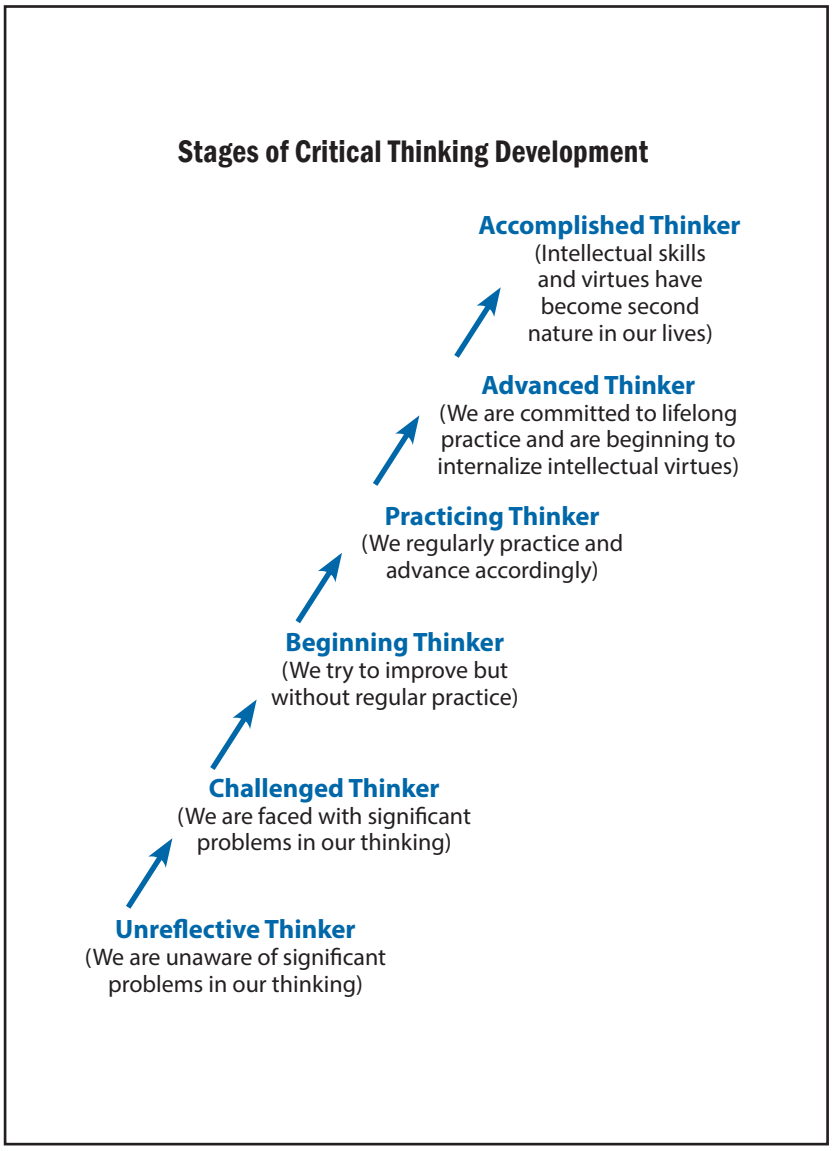
Analyzing & Assessing Research

Use this template to assess the quality of any research project or paper.

1) **All research has a fundamental PURPOSE and goal.**
   - Research purposes and goals should be clearly stated.
   - Related purposes should be explicitly distinguished.
   - All segments of the research should be relevant to the purpose.
   - All research purposes should be realistic and significant.
2) **All research addresses a fundamental QUESTION, problem or issue.**
   - The fundamental question at issue should be clearly and precisely stated.
   - Related questions should be articulated and distinguished.
   - All segments of the research should be relevant to the central question.
   - All research questions should be realistic and significant.
   - All research questions should define clearly stated intellectual tasks that, being fulfilled, settle the questions.
3) **All research identifies data, INFORMATION, and evidence relevant to its fundamental question and purpose.**
   - All information used should be clear, accurate, and relevant to the fundamental question at issue.
   - Information gathered must be sufficient to settle the question at issue.
   - Information contrary to the main conclusions of the research should be explained.
4) **All research contains INFERENCES or interpretations by which conclusions are drawn.**
   - All conclusions should be clear, accurate, and relevant to the key question at issue.
   - Conclusions drawn should not go beyond what the data imply.
   - Conclusions should be consistent and reconcile discrepancies in the data.
   - Conclusions should explain how the key questions at issue have been settled.
5) **All research is conducted from some POINT OF VIEW or frame of reference.**
   - All points of view in the research should be identified.
   - Objections from competing points of view should be identified and fairly addressed.
6) **All research is based on ASSUMPTIONS.**
   - Clearly identify and assess major assumptions in the research.
   - Explain how the assumptions shape the research point of view.
7) **All research is expressed through, and shaped by, CONCEPTS and ideas.**
   - Assess for clarity the key concepts in the research.
   - Assess the significance of the key concepts in the research.
8) **All research leads somewhere (i.e., have IMPLICATIONS and consequences).**
   - Trace the implications and consequences that follow from the research.
   - Search for negative as well as positive implications.
   - Consider all significant implications and consequences.

Critical thinkers routinely apply intellectual standards to the elements of reasoning in order to develop intellectual traits.




Stages of Critical Thinking Development
Accomplished Thinker
(Intellectual skills and virtues have become second nature in our lives)
Advanced Thinker
(We are committed to lifelong practice and are beginning to internalize intellectual virtues)
Practicing Thinker
(We regularly practice and advance accordingly)
Beginning Thinker
(We try to improve but without regular practice)
Challenged Thinker
(We are faced with significant problems in our thinking)
Unreflective Thinker
(We are unaware of significant problems in our thinking)

The Problem of Egocentric Thinking

Egocentric thinking results from the unfortunate fact that humans do not naturally consider the rights and needs of others. We do not naturally appreciate the point of view of others nor the limitations in our own point of view. We become explicitly aware of our egocentric thinking only if trained to do so. We do not naturally recognize our egocentric assumptions, the egocentric way we use information, the egocentric way we interpret data, the source of our egocentric concepts and ideas, the implications of our egocentric thought. We do not naturally recognize our self-serving perspective.

As humans we live with the unrealistic but confident sense that we have fundamentally figured out the way things actually are, and that we have done this objectively. We naturally believe in our intuitive perceptions—however inaccurate. Instead of using intellectual standards in thinking, we often use self-centered psychological standards to determine what to believe and what to reject. Here are the most commonly used psychological standards in human thinking.

"IT'S TRUE BECAUSE I BELIEVE IT." Innate egocentrism: I assume that what I believe is true even though I have never questioned the basis for many of my beliefs.

"IT'S TRUE BECAUSE WE BELIEVE IT." Innate sociocentrism: I assume that the dominant beliefs of the groups to which I belong are true even though I have never questioned the basis for those beliefs.

"IT'S TRUE BECAUSE I WANT TO BELIEVE IT." Innate wish fulfillment: I believe in whatever puts me (or the groups to which I belong) in a positive light. I believe what "feels good," what does not require me to change my thinking in any significant way, what does not require me to admit I have been wrong.

"IT'S TRUE BECAUSE I HAVE ALWAYS BELIEVED IT." Innate self-validation: I have a strong desire to maintain beliefs that I have long held, even though I have not seriously considered the extent to which those beliefs are justified by the evidence.

"IT'S TRUE BECAUSE IT IS IN MY SELFISH INTEREST TO BELIEVE IT." Innate selfishness: I believe whatever justifies my getting more power, money, or personal advantage even though these beliefs are not grounded in sound reasoning or evidence.

The Problem of Sociocentric Thinking

Most people do not understand the degree to which they have uncritically internalized the dominant prejudices of their society or culture. Sociologists and anthropologists identify this as the state of being "culture bound." This phenomenon is caused by sociocentric thinking, which includes:

- The uncritical tendency to place one's culture, nation, religion above all others.
- The uncritical tendency to select self-serving positive descriptions of ourselves and negative descriptions of those who think differently from us.
- The uncritical tendency to internalize group norms and beliefs, take on group identities, and act as we are expected to act—without the least sense that what we are doing might reasonably be questioned.
- The tendency to blindly conform to group restrictions (many of which are arbitrary or coercive).
- The failure to think beyond the traditional prejudices of one's culture.
- The failure to study and internalize the insights of other cultures (improving thereby the breadth and depth of one's thinking).
- The failure to distinguish universal ethics from relativistic cultural requirements and taboos.
- The failure to realize that mass media in every culture shapes the news from the point of view of that culture.
- The failure to think historically and anthropologically (and hence to be trapped in current ways of thinking).
- The failure to see sociocentric thinking as a significant impediment to intellectual development.

Sociocentric thinking is a hallmark of an uncritical society. It can be diminished only when replaced by cross-cultural, fairminded thinking — critical thinking in the strong sense.

Envisioning Critical Societies

> The critical habit of thought, if usual in society, will pervade all its mores, because it is a way of taking up the problems of life. Men educated in it cannot be stampeded by stump orators ... They are slow to believe. They can hold things as possible or probable in all degrees, without certainty and without pain. They can wait for evidence and weigh evidence, uninfluenced by the emphasis or confidence with which assertions are made on one side or the other. They can resist appeals to their dearest prejudices and all kinds of cajolery. Education in the critical faculty is the only education of which it can be truly said that it makes good citizens.
>
> William Graham Sumner, 1906

Humans have the capacity to be rational and fair. But this capacity must be developed. It will be significantly developed only if critical societies emerge. Critical societies will develop only to the extent that:

- Critical thinking is viewed as essential to living a reasonable and fairminded life.
- Critical thinking is routinely taught; consistently fostered.
- The problematics of thinking are an abiding concern.
- Closed-mindedness is systemically discouraged; open-mindedness systematically encouraged.
- Intellectual integrity, intellectual humility, intellectual empathy, confidence in reason, and intellectual courage are social values.
- Egocentric and sociocentric thinking are recognized as a bane in social life.
- Children are routinely taught that the rights and needs of others are equal to their own.
- A multi-cultural world view is fostered.
- People are encouraged to think for themselves and discouraged from uncritically accepting the thinking or behavior of others.
- People routinely study and diminish irrational thought.
- People internalize universal intellectual standards.

If we want critical societies we must create them.

The Thinker's Guide Library

The Thinker's Guide series provides convenient, inexpensive, portable references that students and faculty can use to improve the quality of studying, learning, and teaching. Their modest cost enables instructors to require them of all students (in addition to a textbook). Their compactness enables students to keep them at hand whenever they are working in or out of class. Their succinctness serves as a continual reminder of the most basic principles of critical thinking.

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Analytic Thinking—This guide focuses on the intellectual skills that enable one to analyze anything one might think about — questions, problems, disciplines, subjects, etc. It provides the common denominator between all forms of analysis. **#595m**

Asking Essential Questions—Introduces the art of asking essential questions. It is best used in conjunction with the Miniature Guide to Critical Thinking and the Thinker's Guide on How to Study and Learn. **#580m**

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Dr. Linda Elder is an educational psychologist who has taught both psychology and critical thinking at the college level. She is the President of the Foundation for Critical Thinking and the Executive Director of the Center for Critical Thinking. Dr. Elder has a special interest in the relation of thought and emotion, the cognitive and the affective, and has developed an original theory of the stages of critical thinking development. She has coauthored four books on critical thinking, as well as twenty-four thinkers' guides. She is a dynamic presenter with extensive experience in leading seminars on critical thinking.

Dr. Richard Paul is a major leader in the international critical thinking movement. He is Director of Research at the Center for Critical Thinking, and the Chair of the National Council for Excellence in Critical Thinking, author of over 200 articles and seven books on critical thinking. Dr. Paul has given hundreds of workshops on critical thinking and made a series of eight critical thinking video programs for PBS. His views on critical thinking have been canvassed in *New York Times, Education Week, The Chronicle of Higher Education, American Teacher, Educational Leadership, Newsweek, U.S. News and World Report,* and *Reader's Digest.*

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B – Research Forms and Templates:

Consent form for Leaders, Plain language Statements for Leaders

UNIVERSITY OF CAMBRIDGE
Faculty of Education

Research Project:
Infusing Critical Thinking Across the Curriculum: A Portfolio of Institutional Change

Consent form

Name of Researcher: Rush Cosgrove

1. I confirm that I have read and understand the Plain Language Statement for the above study and have had the opportunity to ask questions.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.
3. I consent to being interviewed.
4. Finally, I accept the assurance of the researcher that when referred to or cited in the thesis arising from the research, participants will be referred to by pseudonym, and general job function (e.g. 'John', administrator).
5. I understand who will have access to identifying information provided and what will happen to the data at the end of this project.

_____	_____	_____
Name	**Date**	**Signature**

Head of Faculty: Mike Younger MA *Secretary of the Faculty:* Milly Bodfish
184 Hills Road, Cambridge CB2 8PQ Telephone: 01223 767600 http://www.educ.cam.ac.uk/

UNIVERSITY OF CAMBRIDGE
Faculty of Education

Research Project:
Infusing Critical Thinking Across the Curriculum: A Portfolio of Institutional Change

Plain Language Statement

What is the purpose of the study?

This study is designed to gain a deeper understanding of teachers' successes and struggles in understanding critical thinking and teaching for it effectively within various disciplines. Furthermore, it seeks to understand how students respond to such efforts. By documenting the substantive and systematic attempts by the [university] to infuse critical thinking across the curriculum, the hope is to provide other institutions with guidance on their own faculty development initiatives.

What does my participation entail?

One 30-45 minute interview.

What else do I need to know?

It is your decision to take part in this study. You can decide to stop your participation at any time. All information will remain confidential. Every effort will be made to preserve anonymity. Leaders will be referred to by pseudonym, and general job function (e.g. 'John', administrator).

This project has been designed in accordance with the Ethical Principles of the British Educational Research Association.

What will happen to the results of this research?

The results of this research will form:

1) a basis for a Cambridge PhD dissertation
2) a basis for potential articles and books written by the researcher.

If you wish to obtain a copy of the published results, please inform the researcher.

Contact for Further Information or Follow-up

If you have any further questions about this research, please feel free to contact the researcher:

Rush Cosgrove, Department of Education, 184 Hills Road, Cambridge CB2 8PQ
Via email at drc51@cam.ac.uk.

Or contact the supervisor of the researcher:

Neil Mercer, Department of Education, 184 Hills Road, Cambridge CB2 8PQ
Via email at nmm31@cam.ac.uk.

B – Research Forms and Templates:

Consent form for Professors, Plain language Statements for Professors

UNIVERSITY OF CAMBRIDGE
Faculty of Education

Research Project:
Infusing Critical Thinking Across the Curriculum: A Portfolio of Institutional Change

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2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.
3. I consent to being interviewed and to have some of my classes observed.
4. Finally, I accept the assurance of the researcher that when referred to or cited in the thesis arising from the research, teachers will be referred to by pseudonym, including true information on subject taught (e.g. "John", Biology teacher).
5. I understand who will have access to identifying information provided and what will happen to the data at the end of this project.

Name	Date	Signature

Head of Faculty: Mike Younger MA *Secretary of the Faculty:* Milly Bodfish
184 Hills Road, Cambridge CB2 8PQ Telephone: 01223 767600 http://www.educ.cam.ac.uk/

UNIVERSITY OF CAMBRIDGE
Faculty of Education

Research Project:
Infusing Critical Thinking Across the Curriculum: A Portfolio of Institutional Change

Plain Language Statement

Invitation

This study is aimed at understanding vital aspects of critical thinking pedagogy and its relationship to continuing professional development efforts at the University. Professors are needed for interviews and to allow observations of their classroom practice.

What is the purpose of the study?

This study is designed to gain a deeper understanding of teachers' successes and struggles in understanding critical thinking and teaching for it effectively within various disciplines. Furthermore, it seeks to understand how students respond to such efforts. By documenting the substantive and systematic attempts by the [university] to infuse critical thinking across the curriculum, the hope is to provide other institutions with guidance on their own faculty development initiatives.

What does my participation entail?

This project will be based on interviews as well as observations of classroom practice. One or two long interviews (not more than an hour in total) will be conducted, as well as brief pre-lesson interviews (3-5 minutes) before each observed class (2-4 observations).

What else do I need to know?

It is your decision to take part in this study. You can decide to stop your participation at any time. All information will remain confidential. Every effort will be made to preserve anonymity. Professors will be identified only through an invented alias, as well as true subject taught (e.g. "John", biology teacher). Of course, given the nature of qualitative research, anonymity can never be completely guaranteed, as it is always possible that an individual's words may be recognized.

This project has been designed in accordance with the Ethical Principles of the British Educational Research Association.

What will happen to the results of this research?

The results of this research will form:

1) a basis for a Cambridge PhD dissertation
2) a basis for potential articles and books written by the researcher.

If you wish to obtain a copy of the published results, please inform the researcher.

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B– Research Forms and Templates:

Consent form for Students, Plain language Statements for Students

UNIVERSITY OF CAMBRIDGE
Faculty of Education

Research Project:
Infusing Critical Thinking Across the Curriculum: A Portfolio of Institutional Change

Consent form

Name of Researcher: Rush Cosgrove

1. I confirm that I have read and understand the Plain Language Statement for the above study and have had the opportunity to ask questions.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

3. I consent to being interviewed.

4. Finally, I accept the assurance of the researcher that when referred to or cited in the thesis arising from the research, participants will be referred to by pseudonym, and subject (e.g. 'John', biology student).

5. I understand who will have access to identifying information provided and what will happen to the data at the end of this project.

_____ _____ _____

Name **Date** **Signature**

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What does my participation entail?

One 10-30 minute interview.

What else do I need to know?

It is your decision to take part in this study. You can decide to stop your participation at any time. All information will remain confidential. Every effort will be made to preserve anonymity. Students will be referred to by pseudonym, and subject (e.g. 'John', student of biology).

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What will happen to the results of this research?

The results of this research will form:

1) a basis for a Cambridge PhD dissertation
2) a basis for potential articles and books written by the researcher.

If you wish to obtain a copy of the published results, please inform the researcher.

Contact for Further Information or Follow-up

If you have any further questions about this research, please feel free to contact the researcher:

Rush Cosgrove, Department of Education, 184 Hills Road, Cambridge CB2 8PQ
Via email at drc51@cam.ac.uk.

Or contact the supervisor of the researcher:

Neil Mercer, Department of Education, 184 Hills Road, Cambridge CB2 8PQ
Via email at nmm31@cam.ac.uk.

B – Research Forms and Templates:

Leader Email Template

EMAIL FROM UNIVERSITY LEAD TEAM TO PROSPECTIVE PARTICIPATING FACULTY:

Dear [name removed],

You will soon be receiving an email from Mr. Rush Cosgrove soliciting your participation in his research study on how faculty teach the Paul-Elder framework in their courses here at [the University].

Mr. Cosgrove is a doctoral candidate in higher education at the University of Cambridge, Cambridge, England, and is a Fellow of the Foundation for Critical Thinking, For more information about him go to http://www.criticalthinking.org/ABOUT/Fellow_Rush_Cosgrove.cfm

[Name removed], [name removed], and I recommended that Mr. Cosgrove contact you about participating in his research because of your commitment and the success you have shown in teaching critical thinking in your work with undergraduate students. Although we thoughtfully made the recommendation, the choice to participate in the research study is obviously yours.

Please do not hesitate to contact either me or [name removed]if you have any questions or concerns. Mr Cosgrove will provide the essential information about his research study and protocol to help you make an informed decision about participating in his research study.

Thank you for thoughtful consideration of his request.

Best,

[Lead Teacher]

FOLLOW-UP EMAIL FROM PRINCIPAL INVESTIGATOR TO PROSPECTIVE PARTICIPANT:

Dear [name removed],

I am following up on an email sent by [name removed] regarding my research at the University this fall. She has informed me that you are potentially interested in participating. Thank you for responding quickly, I am very much looking forward to beginning the study.

Attached are two forms. One gives an outline of the purpose and goals of the study, along with a description of what your participation will entail. The second is the confirmation from [the University] that the research has been approved to go ahead.

Please read over the 'Plain Language Statement' and let me know if you have any questions or suggestions. I am hoping to conduct the long interviews in the week between August 15th and 22nd, but will of course work around your schedule.

Thanks again and I look forward to working with you.

Best,

Rush Cosgrove

PhD Candidate

Faculty of Education

University of Cambridge

B– Research Forms and Templates:

Rush Cosgrove Email Template

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Sincerely,
Rush Cosgrove
Foundation for Critical Thinking
www.criticalthinking.org
cosgrove@criticalthinking.org
707.878.9100
707.878.9111 (fax)

The Foundation for Critical Thinking

For more than 30 years, the Foundation for Critical Thinking has been working towards the advancement of critical societies. The Foundation is a non-profit organization that seeks to promote essential change in education and society through the cultivation of fairminded critical thinking, thinking which embodies intellectual empathy, intellectual humility, intellectual perseverance integrity and intellectual responsibility.

Review of Critical Thinking Models

Model	Comprehensive?	Applicable to all Disciplines?	Defines specific cognitive skills including metacognition?	Offers high quality resources?
1. Toulmin: Theory of Argument	No	Yes	No	Yes (3)*
2. Bloom's Taxonomy	No	Yes	No	Yes (3)*
3. Brookfield (1987) 5 Phase Model	No	Yes	No	No
4. Dirks: A Model of Critical and Analogical Thinking	Yes	Yes	N o	Yes (3)*
5. PATOP Model of CT	No	No	No	Yes (2)*
6. Bogo & Vaiyda ITP Model of CT	No	No	No	Yes (2)*
7. Arthur Whimbey's Metacognitive Model	No	N o	Defines metacognition	Yes (1)*
8. Norris & Ennis (1989) 5 Phase Series of Abilities	Yes	Yes	NO	Yes (2)*
9. Bullen (1998) 4 Phase Model	No	Yes	No	Yes (2)*
10. Garrison, Anderson, & Archer (2001): Community of Inquiry Model	No	Yes	No	Yes (2)*
11. Facione and Facione Model	**Yes**	**Yes**	**Yes**	**Yes (5)***
12. Calvin Taylor's Model of CT	Yes	Yes	No	Yes (2)*
13. Richard Paul Model of CT **(Paul and Scriven's definition of CT is the one adopted by UofL for the I2A document)**	**Yes**	**Yes**	**Yes**	**Yes (5)***

Evaluation criteria adapted from: Surrey Community College. Characteristics of a good critical thinking model. Retrieved August 29, 2007, from the World Wide Web: http://www.surry.edu/about/ct/choosing/choosing.html.

*Indicates a Likert-type rating with (1) being the lowest score and (5) the highest. Ratings by E. Ross

D – Two full student interviews

RC: Today is Friday, October 21st, 2011. And I'm interviewing [name removed]. Um, cool. So let's just start with, um, your first introduction to the Paul/Elder framework. How did it happen, and where?
M: OK. Well, I'm a student at the [research site], and I've taken a [name removed] class...and it was introduced by the professor and it's something we studied. He introduced us to the book as a whole, and then we systematically have been going through it and applying the principles within it. Both trying to understand the principles themselves, and then how to apply them to different situations as well.
RC: So what year are you?
M: Um, I originally started going to school at [name removed] ten years ago, and then I stopped to start my own business for a while, so I've been a CEO and COO of previous companies, and I did that for about five or six years, and then I just recently came back to school to pursue education. So I'm coming to school now – I'm technically a junior – I'll be a senior next semester. But in the school of education I think I'm a sophomore.
RC: OK, cool. So your major is education?
M: Yep. I'm going to be a teacher.
RC: OK. Cool, man, cool. Alright, so [name removed], uh, he, um, he presents this in class – he kind of explains the model, right?
M: Yep.
RC: And then he also gives you – he assigns reading, right?
M: Yeah. We've been studying the pamphlet – as you know it's divided into different sections, highlighting different principles, standards, ethics, theories, what have you – and so we've been going through each of those individually at a time, and then as we learn them try to use them as well.
RC: And he also, um, he also like he grades you based on the standards, right?
M: Um, yeah. What he's looking for is – he's looking for us to specifically use terms or, uh, or principles, for lack of a better term, as we're replying to some of the statements or problems that we're trying to dissect. So the way that we use it in class is he'll show us a video or he'll make us read an article, and using the principles that we learn in the critical thinking guide, we'll have to find critical thinking errors or successes according to the pamphlet.
RC: Mm-hmm. And how do you find that process?
M: Honestly I find it really useful – very successful, so far. Um, it's caused me to reflect on both like, the intentions, whether it's biased or unbiased, objective of course, of both the way that I'm perceiving it, assuming anything, and the way they're delivering the information. So it's been pretty helpful for me in numerous areas.
RC: Yeah. And how do you see the specific language, or terminology, or principles helping you do that reflection?
M: I think first of all it gives us, a lot of times – for example in the beginning of the book, one of the things it says is that, just people by nature are biased, and prejudiced in certain areas, not even knowing. So I think one of the things it does is it tells you to stop and be reflective on how you're actually interpreting information, and it gives us key words that we can use, or principles, to actually put that into clear, concise standards. You know, whether it's using logic, or whether we're assuming things, or any number of the terms. But, something where we might not even know how to articulate how to interpret the information, and it gives us a set of standards – almost like a guideline to interpret information, and how to deliver it effectively as well.
RC: Sure. So could you give me an example of you used one or more of the principles, either in class or elsewhere?
M: Sure, sure. Um, well I'm a parent of three boys, and so I'm constantly teaching them how

to do everything, whether it's life skills, or homework, or anything like that. And so one thing that it's caused me to do is – like I said before – stop and reflect on how I'm about to deliver the information, and am I assuming that people know something, or that my child knows something, before I actually, you know, build on top of that. You know, if you're looking at a pyramid, am I giving them the top part of the pyramid without the bottom foundation? And so it's been really great for that because it makes me reevaluate things, and try to deliver it in a way that's, uh, more sensitive to where the person that I'm speaking to is at – rather than where I'm at.
RC: Interesting.
M: Whereas before I might just plow through something and not even think about "how am I delivering this?" Are they in a place where they can receive the information that I'm giving them? You know, are we defining words as the same thing? Because oftentimes you've got, you know, I'm telling you that this word means 'a,' but where you're from it actually means 'b.' And so, kind of like, metacognitive – just thinking the way that we're thinking and delivering stuff. So it's helped me a lot with that. I also teach music, so I teach music, drumming students, and it's been great because that's more practical things, like reading music, reading rhythms and stuff, and sometimes I assume that they already know how to read these certain rhythms, um, but sometimes they don't. I need to actually take a step back and say, well, rather than working through this complex rhythm, let's talk about what each of these notes mean. How much time do they actually take? You know, taking a step back. So it's helped me to do that.
RC: Interesting.
M: I think it's going to improve my teaching already.
RC: Uh-huh. Interesting. So then, um, in your own process of understanding the ideas, how did that happen?
M: Um.
RC: I mean, was it enough to just hear them spoken, or…
M: No. I mean, hearing the different terms, like – I'm going to whip it out so I can look at some of this.
RC: Sure
M: Um. For example, like, there's intellectual standards, and there's elements of thought. It helped me when we actually had to dissect articles, or speeches, videos, any sort of mixed media presentation or something like that, where I'm actually taking that and using those standards to dissect whatever it is to find successes and failures within it. And then it starts to click – things start to, you know, work a little more, and I start to understand it a little more practically seeing it in action rather than it just being a definition.
RC: Sure.
M: So that helped me a lot.
RC: And how many, how many kind of times do you think you had to engage in this process before it really started to become a part of what you're doing?
M: I don't think it took very long. I mean, really just, I think every time that I actually was intentional on doing it, rather than maybe if I was just trying to do homework as fast as possible, as opposed to intentionally trying to engage the critical thinking guide with my homework. I think every time I did it I left a better thinker, and I left more equipped to think better.
RC: Interesting.
M: And so like, I actually, can I keep it with me? Whenever I'm doing something – I write articles and product reviews as well – and so I kind of keep it close by just to review. There's even questions throughout there that says, like, how to make sure you're – how to dissect an article. You know, something like that. So I kind of used some of those questions – I think the questions are just as important as the definitions because that's a little more applicable for me. You

know, is this clear? Is it concise? Is it using logic? You know, all those different things. Are we assuming anything? Do we know the other person's perspective? Yeah.
RC: Interesting. So, let me say, how do you think – if, uh, Professor [name removed] had simply just lectured about the material, and maybe said, "this is really important, and throughout this class you should use this book whenever possible," but hadn't continued to emphasize it throughout the course, how do you think your understanding and application of the ideas might be different, if you can even imagine that?
M: Yeah, I think it would be significantly less. I think actually applying it in real world situations, both outside of the classroom and for the classroom projects, homework, and so forth, has been instrumental in understanding it. Otherwise, it, you know, especially in a college setting a lot of times we're on survival mode. So you're not actually going to apply principles, concepts, standards, you know, thought processes, unless you're specifically told to. So if someone handed me this book and said, "you should use this throughout the semester," but doesn't require it, it's very possible I would have done all the things I was required to do first. And then, if on top of that I still had time to spend with my kids, my family, my work, my teaching, and all that, then I perhaps might, but the chances are a lot less. So I think since he mandated that we were to use it to break down and evaluate things, it forces me to use it and understand it more.
RC: Mm-hmm. Interesting. So then, let's, um, if I were to ask you the question, "what is critical thinking to you?" how would you respond?
M: I think critical thinking, um, I really like the way that Professor [name removed] talks about it being about the process rather than the product. So I don't think it means having the right answer – even in class I think a lot of people are getting this confused and talking about having this answer as if it's an absolute – I think the whole purpose of critical thinking is to reflect on the way that you're interpreting the information, the way that you're going about finding an answer that could even mean that once you have the answer it might change in the future because various other things change. You learn new information, which alters the way you perceive it. Um, I think the whole – if I was to define it, I would define it as, you know, basically the process that we use to interpret information critically, so that we interpret it more unbiased, objectively, and that we can grow from it.
RC: Mm-hmm. And how do you see, uh, what relationship do you see with that sort of general concept of critical thinking and the Paul/Elder framework?
M: Could you say that again?
RC: So, so you, you described it a general process of reflection, of thinking about our thinking of the process. And then there's the specific like, language, and model that is the Paul/Elder framework. What does this specific language do?
M: Yeah. I think that gives us almost like a set of standards that we can use. You know, when you're studying any different field of study, there's always different standards – there's theories that people have – there could even be alternate theories and alternate sets of standards, but what this does is provide one that anyone that even gets this for the first time, I think someone could sit down with this book and get an article and get the critical guide to thinking, who has never seen either one before, and he could apply – he or she could apply – the critical thinking guide to the article. I think it gives just a clear set of standards that are comprehendable, um, that are concise – short and simple – which is very effective I think. Um, and it helps us evaluate things because of that – because it's so easy to use. And it's an easy set of standards.
RC: And how do you think, how do you think you might think about critical thinking differently if you had – if someone had presented to you this idea of critical thinking as this process and this idea, but without the specifics of the language that's in this book, and the questions that are in this book?

M: Yeah. I think one of the things that would be different is that everything would – I might interpret the other version without using this. For example, according to my own strengths, and my own knowledge, and my own capabilities, as opposed to challenging myself to think in a way that is supposedly objective – even if I'm trying to be objective now, there still might be ways where I'm still not articulating that and applying that. And I think what the critical thinking guide does is it tries to provide a framework that if you use it, it should theoretically be an unbiased, objective form of doing it. Whereas if it was on my own, I think it would be more likely to be flawed in certain areas.
RC: Mm-hmm. Interesting. And, I mean, how do you think you might have talked about critical thinking before this course and before you worked with this book?
M: Um. Well, it definitely, like, it would have been limited to my own perspective at the time. And it would have been something to the effect of, you know [pause] I think what I've thought about critical thinking before is, maybe trying to get someone else's perspective – a third party – or trying to understand the other person's perspective. Maybe trying to give more evidence to substantiate whatever I'm thinking in any way, shape, or form. Um, but [pause] I lost my train of thought honestly. But yeah, I think it would have been limited to that.
RC: Sure. Sure. Um, so then, well, have you had any other professors that have used this guide?
M: I have not had any other professors that have used this guide. However, I've had two other classes that emphasized critical thinking in general. They just talk about the necessity for it. So yeah, so they haven't actually brought out this book, or even talked about it, or Paul and Elder, or their framework, but they've talked about, just the need for critical thinking in the way that we approach all of our different activities.
RC: Sure. And how do you – I mean, is that approach very effective for you?
M: Well, they don't actually – see that's the thing – they'll talk about critical thinking but not provide the set of standards in which to approach it. So it's very subjective, and it's left – I mean, the person sitting in front of me, behind me, beside me – will all approach it differently than I am. So what this does is it provides a more universal approach to where everyone can be on the same page approaching it through the same lens. As opposed to different sets of lenses.
RC: Yeah. So then when you're in these classes, or even in your other classes that might not talk about critical thinking at all, do you find these tools useful for your studies?
M: Oh, definitely. Definitely. Even the way that we're receiving information from the professors – when they're giving it. I mean, even Professor [name removed] said "everything I say up here is fair game." You know, feel free, take it. And I think it just challenges us not to take everything for granted, which is something, especially, I do when I'm tired, lazy, apathetic towards something, I'll just take it for granted and not actually care. I think one of the unfortunate aspects of it is that the critical thinking guide will only really apply to people who care about pursuing critical thinking – that actually care about seeking things out in an unbiased, objective way. A lot of times – like I said – the survival mode kicks in, and whatever facet you're pursuing, interpreting information, and you just don't care enough. It doesn't mean enough to you or other people to actually dig in. Um. Yeah.
RC: Do you find that many of your classmates have that sort of apathy?
M: Um, yeah. Yeah. You know, like one of the things I was thinking earlier is, uh, there's the three level standards, or, uh, levels of thinking – the three levels of thinking. I think those are presented kind of as absolutes in there, like there's a little 1, 2, and 3. But I personally think it's more of a fluid – it should almost be like it's a stream of water, where it's all mixed together, and you can be in any part of it at any point because I mean, I know in some areas I'm extremely critical in the way that I pursue and interpret the information, and in other areas I could care less. I mean really, you know? It's the nature of man. And so like, I think on any given day, all of us travel between all three levels of critical thinking. And I think it's important to be aware of that. So that like, if I think that I'm a critical thinker at the very top, but then

I'm apathetic about pursuing critical thinking or looking at something else objectively, then maybe I slid right back down to number 1 – or what does that mean, am I in the middle? So I just think it's important to be aware of that.
RC: Yeah. So what do you think, for you, is the most useful thing that this has done, for you – understanding these ideas?
M: I think [pause] you know it's kind of like, um, when you talk about any subject, whatever it is, when you talk about a subject a whole bunch you're always thinking about it. So if I'm always thinking about critical thinking, then what it makes me do is just stop and be reflective on how I'm thinking critically, you know? And not critically in a negative sense, but critically in a sense of "am I interpreting this data in the best way possible?" so that I'm looking at it objectively through as many lenses as possible to understand it, as in depth as possible. And I think that's the biggest thing that I've got out of this – it's provided a set of standards, which is super important. I think that's one of the best things that I've gotten from it, so I've got a set of standards that I can go to. But even if I don't use the standards, it's actually – like I was talking about with my kids – maybe now I actually stop and I reflect on how I can deliver or how I can receive information, whereas before I wouldn't. And I think people just pausing to reflect on how they're going to interpret or deliver information already makes a difference. I think that's the biggest thing. So even if I don't ever open the book again, if I stop and think about that, I think that's already a step in the right direction.
RC: Yeah. For sure. Um, and so for you, moving, moving forward, um, do – what do you think are your, what do you think are you strengths and weaknesses as a thinker, and how might you work to improve them as you go on in your life?
M: Um. I think one of my strengths is that I really appreciate and like to hear what other people think, and like to see several different aspects of the thing. And I really enjoy – that's why I enjoy college so much – I love just meeting people from all over and hearing what everyone says, even if we disagree. I love it. I love that in class, Professor [name removed] said "this is the one class you can get an 'A' for disagreeing if you do so intelligently." And I think that's one of my strengths, is that. One of my weaknesses might be, um, I might be blind in some areas – maybe to my egocentric side, to my individualistic side, or biases. I think I have several biases, I'm sure, and I'm just simply not aware of them, or unwilling to be aware of them. And I think that's definitely a weakness because, like I said, sometimes we just don't want to be objective.
RC: Sure.
M: And I definitely think that's the case with me sometimes.
RC: So do you see, as you, as you finish this class and you continue on, do you see yourself working on these things in the future?
M: I do, actually. I think this would be a great thing to even – I mean my kids are the perfect age right now just to start talking to them about how they're receiving information. I'm studying human development as well, and it's really cool. One of my sons is six years old and he's right at just this beautiful ripe age of where he's starting to figure out how he thinks. And he's starting to actually question how he thinks about things, and it's the perfect time to start talking to him about this kind of thing so that he can go through and challenge the things that he sees, or says, or reads, you know. I even did it the other day. Someone told him in school that if he, uh, looks in the mirror in our bathroom and says "Bloody Mary" three times that a ghost is going to come out and kill him. And so like we actually kind of used some of the principles just challenging this – what evidence do we have to this? Has the other person done it? Well, if they had done it, how come they are still alive?
RC: [laughs]
M: You know, and just asking these questions. So how would he ever know because whoever did it would have died and couldn't tell anyone. So, like just getting my children to work through it – it's been really cool, it's been fun. And so, yeah.

RC: Interesting, man. Interesting. Um, well, that covers all the topics I wanted to talk about. Um, we've talked about a lot, but is there anything else that we haven't covered that you wanted to say?
M: Um, you know, I think one of the things that I talked about, like, for example, one of the things that I like about this is that it talks about the egocentric and the sociocentric thinking, and just for me that kind of helps keep everything in check objectively, like I said. I think that's one of the ways to they try to keep this fair is to get you aware that we think in both of those aspects. One of the things I thought could have been better is that when they talked about intellectual traits, I think, they were all positive traits – there wasn't anything about laziness or apathy. Or like I said, the levels of thinking are very concrete. I think it could be beneficial to talk about those being more flexible, um, more fluid, and that being aware of some of our negative intellectual traits, we might be more prone to actually avoiding them. That we'd think about it. But if we're only talking about the positive traits, we won't be as aware of the negative ones.
RC: Sure.
M: That's pretty much it.
RC: Yeah, cool, man. Well, hey, thanks man.

RC: Today is Monday, November 14th, 2011, interviewing [name removed]. Cool. So let's just start with your experiences in Professor [name removed] class. How do you – how is it?
R: Sure. Well, I think firstly, for me it's very helpful to have the group activities that we do every week because for me they're kind of how I learn better is by actually doing something and practicing it, as opposed to just listening to it from a lecture. I'm a very hand's on type of learner. And so that's been very helpful to actually get to discuss things in a group setting to get other people's feedback, to get their opinions – or like if one of us isn't getting a concept, we can help give examples to help other classmates. So I feel like that's been really helpful. And just the research – the subjects itself – are very much so, like, good for critical thinking because most of the things, like, you need to think of examples to be able to discuss it, to talk about it. And so I just feel like it's been a very helpful course overall and I really do just appreciate getting into groups and being able to discuss it and come up with our own examples and to take it beyond just the classroom setting.
RC: Sure. So could you give me an example of one of the discussions that you had that really helped you learn something?
R: Yeah. Well, like, throughout the course we've kind of been using the same example that we started with at the beginning so it's been neat to follow it through all of the different phases of the research itself. So like my group came up with measuring the frequency of cavities, for example, when you use a fluoride toothpaste versus when you don't. So we've just been, like, taking that through, like, figuring out, well, what kind of research is this – is it experimental, is it, you know, what kind is it? So being able to look at that and then, um, also just writing our hypothesis and learning about the null hypothesis along with that – things like that. And so to take it through those different steps has been really helpful. I know one of the activities we did was using a bag of M & Ms [laughs] and using that to kind of help us understand probability, and sampling, and stuff like that. So that was very helpful.
RC: So what did you do with the M & Ms?
R: Um, we did several different activities with them: the first thing we did was we just opened the bag and took out the first three M & Ms that we had, so it was simple random sampling. And then we sorted them into different colors and wrote down how many of each color we had, and just did different things. It just kind of really helped us to be able to, like, have a visual and be able to manipulate it and move it around. So, yeah, there's other stuff like that. And we would put some of the M & Ms back in the bag and shake it around again and see what our results were, and stuff like that. So it just really helped to kind of let those concepts stick and be re-

tained.
RC: Right. Cool.
R: Yeah. It was a really neat exercise [laughs] I really enjoyed it. And then we got to eat them afterward [laughs]. That's always a plus.
RC: [laughs] That's the best part.
R: Yeah. [laughs] But, yeah.
RC: Cool. So then, how, so do – so do think that these sorts of things – I mean, obviously that's a research class, right? Research methods?
R: Yeah.
RC: Um, do you think that sort of framework might be used to focus on other aspects of dental hygiene?
R: Most definitely. Actually, one of our other classes we are using the – we have a little booklet on critical thinking – it's like the eight elements of critical thinking. And for next semester we actually have to do a case study on a patient kind of using those eight elements and going through it and discussing that. And so we did kind of a practice one this semester where it wasn't as detailed as it would be next semester, per se, but it gave us kind of some hands-on practice with what to put under each heading, and how to think about the patient in that way. So that was very helpful, like, and we shared it in front of the class. We just went through, like – and this was actually the patient I had that one day who needed certain treatments and we weren't able to give her all of them. So I used her for this project, and basically just went through, like, one of them was like, problems that you had and so obviously her insurance and seeing how that related to the treatment we were able to provide versus the treatment she needed, and how we were going to kind of handle that, and, like, to think critically about how we were going to handle this, and what's our next best option. So that was very helpful, and then we shared those with the class. So we got to hear a lot of different situations where students had to take a different approach to things besides, you know, the textbook way of doing things – we had to kind of think outside of the box and apply those critical thinking skills to a practical, clinical situation. So that was very helpful to take the time to kind of break apart our own clinical experiences and work through those and kind of see, like, what did we do here, and why did our professors tell us to do this, and things like that. And just like taking the time to sit down and really work through it, and think about it, and then share it with the class is a really helpful experience, I think.
RC: And how do you feel that the specific tools that were in the little pamphlet – the little blue book?
R: Yeah, it is.
RC: How do you feel that those tools helped you to engage in that process?
R: Sure. They were a very good outline – very helpful. And I think just like being able to – and we used the little blue book, and then also our professor gave us a sheet that had some, like, sample questions that would fit under each category, and so that really helped me to see those examples and then be like, oh, you know, this is how that, like, if for purpose was the main thing we were trying to do, and then going through and like listing, like, how would you measure your success. So like, in my certain situation, like my success is measured by, you know, did the patient understand what I was telling her? So it really helped outline it and break it down, as opposed to having one big situation and kind of looking at it as a whole. It helped to break it down into components and be able to just kind of focus on little chunks, and really just break it down for me. So it was very helpful for me.
RC: Sure. So how were you introduced to this little blue guide?
R: Um, we were given it during – I think we were actually given a copy [in general education], which is where we completed the first two years, and then we were also given a copy when we started the dental hygiene program itself in one of our classes – I think it was actually our first,

like – we have a clinic seminar each week where we kind of sit and discuss topics that have come up in clinic – things that we don't like, things that we do like, things that we think need to be changed or have a different way of doing it, and so I think we were actually given the booklet during that time – our first semester – during the program.
RC: And how many professors have you had that have worked with it in class?
R: Well, [name removed] worked with it the first semester when she handed it out. She gave us a scenario and we had to work through each of the eight elements of thought, and – so she's used it. And the professor I was telling you about, [name removed], she's used it, and I think other professors have used aspects of it without actually using the blue book itself. But I know each course kind of requires them to do something with critical thinking. And so I don't think all of them have gone straight to the blue book, but I think that they have pulled stuff from it for us to use.
RC: Sure.
R: But I do, um – and at first, like, critical thinking has always been something that I'm kind of like, eerrrr, I don't really like that, you know – more like it's always just kind of scared me, but I think, like, the blue book makes it a lot simpler. Like, it doesn't make it look as scary [laughs]. Because I think that phrase sometimes is kind of something that people shy away from, maybe, and are kind of, like students especially, to me it means more work. But really it's worth it when you get to work through something like that. I think it helps you understand what you're learning better. So I think in the long run it's definitely something that's helpful, and I think it's good that it's being incorporated into our studies. And I think that if more professors used it, we would retain more knowledge about what we were learning because we would actually be spending time working through things and kind of not just looking at a fact and memorizing it, but applying it.
RC: Yeah, sure. So with all the work that you've done with the blue book, what do you think has been the most helpful – or some of the things that you've done that have been the most useful?
R: Well, definitely just like, within transitioning over from strictly doing lecture courses and then coming into clinic, I think that the critical thinking aspect of those classes kind of made it easier to transition over to real-life situations because we were already thinking in that mindset. If we would have been just memorizing facts and learning about things detached from real-life situations and applying them using critical thinking to learn about them, I think it would have been a lot harder for us to transition over to being in clinic and having to, you know, apply toothbrushing methods for each specific patient if we would have just learned about it and that would have been the end of it. But instead, going through it and thinking critically about it, and thinking, OK, this patient has this issue or is having difficulty with this, like we can give them this aid. And so I think taking those things and thinking critically about them has really helped to be able to think critically about our patients and to give them better treatment overall.
RC: So you feel more prepared to kind of deal with the problems as they emerge?
R: Yes, definitely. Because in dentistry especially – just like in any medical field – you know, each patient is different, and each patient has different needs, they have different things that they're struggling with, they have different aids that might be useful for them that might not be useful for another patient at all. And so – what we get on the computer, it's all helpful, but until you have that patient in your chair, you can't make some of those judgments so you have to be able to be a good critical thinker and to do it in an efficient manner and quickly while your patient is here so that you can just be like, oh, you know, they have this, this, this, and this, and like, I can apply that and give them this to help them. So I think it's very helpful to be able to do that in our lecture courses before we're just thrown into clinic and expected to think critically every day.
RC: Sure. Sure. That's cool.

R: Yeah [laughs]. It is. It's been very helpful I think.
RC: And it sounds like you're enjoying the process as well.
R: Yeah, definitely. Aspects of it are hard, but I think that that's good – I think it's good to have a challenge and to be forced to just kind of go beyond learning material and actually being able to apply it. And I think it just brings a whole new depth to what you're learning, to be able to think critically about something and to not just – I think a lot of times things are just really quickly mentioned, or concepts are just stated and then you move on to the next thing, whereas when you're using the critical thinking, for instance, like in [name removed] class, like, we learn about a topic, and then we spend time thinking about it, and applying it, and kind of working with it, and applying it to different situations and just seeing how it would work in a real-life way. So I think that's been very helpful. It helps me – like when I go back and study those things, I remembered them. Like, I remember them because of the examples that we've used, and because we spent time kind of going through it and working through it.
RC: And do you find that in other classes where it's just lecture that when you go back to study…
R: It's a lot harder to remember things, I think, for sure because it's told to you and that's the only way that you're being taught these topics is just simple lectures. And so I feel like when you are actually able to do activities and to do things that involve critical thinking, your memory kind of grabs onto it more. And so definitely I find that, like, when I go back to study for her class, I'm like, oh yeah, I remember we did this with M & Ms. Like, I remember we did that M & M experiment, and I can go back and I can look at that sheet and I can remember what we did to get those things, whereas if I'm just looking through powerpoints or something like that, it's like, oh, now what did that professor say about this, you know? So I definitely find that there's a difference between classes who incorporate those critical thinking activities versus classes that don't.
RC: Sure. And how do you feel, like, your classmates respond to it?
R: Yeah.
RC: Do you think that it's generally liked, or…?
R: I think there's a little bit of a mix. I think overall that most of the class consensus would probably be that they like it, or that they like the results of it – because spending more time on something isn't always fun, but I think that when you get it, and you learn it, and you remember it, that's when it pays off. And so I know like some of my classmates during the critical thinking activities, there are definitely some people who are more into it and more involved than other people in the group, but I think you would find that pretty much no matter what you would try to do. But definitely I just think because it can't be just one person doing it, so I think it kind of forces other people to get involved as well. And I think that's a good thing about it too, is that if you work together as a group, even if somebody doesn't really like it or is not into it, you can still try to get feedback from them. But I would think that mostly people would find it helpful.
RC: Sure. And what about – have you found yourself thinking critically in areas that are outside of your studies?
R: Yeah, definitely. I think just in everyday situations you definitely have to be a critical thinker, and sometimes I don't think you even realize you're doing it, but the more that you use that skill, the more it becomes a part of your everyday life. And, you know, just little things, like – I'm trying to think of some examples, but maybe just like even, you know, when you're shopping or something like that – like looking at different choices, and comparing them, and picking the best option. Something as simple as that I think that critical thinking helps you just function better and make wiser decisions, and be more informed about the decisions that you're making. And so I definitely think that having critical thinking be a part of our curriculum here is helpful, not only for our studies, but also for our lives in general.

RC: Sure. Cool. Well, and let's say moving forward for you, as a dental hygienist or even as a person, what are the things that you're most thinking about working on as far as critical thinking goes?
R: Hmm. Well, definitely in the office. You know, I don't know where I'm going to be working yet, but, like I said, every patient is different and every office is different. So, you know, the office might not have certain things that you can give to patients. And so, thinking in that light, if a patient needs something and the office doesn't offer it, what is an alternative I can give them? So that would definitely be a situation where critical thinking would come in. Also, a lot of times as a hygienist we're kind of expected to kind of assess the patient – to be ready to give the dentist kind of an overview of what's going on. So just using critical thinking, if we see any abnormalities in just like their mouth in general, like, you know, what could this be, like asking the patient questions – to be able to assess that and really to find a proper diagnosis for something and relaying that to the dentist. And I know some dentists are more accepting of you doing that than others are, but you might be expected to depending on the office that you're working in. And just like as apart from dental hygiene, I think just in the future, you know, as you get older life situations happen, you know, just with different things that occur in life, you know, with like kids is one that I'm especially thinking of [laughs]. There's definitely a lot of room for critical thinking there when raising children and dealing with situations as they arise during that experience, and so I think that critical thinking is something that doesn't just end with school. But I think that if it's taught in schools and it's taught in such a way – like the little blue book makes it ten times easier to follow and to really understand than if you're told just critically think about this topic – you're like, what? You know? But I think the blue book really helps to break it down, and so I think that because it does that it's easier to apply to different situations outside of what they just tell us to do it with. And like I said, I find myself doing critical thinking and using some of those eight elements in everyday life when I don't even – probably I wouldn't even realize I was doing it, but it's just been taught to me and I think it's vital, really, for living in a way that is, you know, making good decisions and being able to do things like that.
RC: Sure. Cool. Cool. Well, that pretty much covers everything that I wanted to talk about. Is there anything else that we haven't talked about that comes to mind for you?
R: All I would say is that I think it's something that professors should be encouraged to use. I've had some professors on campus – they were like, we have to do this critical thinking thing, so we're going to do this activity. And I think when the professor isn't excited about it, it doesn't make it seem like something that's important – it's just something that they have to do. I think it makes it a lot harder for students to get the full benefits of doing whatever the critical thinking activity may be – I think it makes it a lot harder for students to gain from that experience as well as it's a professor where they're excited about it and really understood the importance of doing this with their class. So then – something we don't really have control over – but I would say that makes a big difference in just encouraging professors to use it more as kind of a tool for learning, and not to be – not to kind of shy away from it. Because I know my tendency was to do that, but I think that breaking it down to the eight elements is really useful. It doesn't make it quite as intimidating, I guess. So I found the blue book, and especially the eight elements very helpful to learning in the classes it's required, and the classes it's not required.
RC: Sure. Cool.
R: Yeah.
RC: Well, thanks a lot [name removed].
R: Yeah, no problem.
RC: I really appreciate it.
R: Yeah.

E – Three Re-designed Lessons:

- **K-3, 'LISTENING GAME'**

Objectives of the Remodeled Lesson

3rd Grade

The Students Will:

practice critical listening skills and develop insight into critical listening by discussing listening, comparing listening to reading, comparing active to passive listening, and discussing ways to listen actively and accurately
explore the implications of changes to a story retold five times
discuss how to judge the accuracy of conflicting versions of a story
recognize when to suspend judgment
explore how one's point of view can shape one's interpretation of events
Abstract

In this lesson, five students are asked to leave the room. Next, the teacher reads the story "The Dizzy King" asking that the remaining students listen very carefully. When the story is finished, one student from class brings in student #1 and retells the story. Then student #1 tells the story to student #2, etc. After all the students have been told the story, the class discusses how the details of the story changed. "Were details left out? Added?"
(from Using Our Language, Dr. Anne D. Ross. Bowmar Noble Publishing Inc. Economy Co., 1977. p. 55.)

Critique
Although this lesson is about listening clearly and carefully, it doesn't discuss or teach strategies for skilled listening, such as self-regulation and correction, or the need to test oneself by reiterating a sensible version of what one has heard. This lesson oversimplifies the difficulties of listening carefully and fairmindedly. The only kinds of mistakes it refers to are altering details, leaving details out, or adding new ones. It fails to address the effect these changes have on the meaning of what was heard.

This lesson addresses only the problem of remembering a number of details from a story. Since the story doesn't involve, or appeal to, anyone's self interest, the lesson overlooks the motives people have for changing stories. Although listening to remember details is an important skill, children face more profound problems when listening carefully to understand the story as a whole: distinguishing credible from un-credible sources of information, recognizing contradictions, determining the effect of point of view, and suspending judgment when they don't have enough information to know.

The lesson could also increase students' insight by relating listening to reading, writing, and speaking.

Strategies Used to Remodel

S-22 listening critically: the art of silent dialogue
S-35 exploring implications and consequences

S-9 developing confidence in reason
S-11 comparing analogous situations: transferring insights to new contexts
S-8 developing intellectual perseverance
S-16 evaluating the credibility of sources of information
S-2 developing insight into egocentricity or sociocentricity
S-34 recognizing contradictions
S-5 developing intellectual humility and suspending judgment
The class could first have a discussion about the differences between active listening and passive listening. Students could also compare listening to reading. "If someone is talking and you're interested in what he or she is saying, do you listen differently than usual? In what ways? Why? How does that compare to times you weren't really listening? Why do people sometimes not listen carefully? How is listening easier than reading? Harder? Why? What do these two have in common? Why? What can you do to listen better?"

Then, after playing the original game and discussing how the story changed, the teacher could add the following questions: Was anything in a rearranged order? Was something important left out of some versions? What? Why was it important? Did each version of the story make sense? Did any of the changes affect the meaning of the story? Which changes? How did they change the meaning? Why did some changes not affect the meaning of the story? S-35

How was student #2's version affected by the changes made by student #1? Did any of the distortions from the first re-teller show up in the last version? Then, to develop insight into careful listening, students could explicitly discuss listening: What were you doing as you listened? While you were listening, did something not make sense? Did you ask for clarification? Why or why not? What question or questions could you have asked? S-9

Do you listen differently when you know you will have to remember and repeat what you are hearing? How? Why? Do you read differently when you know you're expected to remember what you read? Do you speak or explain things differently when your audience has to understand and remember what you say, than you do when you're just talking for normal purposes? How? Are there ways speakers can make it easier for listeners to understand and remember what they say? What? Why would that help? How do writers help their readers follow, understand, and remember the key points? Could speakers use any of these techniques? Which? Why? How would that help? S-11 The experiment could be repeated after this discussion. Encourage students to stop the teller to ask questions or to get clearer explanations as they listen. "What was different this time? Did thinking about listening help you listen better?" S-8 Students could retell TV shows and correct each other.

Extension S-16
The teacher could extend this lesson to stress the importance of determining credibility. We suggest adding a detailed discussion of the motivations people have for changing or distorting stories. "Did you ever hear two or more different versions of the same story?" If you need examples to get the students on track, mention how siblings might explain a quarrel differently to their parents.

After getting a number of examples, have students discuss them. You could use questions such as these: Why do you think the people told different stories? (To avoid blame; to make one's self or friend look good; to make someone else look bad; because they saw different parts; because they made different inferences.) S-2 Could all of the versions of the story be true? Why or why not? Which part of that version contradicted the other version?

S-34 Could you tell if any particular version of the event was true? Were parts of the story true but not other parts? Can you always find out the truth? Tell us about a time you had to suspend judgment, and why. What could you do to find out what really happened? S-5

- **JUNIOR HIGH, 'INTEGRATED GRAMMAR'**

Objectives of the Remodeled Plan

The Students Will:

explore their ideas about language through Socratic discussion
analyze a written passage and distinguish author's grammatical usage in terms of style
evaluate a written passage
Standard Approach

The traditional pattern is based upon a format which explains the lesson, gives examples, and then provides drills for students on such topics as the following: parts of speech, verb tenses, active vs. passive verbs, dependent and independent clauses, punctuation. The simplicity or complexity of the lesson depends upon the grade level of the text.

Critique
Grammar was chosen as a lesson because it seems the least likely to be included in a discussion on critical thinking. Indeed, the traditional method utilized in grammar texts does discourage reasoning about grammar.

The facts of English are presented in a raw fashion and the student simply is expected to accept them. Some grammar texts attempt to be innovative by making grammar "fun" - using graphics and clever sentences for examples, but the message is the same: Grammar is a subject that students must learn. Soon they get the message that it is boring and worse than that, difficult and irrational. Students learn each distinction and skill in such a way that they only "know" it when specifically asked to look for it in the directions. They do not learn the details in any useful context, whether reading or writing. Students need to use grammatical analysis in order to see its importance and meaning.

Integrated Grammar is a method which was presented at a California Model Curriculum Conference. The premise is that if grammar is taught, it should be within the context of the literature that is being taught. Grammar is not a genre and it is something that we would have no use for if we didn't have something to communicate. It makes sense then to have students learn about grammar from literature and other writings. Most teachers would prefer to teach something else when given the choice. How then does a teacher who wishes to incorporate critical thinking into all areas of the curriculum teach grammar?

Strategies Used to Remodel

S-1 thinking independently
S-24 practicing Socratic discussion: clarifying and questioning beliefs, theories, or perspectives

S-21 reading critically: clarifying or critiquing texts
General Discussion of Language S-24

Before teachers attempt an integrated grammar lesson, the class can be divided into groups of three or four and asked some critical questions about the structure of their language. Ask one or two questions at a time, and ask one student in the group to volunteer to record the group's answers.
What are some rules a person would have to know to speak English?

How do humans acquire language? At what age? Explain exactly how it is done. What do you remember about your own language acquisition?

Are all people taught grammar and, if so, at what age do they learn it? If there are younger children at home, how are they learning (did they learn), and what mistakes did they make? Why did he say that? Why was it a mistake?

Who determines what correct English will be? What implications does this have for society?

What is the definition of syntax? (OK to use the dictionary.) Does word order matter in English? (For example, does the sentence, "Help my dog eat," and the sentence, "Help eat my dog," mean the same thing?) If someone in your group speaks another language, find out if word order is important in the construction of their language.

What are the implications for a person who cannot speak at all? How do they communicate? How important is language of any kind to a person?

What are some things you would like to know about language that you were never taught?

By this time, you have involved students in thinking deeply about the importance of language. This process awakens intellectual curiosity instead of deadening it with grammar drills. The teacher may spend as much time as she likes exploring fundamental assumptions about language.

You may want to assign a writing project in which one group writes a paragraph then changes the word order in each sentence. For example, ask each group to collaborate on a short paragraph about the way children learn language. A partial response might be: Children learn language at a very young age. Their parents are the main teachers, but sometimes children just repeat things they hear. Then ask the group to mix up the syntax using the same words: Very young language learn at a children age. Teachers sometimes but main parents repeat just the children are their things they hear. Groups exchange papers and try to decipher each other's paragraphs to make sense. Students could share their methods of approaching this problem. It soon dawns on students that language has a rigid structure and that although they may not be able to recite the rules governing syntax, they know them. Students that speak a non-standard variety of English could compare their syntax with standard English and generate rules for translating.

Grammar in Literature S-21

First, choose a short passage that is exceptionally descriptive, exciting or well written. Then

ask students to write down the passage while you dictate it. This improves their listening and note-taking skills. Students could later compare different ways of using punctuation to write the passage.

The following passage is from John Steinbeck's The Pearl:

The scorpion moved delicately down the rope toward the box. Under her breath Juana repeated an ancient magic to guard against such evil, and on top of that she muttered a Hail Mary between clenched teeth. But Kino was in motion. His body glided quietly across the room, noiselessly and smoothly. His hands were in front of him, palms down, and his eyes were on the scorpion. Beneath it in the hanging box Coyotito laughed and reached up his hand toward it. It sensed danger when Kino was almost within reach of it. It stopped and its tail rose up over its back in little jerks and the curved thorn on the tail's end glistened.
Because students have written the passage, they are more prepared for the analysis you will ask them to do. Place them in groups to work on the following questions: List some things that you notice about the writing style of this author. S-1 Go through the passage and write down some verbs that worked especially well. Go through the passage and write down some nouns with their adjectives that made the passage more vivid. How do the adverbs contribute to the passage? List some positive and negative criticism you have of this author's writing style. S-21

This lesson will have students thinking about the way the grammar works in the passage. Students will develop a sense of what is powerful in writing and be able to generalize rules that will improve their own work. As a closing exercise, ask students to write a paragraph in which they imitate Steinbeck's style. They should be encouraged to invent their own fiction and not write a passage about a scorpion. These models of Steinbeck's style can be shared with the class and analyzed for points of comparison.

- **HIGH SCHOOL, 'GEOGRAPHY AND HUMAN WELFARE '**

Geographical Thinking and Human Welfare

Deep Point: Getting insight into how "geographical thinking" is essential to human welfare.

Central Concept: landforms

Central Issue: What is the relation between landforms and the conditions of human life?

Present Practice: Geography is often taught, like many other subjects, as a conglomeration of factoids that students are given to memorize and be tested upon. Rarely do students have to reason geographically in such instruction.

Critique
Geographical facts and concepts play an increasingly important role in schooling, and rightly so, but when they are taught didactically, students rarely learn how to reason geographically. Consequently students rarely acquire geographical insights or an enthusiastic sense of how and why geographical thinking is essential to human welfare. Etymologically, the word 'geography' means "a description of the earth". In fact geographers are most principally concerned--in

contrast to, say, geologists--with the implications for human life of facts about the earth. In studying the earth from the geographical standpoint one can concern oneself with mathematical questions (about the size, shape, and movements of the earth), about "physical" questions (about the layers of the earth surface and about the forces historically shaping those surfaces), or about "biological" and "human" questions (about the life conditions of plants, animals, and humans). The result is that good geographical reasoning presupposes some ability to reason geologically, astronomically, zoologically, botanically, meteorologically, and historically. The central concept is "the earth in evolution" and the central impact of informed reasoning with respect to that concept is insight into the way in which the evolution of the earth has shaped and transformed, and continues to shape and transform, conditions for life on earth.

Now since all reasoning involves basic fundamental structures or elements (elements of thought), and since these elements are essential to reasoning well, it is important that as we cultivate geographical thinking we cultivate students awareness not only of their use, but of the need for standards in their use, of these decisive structures. So, because all reasoning serves a purpose, which directs it, we want our students to have a clear purpose in mind as they go about reasoning geographically. Because all reasoning generates questions that need to be expressed clearly and precisely in order to be answered, we want to teach in such a way that students get experience in putting their geographical questions into clear and precise form. Because all reasoning depends upon accurate and sufficient information about the "things" we are reasoning about, it is important that we design instruction so that students have opportunities to gather and interpret and assess geographical information.

It is important that the specific content that we are focusing on - land forms in this case--not become an end in itself, that is, not be reduced to a series of surface facts about the shape and character of land. Finally, it is important that we not overwhelm our students with either questions or facts nor proceed so quickly that they are not able to reason their way into the content on the basis of their previous knowledge, beliefs, and experiences.

Proposed Design For Instruction

I will bring some globes into class, divide my class into groups of four or five, and ask that each group figure out what they can tell about the planet from what they see on the globe itself (collaborative learning, dialogical thinking, critical listening, independence of thought, intellectual perseverance). I will put my question as follows. "Based on what you know right now about interpreting what you see represented on the globe, figure out what conclusions you can justifiably come to concerning the earth and the conditions for life on it." I would stimulate thinking with more specific questions like this: "For example, are there areas of the world that you can see that you believe would have very few plants and animals?", "Are there areas of the earth where people could not live except under very special circumstances?" (Thinking aloud), etc..

I would give the groups a set amount of time to prepare a short report on the conclusions they came to and when the groups reported I would encourage the class to question how the individual groups came to the conclusions they came to and whether or not those conclusions were, in their view, justified (formulating questions at issue, distinguishing evidence from conclusions, assessing inferences, noticing and questioning assumptions, analyzing concepts, critical listening, critical speaking, dialogical, perhaps even dialectical, thinking), . As the reports and probings into the reports were taking place I would be writing on the board the geographical concepts that were occurring, and questions and issues that were arising, in the geographical reasoning being presented.

Subsequent to this activity, I would lead a general discussion on the assumptions, including the assumed geographical ideas, implicit in their group's reasoning as well as in the subsequent questioning of that reasoning (Socratic questioning). I would outline the issues that arose (identifying and clarifying issues). I would ask the class to help me divide the issues into those that have to do with the nature of the earth as a whole and those that have to do with specific areas of the earth (analyzing and classifying questions). On the basis of the division I got, I would ask the group to choose which cluster of questions they wished to explore in working groups (which would be assigned as library research as the basis of a further report to the class as a whole) (critical reading, collaborative learning, dialogical thinking). I would underscore the importance of discussing in the group what to include and why (seeking and giving good reasons). I would ask the students to pay attention to what questions or issues they feel they have answered or resolved and which questions or issues they have not (intellectual humility).

The report would be a written report and I would spell out to the class how the report should be structured and why (critical writing, asking root questions, clarifying purpose). In doing this last I would periodically stop and ask the question "Why do you think it is important to do this in writing up your report?". For example, "why do you think it is important to identify your sources?", "Why do you think it is important to put into quotes what you take literally from outside sources?", "Why do you think it is important to separate the conclusions you come to from what you are basing your conclusions on?", "Why do you think it is important to make us a short glossary of the important technical terms that you are using in your report?" (leading to assessing the credibility of sources, clarifying evidence, making well-reasoned inferences)

Four copies of each report would be made and each group would now become as assessment group for the report submitted by another group (assessing reasoning, utilizing elements of thought and intellectual standards). Before each group proceeded with the assessment, I would hold a discussion with the class as to how to go about assessing the reports (designing and analyzing standards for evaluation). This would involve, ultimately, detailed suggestions as to what to look for and why. The emphasis, of course, would be on constructive suggestions as to how the report could have been made more useful to the class including comments on what further research would be required in the light of what the report did and did not accomplish (intellectual civility, intellectual responsibility, intellectual humility). I would emphasize the importance of trying to figure out what further questions or issues are raised in the light of the findings of the groups (intellectual curiosity, intellectual perseverance).

The next activity would be the reading, by a representative of the research group, of their report to the class as a whole (critical speaking, critical listening). The floor would then be opened for questions (because everyone has already served as part of an assessment team on some groups' report I would expect every group report to generate some good probing questions) (dialogical thinking, asking root questions, analyzing and assessing reasoning, clarifying concepts, identifying assumptions, tracing implications, developing one's perspective). After each report and question and answer period, a representative of the assessment team for that report would summarize the assessment teams' findings (critical speaking). The class would be given an opportunity to comment on the assessment (critical listening, analyzing and assessing reasoning, etc...). In this period any member of the group whose report was assessed could respond as well, agreeing or disagreeing with elements of the assessment (critical speaking, dialogical and dialectical thinking, assessing reasoning, developing one's perspective).

In the light of the issues and questions that arose from the reports, assessments, and discussions, new clusters of problems would be generated, new groups formed, and new research projects begun, leading to new assessments, new discussions, and yet further questions and issues. From this design for teaching "land forms" it is apparent that a conception is being formed that could be generalized to a whole semester. It illustrates, therefore, how, given skill in the art of instructional design based on critical thinking, one can avoid detailed lesson plan design for each class and of how well-conceived overall design strategies can simplify, when they don't obviate entirely, the tasks of day-to-day design.

Patterns in Teaching

Every teacher teaches in a patterned way, though few teachers are explicitly aware of the patterns implicit in their teaching. It is important for teachers who aspire to take command of their teaching to foster higher order learning to begin to develop a sense of the patterns implicit in their own instruction and a sense of the patterns they might experiment with that would enable them more readily to cultivate the critical thinking of their students. For one thing, once one discovers one or two powerful patterns of teaching with which one can successfully work, it is possible to structure a whole semester of teaching around that pattern.

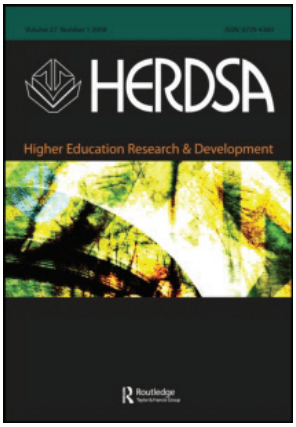
For example, consider the following patterns of instruction summarized, each one of which may be used as the repeating basis for instruction:

Conclusion

The redesign of instruction presupposes intellectual development on three fronts, a growing recognition of: 1) what is wrong with didactic instruction, 2) the nature and dimensions of critical thinking, and 3) pedagogical strategies that can be used to effectively integrate critical thinking into instruction (based on 1 and 2.) Problems of understanding on any of the three fronts can produce problems of implementation. It is not enough for our heart to be in the right place. Nevertheless, it is possible to begin the process of moving forward on each of these fronts simultaneously. Indeed, that is the only way that significant progress can be made. We must continually teach with three considerations in mind. Am I falling into the traps of didactic instruction? Are the students reasoning their way through the class or are they falling back into roles of passivity? What strategies and what patterns of instruction am I using to keep students involved in disciplined critical thinking?

This article is modified from a chapter in Paul. (1995). Critical Thinking: How to Prepare Students for a Rapidly Changing World. Dillon Beach, CA.

F– Oxford Tutorial Paper



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Critical thinking in the Oxford tutorial: a call for an explicit and systematic approach

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Critical thinking in the Oxford tutorial: a call for an explicit and systematic approach

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This paper summarises a study focusing on the extent to which the Oxford tutorial fosters critical thinking in students. In doing so, it aims to contribute to a largely ignored area of research regarding teaching pedagogy and classroom practice. The results of this study successfully reveal that participating tutors were primarily concerned with fostering students' abilities to clarify central questions, define key terms and question important assumptions (principally within the writing of essays). Participating tutors were less focused on fostering other essential critical thinking skills and dispositions including: (1) intellectual analysis and the internalisation of new ideas, (2) intellectual evaluation and (3) intellectual traits of mind. The primary hypothesis suggested by this study is that students are more likely to internalise those intellectual skills and dispositions that are explicitly and systematically discussed and required than those that remain implicit (and seem optional).

Keywords: classroom practice; critical thinking; Oxford tutorial; student learning; thinking skills

Introduction

This paper, based on a study recently conducted at the University of Oxford, documents attempts on the part of tutors to foster critical thinking (CT) within the Oxford tutorial. This study sought to shed light on: (1) how participating tutors conceptualise CT and the extent to which they teach it; and (2) how students conceptualise CT and the extent to which they are acquiring CT skills, abilities and traits within the tutorial.

This study is situated in a relatively rare and privileged position: it is focused on a paradigm (the Oxford tutorial), which is highly regarded worldwide and yet has been researched only superficially; and it is centred on a topic (critical thinking), which is internationally valued (at least rhetorically), is increasingly embedded in the language of the purposes, missions and standards of education from primary to postgraduate level and yet has never been researched directly in terms of the tutorial.

Given that this is the first study to focus on the tutorial from a critical thinking perspective, and being limited in terms of sample size, it is best seen as breaking ground rather than as a finished product; raising questions rather than coming to definitive conclusions; exploratory rather than evaluative.

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Literature review

The Oxford tutorial

First of all, what is the Oxford tutorial? Naturally it would be impossible to fully explore all of its features in a brief paper. However, the core concept can be easily expressed: it is a pedagogical framework involving low student-to-teacher ratios (usually ranging from 1:1 to 4:1). For each fortnightly tutorial, pupils are typically required to write a short essay, which focuses the tutorial. Students generally read aloud or summarise their work, after which the tutor and/or peers offer comment and critique.

The Oxford tutorial is a highly respected educational framework (Beck, 2008; Palfreyman, 2008) and no more than a cursory investigation is necessary to find the language of critical thinking explicitly and implicitly embedded within its course handbooks (for example, students are asked to 'critically analyse', critically engage', 'question underlying assumptions').

Yet what do we know, directly and conclusively, about the extent to which the tutorial fosters critical thinking? Unfortunately, very little. Robert Beck (2008) remarks: 'our admiration for the Oxford tutorial rests on belief only … not on hard evidence' (p. 1); and Paul Ashwin (2005) decries the 'paucity of research into the Oxbridge Tutorial systems' (p. 632). Indeed, except for anecdotal accounts or histories of the university in general, we have only the recent studies of Ashwin (2005, 2006) and Ashwin and Trigwell (2003), Moore's (1968) *The tutorial system and its future*, Beck's (2008) 'The pedagogy of the Oxford tutorial' and Palfreyman's (2008) *The Oxford tutorial*.

What does this literature tell us? Setting aside the work of Ashwin and Trigwell for the moment, Moore's treatise, Beck's essay and Palfreyman's collection are, quite clearly and openly, biased (in the non-pejorative sense) defences of the tutorial system. They highlight the best of the tutorial, but are not empirical investigations, and do not claim to be.

For a more scientifically-based perspective, let us turn briefly to Ashwin and Trigwell's examinations. In a quantitative study of 2330 Oxford undergraduates, Ashwin and Trigwell (2003) concluded that those Oxford undergrads with a deep approach to learning (tied to ideas associated with critical thinking, such as questioning assumptions, connecting key concepts and thinking through main implications) were more successful in exams, judged teaching quality to be higher and felt more confident, supported and motivated than students who relied on surface approaches to learning (approaches associated with uncritical thinking).

But how many students approach their tutorials in a deep and critical manner? In a much smaller qualitative study (28 students), Ashwin (2005) concluded that two thirds of the students interviewed (18) adopted surface approaches to learning and only three students articulated conceptions that were in the 'deepest' category (p. 640). According to Ashwin (2006), tutors did not fare much better: only 5 of 20 expressed the deepest approach to teaching in the tutorial, the same number that expressed the most superficial approach.

Critical thinking

In this study I was concerned with understanding the manner in which tutors defined critical thinking using their own words (see the methodology section), as, of course, it is the tutors' own conceptions of CT that naturally drive the manner in which they

teach it. However, to identify areas of investigation within which to develop interview questions, it is necessary to have some idea of the broad and non-controversial framework of critical thinking into which individual understandings can be placed.

Unfortunately, internal debate in the field of critical thinking often centres on disagreements between theoreticians rather than on their agreement (Hale, 2008). This obscures the significant common ground that does exist and gives the false impression that the field is disjointed or, colloquially, that 'no one agrees about what critical thinking *is*!' Hale convincingly argues that, while theoreticians often emphasise different aspects of critical thinking, virtually all agree that it entails analysis and evaluation of thinking with a view towards improving it, that it includes the development of intellectual traits and that it should be applied to one's own thinking, the thinking of others and thinking within subject disciplines (for examples, see Ennis, 1991; McPeck, 1981, Nosich 2009; Passmore, 1972; Paul & Elder, 2002; Peters, 1974; Scheffler, 1973; Scriven & Fisher, 1997; Siegel, 1990).

Thus, in keeping with this literature, we can divide critical thinking into the following broad dimensions:

- Skilled intellectual analysis: the ability to divide important intellectual constructs into constituent parts so as to internalise and evaluate them.
- Skilled intellectual evaluation: the ability to determine the quality of intellectual constructs and their parts.
- Intellectual improvement: the ability to creatively devise strategies aimed at correcting weaknesses and improving strengths (which have been identified through analysis and evaluation).
- Intellectual traits: characteristics of mind necessary for developing fair-minded critical thinkers, such as: intellectual perseverance, intellectual integrity, intellectual courage, intellectual empathy, intellectual autonomy. It is argued that such traits guard against the development of sophistic or self-deceptive thinking.
- Knowledge of the problematics of thinking: including intrinsic tendencies such as egocentrism and sociocentrism, which trap the mind in oversimplified and prejudiced mental states.

Furthermore, these dimensions need be applied to various contexts:

- To thinking generally (one's own thinking, the thinking of a professor, colleague, friend, parent, lover …);
- To subject disciplines (each of which have specific and sometimes unique forms of analysis and evaluation);
- To personal life, both with regard to significant decisions (buying a car or house, making career decisions …) as well as day-to-day activities (such as health, diet and exercise, parenting, voting and politics, managing finances …).

These lists are not exhaustive, but illustrate some of the many ways in which critical thinking can be conceptualised and applied, a number of which emerged in the study described herein.

Central research questions

The central research question in this study was: 'What critical thinking skills and traits are presently being fostered by tutors and internalised by students in the Oxford

tutorial and which forms are seemingly less valued or perhaps not as deeply understood?' To answer this question, three sub-questions were explored.

First, both tutors' and students' conceptions of critical thinking needed to be brought to the surface. Here the key question was 'How is critical thinking understood by participating tutors and students?' The goal was not to look for any putative 'correct' answer, but rather to explore tutors' and students' conceptualisations of CT, as well as their perceptions of how, and the extent to which, they were teaching or learning it.

Second, this study was not confined to analysing *perceptions* and *beliefs* only. It also sought to explore whether and to what extent critical thinking was *actually being practiced* by tutors and students. Key questions: In the case of tutors: 'What specific strategies were employed within the tutorial to foster student development of CT?' In the case of students: 'How successful are students in deploying those concepts in their intellectual (and even personal) life?'

Finally, and by implication, it was important to note those essential dimensions of critical thinking that were seemingly not being fostered. Key question: 'What critical thinking skills, abilities and traits seem undervalued or unnoticed (by tutors and/or students)?'

Methodology

Semi-structured interviews were conducted with three tutors (all male) and seven students (four male/three female) in the middle of the second (Hillary) term. Additionally, four tutorials were observed, one from each tutor and two from one.

Due to the exploratory nature of the study, as well as the difficulty in gaining access to such an intimate environment, tutors were identified informally through suggestions made by a contact in the department of politics, within which all tutors worked. Only second-year students were chosen as they have more tutorial experience than do first-years (and potentially more maturity and reflectiveness) yet do not have the burden of impending finals, as do third years, which might have introduced a level of stress and potential for negativity among student participants. All students except one were taking the Politics, Philosophy, and Economics (PPE) course, a combined degree at Oxford.

Tutor and student conceptions of critical thinking were explored through semi-structured interviews. Tutors and students were questioned on each of the key categories of critical thinking identified in the research literature. Thus, tutors and students were probed in the following directions:

- What is your conception of critical thinking?
- What role does critical thinking play within the tutorial?
- How did you develop your conception of critical thinking?
- How do you approach learning new ideas?
- What criteria do you use to judge the quality of intellectual work?
- What is the importance and role of intellectual traits in the tutorial?

Tutors were also asked:

- How do you go about teaching critical thinking in your tutorials?

Students were also asked:

- Do you feel that you are developing your critical thinking skills as a result of your tutorial experience?

This semi-structured approach ensured that each tutor and student was queried regarding key components of critical thinking implicit in the literature, while allowing the flexibility to explore topics spontaneously as they arose (Marton & Booth, 1997; Pring, 2000; Rubin & Rubin, 1995). The stability of question categories enabled direct comparisons to be made between teacher and student responses regarding the same intellectual topic.

Each interview was conducted on a one-to-one basis in places of convenience and comfort to the interviewee; all within college rooms or student accommodation. Vague or overly general responses were followed by requests for examples. These interviews were recorded and fully transcribed (totalling over 60,000 words).

Observations were aimed at collecting more objective data to supplement the subjective accounts given by tutors and students. The primary purpose was to determine the extent to which self-identified attempts on the part of tutors and students to teach or employ critical thinking strategies could be observed.

Initially it seemed important to explore both sides of the tutorial experience (tutor and student) so as to be able to compare the views of specific tutors and their own students; thus I decided to interview not simply tutors and students, but tutors *and their* students. To accomplish this, tutors were invited to participate first and students were chosen from among those being taught by the tutors. In retrospect, this connection with individual tutors was not as significant as originally thought. This was largely due to the high level of convergence between tutors' conceptions of critical thinking within the study and, if students' accounts are to be believed, between most tutors in the department of politics.

Five tutors were invited to join the study. One did not reply to emails and another declined due to a busy schedule. The other three agreed to participate. Eight students were invited to join the study. One did not reply to emails, the other seven agreed to participate.

Criteria for evaluating the quality of data and findings developed in this study: data analysis and generalisability

The quality of data in this study was determined according to the trustworthiness and authenticity of participant responses. These two features were maximised through deep questioning of participants focused on gathering rich and detailed examples. As Cooper and McIntyre (1996) put it, 'the intention of this approach is to ensure interviewee's accounts are grounded in their perceptions of the actual events … where interviewees do make generalised remarks, the researcher requests exemplification. It is, therefore, possible to distinguish between responses that are so grounded and those that are not' (p. 37). Thus, clarity, precision and depth of responses was taken to indicate deep understanding, whereas vague, muddy or superficial examples were seen as evidence of partial or superficial understanding.

Data was analysed in relation to explicit concepts and principles implicit in critical thinking scholarship. Teacher and student responses were also compared against each other to determine the extent to which tutors' attempts to teach critical thinking were effectively impacting student understanding.

As the sample size in this research does not justify large-scale conclusions, this project aims only at 'naturalistic' generalisability (Stake, 1995), in which the reader, and not the researcher, does the generalising. It is hoped that by developing data that is richly contextualised, this study should help readers determine the extent to which the tentative hypotheses generated are helpful within their own context.

Critical thinking in the Oxford tutorial

The results show that, with regard to critical thinking, participating tutors were primarily concerned with students' ability to clarify central questions, define key terms and question important assumptions within the writing of their tutorial essays. Participating tutors were less focused on helping students develop approaches to: (1) learning new ideas (the process of which was often seen as divorced from, and prior to, critical thinking); (2) intellectual evaluation (which participating students said they most commonly based on intuition); and (3) the development of intellectual traits (which students said were often lacking in peers, and which were largely missing from both tutor and student articulations of critical thinking). Tutors in the study were found to believe that these latter skills, abilities and traits would develop naturally, without the need for explicit teaching. As we shall see, student responses do not support this belief.

In line with tutor emphasis, students explicitly saw themselves acquiring skills in writing essays, including clarifying central questions, defining key terms and questioning important assumptions. On the other hand, students expressed no clear approaches to the understanding of new ideas, to intellectual evaluation nor to the cultivation of intellectual traits.

The primary hypothesis suggested by this study is that students tend to develop those intellectual skills and abilities that are explicitly fostered and reinforced by multiple tutors and tend not to acquire those that remain implicit or seem optional. As the degree of explicitness is not an issue unique to the tutorial, this suggestion, if justified, would have implications not only for Oxford, but for teaching critical thinking more generally.

Area of convergence: the writing of essays and critical thinking

It was in the area of essay writing that tutors' and students' conceptions of critical thinking converged most. All participating tutors and students interviewed mentioned that the first task when writing an essay was to clarify the question asked by precisely articulating the meaning behind key concepts, as well as identifying the assumptions underlying their use:

Tutor A: In considering a problem, or an issue, [a critical writer] tries to isolate the absolutely *core question or questions* that are involved, attempts to look rigorously at both the *logic* of suggestive answers and at the empirical basis of any *assumptions* that have been made.

Student J: So I've actually been taught how to [test assumptions and explain terms]. Teachers and tutors have recommended that I do that. And that's only something I've done recently. … So I remember essays from even last term. I hadn't really explained the *question*. I hadn't really teased out any *assumptions* in the *question*, I hadn't done any of that. And my tutors had hit me up on that. So it's since then that I've taken that into account.

Student E: Well first of all, in an essay, I look at the title of the essay, whereas before I would have looked at it and just gone straight into it and answered it, now I like

> to *define the terms*, which almost takes half an essay sometimes, to find out what everyone means by the terms they used and what they're asking really as opposed to the *surface meaning of the question*, which I've never done before. And that's kind of a big change. (emphases added throughout)

Observations confirmed this focus, as every observed tutorial began with a discussion of key terms within the essay question and the assumptions behind them. Tutors' shared emphasis and explicitness on these three intellectual skills (defining key concepts, clarifying central questions and bringing to light important assumptions) within the realm of essay writing apparently translated into meaningful and significant learning on the part of participating students. This indicates that when powerful concepts and strategies are made explicit and systematically required, students are capable and willing to internalise and apply them.

Unfortunately, the lack of explicit direction for engaging in other important intellectual tasks left students unsure and often confused as to how to perform them.

Critical thinking often seen implicitly rather than explicitly in tutorials

It was clear that a significant amount of student time and energy was wasted due to a lack of clarification regarding their required tasks and how they should approach completing those tasks. Tutors seemed to almost embrace this implicit approach, while students seemed frustrated:

> Tutor C: Being able to write an essay, being able to present a structured argument … these are essential parts of intellectual pursuit. They're nothing the tutorial is a particularly productive forum for explicitly teaching, but they're a by-product of the way that tutorial teaching works … we're developing those skills along the way. … But the tutorial is not necessarily the forum in which these skills can be addressed.
>
> Tutor A: There is increasingly a tendency to try to formalise [the tutorial], to give people rules. On occasion I have to preside over training sessions for graduate students in this. I try not to make it too obvious that I think this is an utterly pointless activity because if they're any good they will throw the rules away or write them for themselves.
>
> Student J: Well I think that's the thing with the tutorial system is that your tutors are very rarely actually explaining things to you. … So I remember the first time I came up here and I got an email saying 'read these chapters in a book, read this book as well, and write this essay'. And I hadn't received any tuition, hadn't been to lectures, this is completely new! … So I had three days to read 200 pages and write an essay on a subject I'd never done before. So you can't be, in a tutorial, like with this essay that you think is utter shit and you don't really understand what you've written … and I'd be so nervous about that in the tutorial that it was really difficult to actually learn anything, because I was so nervous about the whole thing.

While not possible to fully document in this brief article, the interviews and observations clearly demonstrate, in over 60,000 words and 100 pages of transcripts, that much of what is sought after within the tutorial remains implicit and somewhat mysterious. By keeping critical thinking at an implicit level, much is left to chance in terms of what students will internalise in a deep and transformative way. Indeed, research suggests (Pedder, 2006) that pupil learning is improved when tasks are made explicit; the corollary, of course, being that when tasks remain implicit, pupil learning is reduced.

It is perhaps not coincidental that those domains of critical thinking in which faculty understanding was most implicit were the same that produced the weakest and most problematic responses from students. This relationship is briefly explored in the next two sub-sections.

Intellectual analysis and the learning of new ideas

One area of concern revealed through this study was the manner in which students approach the learning of new ideas. Tutors seemed to separate tasks of understanding (of 'clarification' or 'filling in gaps of knowledge'), from true 'critical thinking', a conception that excludes the important analytical function of critical thinking. As tutor B put it: 'You've got to comprehend before you can criticise' In other words, for tutors and students, 'critical thinking' was often equivalent to 'critique' or 'being critical' and most students in the study seemed to reflect their tutors' belief that one must have command of a mass of facts before one could begin to think critically about them:

Interviewer:	So you said in philosophy you need to think a lot before you can analyse – what does thinking entail that's not analysis?
Student I:	I think it's understanding. That's what I mean by it. … I think for me critical thinking is less a role because I'm trying to get the basics down and I'll think through the issues once I look at them again. Whereas I need the issues at the moment.
Student D:	As long as you have enough depth of knowledge [you] can critically think about things, because if [you've] only been doing stuff for a couple of days or a couple of lessons then [you're] not really going to have the resources to think critically about it. [You're] just going to be picking away an argument based on not very much.
Student C:	I just want to say that there is a difference between critical thinking and learning [long pause] stuff. Like reading an article and loads of books. I think the tutorial system probably is good at stimulating a critical way of thinking … but that's at the detriment of actually learning the stuff that you're meant to read.

Note that these answers ('getting the issues' versus 'thinking them through'; 'learning stuff' versus 'critical thinking') contrast critical thinking with learning new ideas. This is a problematic conceptual separation and one that is not shared by theoreticians on critical thinking (see, for example, Ennis, 1991; McPeck, 1981, Nosich, 2009; Paul & Elder, 2002; Siegel, 1990). The grasping of content cannot be divorced from the process of evaluation, as the human mind begins to categorise and prioritise information as soon as it is encountered and not significantly later (Browne & Keeley, 2006; Paul & Elder, 2002).

Perhaps reflecting this lack of explicit analytical strategies, most participating student articulations explaining how they learned new ideas were vague or technical, rather than clear and critical. For example, student D remarked that his strategy was 'once I've done all my reading I'll make notes on each of the papers that are vaguely useful, and just sort of take out useful quotations and try to synthesise all that into a plan.'

We might juxtapose this remark against a more critically skilled, hypothetical, response such as: 'When I attempt to understand the reasoning of a particular philosopher, the first thing I look for is the key concept that seems to tie together the entire theory. Then I look at the assumptions on which that theory is based and the key

question which the philosopher seems to be focused on. I then follow out the implications of the theory, asking 'if this is true, how does it change the way I should live or the way society should be structured?' Such intellectual moves are essential to deep understanding and they seem to be missing from the approach participating students used in analysing texts. To the extent that students are not being explicitly taught how to perform intellectual analysis as a vehicle to understanding a text, they are missing a significant domain for critical thought; the domain, for example, of close reading (Paul & Elder, 2006).

Intellectual evaluation

Intellectual evaluation was another area of critical thinking in which participating students lacked essential knowledge and skills. Though tutors had well-developed systems of evaluation for themselves, none articulated explicit strategies for teaching these systems to students. Rather, tutors appeared to assume that students would naturally develop skilled methods for evaluation by virtue of being asked to engage in evaluation frequently (remember tutor C's comment that students would develop critical skills 'along the way'). However, practice is a necessary, but not sufficient, condition for intellectual development, as practice without intellectual discipline can lead to poor habits of mind. Practice without an emphasis on intellectual standards may lead students to internalise ideas, but those ideas may well be illogical, irrational and/or unreasonable.

Students' explanations of intellectual evaluation strongly supported the need for more explicit instruction in this domain. Only one student gave a clear, though limited, response to the question 'How do you judge the quality of an author's reasoning or written work?' (he cited criteria from formal logic). The other students seemed to be guided largely by intuition. Here were some explanations of how students describe themselves engaging in intellectual evaluation:

Student I:	A big part of it is my own intuitive instinct, my own preconceptions of that argument. And so in which case if I start to follow an argument and it corresponds with something I find quite intuitive then that's quite helpful in judging articles.
Student G:	I find it really hard to read someone's essay and critique it. I don't know why, it's like impossible – it's like gibberish I don't know why! … But in the end I just kind of [go] through the plan of [an] essay and then just underneath in a different colour pen, just say like whether I think this is a good or bad idea, but I think that's a bit sort of childish.
Student F:	Yeah well you often just get a – it sounds really like stupid but it's almost just sort of what you think sounds right. It's almost like an impulse. It's almost an impulse decision. It's just what seems more convincing …
Interviewer:	So more intuitive then?
Student F:	Yeah, that's the word, yeah.

Tutors seemed to agree:

Interviewer:	And when you have your students critique the other arguments, what kinds of criteria do you see them using?
Tutor B:	Well I think that's much more ad hoc. They tend to assess in terms of what they agreed and disagreed with. That's probably less helpful … it tends to be more sort of, 'well you know I agree with x. y, z, but I disagree with a, b, c' …

Interviewer:	So you don't actually say 'ok when you're critiquing this person, you need to use these criteria'?
Tutor B:	No but I think I should do, just thinking about it [pause] now you ask it, I probably should say 'look, you know, what do you think are the criteria that I use? You should use the same sorts of things' … but obviously your implicit point is right in that they should do it with criteria.

This last remark reveals some important insights, both for us and for the tutor. Despite the tutor's own skills of evaluation (just a few of the questions he asked were: 'Is it properly structured?' 'Does it flow logically?' 'Is it supported by evidence?' 'Is it coherent, rather than contradictory?' 'Is it persuasive?') and knowledge of students' struggles with evaluation, he had never thought to explicitly discuss the criteria he uses with students. Apparently, he simply assumed that through practice students would improve on their own, an assumption that does not appear to be justified by the student responses in this study.

The other participating tutors seemed to share this belief. Moreover, in observing tutorials, many student comments on the readings started with 'I agreed/disagreed with X, because …' or 'I liked/didn't like Y, because …' Though tutors then often attempted to probe students' thinking with questions like 'Why?', the students seemed to lack an explicit framework for articulating their thoughts. The result was a mix of subjective and objective evaluation, with the subjective most often leading the charge.

Thus, student critique is largely based on 'whether or not they agree' with the point. Paul and Elder (2008) identify this as an 'egocentric standard', which they characterise as 'it's true because I believe it' (p. 21). Under this paradigm, students use their own beliefs, rather than independent criteria such as those articulated by the tutors (clarity, logic, depth etc.), as the primary determiners of what is and is not so. In other words, arguments are largely unproblematic if the conclusions coincide with the beliefs of the student and false and problematic to the extent that they conflict with those beliefs. This manner of evaluation is inconsistent with the spirit of critical inquiry and can lead to intellectual sophistry and manipulation, as highlighted in the next section.

Intellectual dispositions

Not only did tutors not seem to include intellectual traits in their conceptions of critical thinking, in some cases they actively excluded them:

Interviewer:	To what extent do you look to develop intellectual traits of mind?
Tutor B:	I don't really know what you mean by traits of mind.
Interviewer:	Well, you talked in the beginning about an independence, a criticality, distrust of authority …
Tutor B:	No yes, I don't mark down people for not showing – I mean those are the traits of mind that I try to cultivate. But I don't mark people down for not showing them that, you know, or for not going the whole way down the possible critical route …
Tutor A:	The notion of forming someone's character, I *seriously* hope I have never done that because to be proud of doing that would be such a vain statement about my own sense of *my* character.

The lack of emphasis on intellectual traits on the part of tutors in this study is a concern, as it can implicitly encourage unethical and sophistic critical thinking (Ennis, 1991; Paul & Elder, 2008) – skilled but selfish thinking used at the expense of the

rights and needs of others. When sophistic thinking is implicitly encouraged in the classroom, when the goal is simply to 'win' the 'debate', students may ignore insights in arguments to which they are not sympathetic and instead 'attack' or attempt to 'destroy' them (terminology that was used frequently in the student interviews).

Tutor A spoke of this problem quite directly and forcefully when he critiqued the way philosophy is taught at Oxford:

> Tutor A: I have problems with our philosophers here, because the way philosophy is taught at Oxford, is almost entirely destructive. You are trained to go for the jugular and to take that reading [for example] which will best enable you to show that Kant was incoherent. I have no patience with that.

Tutor A did go on to articulate a vision of intellectual traits (including intellectual empathy and humility) in reading; as he put it 'to lead to some productive thought … rather than reading it in the way which allows you to score points'. However, this seemed to be a peripheral rather than central concern. It did not appear to be an essential component of his or the other participating tutors' pedagogical focus. The effects of this approach on students is suggested in the following:

> Student C: I think some people have a knack for bullshit. To be honest a lot of people on my course do. I mean it just comes with the territory right? This is a politician's degree, of course they're going to be good at bullshit [laughing]. Like in my ethics tutorials last term, the guy I had tutorials with, he would do no reading but he was still able to just talk, like for lengths. He could have kept going if the tutor hadn't stopped him [laughing], even though he hadn't really done anything.
>
> Interviewer: Some students have said that some students in PPE have this debating background where it's all about thinking on your feet, making an argument, and who cares if you actually believe in it or not, it's just convincing people you are right – would you say that's a part of the course that you take or not?
>
> Student E: I think it's a PPE trait. Like it actually is! [laughing] and I really dislike it in people. That problem – they use so many words just to kind of talk talk talk talk talk to try and prove their point. You don't know if they believe the point …
>
> Interviewer: And do you find that that method of doing things is rewarded by their tutor and the system in general or is the tutor saying 'well be a bit more nuanced and maybe you shouldn't argue so vociferously' etc. etc.
>
> Student E: I *do* think it is rewarded because they do tend to become better at thinking on their feet so they tend to learn to [bullshit] it almost, which they do quite a lot.
>
> Interviewer: And the tutors don't seem to sort of crack down on that?
>
> Student E: No I don't think so. I think I spend, well I've spent most of my X tutes in silence just kind of – from PPEist to PPEist, and unless there's an issue that particularly grasps me I don't tend to speak because I just watch. It's like a ping-pong game. And if you try and speak you've got to speak across someone, there's not an opportunity.

One can imagine the dangers of teaching that encourages 'scoring points' and 'proving your point' over an open-minded and empathetic exchange of ideas, especially considering that some Oxford students will become future political and business leaders. Nowhere in the interviews with tutors or students were important intellectual traits such as intellectual courage, intellectual integrity, intellectual perseverance, faith in reason or fair-mindedness explicitly mentioned.

Questions and hypotheses for further/future consideration

Results of this study indicate that, to the degree that participating tutors are effectively fostering critical thinking, their approaches, though perhaps different in appearance, are highly similar in substance and aim (e.g. the development of students' ability to clarify key questions, concepts and assumptions). To the degree that this is true across the university (which requires further investigation to determine), one hypothesis for improving tutorial supervision would be to *make more explicit* the key abilities Oxford tutors would like to see fostered in student thought. This articulation need not be static but might be, and likely would be, dynamic, matching the evolving sensitivities of the faculty. Questions for future research:

(1) How do tutors' conceptions of critical thinking vary within departments, as well as across departments?
(2) Does any department promote a common approach to conducting tutorials or do all departments leave it to the individual tutor, as was the case in the department involved in this study?
(3) For those tutors more effective at fostering critical thinking, what pedagogical strategies do they use and how might these strategies be shared with other, less effective, tutors?

Participating students' conceptions of critical thinking, especially in reference to essay writing, were highly convergent with each other and with their tutors. Moreover, the fact that students were much less clear about how to perform intellectual analysis and evaluation seems to correlate with their tutors' implicit approaches in these domains. The hypothesis here is that *student internalisation of important ideas may improve when core concepts are discussed explicitly and adopted by multiple tutors.* Questions for future research:

(4) To what extent do students use critical thinking tools in attempting to understand and internalise new ideas?
(5) How do students engage in intellectual evaluation? How do they learn or develop criteria for assessment?
(6) How, and to what extent, are these, and other, important critical thinking skills communicated to students?

That participating tutors seemed to place little value on the development of intellectual traits is worthy of special attention. That a number of both tutors and students in the study expressed concerns over a perceived disregard for important intellectual dispositions such as intellectual empathy and fair-mindedness indicates the need to study the role of intellectual traits in the Oxford tutorial more systematically. Remember that one tutor categorised sophistry as a widespread problem in the philosophy department and some students characterised many of their peers as engaging in sophistic behaviour. Though Oxford tutors are clearly not *attempting* to foster the development of sophistic minds, it seems that some tutors are unaware or unconcerned that some of their students may be developing skills of intellectual manipulation. Questions for future research:

(7) What are tutors' conceptions of intellectual traits, across Oxford University, and how do tutors think these traits should be cultivated?

(8) What practices in the University either reward or discourage the development of intellectual traits across the disciplines?

Conclusion

If one juxtaposes the down-to-earth comments of the participants in this study with some of the many celebratory comments made by advocates of the tutorial (e.g. Palfreyman, 2008), some tension is revealed. It is clear that further research is called for to determine the extent to which critical thinking skills are in fact being fostered in even highly prestigious institutions such as Oxford.

Though this study has focused on relatively few individuals within one department at one university, the issues it raises are broad: it suggests that critical thinking strategies are more likely to be internalised by students if those strategies are taught explicitly and systematically. As with any skill set, if students are to develop the ability to think critically, they must grasp what that entails, they must be given guidance as to how they should practice it and they must be given time to develop their proficiency in it.

Many of the skills and traits canvassed in this article are *prima facie* significant for intellectual development (e.g. the ability to identify core concepts, the ability to formulate questions clearly and precisely, the ability to trace out the implications of what is said or done …) and the extensive literature on critical thinking offers many more non-controversial candidates for study. For researchers, this study highlights the need to investigate such strategies and their effects on students. For educators, it suggests benefits might be gained by selecting important critical thinking skills and traits and clearly introducing and systematically requiring them of students.

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G– The Critical-Analytical Vocabulary as Academic Lingua Franca

The Critical-Analytical Vocabulary as a Common Academic Language

Preface

Richard Paul, founder and director of research for the Foundation for Critical Thinking, once told me a story about a short flight he took in a private aircraft that contained only himself and the pilot. This pilot also happened to be a biology teacher at the University of Minnesota, a subject Paul knew little about. Paul, being inquisitive, began questioning the pilot on the nature of biology. He began using the tools of critical thinking to probe the foundations of the field, asking questions like 'what is the purpose of biology?' 'what are some of the main assumptions biologists make?' 'what are some key questions biologists routinely consider?' 'what kinds of information do biologists pursue, and how do they determine its quality?' 'what are the most fundamental concepts necessary for understanding biological thought?' 'how do biologists tend to view the world?' 'what are some inferences biologists make as a result of this viewpoint?' After about 30 minutes in which Paul continually questioned the pilot Socratically (by following the implications of each answer given), the pilot stopped the process. He said 'you know, what's really interesting about the questions you're asking is that some of them would be answered in the first day of an introductory biology course, and some of them could be the focus of PhD dissertations'.

This is an example of highly effective intellectual communication. By questioning in a disciplined manner, using a small set of universal analytical tools, Paul had begun to enter into the logic, the system, of biology. In just twenty minutes, he was beginning to ask questions like a biologist, to think like a biologist.

This essay explores the idea of intellectual communication and its improvement through the development of a shared academic language based on these and other universal analytical and evaluative concepts.

Intellectual Communications and Miscommunications

Intellectual communications abound in academia. Researchers must communicate the status of their work at numerous stages: during initial grant applications, when obtaining permission or access, within publications and to reviewers, in presentations to other academics or to the public. Teaching involves communicating to students through syllabi and assignment descriptions, during class and in office hours or tutorials; and again to administrators, department heads, or deans regarding publications as well as teaching successes and struggles, progress and development. Students, for their part, must communicate to professors their puzzlement and confusions during class time and after, as well as the extent of their understanding during exams and tests.

Yet many of these communications are not successfully received and understood by their intended audience, leading to much wasted time and energy. For instance, students are often confused about what is being asked of them. Indeed, recent broad-scale studies (see e.g., Casner-Lotto and Benner, 2006; and especially Arum and Roksa, 2011) support prominent scholars (see e.g., Bloom, 1988; Bok, 2006; Ramsden, 2007) who have long argued that many students complete their undergraduate degree without learning much at all, and with very little development of their critical capacities. Taken as an aggregate of professor and student time across the nation (or world, if you like), this represents hundreds of thousands of hours of 'wasted' time each year.

And, of course, misunderstanding is not exclusive to students. The overwhelming majority of

teachers find it hard to identify objective standards for assessing thought (Paul, Elder, and Bartell, 1997; Thomas, 1999) and to communicate them to their students (for review, see Black and William, 1998, and; James et al., 2006). One implication of this is that much evaluation of students' written work is grounded in highly subjective and personal criteria, such as the degree of 'flair and sparkle' (see, e.g. Paul, 1995).

Analysis and Evaluation: Fundamental to Successful Communication

Successful communication depends upon effective analysis and evaluation of thought. That is, in every case in which humans are confronted with something requiring intellectual processing (an essay, a lecture, an assignment, a research publication, etc.), they must break it down to focus on individual parts (analysis) and then they must determine the extent to which those parts make sense or have validity (evaluation).

This can be seen clearly when applied to written work: there is no way to take in an entire book or a page or a paragraph all at once. Operating simultaneously during analysis is the process of evaluation: once readers have determined the meaning behind a section they've focused on, they then begin to judge the extent to which that meaning is valuable or true. As you critically read this chapter, you are doing these precise things – analyzing what you are reading and assessing it for quality, taking it apart to understand it, deciding what to accept and what to reject, relating the ideas within it to other ideas you already have about education and learning, and so on.

Of course, there are many forms of analysis and evaluation. I've just discussed one: argument analysis. We might also analyze and evaluate this essay grammatically: noting some interesting uses of punctuation and a bizarre combination of British and American spelling. Or perhaps from a gender studies perspective: noting an absence of gendered pronouns in examples being used.

Subject Specific Forms of Analysis and Evaluation

In fact, there are myriad forms of analysis and evaluation. Each discipline has at least one, and many have more. These subject specific forms are often highly specialized and unique: biologists are interested in the extent to which an experiment has been controlled and can be repeated; historians are not. Art critics focus on brush stroke and use of color; psychologists don't. Basketball coaches care about wrist flick and arm extension. Poets think about word choice and rhyme structure. Anthropologists are concerned with interpretation bias.

Though this is not often made explicit, much of our success or failure within academia is due to our ability or inability to become conversant in these scholarly languages and dialects, and thus to communicate in appropriate ways to colleagues, mentors, and students. In other words, people are considered skilled in a subject, not usually by measuring the number of 'facts' they can regurgitate (though this often forms the basis of low-level assessment) but by the extent to which they can read and interpret (i.e. analyze and evaluate) texts or other intellectual communications in the field, and then produce unique and creative syntheses which are clear, accurate, and logical (among other important criteria); conditions which are tested at higher levels of examination, such as PhD dissertations.

Subject specific forms of analysis and evaluation are important and useful. They represent systems which serve to ensure (or at least improve) quality of thought within the discipline. They have developed slowly over time, often in response to previous abuses which were recognized as problematic (e.g. the creation of ethical guidelines in medical research due to unethical actions taken by researchers), or to correct common mistakes in the field (e.g. not controlling for variables in the sciences and social sciences).

However, subject-specific forms of analysis and evaluation are also limited in important

ways: because each is unique, it is not transferrable to other fields or disciplines; because each is complex, often requiring the absorption of a large vocabulary, students must spend many weeks or years reading and working in a particular field before they develop skill enough to contribute to its discourse, and most will never attain nor are interested in attaining such a level . Further, these specialized languages necessarily exclude those who do not speak them. This exclusion tends to increase as one gets closer to primary research; much of what is published is readable by only a small fraction of humanity, which renders impotent many important insights and implications for human action and societal development (for instance, how many fundamental and fairly simple yet powerful ideas have you studied which are not widely understood or employed, with negative implications for individuals or society?) These important insights are not successfully communicated to students and the public because they require knowledge and skill in specific forms of analysis and evaluation, which many readers lack.

Fortunately, underneath these specialized forms of discourse, and fundamental to effective functioning within any discipline, lies a universal set of analytical and evaluative concepts; a set which is sometimes called the 'critical-analytical vocabulary'. This vocabulary, being based in common language (e.g. English, French, Japanese, Arabic), is accessible to all. In other words, it forms the basis of a vocabulary that can be shared by all people in human societies; it can be developed and expanded in an effort to improve the efficiency and success of intellectual communications wherever they exist.

The next two sections briefly explore some of these analytical and evaluative tools, and the manner in which they implicitly operate in human thinking, wherever and whenever humans think.

Universal Analytical Language

I will now make an assertion which may seem controversial, but bear with me for a moment: despite the unlimited potential manifestations of human thinking, there are universal elements of thought which are always present, and which are therefore always subject to inquiry. Further, if one understands that disciplines do not exist as bodies of collected facts but as forms of thinking about the world in specific directions, one will see that each subject can be probed at a fundamental and powerful level through its system of thought.

Think back to the story which begins this essay. How was Paul able to enter into a subject about which he knew very little in such a short time? The answer lies in his understanding of human thinking and therefore human thinking regarding specific subjects: he knew that certain structures form the basis of every discipline, and so knew he had a ready set of analytical questions with which he could investigate this new (to him) system of thought (biology). Paul and Elder call these fundamental structures the 'Elements of Thought', and generally place them into a circle diagram to emphasize the non-linear nature of the relationships between and among them. These structures are not proceduralized, but are based on principles which can be ordered in many possible ways for many possible purposes. To my mind, they form a starting point for the development of a universal analytical language:

Diagram 1: Elements of Thought; used by permission, Foundation for Critical Thinking

Paul and Elder argue that the elements of thought are present wherever human thinking is present, and therefore suggest a minimal set of questions which could be asked while performing any intellectual analysis. One can, for example, question the purpose of studying history or of car buying. One might seek out information for preparing for a nursing exam as well as for making a political decision. There are implications for being a highly skilled teacher just as there are for being a loving and supportive parent. Furthermore, these elements interact in the mind in an integrated way. If your purpose changes (teaching elementary

students versus teaching college students), then so too will your questions, and therefore the information you seek, the conclusions you come to or the inferences you make, etc.
Another way to consider the universality of these structures can be seen in the absurdity of their negation; that is, it would be unintelligible to say of one's own reasoning that it is without a purpose, asks no questions, is based on no information, leads to no implications, embodies no point of view, begins with no assumptions, employs no concepts, and comes to no conclusions. Further, to claim that these structures are not universal is a conclusion (inference) which is based on some information and in response to a problem; it employs concepts filtered through the lens of particular assumptions contained within a point of view; it seeks to accomplish a goal (purpose) and leads to implications and consequences. In other words, to negate them is to use or presuppose them - and thus to prove that they are implicit in reasoning.
In an academic subject, these elements can be applied on multiple levels. To introduce students to a subject, for example, one might begin with a discussion of the elements of reasoning at the heart of the subject, as in: some important purposes of engineering are… some key questions engineers ask are… engineers tend to gather the following types of information… engineers make the following types of inferences… engineering is founded on certain assumptions regarding the nature of the world, such as… some key concepts central to engineering, without which one would not be able to understand it are… some implications of skilled engineering reasoning versus unskilled engineering reasoning might be… engineers tend to view the world as follows…One might substitute any subject or human activity for "engineering" above (e.g. history, anthropology, teaching a course, teaching an individual class, reading an essay or speech, etc. etc.) and these analytical tools will, I believe, prove valid and useful.
Of course, these are not the only possible universal analytical concepts. One theoretician, Gerald Nosich (2009), has proposed a ninth: context. He presents all nine together by putting a box around the circle of elements, with the word 'context' in the corners, implying that human thinking always exists within a particular context. There are possibly more structures which are universal in their application, and as the field of critical thinking continues to emerge it will be important for more scholars to contribute their own ideas and suggestions regarding universal as well as subject specific forms of analysis and evaluation. Linda Elder makes such an appeal in her contribution to this collection.

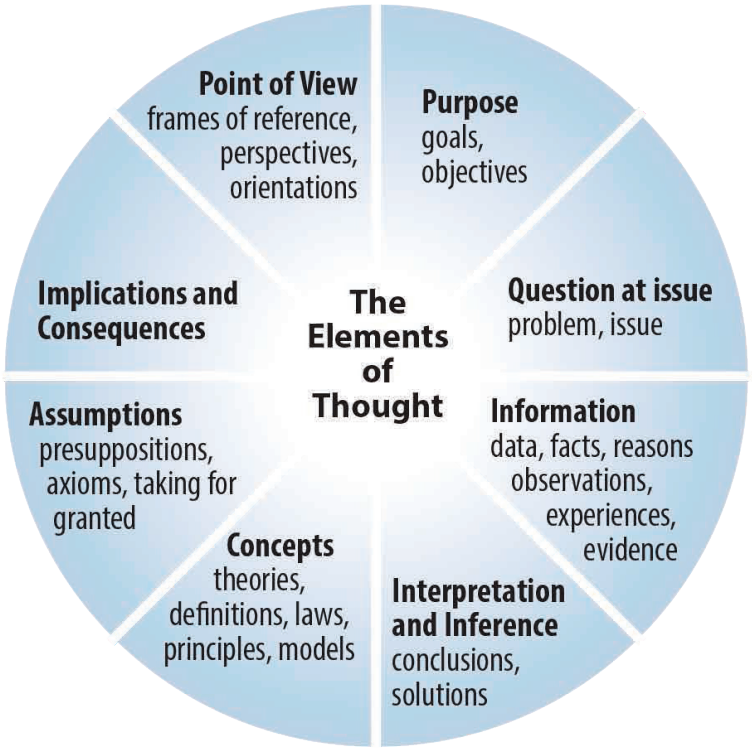
Universal Evaluative Language

In addition to these analytical tools lies a group of fundamental intellectual standards which are essential, to varying degrees, in every discipline. Paul and Elder (2002) offer the following list of what they term "essential intellectual standards."

Diagram 2: Universal Intellectual Standards; used by permission, Foundation for Critical Thinking (see below)

One can easily see the usefulness of this list to teaching and learning,
and indeed to thinking generally. But Elder and Paul point out that the chart is far from complete, and have explored and developed a more extensive, but still not exhaustive, conception of intellectual standards in the Thinkers' Guide to Intellectual Standards (2009). For example, one can readily see the importance of intellectual standards such as sufficiency, validity, reasonability, consistency and so on.
People skilled in adhering to intellectual standards can determine the quality of intellectual communications by asking the following types of questions, contextualized, for example, when reading an article: "To what extent are the central parts of this argument clear; to what extent are they muddy or vague (clarity)?" "How accurate is the information used in this

Clarity	Could you elaborate further? Could you give me an example? Could you illustrate what you mean?
Accuracy	How could we check on that? How could we find out if that is true? How could we verify or test that?
Precision	Could you be more specific? Could you give me more details? Could you be more exact?
Relevance	How does that relate to the problem? How does that bear on the question? How does that help us with the issue?
Depth	What factors make this a difficult problem? What are some of the complexities of this question? What are some of the difficulties we need to deal with?
Breadth	Do we need to look at this from another perspective? Do we need to consider another point of view? Do we need to look at this in other ways?
Logic	Does all this make sense together? Does your first paragraph fit in with your last? Does what you say follow from the evidence?
Significance	Is this the most important problem to consider? Is this the central idea to focus on? Which of these facts are most important?
Fairness	Do I have any vested interest in this issue? Am I sympathetically representing the viewpoints of others?



report (accuracy)?" "Is there an adequate amount of detail in examples used(precision)?" "Does the author deal with the complexities in the issue, or is the issue treated superficially (depth)?" "Has the author considered alternative viewpoints, or given an overly narrow account (breadth)?" "To what extent is this specific example pertinent to the argument (relevance)?" "How important is this issue (significance)?" "Is the argument coherent, or does it have internal inconsistencies (logic)?" "to what extent is the author using manipulative language or other intellectual trickery to convince the reader that the argument is sound (fairness)?"

Of course, the standards require some degree of interpretation during contextualization. That is, accuracy in a biology experiment is not the same as accuracy in interpreting an essay. The same goes for depth: one might consider multiple societal forces and their effects on a particular event in the study of history or one might look for multiple variables leading to mental illness when reasoning psychologically. In some cases it may seem that one or more standard is not relevant to a discipline at all (e.g. 'breadth' in architecture); however, in my experience this is usually resolved upon deeper reflection (e.g. 'have you considered the viewpoints of those who will be living or working in the building? Of the builders? Of the neighbors?).

As with the elements of reasoning, arguments against the importance of intellectual standards in human thought are implicitly based on those very criteria. For instance, they imply at minimum that the argument is clear and accurate. Further, can you imagine a professor or professional saying "what we want in our field is people who routinely think unclearly, inaccurately, imprecisely, superficially, without regard to complexity, narrow-mindedly, illogically, and unfairly"?

Analytical and Evaluative Fluency

This analytical and evaluative language is intuitive (few would argue against the importance of their usage). Yet how fluent are we in its use or in the use of any analytic and evaluative language? Extant research is not inspiring. For example, in the studies conducted by Paul, Elder, and Bartell (1997) and Thomas (1999), only 8% of professors interviewed were able to enumerate any intellectual criteria required of students , and over 90% of faculty could not distinguish between an inference and an assumption, or between an inference and an implication. It may come as no surprise, then, that the new and highly visible report Academically Adrift (Arum and Roksa, 2011), finds that students' ability to effectively analyze and evaluate is generally poor, and that these skills do not increase much during their college years (during which 45% of students demonstrate no statistically significant gains in critical thinking).

Thus, teachers' good intentions are often not successfully communicated to students. Let us look at some brief excerpts from research I conducted at the University of Oxford which demonstrate this miscommunication between teachers and students (Cosgrove, 2011; 351):

RC: and when you have your students critique the other arguments, what kinds of criteria do you see them using?

Tutor B: Well I think that's much more ad hoc. They tend to assess in terms of what they agreed and disagreed with. That's probably less helpful…it tends to be more sort of, "well you know I agree with x. y, z, but I disagree with a, b, c"…

RC: So you don't actually say "ok when you're critiquing this person, you need to use these criteria"?

Tutor B: No but I think I should do [pause] just thinking about it [pause] now you ask it, I probably should say "look, you know, what do you think are the criteria that I use? You should use the same sorts of things"…but obviously your implicit point is right in that they should do it with criteria.

Accordingly, undergraduate responses to the question of what criteria they use in intellectual

evaluation exhibited considerable confusion and anxiety:
Student G: I find it really hard to read someone's essay and critique it. I don't know why, it's like impossible – it's like gibberish I don't know why!... But in the end I just kind of [go] through the plan of [an] essay and then just underneath in a different color pen, just say like whether I think this is a good or bad idea, but I think that's a bit sort of childish.
Student F: yeah well you often just get a - it sounds really like stupid but it's almost just sort of what you think sounds right. It's almost like an impulse. It's almost an impulse decision. It's just what seems more convincing…
We can see here frustration on both sides: by the tutor for lack of critical thinking from students, and by students for not knowing how to engage in critical thinking; and all for lack of an explicit understanding of the tools of analysis and evaluation.
Finally, even much research activity (even by PhD's; even graduates of the world's most respected institutions) suffers from improper or poorly conducted analysis and evaluation; thus the need for extensive peer review and the rejection of much submitted work.

Recap

In sum, my argument is that effective intellectual pursuit requires effective communication, which in turn depends upon effective engagement in analysis and evaluation. Further, though forms of analysis and evaluation differ from subject to subject, there are universal forms which are fundamental to all disciplines; and that the groundwork for this 'critical-analytical vocabulary', or shared academic language, has been established by Paul and Elder in the intellectual constructs termed the 'Elements of Thought' and the 'Universal Intellectual Standards'. Finally, despite our good intentions, we humans are not, with few exceptions, fluent or disciplined in the language of analysis and evaluation, universal or otherwise.

Immediately following is an exploration of some possibilities which explicit adoption of a common academic language might create.

What would adoption of a common academic language look like in an ideal world?

Let us now consider a hypothetical university in which virtually all students and faculty are fluent in a universal analytical and evaluative language, focusing for the moment on important implications for teaching and learning. In this imaginary institution the logic of each course is identified from the very beginning in the syllabus: its purposes and key questions, core concepts and main sources of information, important assumptions and implications, as well as the central perspective (or perspectives) which will be explored or developed. Students, being sensitive to the elements of thought, are readily able to read and digest the basic logic of the course, even if they have never before studied the subject (as Paul did with biology, using the elements of thought). Students come to class with questions about these fundamental structures – how are they different from or similar to those within subjects and fields which they already understand? What unique structures will be considered during the course?

Teachers are ready to respond to these questions and are comfortable helping students make connections with other disciplines, since their own fluency in this common academic language has allowed them to probe the structures of surrounding as well as distant fields of understanding (again, as Paul did). Further, they make clear their intentions with the course: the grounds upon which students will be evaluated; the skills and dispositions they will be expected to exhibit or develop. Students understand these communications, as they are accustomed to discussing analysis and evaluation and possess well-developed vocabularies for both; they are knowledgeable about these processes generally, as well as experienced in their engagement in multiple forms.

Consequently, the quality of student papers and student thinking is generally high. Though differences certainly still exist, few student papers contain wildly irrelevant or fla-

grantly inaccurate statements. Students are cognizant of what to look for in their own writing and, by the time they graduate, have years of experience of explicit and informed self-reflection (itself entailing analysis and evaluation). Due to this experience, these students take constructive critique well, and understand that their writing and reasoning can always improve.

Students graduate with fundamental and long-term understandings of the basic logic of various disciplines. They are explicitly aware of both universal as well as subject specific forms of analysis and evaluation, and they are ready to apply these to further study or in work settings; finally, students are flexible and experienced in learning new systems, so they can more readily enter into whatever novel and/or unique forms of analysis and evaluation they encounter throughout their professional and personal lives.

What does this look like in reality?

The above ideal may never be achieved, certainly not in the near-future. However, schools and universities across the United States and beyond are beginning to take critical thinking more seriously, and are working to integrate its analytical and evaluative language into their courses and curricula. One such institution is currently attempting to infuse the 'elements of thought' and 'universal intellectual standards' across the curriculum. Some faculty are attesting to powerful change, and to the benefits of a shared academic vocabulary. For example, consider this highly reflective and self-aware comment from one professor after being introduced to the elements and standards and using them in her classroom:
"I think that for decades I have given my students many opportunities to engage in critical thinking, and I have modeled critical thinking in class discussions. But I don't think I can claim ever to have taught critical thinking in a systematic way. [The Elements of Thought and Intellectual Standards] give me a way to share a critical thinking vocabulary with students and to chart their progress. I know and can tell my students exactly what I am looking for."- Spring 2008 Pilot Program Participant, Department of English

The first sentence represents the thoughts of the vast majority of teachers, 97% of whom claim critical thinking to be of primary importance and who further claim to be developing it in their students (Gardiner, 1995; Paul, Elder, and Bartell, 1997; Thomas, 1999). Of course, most teachers believe they are teaching for critical thinking and most probably are providing some opportunity for students to think critically; however, because the overwhelming majority of faculty (roughly 80%) are not fluent in the language of analysis and evaluation, and so do not discuss analytical and evaluative concepts explicitly with their students, most of this opportunity is wasted, the time instead filled with uncritical discussion and reaction.
After being introduced to the 'elements' and 'standards', this professor began to integrate them into her course in a systematic way. On the next page is an example of how she used this language to communicate with her students more explicitly and clearly regarding the analysis and evaluation of historical texts. Notice that she has added one subject-specific analytical concept: 'techniques'.

respectively, as the key indicates (you can see that she has also included one subject-specific analytical category: 'techniques'):

There is some indication that explicitly communicating this language to students can lead to

improved student reasoning. For example, contrast the student responses from Oxford undergraduates regarding evaluation with this response from a student four years their junior, but who has been introduced explicitly to the intellectual standards (Cosgrove, 2010):

RC: so as you can see from the stuff that you've read, what I'm focused on is critical thinking – has your teacher talked to you about critical thinking?

(Students laughing, lots of "yeahs")

Student: yeah he loves his critical thinking. The concepts are wide right. Like "breadth, how wide does the argument go? Depth, how deep does it go? Specific, precision, accuracy" all of that, all the time. (laughing)

RC: so what does he have you do with these ideas?

Student: just so when you write, and also when you read. So when you read a source "how deep does this go? Is this just skimming the surface or is it a deep in-depth opinion?" when you write "are you just writing briefly or are you writing deep points?" and accuracy is something, on exams you need to be accurate, so that's a good thing. Other ones, such as breadth, so how wide do you cover, do you look at different points of view? Or are you being quite limited in your thinking and the way your arguing? So he's always saying like "don't forget!" he loves them, he loves them! (laughing)

This response is far more elaborate and precise than any response from the Oxford undergraduates, as well as 90% of the teachers interviewed by Paul, Elder, and Bartell (1997) and Thomas (1999). Of course, it is imperfect, and we have no evidence that this student uses these ideas effectively when reading or writing. However, he has become explicitly aware of some fundamental and powerful evaluative language and seems to be interested and engaged with the ideas. Further, he is at minimum aware of their potential use, and so is better positioned to employ them in his thinking.

These are but a few of the ways in which the Elements of Thought and Universal Intellectual Standards are currently being used to improve intellectual communications between teachers and students.. For example, some resources can be found in the handbooks provided by the Foundation for Critical Thinking, which contain dozens of sample course designs and assignments from every major subject for k-12 education (see, e.g. Paul et al., 2008). Further guidance can be found in Gerald Nosich's (2009) Learning to Think Things Through: A Guide to Critical Thinking Across the Curriculum.

Some Implications for Research

Of course there are broader implications beyond teaching and learning of a shared academic language. One important direction is that of interdisciplinary research. Currently, much research is confined within a specialized area, and there are relatively few examples of cross-disciplinary research; yet such investigations often produce the most groundbreaking advancements. Further, as world problems are increasingly recognized to be multi-dimensional, researchers are finding it necessary to take a multi-disciplinary approach; an approach which includes team members from different backgrounds who possess varied knowledge and skill sets. One such example is climate change research, which necessitates integrating insights from such disparate disciplines as ecology, chemistry, climatology, biology, meteorology, and physics. Another example is that of drug rehabilitation, which again requires insights from psychology, history, neuroscience, and sociology.

If effective research is to be done regarding climate change or drug rehabilitation, must individuals then become experts in all these fields? Even if we had the inclination and potential, the time required makes this highly impractical. Yet the critical-analytical vocabulary offers the possibility for experts to communicate complex ideas in a universal language which is understood by all members of a research team. Such communication could, would, and should, be done creatively; yet a simple way to start would be to produce the 'logic' (again,

which includes all the elements of thought) of a given aspect of the project to all participating researchers. Thus, each would be able to grasp the basic ideas and findings fairly quickly, and could then integrate them into their own specialized thinking and planning.

A similar approach (using the elements of thought to structure a summary of research) could be taken in the presentation of findings to the public: by using common language which is more accessible, researchers might better bridge the gap that often separates academic research from public understanding, acceptance, and implementation.

Summary and Conclusion

To summarize: if we look at the academic world as intense with intellectual communications, we see that much is lost in translation between people skilled in different forms of analysis and evaluation. Some of this difference is necessary and helpful; however much of it is counterproductive. I see in the critical-analytical vocabulary of the English language the potential for an academic lingua Franca which could significantly improve communications between teachers, students, researchers, and the public. This article has laid out some of these possibilities.

What, then, are some important implications of this argument? The first is that we need to think and talk about analytical and evaluative language more explicitly in general. Every field should discuss and consider the important forms of analysis and evaluation central to that discipline, and these should be communicated to students clearly and routinely. Indeed, the 'Assessment for Learning' and 'Learning how to Learn' (Black and William, 1998; James et al., 2006) projects encouraged faculty to do just this and achieved significant learning improvements as a result.

More immediately, and perhaps more easily, individuals and communities should increase their fluency in the universal language of analysis and evaluation. If we are to communicate effectively with each other, if we are to understand thoughts and ideas that are presently beyond us, we must improve our ability to analyze and evaluate those communications. The 'elements of thought' and 'universal intellectual standards' provide us with resilient tools to improve our efforts in this direction. If this vocabulary seems to you intuitive, begin to experiment with it more explicitly in your intellectual communications. Then, finally, after a rich diversity of applications of these elements and standards to a range of intellectual systems, judge for yourself whether they contribute to the power and enrichment of your students' (and your own) intellectual work.

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