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# How Professors Infuse Critical Thinking into College Courses

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How Professors Infuse Critical Thinking into College Courses

by

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Submitted in partial fulfillment of the requirements for the  
Degree of Doctor of Education  
Seton Hall University  
2014


Nancy K. Lennon

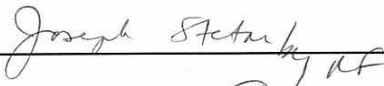
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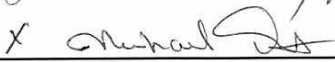
APPROVAL FOR SUCCESSFUL DEFENSE

Doctoral Candidate, **Nancy K. Lennon**, has successfully defended and made the required modifications to the text of the doctoral dissertation for the **Ed.D.** during this **Fall Semester 2013**.

DISSERTATION COMMITTEE  
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The mentor and any other committee members who wish to review revisions will sign and date this document only when revisions have been completed. Please return this form to the Office of Graduate Studies, where it will be placed in the candidate's file and submit a copy with your final dissertation to be bound as page number two.

## **Abstract**

### How Professors Infuse Critical Thinking into College Courses

The purpose of this case study was to explore professors' understandings about how they infuse critical thinking within Signature courses in one private Catholic university, where a strong commitment exists to develop students' critical thinking skills through the Core Curriculum. This qualitative study investigated the views of 12 professors in 6 disciplines as to how they approach the teaching and assessment of critical thinking skills within three Signature courses of the Core Curriculum.

Data collection included documentation and one-on-one interviews with the professors, who taught Signature courses during the Spring 2011 semester. Through a cross analysis of the data, the professors' perceptions about how they understood and defined critical thinking, their teaching and assessment practices, the challenges of infusing critical thinking as one of the core proficiencies, and their views about critical thinking professional development programs were examined.

The results from this study generated further insights about the challenges professors confront when they focus on infusing critical thinking into core curriculum courses. These major challenges are related to a number of complex factors, such as overcoming faculty resistance, a lack of a common understanding and definition about critical thinking, and the need for more effective professional development opportunities. Given the complexity of attempting to align all of these various factors together in one institution, this case study examined the understandings of how professors implemented critical thinking as a valued curricular goal.

## **Acknowledgments**

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I wish to thank all of the professors who participated in this study for their enthusiasm and dedication to teaching critical skills in their college courses. Your participation made this a most interesting study.

I wish to thank Dr. Christopher Wright, Dr. Robert Pampin, and Dr. Frederick Bender and all of my family members and friends for all of their unconditional understanding and encouragement throughout this dissertation journey.

## **Dedication**

I wish to dedicate this dissertation to my late parents Professor James P. Kehoe and Mrs. Jeanne A. Kehoe who taught me about the true meaning of a good value system, faith in oneself and others, a good sense of humor, a positive attitude, and to enjoy life's blessings. I am grateful for the gifts that you gave me. This dissertation is also dedicated to my children, Brendan Lennon; my daughter-in-law, Angela Lennon MD; Elizabeth Lennon, PhD; and Mary Lennon and to my two grandchildren, Kyle Messerle and Sophia Lennon. Your understanding, patience, and encouragement helped me so I could pursue this dream.

I love you all.

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## Chapter I:

### Introduction

Educators, scholars, and employers concur on the importance of teaching critical thinking skills to undergraduate students (Dewey, 1933; Gose, 2009; Paul, 1995; Tsui, 2002). According to Brookfield (2005) and Paul (2004), students need to be taught to be able to reason well in order to succeed academically in college. In the 21<sup>st</sup> century, critical thinking skills are essential due the accelerating changes in technology, since the Internet allows students to access huge amounts of information in just a few seconds and with just a few keystrokes. However, insofar as this knowledge is not always reliable or accurate, faculty members need to teach students the necessary critical thinking skills to judge both the accuracy and credibility of the information source (Halpern, 2001; Brookfield, 1990).

Brookfield (1990) suggested the development of critical thinking as the underlying rationale for college teaching, providing both its methods and its organizing vision. Brookfield (2005) believed that critical thinking is considered as an important educational goal “because learning to think critically can help students deal with ambiguity and negotiate the bewildering pace of social and technological change” (p. 49).

Paul (1992) concurred, stating that the only way for students to effectively deal with rapid changes in technology is to educate them to develop and apply critical thinking skills to ensure their capacity to deal with future problems, including their own economic survival. Friedman (2005) and Paul (1995) asserted that in the new millennium, college graduates will be confronted with far greater challenges in the workplace than previous generations. Mass communication, outsourcing, and rapid technological changes

challenge all students to be more prepared and competitive in the work force of a global economy. College students, as future employees, will be required to make reasoned judgments, which require critical thinking skill, and act accordingly to meet the demands of job responsibilities in a global economy. As the missions and goals of higher education evolve to meet the incessant changes in a global economy and society, the importance of critical thinking, then, becomes a focus for undergraduate students to succeed as future worldwide citizens.

### **Background**

To meet this demand, the Association of American Colleges and Universities, AAC&U (2009) conducted an online survey by Hart Research Associates from November 19, 2008, to February 16, 2009, to measure the prevalence of specified learning outcomes in higher education institutions to document current trends in curricular change, specifically in the areas of general education and assessment. The sample for this survey is representative of AAC&U's total membership in terms of both institutional type (Carnegie Classification) and affiliation or source of control. The total population for the survey included 906 AAC&U member institutions, which were invited to complete the survey, and thus the response rate for the survey is 48%.

According to the AAC&U (2009), a summary of key findings stated that a large majority of AAC&U member institutions (78%) have a common set of intended learning outcomes for all their undergraduate students. These outcomes address a wide variety of skills and knowledge areas, which include writing, critical thinking, quantitative reasoning, and oral communication skills. The knowledge in these areas is often



incorporated in the humanities, sciences, social sciences, global cultures, and mathematics.

The 2006 survey conducted by Hart Research on behalf of AAC&U surveyed employers regarding the selected learning outcomes that colleges and universities should emphasize in undergraduate programs. This survey revealed that employers believe that colleges and universities should do more to achieve learning outcomes in several areas to ensure that individuals will be successful and contributing members of today's global economy. Business executives felt that critical thinking and analytical reasoning skills (73% should place more emphasis) are among one of the areas which were most in need of increased emphasis by higher education institutions. This particular finding suggests a "closer relationship among clear goals for learning, coherent sequences of courses, and the development of capstone experiences in general education" (p.4).

Hart Research Associates (2013) conducted another online survey report *It Takes More than a Major: Employer Priorities for College Learning and Student Success* among 318 employers on behalf of the AAC&U from January 9 to 13, 2013 to find out what employers would like to see colleges and universities emphasize in undergraduate programs. This survey report (April 2013) provided a detailed analysis of employers' priorities for the kinds of learning today's college students need to succeed in today's economy. Respondents were executives at private sector and nonprofit organizations, including owners, CEOs, presidents, C-suite level executives, and vice presidents. Nearly all those surveyed (93%) agreed, "A candidate's demonstrated capacity to think critically, communicate clearly, and solve complex problems is more important than their undergraduate major" (p.1) .

This survey report (AAC&U 2013) documented key findings of employees needing a broader skill set than in the past and “Employers indicated that they prioritize critical thinking, communication, and complex problem-solving skills over a job candidate’s major field of study when making hiring decisions” (p.1). Employers emphasize a greater need to be placed on the following areas: critical thinking and analytical reasoning (82% more emphasis, 7% less) and complex problem solving and analysis (81% more emphasis, 6% less). Employers recognize the importance of a liberal arts education as reflected in these findings so as to develop students’ critical thinking as future candidates in the workforce.

According to the AAC&U (2013), the majority of employers agree that having both field-specific knowledge and skills and a broad range of skills and knowledge is most important for recent college graduates to achieve long-term career success. Eighty percent of employers agree that regardless of their major every college student should acquire broad knowledge in the liberal arts and sciences. When read a description of a 21<sup>st</sup> century liberal arts education, a large majority of employers recognize its importance, and 74% would recommend this kind of education to a young person they know as the best way to prepare for success in today’s global economy. Findings from these AAC&U reports confirm the value of teaching critical thinking in liberal arts curricula to prepare students for future employment.

The liberal arts programs continue to remain the “best preparation for today’s students and tomorrow’s workforce” (DiConti, 2004, p. 167). This is because the liberal arts inherently develop the twin systems of inquiry and discovery that are necessary for critical investigation through the “habit of mind” (Fong, 2004, p. 9). The disposition to

think critically has been described as “ongoing tendencies that guide intellectual behavior” (Tishman, Jay, & Perkins, 1993, p. 148) and “a constellation of attitudes, a set of intellectual virtues” (Facione, Sanchez, Facione, & Gainen, 1995, p. 1). Nurturing the “habits of mind” is supported in a liberal arts curriculum, which yields fertile ground for cultivating critical thinking (Tsui, 2007 p. 224).

A vital issue emanating from the literature on higher education is the increasing need for an educated workforce that can meet the demands of a changing economic order, and critical thinking is one of the important outcomes. Although critical thinking is an important skill in undergraduate education, studies reflect that colleges and universities are not doing a very good job at developing students’ critical thinking skills.

For example, the AAC&U (2009) report revealed that employers believe that colleges and universities should do more to achieve critical thinking as a learning outcome so that individuals will be successful in a global workforce. The Spellings Commission (2006) report *A Test of Leadership: Charting the Future of U.S. Higher Education* asserted, “Colleges and universities must become more transparent” (p.4) about student outcomes through more accountability for critical thinking as an important learning outcome through supporting extensive nationwide testing. The Collegiate Learning Assessment (CLA) was one of the tests that the Spellings report recommended as providing “quality assessment data” claim to measure “critical thinking, analytic reasoning, problem solving and writing” (Arum and Roca 2011, p. 21). According to Arum and Roksa (2011), the report identified the Collegiate Learning Assessment (CLA) as “among the most comprehensive national efforts to measure how much students

actually learn at different campuses by promoting a culture of evidenced-based assessment in higher education” (p. 138).

The Collegiate Learning Assessment (CLA) consists of three open-ended assessment components: a performance-based analytical writing task (i.e., to make an argument and to break an argument). The CLA was designed to assess “core outcomes espoused by all of higher education - critical thinking, analytical reasoning, problem solving and writing. These general skills are the broad competencies that are mentioned in college and university mission statements” (p. 21). In addition,

Rather than testing for specific content knowledge gained in particular courses or majors, the intent was to assess the collective and cumulative result of what takes place or does not take place over the 4 years of undergraduate education in and out of the classroom. (p. 21)

Regardless of this demand for accountability to improve students’ reasoning skills as a learning outcome in colleges and universities, the Collegiate Learning Assessment (CLA) supports findings that many students are only minimally improving their skills and critical thinking, complex reasoning, and writing during their college years (Arum & Roksa, 2011, p. 35). From the beginning of their freshman year to the end of their sophomore year, students in the sample of over 2000 have improved these skills as measured by the CLA by only 0.18 standard deviations. This translates into a 7-percentile point gain, meaning that an average schooling student in the fall of 2005 would score 7 percentile points higher in the spring of 2007. Stated differently, freshmen who enter higher education at the 50th percentile would reach a level equivalent to the 57th percentile of an incoming freshman class by the end of their sophomore year. Three

semesters of college education had a barely noticeable impact on students' critical thinking, complex reasoning, and writing skills.

Another way to assess the magnitude of learning in the first 2 years of college is to estimate how many students experience gains that are below a level of statistical significance, or in other words are statistically not above zero. With more than 2,300 students in this large sample, they observed statistically significant gains in critical thinking, complex reasoning, and writing skills for at least 45% of the students in their study. A large proportion of students are progressing through higher education today without measurable gains in general skills assessed by the Collegiate Learning Assessment (p. 56). Pascarella, Blaich, Martin, and Hanson (2011) claimed that if the (CLA) findings are "robust broadly generalizable and whether or not they intended to, Arum and Roksa (2011) have thrown down a sizable gauntlet (p. 20)."

Despite the questionable (CLA) validity issues of the results, the Wabash National Study of Liberal Arts (WNS) replicated Arum and Roksa's (2011) study and reported consistent findings (Pascarella, Blaich, Martin, & Hanson, 2011).

Pascarella et al. (2011), researchers at the University of Iowa and Wabash College, simulated Arum and Roksa's study for the purpose of finding out how robust Arum and Roksa's findings were about students' intellectual development. The researchers decided that the WNS study was worth replicating due to the national visibility of *Academically Adrift*. "And because Arum and Roksa were transparent about their research methods, conducting such analyses with the WNS was reasonably straightforward" (p. 20). The WNS had a design which closely paralleled the *Academically Adrift* study. Because the researchers administered standardized measures

of such outcomes as critical thinking and moral reasoning, the WNS presented a unique opportunity to determine the generalizability of the *Academically Adrift* findings with a different sample of institutions and students and with somewhat different measures of student intellectual development (p. 20).

The Collegiate Assessment of Academic Proficiency Critical Thinking Test (CAAP-CT) and the Defining Issues Test (DIT) were the standardized tests used to address students' intellectual development in the WNS study (Pascarella, Blaich, Martin, & Hanson, 2011). The (CAAP-CT) is a frequently used instrument to measure students' ability to clarify, analyze, evaluate, and extend arguments. The DIT measures levels of moral judgment or reasoning. It gauges the extent to which an individual uses principled moral reasoning in resolving moral dilemmas and rejects ideas based on their being simplistic or biased. Students were randomly assigned an instrument (half were administered the (CAAP-CT and half the DIT) in fall of 2006 and continued with the same instrument in the follow-up assessments. Usable data across all 4 years of the WNS were available for 2212 students (p. 21).

The WNS was a large, longitudinal study of students attending 17 four-year institutions located in 11 states. It oversampled liberal arts colleges because its focus was the effect of a liberal arts education, but it also contained a mix of public and private research universities, as well as comprehensive regional institutions. Random samples of full-time students at each institution were assessed when they entered college in fall 2006, a second time at the end of their initial year of college (spring 2007), and a third time near the end of 4 years of college (spring 2010) (Pascarella, Blaich, Martin, & Hanson, 2011, p.21)

The one difference in the longitudinal design of WNS is that first follow-up in the WNS came at the end of the first year of college. While the first follow-up assessment in the CLA study came after 2 years of college. To replicate the analyses for WNS

The researchers calculated average change scores on the CAAP-CT and the DIT over the first year of college and over four years of college. They converted their average change scores to the same scales as Arum and Roksa's (i.e., a proportion of a standard deviation gain and percentile gain) and likewise estimated the percentage of students failing to demonstrate statistically reliable CAAP-CT and DIT gains after one and four years of college. (p. 21)

Pascarella et al. (2011), noted that WNS found that the average gains during college on the CLA, CAAPCT, and DIT-N2 were generally similar, particularly on the gains made by students from two independent samples on the CLA and CAAP-CT.

Using the same statistical procedure to identify a significant gain as Arum and Roksa (2011), they estimated that 44% of students did not make statistically significant gains on the CAAP-CT over the first year of college and that 33% did not do so over 4 years of college. The findings from the WNS study are consistent with those findings of Arum and Roksa (2011) as reported in *Academically Adrift* (p. 23). The researchers reported their concerns about both of these studies in terms of questioning the procedures as well as cautions "involved in interpreting change scores as indicators of the actual college effort." (p.23). Even though the findings from the WNS study did not address all the issues and concerns regarding the procedures as reported in the (CLA), the results do suggest that the findings from "Academically Adrift" should be taken seriously as a wakeup call to American higher education" (p. 24).

Despite the bleak (CLA) findings, the literature supports pedagogy and other approaches to develop students' critical thinking skills. For example, Halpern (1993) concluded that there is "sufficient overlap" in thinking to enable those who study the subject to "move beyond the definitional stage" (as cited in Tsui, 2007 p. 240).

Although there remains much we do not know about critical thinking development, a few conclusions can be drawn from past research (Tsui, 2007). For one thing, we know that faculty actions in the classroom affect student development, and there is substantial evidence to suggest that CT can be enhanced by purposeful instruction (Halpern, 1999; Pascarella & Terenzini, 2005). The diverse manner in which critical thinking as relevant instruction has been operationalized across studies has made it difficult for a solid body of consistent results to emerge.

However, Tsui (2007) stated that there is a significant amount of evidence in the research to suggest that there are approaches to improve the development of critical thinking skills in college classrooms. Tsui (2007) cited a number of authors to support the following critical thinking approaches as: student engagement in interactive exchanges and class discussions involving higher-order thinking processes (McAdams & Foster, 1998; Tsui, 1998, 1999, 2002), problem-solving methods and activities (Marra, Palmer, & Litzinger, 2000; McAdams & Foster, 1998), the integration of ideas and themes across courses or disciplines (Tsui, 2006, 2007), examination of epistemological assumptions (King & Kitchener, 1994; Kronholm, 1996; Thompson, 1995; Tsui, 2002), and a constructivist-oriented pedagogical approach (Baxter Magolda, 1992; Holfer, 1998–1999) and views them as positively related to student gains in the area of critical thinking and the like (p. 202).



The research suggests that colleges and universities can make a difference in promoting critical thinking skills by fostering effective attitudes and approaches. Besides instruction Tsui (2007) added that educators can affect students' long-term outlook on intellectual pursuits and their habits of mind via exposure to a certain intellectual ethos when they are promoted in college classrooms.

According to Tsui (2007), the intellectual ethos of an educational setting fosters critical thinking and is shaped by numerous sources, including but not limited to instructional approach, but includes faculty beliefs and values. The three elements that facilitate the development of critical thinking include pedagogy, which can be characterized to think "outside the box." Students are encouraged to examine topics, and for them knowledge becomes more the knowing the "what," but examining the "how" (i.e., How do we know what we know?). The second element that is part of the intellectual ethos is the cultivation of self-efficacy in students (p. 222). Engaging students in active learning instructional techniques encourages students to realize that their ideas are worthy of articulation and examination by peers and professors. The third element of developing students' critical thinking skills is self-directed learning. These three facets of intellectual ethos promote students' critical thinking development since they enhance students' dispositions toward critical thinking (p. 223).

According to Tsui (2007),

Intellectual ethos can facilitate or hinder the achievement of valued student outcomes such as critical thinking by guiding the manner in which students view what knowledge is, how knowledge is acquired, and what role they themselves are to play in the learning process (p. 202).

To promote practices in developing students' critical thinking abilities, colleges and universities also have to overcome student resistance. Even though evidence supports that faculty instruction and beliefs in the classroom can affect the development of students' critical thinking skills, there remains a great deal of resistance on part of the students to engage in critical thinking activities. Some students are resistant because they believe that they are unable to think critically (Halx & Reybold, 2006). Therefore, they lack the willingness and motivation to do so. To paraphrase Aristotle, critical thinking requires a willingness to entertain ideas without necessarily accepting them. "According to Facione, Sanchez, Facione, and Gainen (1995), it is increasingly accepted that a comprehensive approach to developing college students into critical thinkers must include nurturing the disposition toward critical thinking, of which confidence is one component" (as cited in Tsui, 2007, p. 216). This disposition plays a central role in critical thinking development (Bailin et al., 1999a). Halpern (1999) agreed, stating that one must possess the "disposition to recognize when a skill is needed" and then "exert the mental effort needed to apply it if one is to think critically" (p. 312).

According to Crenshaw, Hale, and Harper (2011), the problem with infusing critical thinking skills in college classrooms lies with the student population. In a few words, most college students lack the preparation to think critically (Angelo, 1995; Gross, 2009). Crenshaw et al. (2011) cite Bughussian, Halx, & Reybold by stating that "College students resist learning higher order thinking skills due to the intellectual labor required in contrast to merely absorbing information" ( p. 17). Not only do they lack the preparation to critically think, many students do not complete the assignments in their course work. For example, Arum and Roksa (2011) found that students are not spending

enough time on their coursework. They reported spending only 12 hours per week preparing or studying for their assignments. “Even more alarming, 37 percent of students reported spending less than five hours per week preparing for their courses” (p. 69).

Since critical thinking is a mental habit, which demands students to think about their thinking, so as to improve their processes of metacognition, it requires students to use higher order thinking skills, not memorize data or accept what they read or are told without critically thinking about it (Schafersman, 1991; Scriven & Paul, 2007; Tempelaar, 2006). Particularly when students are accustomed to being passive learners by merely memorizing and recalling information, it may be difficult at first to engage them in active learning situations that require critical thinking skills (Brown & Kelley, 1986).

In addition to student resistance, another key challenge colleges and universities need to address to promote critical thinking is overcoming faculty resistance. There are also number of reasons why faculty members are resistant to teach critical thinking skills to undergraduate students. One of the major reasons evidenced in the literature is that faculty may not have a lucid understanding of a conception about critical thinking or value its importance in their teaching practices (Ennis, 1987; Paul, 1993), and this makes it a challenging undertaking across disciplines. For example, California Commission on Teacher Credentialing (1997) conducted a study of college and university professors. Findings indicated that the majority of the faculty (89%) believed critical thinking to be a primary objective of their instruction; however, only a small minority (19%) could provide a clear explanation of what critical thinking is, and only 9% of the respondents were plainly teaching for critical thinking on a typical day in class. In addition, only 20%

said their departments had a shared approach to critical thinking, and only 9% were able to articulate clearly how they would assess the extent to which a faculty member was or was not fostering critical thinking.

Besides a lack of common understanding about the conception of critical thinking, another reason why professors have difficulty teaching critical thinking is that many professors have not experienced a critical thinking approach as part of their own educational experiences. Lectures were more than likely the prevalent teaching pedagogy when they were attending undergraduate and graduate programs; therefore, they did not learn through active learning models. Thus, many professors remain comfortable with lectures as a method to teach their own disciplinary content. Professors are reluctant to give up the lecture format, which prevents them from trying more student-centered approaches to teach critical thinking skills in their classes, so they do not have to take away from teaching subject matter content.

It is difficult to not only teach critical thinking skills but also just as difficult to assess critical thinking without a clear conception of critical thinking. Professors tend to have their students memorize facts from course content facts following a lecture as part of their assessment procedures. In addition, many textbooks provide test blanks with easily graded multiple-choice and true-false questions. Thus, many college professors are reluctant to give up traditional multiple-choice tests that emphasize surface-level knowledge. “A critical thinking emphasis demands much greater creativity in developing assessment procedures” (Haas & Keeley, 1998, p. 2). It is vital for faculty members to overcome their own resistance to teaching critical thinking in college classrooms. One of the key ways to overcome this resistance is through faculty training. By first addressing

their own resistance, they can encourage students to overcome their resistance. “We need to examine our own resistance as well as our own students” (p.1). Haas and Keeley (1998) believe that a continuing dialogue about the resistance process is necessary for educators to begin to implement critical thinking skills in college classrooms.

To overcome faculty resistance about infusing critical thinking into college courses, more faculty training is necessary to bring about this change. Since many faculty members lack training in critical thinking pedagogy, they are not secure in trying more active-learning approaches. They may feel, “We can't teach students skills we're not sure of ourselves” (Haas & Keeley, 1998, p. 2). Thus, the lack of critical thinking preparation and training becomes a real dilemma for professors, who attempt to teach it. “When faculty members do not agree on the definition of critical thinking, and as they are not trained specifically for this type of teaching, is it prudent to hold faculty members solely responsible for critical thinking development” (Halx & Reybold, 2006 p. 311).

Despite the importance of critical thinking as a learning outcome, research is limited and varied on the actual practice of critical thinking pedagogy. Not only are faculty resistant to teaching critical thinking skills, they are uncertain as what to do to promote these skills (Tsui, 2007 cites Meyers, Paul, Elder, & Bartell). Studies are limited in the areas of how faculty members conceive, teach, and assess students' critical thinking skills. Very few studies on critical thinking among college students examine the impact of instructional factors on developing their skills to become critical thinkers. Among the studies that examine the impact of teaching critical thinking, there are conflicting findings as well as varied pedagogy (Tsui, 2002). For example, studies are scant regarding effective critical thinking teaching methods for how faculty members

should teach key elements of thought, such as the ability to clarify questions, gather relevant data, and reason to logical conclusions (Paul, 2004).

Despite limited research about critical thinking pedagogy, the literature suggests a number of areas that can shape improving faculty attitudes toward teaching the development of students' critical thinking skills in colleges and universities. One central area is for faculty members to know that an institutional commitment exists as part of its mission to support critical thinking as an important educational goal. With institutional commitment, faculty members can receive the needed support to participate in professional development programs for advancing their knowledge about effective critical thinking pedagogy in their disciplines. Furthermore, research studies suggest that faculty members need clear conceptions about critical thinking as well as definitions to improve teaching and assessment practices across and within college disciplines (Ennis, 2008; Paul, 2004).

To meet the challenge of teaching critical thinking across college disciplines as an outcome-based competency, institutions of higher education are currently encouraging faculty members to learn more about effective critical thinking pedagogy. Elder (2005) contended that colleges and universities need to actively support faculty members with professional development seminars and workshops in the areas of critical thinking to accomplish this widely professed goal. Furthermore, Elder emphasized that effective professional development for critical thinking can only take place by providing a strong institutional commitment so that critical thinking is at the center of its teaching and that it becomes the defining concept of the college. There is evidence in the literature to suggest that faculty members as experts in their disciplinary areas want to enhance

students' critical thinking skills, but too many lack expertise in the areas of teaching and assessing critical thinking skills in their own disciplines. According to Tsui (2007), few faculty members receive sufficient training to know how to teach or assess critical thinking skills to undergraduate students. Therefore, institutional support is crucial for providing faculty members with professional development with specific training on critical thinking pedagogy. Elder (2005), an expert on critical thinking, suggested that the most effective design for professional development is one that introduces the foundations of critical thinking and then is "systematically followed up by contextualization of these foundations throughout curricular areas for developing college wide policies and practices" (p. 41). Moreover, Paul (2005) argued that successful faculty development programs can only be initiated when college faculty at all levels acquire a substantive conception and definition of critical thinking. Even though professors are experts in their disciplinary areas, they often lack expertise in the areas of teaching and assessing critical thinking skills in college courses. The research supports the view that professors lack sufficient training to know how to teach or assess critical thinking skills in undergraduate education (Paul, 2004). Yet, the literature suggests ways that can influence and improve how faculty members teach critical thinking in undergraduate education.

One way is for professors to know that institutional commitment exists to the mission of supporting critical thinking as an important educational goal, with institutional commitment, professors can receive the needed support to participate in professional development programs to advance their knowledge about critical thinking pedagogy in the content of their disciplines (Elder, 2005). From the perspective of needed research in

the area of critical thinking professional development, the research from this study advances a greater understanding of how professors perceive the need for professional development improvement in the areas of defining, teaching, and assessing critical thinking skills, particularly in a university, where critical thinking is valued as an institutional goal in undergraduate education.

### **Problem Statement**

Given the significant role of critical thinking in the new millennium, the problem is indeed a complicated one with multiple layers. The literature supports that one of the major problems about critical thinking is the lack of consensus among faculty members on how to define critical thinking, which permeates into the other layers of critical thinking teaching and assessment practices. Although the development of critical thinking is highly valued as an important curricular goal and learning outcome among colleges and universities, how well it is achieved appears rather variable across institutions. In fact, Arum and Roksa (2011) indicate that (CLA) findings reveal very little improvement in students' critical thinking skills during their 4 years or more of college. Nonetheless, it is college faculty, who are charged with the responsibility to teach college students how to think, yet they receive limited or no training at all to advance this important educational objective (Tsui, 2007). Furthermore, Ennis (1963), a critical thinking expert, evaluated the state of knowledge about critical thinking over 50 years ago by citing the areas of needed research as: "further refinement and definition of the concept 'critical thinking'" (p.18), "the development and comparison of teaching methods and curriculum organization" (p. 20), and the development of critical thinking tests" (p. 18). Despite the interest in and importance of critical thinking, these areas are



still in need of further investigation” (Kennedy, Fisher, & Ennis, 1991 p. 26). Ennis (1963) stated that the problems with critical thinking reflect a lack of consensus among academics and scholars as to what comprises critical thinking; how to define, teach, and organize curricula; and assess critical thinking skills in colleges and universities; the issues continue in the new millennium. This lack of agreement among educators and scholars as to how to define critical thinking, as well as teach and assess critical thinking demonstrates a strong need for further research, especially in colleges and universities, where higher education advances critical thinking as a learning outcome.

In spite of the importance of critical thinking as a highly valued learning outcome among the institutes of higher education in the 21st century, studies suggest that colleges and universities are not doing a very good job at it. For example, findings from the (CLA) nationwide standardized testing results reveal that students demonstrate minimal improvement in critical thinking skills over their 4 years of attending college ((Arum & Roksa, 2011). However, the literature suggests that there are a number of key factors and methods to improve students’ critical thinking skills. To advance students’ critical thinking skills in colleges and universities, the literature suggests such evidence as institutional commitment, active learning environments, intellectual ethos, as well as overcoming student and faculty resistance through faculty development programs (Tsui, 2007, Halx and Reybold, 2006).

### **Purpose**

The purpose of this case study was to explore professors’ perceptions about critical thinking in one institution where a strong institutional commitment exists to develop students’ critical thinking skills as a learning outcome. This case study was

particularly interested in examining how professors in one institution confront the challenges of implementing critical thinking as a curricula goal. This study intended to demonstrate the complexity of attempting to align all of these major factors together in order to find out what worked and what did not work.

### **Research and Subsidiary Questions**

The research question for this qualitative study investigates: How do professors from diverse disciplines perceive the teaching and assessment of critical thinking skills in one university, where a strong commitment exists to infuse critical thinking skills into undergraduate programs? Other research sub questions examine how select professors infuse critical thinking as part of this study:

1. How do select professors view critical thinking in their respective disciplines of study?
2. How do select professors define critical thinking?
3. How do select professors' definitions of critical thinking shape their approaches to infuse critical thinking into their courses?
4. What kinds of pedagogy do select professors use to teach critical thinking in their courses?
5. How do select professors assess critical thinking in their courses?
6. How do select professors perceive professional development courses in order to improve their critical thinking teaching and assessment practices?

This case study intended to investigate these research questions for the greater purpose of understanding how one institution aligns all these complex factors to promote critical thinking as an important curricula goal.

## Conceptual Framework

“A conceptual framework explains, either graphically or in narrative form, the main things to be studied—the key factors, constructs or variables—and the presumed relationships among them” (Miles & Huberman, 1994, p. 18). The graphic depiction of this conceptual framework constructs the key critical thinking concepts so as to understand the phenomena generated from the research questions and data.

This case study explores how participants perceive their understandings of how to infuse critical thinking as part of their teaching assessment practices. This conceptual framework serves as a model to generate a theory on how professors infuse critical thinking into the courses they teach in an institution, where a commitment exists to infuse critical thinking as a curricula goal. Figure 1 depicts the conceptual framework for this case study.

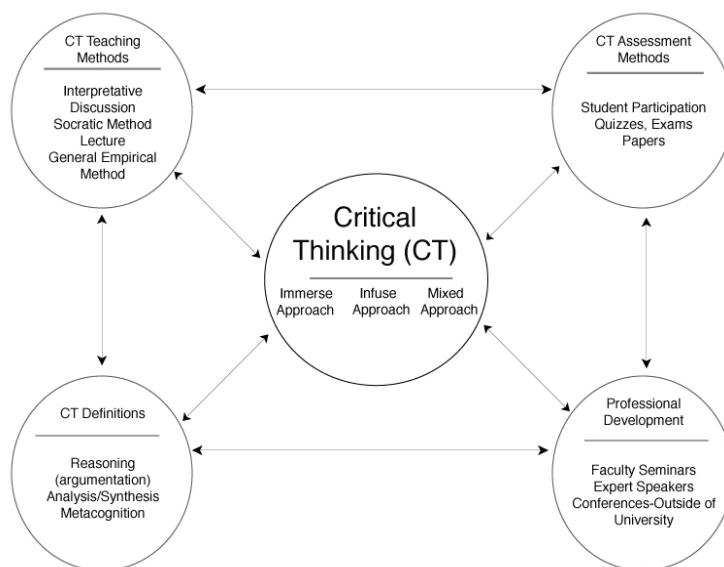


Figure 1. *Conceptual Framework*

“Glaser and Strauss’s term ‘grounded theory’ (1967) refers to a theory that is inductively developed during a study and in constant interaction with the data from the

study” (as cited in Maxwell, 2005, p. 42). Grounded theory involves discovering a theory by analyzing the data through both inductive and deductive thinking processes.

For this qualitative study, the generation of a grounded theory is to discover the participants’ main concerns about how to infuse critical thinking into their college courses, while attempting to implement it as a curricular goal. To generate a grounded theory the questions that I repeatedly ask about the data: "What’s going on?" and "What is the main problem of the participants, and how are they trying to solve it?"

### **Significance**

Recently President Barack Obama stated that one of the key forces to a workforce equipped to handle 21<sup>st</sup> Century problems is the development of critical thinking skills and abilities (Crenshaw et al., 2011 cite Halper and Jackson p. 13). Contributions to the research from this study were intended to demonstrate how selected professors view the interface of the teaching of critical thinking and institutional value. The results from this study aimed to advance the understanding of professors’ perceptions, attitudes, and activities about critical thinking development in an institution, where critical thinking is a valued educational goal. This study also intended to advance a greater understanding of how an institution addresses critical thinking as one of the primary goals of an undergraduate education when confronted with such ongoing challenges as faculty members’ lack of preparation, resistance, and disciplinary blinders. The research from this case study intended to further investigate the challenges of implementing critical thinking at the concrete level and how these variables were addressed and implemented in one institution in order for other institutions to learn from these particular challenges.

## Summary

Educators, employers, and policymakers endorse critical thinking as a valued learning outcome in colleges and universities. Despite efforts to develop students' critical thinking skills, the Collegiate Learning Assessment (CLA), a nationwide standardized measure of critical thinking and complex reasoning skills, documents that many students are only minimally improving their skills and critical thinking, complex reasoning, and writing during their undergraduate education (Arum & Roksa, 2011, p. 35). One of the major problems with critical thinking is the lack of agreement on how to define it, yet those who study critical thinking find there is "sufficient overlap" to "move beyond the definitional stage" ( Tsui,2007 cites Halpern p. 240). However, a lack of a common definition continues to make it difficult to study critical thinking in terms of teaching and assessment practices in colleges and universities. These challenges also create reasons why faculty and students remain resistant to teaching and learning about critical thinking. The literature suggests that there are ways to improve faculty members' critical thinking teaching methods. One way is for faculty member to realize that institutional support exists through ongoing professional development with specific courses on critical thinking pedagogy. Haas and Keeley (1998) believed the right environment is needed to support critical thinking as an academic goal.

Education for genuine understanding and for critical and creative thinking is hard, and in some ways, a technical enterprise calling for theories and tools of teaching and learning suited to the challenge. "Faculties, like students, do not easily gravitate toward new, difficult, and potentially risky activities" (Hass & Keeley, 1998 cite Nickerson, p. 64). The right incentives and an appropriate environment must be present. Haas and

Keeley (1998) contend that efforts for faculty development need a supportive and encouraging environment so as to create an atmosphere and mindset for faculty to change to more critical thinking teaching style.

## Chapter II

### Literature Review

How do we think? How do we know? Since ancient times, these questions have been asked and are still being asked today. Socrates, a Greek philosopher in the fourth century B.C., inspired his students by asking them questions to seek truth and knowledge. This renowned Greek philosopher founded the Socratic method as a way to teach critical thinking skills. Today, in the 21<sup>st</sup> century, professors use his pedagogy as a method to teach critical thinking skills in American college classrooms. Although the Socratic method was introduced 2,500 years ago, arguments persist among academic communities as to what critical thinking is, how to define it, how to teach it, and how to assess it. Yet, despite all of the controversy, critical thinking is a major goal of a college education (Tsui, 2000). The literature review for this study presents research findings on defining, teaching, and assessing critical thinking skills in colleges and universities.

### Policy

Recent research on critical thinking skills has fostered educational policies and pedagogy to promote critical thinking skills as a primary goal for achieving an American college education. Schamber and Mahoney (2006) stated, “Today, many colleges and universities include the development of critical thinking as a fundamental curricular objective of general education” (p. 104). Kennedy, Fisher, and Ennis, 1991 cited the Educational Policies Commission’s reason to teach critical thinking in college as “Teaching for rational thinking, especially as a way to become responsible citizens: The purpose which runs through and strengthens all other educational purpose - the common thread of education is the development of the ability to think” (pp. 11–12). Yet, after

four decades, professors in American colleges and universities continue to express their concerns about undergraduate students not mastering “critical thinking skills” despite spending 4 years in colleges (Tsui, 2001).

Kennedy et al. (1991) cited their fears about students’ lack of critical thinking skills from the National Commission on Excellence in Education, *A Nation at Risk* (1983),

Many 17-year-olds do not possess the “higher order” intellectual skills as we should expect of them. Nearly 40% of them cannot draw inferences from written material; only one fifth can write a persuasive essay; and only one-third can solve a mathematical problem requiring several steps. (p. 9)

Schamber and Mahoney (2006) stated that the origins of this debate emphasizing this objective to teach critical thinking skills emerged out of the discussions in the 1980s lead by the National Commission on Excellence in Education’s declaration that the United States was a “a nation at risk” (National Center for Educational Statistics, as cited in Schamber & Mahoney). Kennedy et al. (1991) cited the policies from the 1980s as a rebirth for supporting the importance of teaching critical thinking skills in higher education. Higher critical thinking skills, such as problem solving skills, were deemed an essential and basic competency for educating Americans in the 21<sup>st</sup> century (National Science Board Commission on Precollege Education in Mathematics, Science, and Technology, 1983). The Commission on Humanities (1980), the College Board (1983), the Panel on the General Professional Education of the Physician and College Preparation for Medicine (1984), and the American Federation of Teachers (1985) also advocated the central role of thinking skills in higher education (cited in Kennedy et. al,1991, p. 12).



Kennedy et al. (1991) found that this renewed interest in teaching critical thinking skills in higher education has emerged based on the evidence as well as college professors' views about the present lack of higher order thinking abilities among college students. This pronounced need for students to think critically is vital in preparing them to meet the demands of the modern world, the workplace, and to participate totally in a democratic society. This new awareness in teaching critical thinking skills can be traced back to the philosopher John Dewey, a leading figure in American education. Kennedy et al. (1991) cited that it was "John Dewey (1933), who asserted that reflective thinking is a basic principle for organizing the curriculum" (p. 11). Dewey referred to "reflective thinking" as the kind of thinking that consists in turning a subject over in the mind and giving it serious consecutive consideration" (p. 3). Giancarlo and Facione stated that "though the terminology has changed slightly over the years, developing students' critical thinking remains a central goal of the educational process" (cited in Kennedy et. al, 1991, p. 29).

### **Critical Thinking Definitions**

In order to understand the origins of critical thinking and its influence throughout higher education, a definition is fundamental for understanding how to teach and assess critical thinking skills in college courses. In searching for a definition of critical thinking, I found that Tice (2000) said it best: ask 10 different people how to define critical thinking and you will probably get 10 different responses.

There are almost as many definitions of critical thinking, if not more than there are disciplines of study. It is a broad topic overlapping many areas of study and across a

wide assortment of disciplines such as cognitive psychology, philosophy, engineering, education, medicine, and economics, just to name a few.

Critical thinking definitions range from the general to the specific. Kennedy et al. (1991, p. 13) cited examples of the wide range of definitions as: Ennis (1985a) broadly defines critical thinking as: “reasonable, reflective thinking that is focused on deciding what to believe or do” (p. 46). McPeck presents another broad critical thinking definition as: “the propensity and skill to engage in activity with reflective skepticism” (p. 8). Facione defines critical thinking as “purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which judgment is based”(p.8). Although there is considerable agreement as to what constitutes critical thinking, the picture is not always complete. Kennedy et al. (1991) continued to ask the following questions about critical thinking. “How broadly or narrowly should critical thinking be defined? What is the relationship of critical thinking to problem solving, reflective thinking, and higher order thinking? What common critical thinking vocabulary is most fruitful across fields?” (p. 26).

### **Problem Solving**

The literature suggests problem solving as another well-known definition of critical thinking. Pascarella and Terenzini (2005) defined critical thinking as an individual’s ability to solve problems or intellectual puzzles. These problems or puzzles come in many forms and require the application of complex reasoning and information processing, yet they usually have the common trait of a verifiably correct, or at least a more valid, answer. The critical thinking, information processing, and formal reasoning

skills involved in puzzle or problem solving are important acquisitions in the development of intellectual resources” (p. 160).

Defining as a problem solving ability is commensurate with underlying critical thinking teaching methods, which can be infused in many disciplines among undergraduate programs. Problem solving as a critical thinking definition is useful as a common denominator across all domains of study. For example, critical thinking requires problem-solving skills in such linguistic domains of study as English and history as well as non-linguistic domains of study (e.g., mathematics and science). Specific modes of thinking (i.e., scientific thinking, mathematical thinking, historical thinking, anthropological thinking, economic thinking, moral thinking, and philosophical thinking) all impact and are impacted by critical thinking. Donald (2002) found that problem solving can serve as a common definition for critical thinking, since problem solving transcends specific disciplines and demands using skills, which require domain specific knowledge, methods and techniques among disciplines. Problem solving as a definition of critical thinking plainly associates the cognitive skills and processes necessary to critically think across a wide range of disciplines.

### **Critical Thinking as Criteria**

Donald L.Hatcher (2000) focused on the need for criteria to be an intrinsic part of defining critical thinking skills. For example, Hatcher pointed out that educational philosopher, Matt Lipman included criteria in his definition of critical thinking as “skillful and responsible thinking that facilitates judgment because it relies on criteria as self-correcting, and is sensitive to context.” However, Hatcher found that Lipman’s use of criteria as vague, since criteria is not made clear as to what specific kinds of criteria

should be included as part of this critical thinking definition. “What should a good definition of critical thinking include?” (p. 4). Donald L. Hatcher believed that a good definition of critical thinking should consist of the following 10 criteria:

1. It should be as clear and concise as possible so we and the unconvinced know what we are talking about.
2. It should be easy to explicate to faculty and administrators, showing why critical thinking is an essential educational goal.
3. It should refer to the criteria to be used for critical judgment. Otherwise, there will never be agreement over what counts for critical thinking.
4. It should, as Harvey Siegel has pointed out, refer to the appropriate character traits of a critical thinker.
5. It should show that critical thinking has broad educational utility, i.e., is applicable to many disciplines. It should be clear that students in art, literature, political science, or history can benefit from learning to think critically.
6. It should allow people to distinguish critical thinking from other cognitive activities such as creative thinking, problem solving, and logical inference.
7. It should make clear what sorts of courses would count for fulfilling a critical thinking requirement and which should be left out. Without such a demarcation, as Michael Scriven has argued, educators succumb to "the prostitution of the critical thinking requirement."
8. It should provide enough guidance so that faculty can construct tests to assess whether or not students have acquired the appropriate skills and dispositions.

9. It should be consistent with the historical understanding of good, as opposed to dogmatic, thinking, a tradition including such thinkers as Plato, Aristotle, Aquinas, Mill, Dewey, Russell, and Popper.
10. It should be consistent with what is unproblematic in many previous definitions (pp. 4–5).

According to Donald L. Hatcher (2000), this definition for critical thinking is superior to other critical thinking definitions, because this definition allows for “driving a critical thinking requirement, allowing instructors and administrators to identify courses that were and were not critical thinking courses, and convince skeptics of the need for critical requirements in higher education” (p. 7).

Elder and Paul (2007) argued that the eight elements of reasoning, as criteria, is the approach to describe all kinds of thinking processes and are present in all kinds of thinking. The eight elements, as the basis for structures of thought, encourage thinking “for a purpose within a point of view based on assumptions leading to implications and consequences” (p. 5).

The eight elements of reasoning span across all kinds of thinking such as “concepts, ideas and theories to interpret data, facts, and experiences in order to answer questions, solve problems, and resolve issues and are listed on the Critical Thinking Foundation Website as: “generates purposes, raises questions, uses information, utilizes concepts, makes inferences, makes assumptions, generates implications and embodies a point of view” (p. 5). Moreover, Paul stressed the value of the metacognitive aspect of applying these “Eight Elements as by learning the importance of assessing one’s own

thinking or another person's thinking, since these elements as criteria perpetuate the metacognitive connection between the art of thinking well and the art of learning well. Elder and Paul (2007) contend that these eight elements are the "eight structures that define thinking. Learning to analyze thinking requires practice in identifying these structures" (p.5).

### **Bloom's Taxonomy**

Bloom's taxonomy is another conception of critical thinking based within the levels of the cognitive domain. In 1956, Bloom and his colleagues undertook the task of classifying educational objectives so as to establish a classification system for the cognitive, affective, and psychomotor domains. The original hierarchy of the cognitive domain levels was arranged from lowest to the highest as: knowledge, comprehension, application, analysis, synthesis, and evaluation. Even though synthesis and evaluation have much in common as two categories of thinking as part of Bloom's cognitive domain, their intent is quite different. The revised taxonomy changed these two categories so as to emphasize the processes of cognition.

According to Krathwohl (2002), Bloom considered the original taxonomy more than just a measurement tool. For example, Bloom believed that the original taxonomy could also be used as a means for aligning educational objectives, activities, and assessment in courses or to develop curricula. "It is objectives that involve understanding and use of knowledge, those that would be classified in the categories from *Comprehension* to *Synthesis* that are usually considered the most important goals of education" (p.213).

In the original taxonomy, recall in the knowledge category was considered to be a lower order thinking skill. However, in the revised taxonomy, knowledge becomes part of the cognitive dimension process. This revised knowledge dimension contains four categories instead of three original categories. The structure of the knowledge dimension of the Revised Taxonomy is “factual knowledge, conceptual knowledge, procedural knowledge and metacognitive knowledge” (Krathwohl, 2002, p.214). Metacognitive knowledge comprises an awareness of one’s own thinking processes.

Metacognitive knowledge, as the new fourth category, demonstrates knowledge of general cognition as well as awareness and knowledge of one’s own cognition. Metacognitive knowledge is often associated with the cognitive process of metacognition, but was not really acknowledged as part of the cognitive domain. The four subcategories of metacognitive knowledge include strategic knowledge, knowledge about cognitive tasks, including appropriate contextual and conditional knowledge and self-knowledge. Metacognitive knowledge is of “increasing significance as researchers continue to demonstrate the importance of students being made aware of their metacognitive activity, and then using this knowledge to appropriately adapt the ways in which they think and operate” (p.214).

### **Metacognition**

*Metacognition* is another term that is associated with critical thinking and is most simply defined as "thinking about thinking." However, defining metacognition is no simple task, and there seems much debate about what metacognition actually means.

Although the term has been part of the vocabulary of educational psychologists for the last couple of decades, and the concept for as long as humans have been able to reflect on their cognitive experiences, there is much debate over exactly what metacognition is.

One reason for this confusion is the fact that there are several terms currently used to describe the same basic phenomenon (e.g., self-regulation, executive control), or an aspect of that phenomenon (e.g., meta-memory), and these terms are often used interchangeably in the literature.

The term *metacognition* is most often associated with John Flavell (1979). According to Flavell, metacognition consists of both metacognitive knowledge and metacognitive experiences or regulation. Metacognitive knowledge refers to acquired knowledge about cognitive processes, knowledge that can be used to control cognitive processes. Flavell further divided metacognitive knowledge into three categories: knowledge of person variables, tasks variables, and strategy variables. According to Flavell (1979), “metacognitive knowledge consists primarily of knowledge or beliefs about what factors or variables act and interact in what ways to affect the course and outcome of cognitive enterprises” (p.907). The person variable or category consists of everything that you know about yourself and other people. The task variable involves the data known to you during the process of cognition. “As for the strategy category, there is a great deal of knowledge that could be acquired concerning what strategies are likely to be effective in achieving what subgoals and goals in what sorts of cognitive undertakings” (p. 907). Flavell (1979), provides examples of how each of these categories operate and suggests this metacognitive model be considered by researchers for further investigation.



According to Paul (2005), critical thinking is all about metacognition and offers his conception about monitoring one's thinking during the process of reading and writing for understanding course content.

One of the most important abilities a thinker can have is the ability to monitor and assess his or her own thinking while processing the thinking of others. In reading, for example, the reflective mind monitors how it is reading while it is reading. The foundation for this ability is knowledge of how the mind functions when reading well.

For example, if I know that to read for deep understanding I must actively bring ideas taken from a written text into my thinking, I intentionally paraphrase as I read. I put the meaning of each key sentence I read into my own words. If I know that one can understand ideas best when they are exemplified, then as a writer I give my readers intuitive examples of what I am saying. In a parallel way, as a reader I look for examples to better understand what a text is saying. Learning how to read closely and write substantively presuppose critical thinking abilities. When I read closely, I take ownership of important ideas in a text. When I write substantively, I say something worth saying about subject of importance. When we understand, as instructors, what it takes to read closely and write substantively—that students must *think their way through* what they read and what they write—then we design instruction that explicitly links thinking with reading and writing. It moves back and forth between the cognitive (thinking) and the meta-cognitive (thinking about thinking) (p. 32).

Furthermore, Paul (2005) advances the metacognitive aspect of critical thinking as independent thinking as well as the importance of learning to evaluate one's thinking

or someone else's thinking according to "“Eight Elements” and normative standards. “Only then can they make the connection of critical thinking to close reading or substantive writing” (p.37).

Bernard Lonergan, a Canadian Jesuit priest, theologian, and philosopher, formulated his conception of metacognition, grounded in his cognitive theory. Lonergan (1972) analyzed human thinking rooted in his cognitive theory of thinking as a dynamic human structure, which interconnects one's experience, understanding, and judgment with consciousness at the center of human thought. As a philosopher, Lonergan formulated “thinking about thinking” in terms of activities as they loop through the different levels of the cognitive process.

According to Lonergan (1972), thinking encompasses thinking as a human dynamic structure, where one's thinking assimilates as it revolves around the parts of the whole cognitive process, so that human knowing interacts with each and all levels of experience, understanding, and judgment through one's consciousness. Lonergan believed that metacognition is an integration of the cognitive and affective domains as it relates to the cognitive processes of how we think as embedded in his cognitive theory.

The literature demonstrates that there is, indeed, a lack of agreement among scholars and educators as to how to define critical thinking. Kennedy et al. (1991) referred to Ennis (1963) about his assessment on the state of knowledge about critical thinking and found one of the major areas in need of further research as, “further refinement and definition of the concept of critical thinking” (p. 18). Yet, according to Kennedy et al. (1991), “The merit of a theory or definition is often ascertainable when it is applied in practice” (p. 14).

## **Critical Thinking Theories**

Over the centuries, scholars have labored to synthesize historical theories into teaching methods to improve human thought and reflection. Cognitive developmental theory supports conceptual frameworks for understanding the significant links among defining, teaching, and assessing critical thinking skills in higher education. Thus, it would be beneficial to examine some of the familiar critical thinking theories as a principal factor in order to understand the link between teaching and assessment practices.

Since theories help us understand students' learning, especially higher order thinking skills, faculty members need to stress the importance of why it is important for them to learn how to think critically. Theories on students' intellectual development come from the research. Research on intellectual development examines how students interpret their learning experiences and their ways of knowing or thinking as it evolves during the undergraduate years (Baxter & Magolda, King & Kitchener, Perry, cited in Pascarella & Terenzini, 2005). Therefore, the processes based upon theories for validating knowledge are inherently linked to teaching critical thinking within the context of specific disciplines. Kuhn (1991) stated that most educators today favor the view that critical thinking must be taught in the context of specific subject matter. Donald (2002) concurred with this view "since criteria vary among disciplines, critical thinking must take place in the context of specific disciplines" (p. 3).

Critical thinking pedagogy originated out of such theoretical frameworks based on the works of Socrates, Benjamin Bloom, William Perry, Richard Paul, and Bernard Lonergan. Critical thinking pedagogy was often rooted in theoretical frameworks, which

evolved into teaching methods. A brief description of these different theories provides a deeper understanding of how their theoretical frameworks are embedded into critical thinking pedagogy and how they are practiced across a wide range of college disciplines.

### **Critical Thinking Teaching Methods**

Over the centuries scholars have struggled on how to synthesize historical theories of reflection into critical teaching pedagogy in order to improve human thought. Today, scholars and educators still labor on discovering effective pedagogy to develop students' thinking skills.

Critical thinking teaching methods are typically rooted in such theoretical frameworks as the Socratic method, Perry's scheme, Bloom's taxonomy, Richard Paul's eight elements, and Bernard Lonergan's general empirical method (GEM). A review of each one these critical teaching methods, based in theory, reveals how they bridge across a wide range of college disciplines.

*Socratic method.* The history of critical thinking traces its intellectual roots back to the ancient Greek philosophers over 2,500 years ago. In the fourth century B.C., Socrates introduced his critical thinking method, known as the Socratic method. Socrates formulated his method through inquiry, by asking his students questions, so as to find knowledge and truth. Today, in the 21st century, the Socratic method is still considered by many professors to be an effective method to teach students critical thinking skills across course curricula, since the ability to raise and solve complex questions fuels students' critical thinking skills. The literature suggests that effective critical thinking teaching methods developed out of the Socratic tradition as disciplined inquiry. For example, Donald (2002) supported the Socratic method as an effective method to teach

critical thinking skills, since “the ability to raise and solve complex questions is an important component of critical thinking” (p. 7).

Paul and Binker (1990) contended that Socratic questioning is key to teaching critical thinking skills, especially for initiating class discussions. “Socratic discussion, wherein students thought is elicited and probed, allows student to develop and evaluate their thinking by making it explicit” (p.360). These authors offer models of thought-provoking questions that professors can ask in order to elicit students’ critical thinking skills, which include the following:

- What do you mean by\_\_\_\_\_?
- How did you come to that conclusion?
- What did the author mean in this text?
- Why is this issue significant?
- What is the source of your information?
- Why did you make this inference? (p. 367)

Professors, who ask students these types of questions, realize that the Socratic method allows students to reflect upon important concepts, which are embedded in the subject matter. Furthermore, the Socratic method is a method of inquiry that generates the thinking process so student can understand key concepts and principles underlying course content through an exchange of questions. “Socratic questions require teachers to take seriously and wander about what students say and think: what they mean, its

significance to them, its relationship to other beliefs, how it can be tested, to what extent, and in what way it is true or makes sense” (p.360). The Socratic method can be used to teach critical thinking skills in courses across and within college disciplines.

For example, Gose (2009) described how the Socratic method is used to teach students critical thinking skills in undergraduate seminar classes. The purpose of this study was to analyze the Socratic method as a method to teach students’ critical thinking skills, in terms of motivation and interest in group discussions. This study was based on observing two different professors and how they employed the Socratic method and dialogue in their classes. After observing these two professors in their classrooms, Gose categorized their teaching techniques to find out which specific strategies improved class discussions. He identified five specific strategies, which improved the teaching of critical thinking in seminars as:

- Ask probing questions about the issues and ideas being discussed,
- Ask expansive questions about the relationship among ideas,
- Utilize the devil’s advocate role and other comic relief,
- Spend time on group maintenance and group process, and
- Take advantage of positions and roles taken on by others in the discussion (p. 45).

According to Gose (2009), these techniques encourage students’ critical thinking skills by also having them realize the importance of the group process as part of discussion in English seminar classes. According to this author, interpretive questions do not work if the text is not understood. What to do then?

The following kinds of questions tend to keep the discussion in the interrogative mode as a way to prompt students' comprehension of the subject matter.

1. Asking students to find and read passages with which they had trouble.
2. Asking students to find and read passages they have neglected but that will help them sort out an issue.
3. Asking students to read a passage aloud (while interrupting periodically for a summary of what has been read).
4. Asking students to clarify a key term (usually with a few page references to study that term in context).
5. Asking students who have come to an early grasp of the material to summarize key points or understandings.
6. Asking students who have come to an early grasp of the material to summarize key points.
7. Asking students to explain two passages that might seem in contradiction to one another.
8. Asking students to try to find a key sentence or paragraph that suggests the meaning of the whole work.
9. Asking students for their best question about the text.
10. Asking students for their best remaining question about the text toward the end of an otherwise worthy discussion about a key issue in a text. (p. 46)

The value of such teaching strategies is measured by their contribution to the overall goals of helping students learn to analyze logic and assumptions, to critique the validity and soundness of arguments, and to come to true understanding. These are only devices toward higher goals; that Socrates used such methods is evidence of the importance of working one's group of students. Further, while the goal of the dialectic is to approach truth, a secondary benefit is engaging students in the process of being introduced to the "mind of the discussant" (Gose, 2009, p. 48).

The Socratic method encourages students to exchange their ideas with one another by having them ask and answer questions, an educational practice known as active learning, so that students' critical thinking skills are kept alive during group discussions. Browne and Freeman (2000) suggested that "when the activity witnessed in a classroom has as its telos, the evaluation of arguments according to certain specific standards, then active learning is fertilizing critical thinking" (p. 303).

Tsui (2002) found that class discussion is an important factor for promoting students' critical thinking, particularly when they are encouraged to ask questions and verbally debate their ideas with one another. Findings revealed that class discussions usually help students to comprehend and retain ideas. Tsui (2002) cited Pascarella and Terenzini about fostering students' critical thinking skills through class discussions by stating:

When the goal of instruction is higher order cognitive skills (e.g., critical thinking, problem solving), classroom discussion is somewhat more effective than lecturing. This means knowing when to interject and ask thought-provoking



questions and when not to ask questions to pose and what to do when students too readily reach consensus. (pp. 755–756)

*Perry's scheme.* Perry's scheme (1970) provides another worthwhile method to teach critical thinking skills in undergraduate education. Perry's scheme of cognitive development outlines the different stages of intellectual development of college students based on his study of Harvard students. As a teaching strategy for critical thinking, "the Perry scheme describes the different stages in the cognitive development of undergraduate students" (p.128). Thoma (1993) described Perry's scheme as "the critical thinking process with identifiable stages and each stage involves how one views knowledge and learning and that critical thinking is thinking about the topics, the issues, and problems within a particular discipline.

Thoma (1993) referenced the fundamental teaching strategies of Perry's scheme based on Nelson's (1989) model in economics with a primary focus on facilitating transitions from lower to higher levels of cognitive development. Nelson's (1989) formulation of Perry's scheme reflects teaching tactics through transitions in economics. Thoma (1993) added that the advantage of Perry's scheme of intellectual development is that the transitions and modes of thinking can also be transferred to other disciplines of study. Nelson's (1989) model for teaching tactics adopts Perry's scheme in economics by applying four stages of thinking and three transitions between modes of thinking within the stages of cognitive development. These four stages of intellectual development in Perry's scheme are dualism, multiplicity, contextual relativism, and contextually appropriate decisions (Thoma, 1993).

Perry's scheme describes dualism as the lowest level of intellectual development. This is the mode where students hold a black or white, right or wrong, view of the world with little tolerance for ambiguity and where knowledge is regarded as absolute. Learning is seen as a process of the transmission of facts and truths from the instructor to the student. The transitional move through single dualism involves students being able to see and accept that knowledge is not absolute. Students begin to understand different points of view and begin to believe that even experts can disagree on points of view. Nelson (1989) offers a teaching strategy on dualism as a mode that pertains to the field of economics.

***Dualism.*** A teaching tactic to facilitate dualism is to assign a project, which makes students aware of the uncertain nature of knowledge. For example, a professor can assign a project for students to select a current economic issue and summarize different points of views, such as how banks and how consumers perceive inflation. The goal of this project requires students to discern relevant issues in economics so they become more aware of real-world issues by broadening their understanding of opposing views among experts. This kind of mini research project can be applied to other disciplines of study in order to facilitate the transition of thinking from dualism to multiplicity as well as gaining insight to the limitations of a dualistic mode of thinking.

***Multiplicity.*** Multiplicity is a level of cognitive development in which students recognize that reality is uncertain. Students are now able to adopt the view that where uncertainty exists, knowledge becomes subjective. The goal of this transition is to make students aware that criteria in economics are used to discriminate between economic theories and policies. Students start to realize that not all theories are equal. After this

transition, students should be able to apply criteria in evaluating economic theory and policy. A teaching approach to facilitate the transition of multiplicity would be to assign students to prepare an analysis of paired readings. At the multiplicity level, students would be expected to go beyond summarization and start the practice of thinking by comparing, analyzing, and evaluating economic theories. An advantage of the paired reading approach is that the reading is less open ended than a research project.

This kind of assignment often encourages group discussion by having students exchange their ideas about a particular economic topic. Group preparation of a position paper allows students to share their skills and knowledge on a specific economic issue that is followed by a class discussion.

***Contextual relativism.*** Contextual relativism is a mode of thinking that allows students learn the technicalities of how disciplines use different criteria through critical standards to make choices through competing views and theories. Students begin to realize that all proposed solutions are supported by reasons, and they learn to evaluate solutions. Although they may learn to use discipline-specific methodologies in the context of a formal class, they do not perceive the practicality of those approaches. Students who master the games within a discipline might excel academically but still might not be able to think critically and transfer these skills in other academic disciplines. During this transition, students come to realize that in choosing among theories, ideas, or actions in the "real world" of uncertainty, it is necessary to choose methods of critical thinking that can be transferred to outside the context of the classroom. Ideally, this transition leads to the next transition, where students see the necessity of making a choice and ultimately a commitment.

For this phase of contextual relativism Nelson (1989) considered assigning students a project where they can recognize the value of critical thinking in the real world. An assigned project for students could provide an analysis of economic issues, such as a survey of Marxist views on capitalism. The goal of this type of an assignment is for students to realize that the theories that they have learned can be applied for making more mature choices among real-world alternatives in a world of uncertainty.

*Contextually Appropriate Decisions.* In this mode of thinking, students accept the reality of uncertainty but now are able to independently commit to choices of ideas and action. Choices are based on applications of the methods within disciplines through the context of a student's value system. During the phase of contextually appropriate decisions, students recognize that knowledge is not absolute, and methodologies of specific disciplines are not perfect. At this point they become aware that they are responsible for making choices and that these choices must be based on connecting personal values with the criteria of appropriate disciplines. This mode is the highest level of cognitive development in the Perry scheme. A teaching approach to employ for the contextually appropriate mode, the final phase of Perry's scheme, is for faculty members to assign students to choose a specific topic in economics in which they defend a position.

Thoma (1993) supported Nelson's formulation of Perry's scheme in economics:

The (?) focus of critical thinking must be on fostering transitions within the context of a specific discipline. That is, strategies to foster cognitive development will be more effective when these techniques are actually applied within the content of disciplines rather than in general courses on critical thinking. (p. 129).

Thoma (1993) advanced the benefit of teaching critical thinking through Perry's scheme, since the transitions and modes of thinking of intellectual development are easily transferred to other disciplines of study.

***Bloom's taxonomy.*** Bloom (1956) developed one of the most often cited models for critical thinking skills by developing a cognitive domain for applying educational objectives to teaching and assessment practices. Bloom's taxonomy of educational objectives became familiar language among educators. Bloom's taxonomy as part of the cognitive domain is arranged as a hierarchy of six levels ranging from the lowest to the highest: knowledge, comprehension, application, analysis, synthesis, and evaluation.

"The taxonomy of educational objectives is a framework for classifying statements of what we expect or intend student to learn as a result of instruction" (Krathwohl, 2002 p. 212). Bloom's taxonomy provides educators with a framework of educational objectives for planning, teaching, and assessing college courses across different disciplinary curricula. In addition, educators found that they needed to develop assessments that would measure how well students had learned critical thinking objectives as part of course content. Educators regarded this new language as a lexicon to assess the alignment of teaching course content with critical thinking skills.

Lorin Andersen (2001), a former student of Bloom, published a revised version of Bloom's taxonomy from lower order thinking skills to higher order thinking skills as remembering, understanding, applying, analyzing, evaluating and creating. The revised version presents the use of verbs instead of nouns as in Bloom's taxonomy's original format and is noted as more operative way for measuring course objectives, such as critical thinking in college courses.

*Metacognitive methods.* The literature suggests metacognition as a current method to teach college students about thinking about their thinking. Elder and Paul (2007) advocated that all thinking can be conceptualized by employing the eight elements because they are present in all forms of reasoning and in all modes of thought. The eight elements are a valuable method to teach critical thinking skills to students, since they transfer across college disciplines. The diagram depicts the eight elements, which are present in all kinds of thinking.

The eight elements, as a critical thinking teaching model, generates purposes, raises questions, uses information, utilizes concepts, makes inferences, makes assumptions, generates implications, and embodies a point of view. These eight elements can be applied:

Whenever we think, we think for a purpose within a point of view based on assumptions leading to implications and consequences. We use concepts, ideas and theories to interpret data, facts, and experiences in order to answer questions, solve problems, and resolve issues. (p. 5)

According to Elder and Paul (2007), the eight basic structures are present in all kinds of thinking, and one's thinking can be improved by analyzing it and assessing it explicitly, whether it is in history classes, science classes, math classes, or in any college class. This model as (elements of reasoning) employs eight questions, which can introduce the application of reasoning and analytic skills across all disciplines as:

1. What is the purpose of studying this subject?
2. What kind of questions do they ask?
3. What sorts of data do they ask?

4. What types of inferences do they typically make?
5. What are the most basic ideas, theories in this field?
6. What do professionals in this field take for granted or assume?
7. What viewpoint is fostered in this field?
8. What implications follow from studying this discipline?

These questions can be contextualized for any given class, chapter in the textbook, and dimension of study. In conclusion, there are many types of analysis specific to particular disciplines. These forms of analysis frequently demand specialized training, such as instruction in chemistry in order to do qualitative analysis chemistry. However, this model of the eight elements is an analytic tool, which enables one to grasp the most basic logic of any discipline, subject, problem or issue. The eight elements provide a way for students to be able to transfer learning how to critically think between and among course subjects and college disciplines (The Critical Thinking Community n.d.).

According to Paul (2004), content in the subject matter of any discipline can be taught as a mode of thinking (i.e., history as historical thinking, biology as biological thinking) to connect the thinking process with the learning process to obtain knowledge. Every discipline — mathematics, physics, chemistry, biology, geography, sociology, anthropology, history, philosophy, and so on — is a mode of thinking. Every discipline can be understood only through thinking. We know mathematics, not when we can recite mathematical formulas, but when we can think mathematically. We know science, not when we can recall sentences from our science textbooks, but when we can think scientifically. We understand sociology only when we can think sociologically, history only when we can think historically, and philosophy only when we can think

philosophically. When we teach so that students are not thinking their way through subjects and disciplines, students leave our courses with no more knowledge than they had when they entered them. When we sacrifice thought to gain coverage, we sacrifice knowledge at the same time.

The eight element model is consistent with Paul's definition of critical thinking as metacognition, since the basic eight structures serve as a metacognitive approach to infuse critical thinking into every mode of thinking and throughout every discipline. These eight basic structures assist students to develop critical thinking skills as a primary tool for thinking about their learning. According to Paul and Elder (2005), the most effective teaching approach adopts a combination of developing critical thinking skills in general as well as in the content areas, "so that students learn to reason well across a wide range of subjects and domains" (p. 7).

***General empirical method.*** Lonergan's (1972) general empirical method (GEM) is a metacognitive teaching method that is rooted in his cognitive theory about thinking, in which he poses the key philosophical question, "What are we doing when we are thinking?" The GEM is the cognitive process of human knowing as a dynamic structure, which interacts with data at all the levels of experience, understanding, judgment, and decision. Lonergan described method as human knowing as a dynamic structure. Lonergan conceived metacognition as a method of thinking, which not only transcends all kinds of thinking, but also as a method to think in all disciplines.

A method is a normative pattern of recurrent and related operations yielding cumulative and progressive results. There is a method, where there are distinct operations, where each operation is related to the others, with a set of relations



forms a pattern, where the pattern is described as a right way of doing the job, where operations in accord with the pattern may be repeated indefinitely, and where the fruits of such repetitions are, not repetitious, but cumulative and progressive. (Lonergan, 1972, p. 4)

The general empirical method is a method about thinking about one's thinking as it assimilates data during the activities of experience, understanding, judging, and deciding at distinct levels (Lonergan, 1972). The levels of experience, understanding, judgment, and decision as activities of one's cognitive processes of the GEM are a metacognitive method, which can teach students about their own thinking processes. For a further explanation of the GEM and how GEM can be used to teach critical thinking skills in college courses, refer to Appendix L.

Through his work on the GEM, Lonergan (1972) intended to create a strong foundation for agreement in such disciplines as philosophy and theology. Lonergan realized that this lack of agreement on method among scholars has prevented a basic consensus from being reached and progress from being made in the disciplines within the humanities and social sciences. Yet, in the natural sciences, Lonergan understood that a general agreement exists among scholars as to the remarkable progress that has been made through the scientific method. "The scientific method is a particularly prominent way in which human beings have gradually refined their way of asking questions and thereby successfully answering questions" (Liddy, 2007, p. 88). Human learning is about asking questions to seek answers in order to arrive at an insight.

Human learning is a generative and ambivalent process. Lonergan (year) reminded us that human learning is also a "responsible" process because it leads us to

confront the crucial question of what we want to do with what we have discovered and understood. It leads us to confront the difficulty of making a choice that is not the result of a deduction only, but also of our meanings and our values (Triana, 2009).

### **Critical Thinking Approaches**

The literature revealed three approaches to teach critical thinking skills; however, there exists a lack of agreement on which approach is the most effective for teaching critical thinking skills within and across college disciplines. Ennis (1989) categorized instruction for critical thinking into the three models of general, infusion, and immersion. There are clear distinctions in how these three approaches are taught in college courses. The general approach consists of explicitly teaching general critical thinking skills separate from the subject matter. The general approach supports the model of teaching of critical thinking as a general reasoning ability, independent of disciplinary content. The infusion model is the other approach, where the teaching of general critical thinking skills is embedded within the teaching of subject matter. The infusion approach may also explicitly teach critical thinking skills but within the specific context of some subject matter. The infusion approach inserts critical thinking components within the content of the academic discipline, and there is widespread support for this approach evidenced in the literature (Kennedy et al., 1991, cited Brookfield, McPeck, Paul & Elder, Willingham). The immersion model suggests that critical thinking is best approached by encouraging a deep understanding of subject matter without explicit instruction. According to (Kennedy et al., 1991), “It is not known which approach is the most effective” (p. 16).

Although academic debates continue to revolve around the question of whether critical thinking should be taught within a specific subject or as a separate subject, there is another approach known as the mixed approach. The mixed approach employs a combination of either the immersion or infusion and general approaches. Ennis (1985a) and R.H. Sternberg (1987) preferred the "mixed model" approach, since it provides both a separate course for critical thinking, while simultaneously infusing or immersing critical thinking skills into course contents.

These three approaches provide models on how to infuse critical thinking skills into courses. However, faculty members remain uncertain on how to effectively infuse these critical thinking approaches into their teaching practices. Further research is needed to determine which approach to infuse critical thinking is actually the most effective (Ennis, 1989).

### **Assessment Methods**

In addition to finding effective teaching approaches and methods, faculty members in colleges are seeking ways to align critical thinking teaching methods with their assessment practices. Bissell and Lemons (2006), two biology instructors from Duke University, developed a rubric using Bloom's taxonomy of educational objectives to assess critical thinking skills and course content in their introductory biology courses. Bissell and Lemons (2006) selected Bloom's taxonomy of educational objectives because it is a "well-accepted explanation for different types of learning and cite that it is widely applied in the development of learning objectives for teaching and assessment" (Bissell and Lemons, 2006, p.67 cite Aviles).

Bloom's taxonomy defines six categories of learning: basic knowledge, secondary comprehension, application, analysis, synthesis, and evaluation. The first two categories, basic knowledge and secondary comprehension, do not require critical-thinking skills, but the last four—application, analysis, synthesis, and evaluation—all require the higher order thinking that characterizes critical thought. The definitions for these categories provide a smooth transition from educational theory to practice by suggesting specific assessment designs that researchers and instructors can use to evaluate student skills in any given category. Correctly using the higher order skills requires both knowledge and comprehension of the content, so all levels should be encouraged. Note that correctly using the higher order skills requires both knowledge and comprehension of the content so all levels of thinking should be encouraged (p. 67).

Bloom's taxonomy subdivides the academic skills that students might need into six different categories as:

1. Basic knowledge: memorizing facts, figures, and basic processes;
2. Secondary comprehension: understanding and illustrating the facts;
3. Application: generalizing the facts to other contexts and situations;
4. Analysis: understanding why the facts are the way they are; breaking problems down;
5. Synthesis: making connections between different elements on one's own; and
6. Evaluation: critically using one's knowledge to ascertain the quality of information.

Bissell and Lemons (2006) designed a rubric as a method constructed in Bloom's taxonomy to assess students' knowledge in the content of biology as well as critical

thinking skills. These instructors based their assessment method on others who have used Bloom's taxonomy to explicitly define the skills necessary for each question. They devised a scheme for developing scoring rubrics, which allows for each question to be a separate assessment of the content and the critical thinking skills. They introduced this method of assessment in their introductory biology courses. "Ideally, this methodology should allow for discipline-specific (i.e., content-based) questions in which the critical-thinking component can be explicitly dissected and scored" (p. 67).

Several steps were taken to develop their methodology for designing, testing, and scoring discipline-specific assessments for both content in biology and critical thinking skills. According to Bissell and Lemons (2006), they first, devised questions, which involved both biological knowledge and critical thinking skills. "Second, they document critical-thinking skills required (e.g., application, analysis, synthesis) and the specific content area then create a scoring rubric for that question. Their scheme synthesized the "work of others who have devised rubrics that independently assess either content, (Bissell & Lemons, 2006 cite Porter, Ebert May et al., Middendorf & Pace) or critical-thinking skills (Facione et al., p. 68). To test the rubric's validity, the questions were reviewed by experts in biology and biology education. Fourth, students were assessed and scored based on the rubric being created in advance. Results indicated a successful implementation of these kinds of assessments in a large (approximately 150 students) introductory biology course at Duke University.

Bissell and Lemons (2006) reported gathering data on student performance, which allows for further assessment of the mastery of content at several different skill levels while simultaneously assessing proficiency of skills using different types of content.

Although these data were in the process of analysis, the instructors discovered advantages for using this type of assessment methodology in their courses.

For example, thinking in advance about what we want questions to accomplish in terms of both content and critical thinking has enabled us to be explicit with students about the skills they need to develop in order to succeed in the course. We have reviewed questions and grading rubrics in our lectures and made examples of them available to students outside of class. As a result of this exposure, students were more aware of the quality of responses we expected for questions and could easily cross-reference their own responses with our explicit guidelines. These efforts helped students reflect on and improve their thinking (and writing) abilities—concept referred to as metacognition. (p. 70)

In conclusion, Bissell and Lemons (2006) found three advantages that emerged from the design of their assessment methodology on student learning. “First, these types of assessments demand content knowledge, so there are no “wasted” questions. Second, the assessments have latitude in that they can be easily revised to accommodate unforeseen answers and can be weighed to favor either the critical-thinking component or the content component. Third, the assessments can be more rapidly and reliably scored than “open-ended” questions because of the highly refined design of the scoring rubrics” (p. 71).

The two biology instructors are now in the process of examining the transferability of skills developed in one context (e.g., introductory biology) to a different context (e.g., introductory physics) (Bissell and Lemons, 2006). These types of investigations have created collaborative opportunities with instructors in other STEM

disciplines at Duke University who are interested in improving student learning and curriculum goals. The critical- thinking assessments thus described offer a gateway into understanding relationships among student learning as well as teaching and assessment practices. Bissell and Lemons, (2006) are” also parlaying this methodology into an interdisciplinary effort to enhance critical-thinking instruction across the STEM disciplines at Duke University, who are interested in improving student learning and curriculum goals”(p.71).

Bissell and Lemons (2006) found that these rubrics to assess course content and critical thinking skills based on the educational objectives of Bloom’s taxonomy would benefit large introductory courses across different disciplines. As a result of the format of this assessment method, “conversations across disciplines and conversations across disciplinary lines have helped faculty to see the value of assessing critical-thinking skills as a distinct goal from measuring content acquisition” (p. 72).

**Assessing critical thinking and writing.** Written expression is another method to assess students’ critical thinking skills. Condon and Kelly-Riley (2004) explained the findings from Washington State University’s (WSU) study based upon the connection between college-level writing skills and critical thinking skills. The authors introduced their study by stating the connection on the academic relationship between writing and critical thinking as:

Writing is the coin of the realm here. It permeates the whole atmosphere rather than being compartmentalized into a single course or slapped on as a series of skills. We believe writing is the tool of thinking. The best way to learn to think is to read a lot of good writing and write a lot about what you’ve read. Writing and

the communication of ideas are central to all disciplines whether one is in college or the workplace. One of the most important skills in the digital age is, in fact, oldest — *writing*. (p. 56)

According to Condon and Kelly-Riley (2004), noted that general education reform and the development of WSU's campus writing programs were developed in part in response to a state-imposed mandate for entry-level, mid-career, and end-of-program assessments. Throughout the implementation of the university's writing program, they believed the common assumption that writing and critical thinking were inextricably linked in that if students' writing improves, then so do their abilities as thinkers improve. By using students' writing samples from zoology labs, international business case studies, term papers, exam questions, and textual analyses, they believed that students' critical thinking skills would also improve.

In the late 1990s, this belief about the relationship between writing and critical thinking changed. Condon and Kelly-Riley (2004) referred to the 2001 Progress Report on the Writing Portfolio to document the relationship between students writing and critical thinking skills. The 2001 Progress Report on the Writing Portfolio demonstrated that 90% of student writers received passing ratings or higher on junior-level writing portfolios, which indicated that a great majority of upper division students showed improvement in writing proficiency as defined by WSU faculty (Condon & Kelly-Riley, 2004 cite Burke & Kelly-Riley, p. 58). Although students' writing skills showed improvement, "faculty members expressed that students lacked adequate higher order thinking abilities — a sentiment echoed by many faculty who evaluated junior Writing



Portfolios — so they began to explore a more systematic relationship between writing and critical thinking” (p. 58).

To further investigate this relationship, student papers for three different senior-level capstone courses were evaluated for critical thinking using an earlier version of the *WSU Guide to Rating Critical Thinking*. Results demonstrated low critical thinking abilities (a mean of 2.3 on a 6-point scale). Lower division general education courses also revealed a lack of critical thinking skills in students’ written assignments, even though writing skills were judged acceptable in terms of quality.

Researchers began to suspect that these findings indicated that there may often be little, if any, relationship between writing and critical thinking. Faculty members believe that they are teaching courses to develop higher order skills, but in fact are not teaching those skills. In the general education program writing was the primary vehicle for developing critical thinking skills. However, it became evident that that “no automatic connection between writing and critical thinking exists, even in curricula and classrooms where the two are explicitly linked” (p. 58).

Due to this lack of connection between critical thinking skills and writing as a finding, faculty members from the Center for Teaching, Learning and Technology (CTLT), the general education program, and the writing programs decided to collaborate on developing the *Washington State University Guide to Rating Critical Thinking*. This guide was synthesized from the scholarly works (Condon & Kelly-Riley cite Toulmin, Paul, and Facione as well as from local practice so as to construct an instructionally useful tool for assessing college students’ critical thinking skills.

Besides being a well-developed diagnostic tool for measuring students' critical thinking skills, the guide enabled faculty to reflect upon and revise their own instructional goals, assessments, and teaching strategies. To accomplish this task, the *WSU Guide to Rating Critical Thinking* identifies seven key areas of critical thinking:

- identification of a problem or issue,
- establishment of a clear perspective on the issue,
- recognition of alternative perspectives,
- location of the issue within an appropriate context(s),
- identification and evaluation of evidence,
- recognition of fundamental assumptions implicit or stated by the representation of an issue, and
- assessment of implications and potential conclusions.

“This skill set for thinking critically demonstrates competence with and integration of all of these components for critical analysis” (p. 59). The *WSU Guide to Rating Critical Thinking* provided a description of critical thinking instead of a definition of critical thinking.

The purpose of the WSU guide, as a diagnostic tool, was not only to evaluate student progress, but also faculty members to reflect upon their teaching practices. The Washington State University Critical Thinking Project helped faculty members to develop contextually based definitions as applications of critical thinking, since their position was that “no one definition of critical thinking is applicable to every discipline at every level” (Condon & Kelly-Riley, 2004, p. 59).

Faculty members were also encouraged to take the seven-dimension guide and create evaluation criteria so that assignments were appropriate for their instructional styles and to evaluate student work. Prior to faculty members giving the assignments, students were provided with criteria so that students had a clear understanding of expectations. Faculty members were also asked to plan assignments for promoting higher order thinking skills. Results were not really unexpected based on the interface between two such complicated constructs.

Results indicate that students' critical thinking scores improved more in one semester in courses that overtly integrated the guide than from the regular progression from freshman to junior year, as established by performances in WSU's Writing Assessment Program. Students in courses in which the guide was overtly used increased their scores up to three and a half times as much as students in courses that did not. Papers received significantly higher critical thinking ratings than in the four courses in which the guide was not used ( $n = 36$ ). Earlier studies showed the interesting finding as an inverse relationship between our scoring of student work in our Writing Assessment Program — the entry-level Writing Placement Exam and the junior-level timed writing portion of the Writing Portfolio—and the evaluation of the same work using the *WSU Guide to Rating Critical Thinking*. In other words, the better the writing, the lower the critical thinking score, but the more problematic the writing, the higher the critical thinking score. The Critical Thinking Project shed light on limitations in our Writing Assessment Program in our efforts to promote writing across the curriculum.

The inverse correlation, and then the lack of relationship between our writing assessment scores and critical thinking raters in our Writing Assessment Program

comment that the exams seemed to show sound writing abilities, but really contain no critical thinking abilities. (p. 61)

Condon and Kelly-Riley (2004 referred to Haswell's (1991) research, which indicates that "when writers take risks with new ways of thinking, often their writing breaks down in structure as the student grapples with a new way of thinking. These assumptions led them to reconsider the relationship between writing and critical thinking, and how they play out in large-scale assessment programs situated and defined by local context. The lack of relation does not mean that either assessment is wrong" (p. 66).

It means that the lack of relationship between writing scores and critical thinking scores indicates that having students write does not automatically mean that we ask students to think critically. This point is surprising for many writing professionals because we have operated with the assumption that writing and thinking are inextricably linked. Arthur Jensen, for example, asserted, "I have found no evidence of any two or more mental abilities that are consistently uncorrelated or negatively correlated in a large unrestricted sample of the population" (cited in Condon & Kelly-Riley 2004,p.66). Such studies, however, not only depend on contextualized measures of cognitive abilities — as opposed to measures that examine student learning outcomes — but they also measure "ability in the abstract" (Condon and Kelly-Riley , 2004 cite Conrad). So one problem with the common assumption that equates writing with critical thinking is that so much depends on the context surrounding the performance and the method for measurement. They found the reasons for the separation in practice to be fairly clear:

1. If faculty do not explicitly ask for critical thinking, students do not feel moved to do it;

2. If faculty do not define the construct *critical thinking* for students, students will not produce a definition;
3. If writing tasks call for summary and fact reporting, we have no reason to suspect that students' performances will incorporate critical thinking;
4. If faculty do not receive assistance in developing assignments that set high expectations and that explain clearly what those expectations are, there can be no reason to assume that course assignments and materials will include either.

“Writing acts as a *vehicle* for critical thinking, but writing is not itself critical thinking” (Condon & Kelly-Riley, 2004, p. 66).

Conclusions from these studies reveal a need to look seriously at educational praxis in higher education, first to be sure that educators actually foster the values and competencies that they claim to promote and second to be sure that any assessment that purports to identify those values and competencies actually does so. In the context of higher education the set of values and competencies that faculty members try to foster in college students can be very challenging and complex.

Condon and Kelly-Riley (2004) contend that “all these values and competencies, like critical thinking, are socially constructed and highly situated within different disciplines. In order to evaluate students' performance, assessments are needed that use the learning outcomes from classes, which means assessment tools and processes must be developed that are capable of evaluating those outcomes” (p. 70).

### **Critical Thinking in Philosophy**

The research in philosophy suggests that teaching students to understand arguments is a method to teach critical thinking skills, not only in philosophy but to

understanding arguments in other disciplines as well. Harrell (2007) set out in her study to determine whether visual representations of argument structure aid in the acquisition and development of critical thinking skills within the context of an introductory philosophy course at Carnegie Mellon University. One of the major goals of the introductory philosophy course is for the students to develop general critical thinking skills. Despite the lack of agreement as to what creates a set of “critical thinking skills,” there seems to be fair agreement among educators as to what kinds of skills they are referring to when they teach critical thinking to their students. Most philosophers concur that one feature of critical thinking is the ability to analyze, understand, and evaluate an argument, “argument analysis.” Harrell (2007) cited Moore and Parker, Lee, Kuhn in that they concur that “argumentative reasoning skills are in fact fundamental to what educators call ‘critical’ thinking and also cites Ennis, who says that “analyzing arguments” is one of the critical thinking abilities” (p. 1).

At Carnegie Mellon students are not taught explicitly how to analyze arguments in their philosophy classes except for logic courses and are not typically provided with explicit guidelines on how to reconstruct an argument. Rather, students are taught how to analyze arguments through an implicit approach. For example, the instructor writes the premises of the argument on the blackboard and then the instructor through demonstration discusses how well the premises support or do not support the conclusion. The instructor often asks students to reconstruct an author’s arguments but without any explicit instruction for analyzing the elements of an argument. The focus of the study was to find out the effectiveness of various alternative teaching methods, such as diagrams to improve students’ argument analysis performance.

According to Harrell (2007), the purpose of this study was to investigate effective methods to assist students in the tasks of analyzing and evaluating arguments. This task consists of analyzing an argument from written text by identifying the main conclusion, the premises (including subconclusions), and the structure of the argument (i.e., how the premises work together to support the main conclusion), while evaluation consists in determining whether the premises actually do support the conclusion (validity or strength of the argument), and whether the premises are true.

Harrell (2007) cited the literature to support the advantages of constructing argument diagrams to teach students and assist them with understanding the task of analyzing and evaluating arguments.

For example Harrell (2007 cites Larkin and Simon, who argued that “diagrammatic representations of information can make recognition of key features and drawing inferences easier than a sentential representation of the same information” (p.1). According to Harrell (2007), Larkin and Simon contend that the benefit of using diagrams to understand arguments is that it is easier to visualize the key elements of an argument so as to draw inferences.

Harrell (2007) cites Winn, who agrees that “diagrams contain much more information that is easier to access than plain text just by virtue of the spatial relationships between the parts and between the parts and the frame. Indeed, research on student learning has consistently shown the efficacy of using diagrams to aid text comprehension (Larkin & Simon, Lee, Novak & Gowin, Schwarz & Raphael, cited in Harrell, 2007, p.1) as well as vocabulary development, post-reading activities, and writing preparation” (Johnson, Pittleman, & Heimlich, cited in Harrell (2007) p. 1). The

advantage of the diagram is that it represents a visual depiction of how philosophers construct an argument, which is a sequence of statements in which one is the conclusion, and the others are premises supporting this conclusion. Thus, the use of argument diagrams is one of the teaching methods to improve students' understanding of arguments as a critical thinking skill.

According to Harrell (2007), the literature suggests that "argument visualization (particularly computer-supported argument visualization) has demonstrated that the use of software programs specifically designed to help students construct argument diagrams can significantly improve students' critical thinking abilities over the course of a semester-long college-level course" (p. 2). However, one does not necessarily need a computer software program to construct an argument diagram; one needs only a pencil and paper. To their knowledge, there has not been research to determine whether the crucial factor is the mere ability to construct argument diagrams, or the aid of a computer platform and tutor, or possibly both. The two factors studied included the basic skills to construct argument diagrams and the tools with which they are constructed.

According to Harrell (2007), these two factors needed to be tested separately to find out whether there is improvement in students' skills to analyze arguments. The hypothesis for this study states the following:

Students who are able to construct argument diagrams and use them during argument analysis tasks will improve in performance on critical thinking tasks over the course of a semester long introductory philosophy class significantly more than students in the same class who do not have this ability. (p. 2)



The best place to study this hypothesis was in the introductory philosophy course. Different instructors typically teach four or five lectures of this course each semester. Even though the general curriculum of the course is fixed, each instructor is given a great deal of flexibility in implementing the curriculum (Harrell,2007). The epistemology, metaphysics, and ethics courses are topic-based courses and are introduced through historical and contemporary primary-source readings. The instructor selects the order of the topics and the assignments. Students in these courses are a combination of all classes and all majors from each of the seven colleges across the University.

This study tested the hypothesis by comparing the pretest and posttest scores of students in the introductory philosophy class, who were able to construct argument diagrams to the scores of those students in the introductory philosophy class who did not have this skill during the spring and fall of 2004 (Harrell,2007).

According to Harrell (2007), the results of the second hypothesis was supported, since the students who mastered the use of argument diagrams—those who constructed three or four correct argument diagrams for Spring 2004, and three, four or five correct argument diagrams for Fall 2004—gained the most from pretest to posttest, and gained the most as a fraction of the gain that was possible. The second hypothesis implies that the number of correct argument diagrams a student constructed on the posttest was correlated with the student's gain and standardized gain. For Spring 2004 there were very few students who constructed exactly two correct argument diagrams on the posttest, and still fewer who constructed exactly four. Similar data obtained for Fall 2004 (p. 3).

Harrell (2007) found it interesting that those students who constructed few correct argument diagrams were roughly equal on all measures to those who constructed no correct argument diagrams. This may be explained by the fact that nearly all (85%) of the students who constructed few correct argument diagrams and all (100%) of the students who constructed no correct argument diagrams were enrolled in the lectures in which constructing argument diagrams was not explicitly taught; thus the majority of the students who constructed few correct argument diagrams may have done so by accident. This suggests some future work to determine how much the mere ability to construct argument diagrams aids in critical thinking skills compared to the ability to construct argument diagrams in addition to instruction on how to read, interpret, and use argument diagrams. The conclusions from this study indicated that most students do not take a critical thinking course during their college years.

Harrell (2007) notes that there may be several reasons for this: the classes are too hard to get into, the classes are not required, the classes do not exist, and so forth. It is difficult to understand, though, why any of these would be the case since the development of critical thinking skills are a part of the educational objectives of most universities and colleges, and since the possession of these skills is one of the most sought-after qualities in job candidates in many fields ( Harrell, 2007, p. 5).

According to Harrell (2007), perhaps some colleges and employers support the belief that critical thinking skills are taught across the curriculum, instead of in one concentrated course. Results demonstrated that students' critical thinking skills improve significantly if they are taught explicitly on how to construct argument diagrams as a method to comprehend and evaluate arguments. This study was based on the use of

applying argument diagrams to improve argument analysis in introductory philosophy course; the authors believe that the use of argument diagrams could also be applied across disciplinary areas.

The analysis of one's own arguments as well as others' arguments transpires "almost every discipline, from Philosophy and Logic to English and History to Mathematics and Engineering" (Harrell, 2007, p. 6). This study supports the use of argument diagrams as an effective method to assist students in developing general critical thinking skills and developing discipline-specific abilities. This suggests that the ability to construct argument diagrams significantly aids in understanding, analyzing, and evaluating arguments.

### **Critical Thinking Skills: An Overview on College Teaching**

According to Cross (2005), college instructors' views vary greatly in what they are trying to accomplish as part of their teaching practices. "Teaching goals are heavily associated with academic disciplines, but they also differ with personal perceptions of their teaching role" (p. 2). This finding was based on a survey of 2800 teachers from 33 2- and 4-year colleges; they were asked which of the six teaching roles they considered primary with the most significant differences occurring across disciplines. For example, whereas 55% percent of the science teachers said they were primarily concerned about teaching students the facts and principles of their subject matter, only 17% of the English teachers saw mastery of subject matter as their primary role. English teachers were far more likely to choose "helping students develop higher-order thinking skills" (p. 1).

Cross (2005), explained the results of the survey, which showed that 28% of teachers across disciplines find that the roles of developing students' higher order

thinking skills and teaching facts and principles are among one of their primary roles but with wide differences in what they consider preferential. Findings indicate that teachers' views of their roles are closely associated to the subjects they teach. For example, teachers in the humanities, English, and the social sciences are most likely to perceive the teacher's role as "helping students develop higher-order thinking skills, " whereas those in math and science are most likely to try to "teach students facts and principles of the subject matter" (p.4). Teachers of business and medicine (in this case, mostly nursing and allied health) see themselves as "preparing students for jobs and careers." Those in the fine and performing arts see their primary role as "fostering student development and personal growth" (p.4). Teachers of basic skills are, of course, largely concerned about the "development of basic learning skills" (p. 4).

According to Cross (2005), the five teaching goals most likely to be considered "essential" by teachers of math, science, and engineering are problem solving skills. A majority of the teachers said that they felt the goal was "essential" to their teaching of the selected course. These goals are strongly subject matter oriented with an emphasis on the development of analytic skills (p. 4).

Cross (2005) reports the teaching goals most often rated as "essential" by the English teachers were found to be the same for the science teachers as the "development of the ability to apply principles and generalities to new problems and situations," and "development of analytic skills" (p. 5). The data from this survey offers critical thinking as an essential goal across disciplines but with limited connections between teaching and learning outcomes. Cross (2005) supports the need for more classroom research so as to "evaluate the accomplishment of his or her teaching goals" (p.12).).

This literature review supports the need for further research in the areas of defining, teaching, and assessing critical thinking skills. “Despite the interest in and importance of critical thinking, these areas are still in need of further investigation” (Kennedy et al., 1991, p. 26).

## Chapter III

### Research Design and Methodology

#### Research Design

This qualitative study investigates how selected professors perceive critical thinking in terms of their methods for infusing it into their teaching and assessment practices. Qualitative research is appropriate for this study since it derives from an inductive approach, which focuses on a specific phenomenon about professors' thoughts about critical thinking (Merriam, 1998). "Qualitative methods build on well-practiced verbal descriptive skills and techniques for selecting and categorizing information" (Kathwohl, 2004, p. 228).

The decision to use a qualitative design for this study, as denoted in Denzin and Lincoln's (2000) description of qualitative research as a situated activity that locates the observer in the world.

It consists of a set of interpretative material practices that make the world visible..... This means that qualitative researchers study things in their natural settings, attempting to make sense, or to interpret, phenomena in terms of the meaning people to bring to them. (p. 3)

A qualitative approach is appropriate for this study, since a "qualitative study is an educational speculation about the form the research is taking and the direction the study is likely to go" (Bogdan & Biklen, 2007 p. 78). The phenomena of interest for this qualitative study explore how professors from diverse disciplines teach and assess critical thinking as part of the Core Curriculum undergraduate program at St. Stephens University, which is a pseudonym for the research site.

The most effective method to find out about how professors approach the teaching of critical thinking from their disciplinary perspectives is to speak with them directly about their ideas and approaches. The research questions for this study investigate the interface between professors' approaches to the teaching and assessment of critical thinking skills as reflected in the commitment of St. Stephens to infuse critical thinking into undergraduate programs.

Participants were selected from a pool of professors across diverse disciplines, who teach critical thinking in Core, Signature I, Signature II, and Signature III courses. To collect data for this qualitative study, methods include in-depth interviews with selected professors, who teach critical thinking in core courses as well as their documentation, such as course syllabi, course assignments, and course examinations. An inductive coding system, according to categorical topics and patterns, was employed to analyze the data.

### **Research Site**

The research for this study on critical thinking was conducted at St. Stephens University, a private Catholic University, located on the east coast of the United States. St. Stephens was chosen as the research site because of the university's commitment to reform the curriculum by infusing critical thinking as core proficiency into undergraduate coursework. Since 2004, the Core Curriculum Committee has been in place to develop critical thinking at St. Stephens University to infuse it as a core proficiency curriculum.

For the Spring Semester 2011, sixty faculty members were teaching Core courses with critical thinking infused into undergraduate courses. Undergraduate students are required to take a minimum of three Core Curriculum courses. In order for professors to

teach Core proficiency courses, professors are required to seek approval from the Core Curriculum Committee by submitting syllabi with infused core proficiencies, such as critical thinking. Once the Core Curriculum Committee approves the professors' course syllabi, they are then assigned to teach a Signature course and or other critical thinking approved proficiency courses. Faculty Seminars as professional development workshops are available on campus for professors to learn more about infusing critical thinking into undergraduate coursework. In addition, the Core Curriculum Committee has developed a Critical Thinking Training Module, which is available online as a training Website for professors, who are currently teaching critical thinking in approved proficiency courses. More detailed information regarding the history and structure of the Core Curriculum as well as applications for faculty members to apply to teach Core courses are available in Appendix N.

### **Selection of Participants**

For this study, professors were selected from St. Stephens University, pseudonym for the name of the university, who were teaching Core, Signature I, Signature II, Signature III courses. According to Krathwohl (2004), purposive sampling, often employed in qualitative research, involves samples chosen to facilitate the research on a research problem. The total number of approved proficiency courses was 60 for the Spring 2011 semester.

The 12 participants, professors representing the following disciplines, were as follows: 1 from Sociology, 1 from History, 1 from Psychology, 1 from Classical Studies, 3 from Philosophy, 5 from Theology. These 12 professors as selected participants



represent a sample population, who were teaching Signature I, Signature II, and Signature III courses from across diverse disciplines within Liberal Arts and Humanities.

Participants were limited to representation of six disciplines of study in undergraduate education. Table 1 indicates the pseudonyms of the professors who participated in this study and who infused critical thinking into Spring 2011 “Signature” Core courses.

The sample population included a total of 12 selected professors, who teach Signature courses. These participants were contacted by email. Participants contacted me by phone and or email that they agreed to participate in this study. After participants agreed to be part of this study, a letter of explanation with a brief description of the study was sent out to all participants, I then scheduled individual appointments to conduct interviews with each participant.

The 12 participants were professors representing the following disciplines: 1 from Sociology, 1 from History, 1 from Psychology, 1 from Classical Studies, 3 from Philosophy, and 5 from Theology. These 12 professors represent a sample population who were teaching Signature I, Signature II, and Signature III courses from across diverse disciplines within Liberal Arts and Humanities. Participants were limited to representation of disciplines of study in undergraduate education. Table 1 indicates the pseudonyms of the full-time professors who participated in this study and who taught Signature Core courses and infused critical thinking as one of the core proficiencies during the Spring 2011 semester.

Table 1: *Participants' Names as Pseudonyms and Disciplines*

Pseudonyms of professors	Highest degree	Discipline	Core course Spring 2011
Alex Holmes	PhD	Sociology	Signature II
Karen Stewart	PhD	History	Signature II
Norman Hale	PhD	Psychology	Signature II
Sam Lock	PhD	Classical studies	Signature II
Alfred Zoner	PhD	Philosophy	Signature II
Mike Collins	PhD	Philosophy	Signature II
Rick Levy	PhD	Philosophy	Signature III
Gladys Trump	D. Min.	Theology	Signature I
Ethan Jones	PhD	Theology	Signature I
Tony Softner	PhD	Theology	Signature II
Jared Book	PhD	Theology	Signature II
Keith Jared	PhD	Theology	Signature II

This table lists the names as pseudonyms of the 12 professors and their highest degree earned in their discipline, and the Signature courses they taught for the Spring 2011 semester. The reason for selecting these professors as participants was to obtain a greater understanding of how they teach critical thinking from an interdisciplinary perspective. Professors from similar disciplines were selected as participants to obtain views on how critical thinking is taught from the same discipline of study. These professors were selected as participants since they are full time-experienced professors,

who taught critical thinking as one of the core proficiencies in either Signature I, Signature II, or Signature III courses.

The 12 participants, professors represented the following disciplines were as follows: 1 from Sociology, 1 from History, 1 from Psychology, 1 from Classical Studies, 3 from Philosophy, 5 from Theology. These 12 full-time professors represent a sample population, who were teaching Signature I, Signature II, and Signature III course from across diverse disciplines within Liberal Arts and Humanities. Participants were limited to representation of six disciplines of study in undergraduate education. In addition, these selected professors have participated in faculty seminars as one of the requirements to teach Core courses. For the purpose of the research for this study, these selected professors readily discussed their ideas about critical thinking approaches at St. Stephens University.

Since the participants taught Signature courses for the Spring 2011 semester, they readily offered their perspectives about teaching critical thinking in Core courses and did not need to depend on their memory to recall past critical thinking teaching experiences. By speaking with individual professors from similar and different disciplines, concrete examples of how they teach critical thinking in Core courses affords rich sources of data for this study.

### **Data Collection**

Qualitative methods were used to gather data for this study on how professors infuse critical thinking into college courses.” The primary sources of data for this qualitative study consisted of interviews with selected professors. In addition to one-on-one interviews, I requested documentation from the 12 professors, such as syllabi,

courses assignments, and exams. The advantage of these qualitative methods reflects Stakes' description of qualitative research as "not necessarily to map and conquer the world but to sophisticate the beholding of it" (as cited in Krathwohl, p. 229). The rationale for these methods is to gather data rich in detail and embedded in context on how select professors' approach critical thinking as part of the Core Curriculum at St. Stephens University, which is a pseudonym for this university.

**Interviews.** Morgan (1997) cited in Maxwell (2005) states that an interview is a purposeful conversation, usually between two people but sometimes more and is directed by one in order to get information from the other. "Interviewing is often an efficient and valid way of understanding someone's perspective" (Maxwell, 2005 p. 94). In-depth and semi-structured interviews were used for this study. The in-depth interview offers an opportunity to gather information that would have been otherwise unavailable. Patton (2002) explained the value of an in-depth interview as a means to "enter the other person's perspective" (p. 341). Probes offered the occasion to ensure that individual experiences and ideas will be in sufficient depth so as to adequately reflect the phenomenon of interest. The interview process intends to make explicit professor approaches to the teaching and assessment of critical thinking skills and to find out how they infuse it into their subject matter. I used semi-structured interviews because they permit, "the participant's perspective...to unfold as the participant views it, not as the researcher views it" (Marshall & Rossman, 1999, p. 108).

Semistructured interviews allow for gathering comparable data across subjects, such as professors' approaches on critical thinking across broad disciplines. A semi-structured format also affords a general framework for initial interviews as well as the

flexibility necessary to pursue promising issues, which may surface during the interviews. I began each initial interview with questions that are relatively neutral (Merriam, 1998). This approach creates an atmosphere for participants to be more comfortable with the interview process prior to asking questions, which they may perceive as more intrusive. I transcribed all interviews. Transcripts were not made transparent to protect the confidentiality of all the participants.

Since the research method for this qualitative study consisted of interviews with 12 professors, a certain degree of consistency for interviewing the participants was required to ensure that all participants address the same basic questions. One-hour periods were the allotted period for conducting interviews with selected participants. The interview guide (see Appendix A) addresses some general factors, which might influence professors' teaching and assessment practices. Other interview questions address how professors construct their understandings of critical thinking and how they understand how their teaching approaches develop students' critical thinking skills. Important information was uncovered by the thoughts of participants as they share their understandings of how they teach and assess critical thinking skills within the subject matter of Core courses. The interview guide for this qualitative study is based on the assumption that the "perspective of others is meaningful, knowable, and able to be made explicit" (Patton, 2002, p. 341).

**Documentation.** Documentation is another primary source to gather data for this qualitative study. Sources of documentation include professors' documentation, such as course syllabi, copies of exams and papers, as well as other course related documents. Documentation about the development of the Core Curriculum and requirements as well

as resources about critical thinking, and the Critical Training Module is available from St. Stephens's Websites.

The Critical Training Module is a Website, which provides a wide range of comprehensive information for professors to learn more about how to infuse critical thinking into their teaching and assessment practices. This Website is only available to faculty members, who are teaching critical thinking in approved Core courses. This source of data offered me valuable information about how the Core views the infusing of critical thinking into "Signature" courses. In addition, this Critical Training Module offers recommendations on how professors can incorporate critical thinking skills into their coursework.

Course documents, such as syllabi, major class assignments, tests, and exams were examined to find out how interdisciplinary professors approach the teaching and assessment of critical thinking skills. These sources of data revealed how professors align and link critical teaching definitions with their teaching methods from their disciplinary perspectives. Furthermore, these data provide evidence as to how professors' course syllabi align with their teaching and assessment practices. Course syllabi as data determine whether professors' course objectives about critical thinking are consistent with their critical thinking teaching and assessment methods. These data supply rich descriptions of how professors approach the teaching and assessment of critical thinking in Core courses. After all the data were collected and gathered, these sources of data were compiled and organized into notebooks and electronic files. Documentation, as sources of data for this study, were examined and reviewed in conjunction with the information gathered from professors' transcripts. The next vital

task for this critical thinking study then becomes one of how to analyze the data from the professors' interviews and documentation.

### **Data Analysis**

The challenge of qualitative analysis is to transform large amounts of raw data into findings that communicate the essence of what the data reveal (Patton, 2002). Miles and Huberman (1994) stated that the most basic process of analysis is coding "to review a set of field notes, transcribed or synthesized and to dissect them meaningfully, while keeping the relations between the parts intact, is the stuff analysis is made of" (p. 56). Krathwohl (2002) further added that coding "is making decisions about what things mean" (p. 307).

One of the most helpful coding techniques to consider for analyzing data is the one suggested by Strauss (1987), and is best described in Strauss and Corbin (1990). I developed an inductive coding system based on categorical topics and patterns on perspectives held by subjects (Bogdan & Biklen, 2007).

Data analysis for a qualitative study begins by making a detailed and comprehensive description of the case including important contextual cues (Creswell, 1998). Description is only the beginning of data analysis. Marshall and Rossman (1999) provided a developmental approach to data analysis. The usual qualitative research study includes six phases: "(a) organizing the data; (b) generating categories, themes, and patterns; (c) coding the data; (d) testing the emergent understandings; (e) searching for alternative explanations; and (f) writing the report" (p. 152). I considered these phases as a guide to analyze the data for this study.

Interview transcripts, notes from meetings, field notes, professors' documents, such as syllabi and exams, were reread several times to recode the same material at a more interpretive level (Bogdan & Biklen, 2007 p. 308). Categories shifted and evolved as part of the research process, for example, initially a dissatisfied code shifted over and became a challenging code. Although the data was initially coded for a dissatisfied code to find out whether the participants were dissatisfied with teaching "Signature" courses, it was discovered that challenging was a more appropriate code as part of the coding analysis. According to Strauss and Corbin (1990), this approach can result in well-grounded codes, tightly knit into a theory that begins to develop. This recursive process assists the researcher to consider the emergence of various interpretations of the data (Merriam, 1998).

Even though the process of categorization that was applied originated from the voices of participants, the interview questions, and documentation, my perceptions initially were grounded in the existing literature about critical thinking in terms of definitions, methods for teaching and assessing critical thinking, as well as professional development in higher education. Although originally was influenced by various ideas and theories presented in the literature, an open mind and a flexible approach was maintained about participants' perspectives during the process of analysis in order to capture the indigenous categories of those interviewed (Marshall & Rossman, 1999; Patton, 2002).

Analysis was divided into two phases. The first phase, within-case analysis, examined data gathered from each professor separately, as if it were a single case.



After coding and analyzing each participant's transcript and documents as an individual case, the process of cross-analysis of all codes, transcripts, and documents became the next phase of coding the data. This process involved further coding and categorization as I read, reread, and reread all data. Miles and Huberman (1994) contended that this process allows the researcher to "see processes and outcomes that occur across many cases, to understand how they are qualified by local conditions, and thus develop more sophisticated descriptions and more powerful explanations" (p. 172).

The title of this study, *How do Professors Infuse Critical Thinking into College Courses* begins with the interrogative question how, and so I asked the following "how" questions to begin the process for coding the data. The coding process involved thinking about how to approach these questions:

1. How do I begin to approach organizing the data?
2. How do I develop codes generated from all of the data?
3. How do I code the data to reflect pertinent themes?
4. How do I facilitate organizing the codes?
5. How do I begin considering all coded data for purposes of cross analysis?
6. How does the how questions become the answers to what?

I approached examining all data, which involved 12 professors' transcripts and documents by first reading all the data at least three times to look for themes and patterns. After many readings, the following codes emerged from the data, as critical thinking definitions, critical thinking teaching methods, assessment methods, satisfaction, challenges to teaching critical thinking, and professional development. I then applied a color coding system to analyze the data as:

Definition- DEF- RED, TEACH- TCH- GREEN, ASSESS- YELLOW,  
 SATISFACTION- SAT- PINK, CHALLENGE- CHALL- TEAL-  
 PROFESSIONAL DEVELOPMENT- PD- VIOLET

By applying this color-coded system, I was able to understand each professor's views about all the critical thinking data as a single case study. This inductive, context-sensitive approach was the best approach for coding the data because it closely reflects the language used by participants. The purpose is to generate categories that are "internally consistent but distinct from one another" (Marshall & Rossman, 1999, p. 154).

The next task involved generating one document on each code to examine all of the data regarding professors' perspectives using the color-coded system. In addition, this color coding system worked as a visual display to organize all data into coding categories, which facilitated the process to understand connections between and among professors' views about critical thinking in terms of individual codes. For example, all the data regarding professors' views on defining critical thinking (color red) became one document. This process was then applied for creating documents on all of the coded data, such as one document on all data coded as teaching critical thinking (color green), and so forth. After generating documents on all of the data on professors' perspectives for each code, the next phase began by re-examining the initial categories to determine any relationships among them. The color-coded system for generating one document served as an effective strategy to begin analyzing the data for cross-analysis purposes. Despite the challenge of revisiting the data many times, I discovered that by coding the data, more meaningful data revealed itself. Bogdan and Biklen (2007) contend, "Analysis

is shaped both by the researcher's perspectives and theoretical positions and by the dialogue about the subject that one cannot help but enter" (p. 183).

The next phase of analyzing the data for cross-analysis was to search for more themes from the single coded data. For this purpose, I created a number of separate tables to compare professors' transcripts and documentation by listing individual codes through the color-coded data system by listing names of individual professors and the Signature courses that they teach at St. Stephens University.

Tables also included professors' perspectives for each separate code categories such as individual professors' views on the definition of critical thinking, methods to teach critical thinking, and methods to assess critical thinking. Subcodes emerged out of this process of analysis. The tables served as a structure to organize all coded data, so that themes, which cut across the data, emerged as subcodes. This phase of cross-analysis revealed more meaning about the richness of the data. Pattern codes, the second level of coding, provide more interpretation of the data, to suggest deeper meaning in an attempt to create a "conceptual web" (Miles & Huberman, 1994, p. 63).

After completing cross-analysis of the data, labels for each code were developed to understand the criteria, so as to qualify as a code. Labels explain the descriptions and criteria for each code and subcodes. All labels for each code and subcodes (definition of critical thinking, teach, assess, challenges, and professional development) include an explanation of each these codes. Labels explain each code and subcode in terms of as definition, general description, inclusion and exclusions with examples from the data. All labels for the coded data are available as appendices and listed for each coded label: Appendix G for Critical Thinking Definitions, Appendix H for Critical Thinking

Teaching Methods, Appendix I for Critical Thinking Assessment Methods, Appendix J for Challenges to Teaching and Assessing Critical Thinking, and Appendix K for Professors' Perspectives on Improving Critical Thinking Professional Development. The next phase of analysis was to interpret the data so as begin writing up summaries from all sources of data. After finishing the written summaries of all the codes, I discovered how the findings emerged from the data through an inductive analysis. Thus, the findings from the data revealed a potential theory grounded on how professors infuse critical thinking into Signature courses in one university, where a strong commitment exists to develop students' critical thinking skills in undergraduate programs.

## Chapter IV

### Discussion of Findings

The analysis of the data from this qualitative study included coding all of the 12 participants' transcripts as well as their course documents. Throughout the discussion of the findings, pseudonyms will be used instead of the professors' names to protect the confidentiality of the participants. Findings uncovered five categories on how professors infuse critical thinking into Signature courses. The five categories of findings include: (a) participants' critical thinking definitions, (b) critical thinking teaching methods, (c) critical thinking assessment methods, (d) the challenges participants encounter when infusing critical thinking into Signature courses, and (e) participants' perspectives on improving critical thinking professional development at the university.

This chapter begins by outlining the course requirements and descriptions for the three Signature courses from the course syllabi. Since the three Signature courses are required to infuse critical thinking as core proficiency, the Core Curriculum Committee offers a common definition of critical thinking, which is available on the Critical Training Module Website. Following this background information, the chapter is divided into five sections reflecting the categories derived from the data analysis. The first section examines how participants from diverse disciplines define critical thinking, in terms of reasoning skills as arguments, analysis and synthesis, and metacognition. The second section presents findings on how participants teach critical thinking in the three Signature courses by using the following methods, discussion (interpretative discussion and Socratic method, lectures and the general empirical method. The third section explains the assessments methods participants use to evaluate students' critical thinking skills as

documented in the three Signature course syllabi. These assessment measures include student participation, quizzes, exams and papers. Section 4 addresses the challenges, such as the structure of the curriculum, texts, and student population participants confront when infusing critical thinking into Signature courses. The fifth section describes participants' views on ways to improve infusing critical thinking as core proficiency into Signature courses by offering more professional development courses within and outside of the university.

Chapter 4 concludes with an inductive generation of a theory. This theory describes participants' perspectives on how they infuse critical thinking as part of their teaching and assessment practices into the three Signature courses of the Core Curriculum.

### **Signature Courses**

An important curricular goal through the Signature courses is to infuse critical thinking into their undergraduate program. St. Stephens's Core Curriculum has developed Signature courses to infuse critical thinking as one of the core proficiencies to advance this commitment. These required Signature Core courses are the Journey of Transformation (Signature I); Christianity, Culture and Dialogue, (Signature II); whereas the Signature III courses are developed according to the Core guidelines as individualized, professor-designed courses. The three Signature syllabi describe courses as text-based discussion of ideas focused on the readings of Core texts to develop students' habits of critical thinking.

Participants provided syllabi for the Signature I, Signature II, and Signature III, Core courses as part of their course documentation. The three Signature course syllabi are

included as appendices, which reference course descriptions, courses requirements, measurable student outcomes, and required Core texts. Core syllabi for Signature I and Signature II courses have common templates with similar course descriptions and course outcomes. Critical thinking is listed as a course objective in all three Signature course syllabi.

The Signature I, Journey of Transformation, syllabus describes the first Core course as an introduction to develop students' critical thinking skills. Signature I as a text-based discussion course focuses on ideas, which each text raises. Students are expected to have read assigned texts before class and to participate orally in each class in discussion of them. The course is meant to introduce students to the habits of critical thinking and writing to reflect upon profound issues of human life as an integral part of their university education.

The Signature II, Culture, Christianity and Dialogue, syllabus describes the second Core course as a way to teach and influence students about the development of Catholic intellectual tradition. Texts from the Christian tradition paired with texts from non-Christian traditions demonstrate direct connections across culture(s) that influence the development of the Catholic intellectual tradition. The course seeks to foster the development of a community of conversation through a focus on key questions and significant texts that address these questions.

The Signature III course syllabi demonstrate how courses reflect a deeper dialogue between the Catholic intellectual tradition and the professor's particular discipline. Professors have more latitude for developing Signature III course syllabi, as reflected in Professor Rick Levy's, pseudonym, course description on The

Philosophy/Theology of Bernard Lonergan. This course description treats the life and work of the Canadian philosopher/theologian Bernard Lonergan. This Signature III course traces Lonergan's biography and development of his theological and philosophical writings from his early days to his later manuscripts on economic theory. Besides outlining the early influences on his thought— Newman, Plato, Augustine, Aquinas, the modern sciences and historical scholarship – the course will trace the 20th century historical context in which he wrote. It will present the broad outlines of his thought with an emphasis on self-appropriation. The relevance of his thought to the various fields and professions in the university will be highlighted. As envisioned, the Signature courses involve a substantial engagement with the Catholic Christian tradition, in which engagement forms an integral part of the course's structure.

### **Core Curriculum Definition of Critical Thinking**

The Core Curriculum Committee has created a critical thinking training module Website as a resource for professors to learn more about critical thinking at St. Stevens University. This Website offers professors, who teach Core courses, access to resources about critical thinking. This Website offers the Core Curriculum Committee's definition of critical thinking as part of the University's commitment to infuse critical thinking into Core courses. For further understanding of how professors infuse critical thinking into Core courses, it is fundamental to describe the Committee's definition/conception of critical thinking as part of the University's commitment to infuse critical thinking into college courses.

The Core Curriculum's critical thinking definition reflects Bernard Lonergan's, Jesuit Theologian and Philosopher, cognitive theory on thinking as a human dynamic



structure. His thoughts about thinking known as metacognition are clarified on the critical thinking module Website as:

Critical thinking can be understood in terms of a series of stages in which questions move us from the level of **experiencing** to **understanding**, and then to the level of **judging**. 1. At the level of **experience** we are confronted with what is given – a text, a work of art or music, a problem to be solved, etc. Attentiveness and open-mindedness are essential as we attend to the data before us. 2. At the level of **understanding** we begin to question our experience. We ask “What is it? Why? How? What is there to be understood here? What are the relationships among the data? At this level we are concerned with possibly relevant insights into the data, which may or may not be correct. 3. At the level of **judging** we raise the further relevant questions as to whether or not our insights are in fact correct. Rather than “What is it?” or “Why?” we ask “Is it so?” or “Is it true?” Here we are involved with determining whether a judgment can be reached on the basis of previous insights, arguments, and the sufficiency of evidence. In light of this, it can be said that critical thinking has a twofold character. It is both the actual exercise of our intelligence as our questions move us from experiencing to understanding to judging, as well as our capacity to identify this process at work in ourselves and our students.

“In addition to these stages, critical thinking also includes a focus on the ways in which understanding operates. Specifically, we note the **genetic** and **dialectical** manner in which the intelligibility of data can be understood. The genetic method involves an understanding of previous conditions that create the

possibilities for later developments. Dialectical understanding attempts to deal with opposition and difference. It seeks to understand disagreements, their sources, and the possibilities for resolution”.

Retrieved from the university’s Critical Thinking Module website

The Core’s concept/definition of understanding derived from Bernard Lonergan’s cognitive theory identifies interconnections of experience, understanding, and judgment as levels of cognitive processes as metacognition. Lonergan promotes the theory of human thinking as a dynamic structure, based in the cognitive process itself, by which human thinking revolves around, connects, and interacts with one’s experience, understanding, and judgment.

## **Findings**

For this study, the report of findings is divided into five sections. The first section examines how participants from diverse disciplines define critical thinking. Findings from the first section reveal that there is a lack of agreement among the participants as to how to define critical thinking. The second section describes how participants teach critical thinking in Core courses. Findings from the second section indicate that although participants differ in how they define critical thinking, there are consistencies with how individual participants teach it. Participants have different approaches and methods to teach critical thinking in Core courses. In terms of pedagogy, participants prefer interpretative discussion as a method to infuse critical thinking into Signature courses. Findings in Section 2 also reveal that participants prefer teaching critical thinking in their disciplinary courses rather than Signature courses. The third section explains the methods participants use to assess critical thinking skills in their courses. Findings

indicate that participants' assessment methods are often linked to their teaching practices. Participants find students' written papers on Core topics to be one of the best measures to assess critical thinking skills. The fourth section addresses the challenges participants confront when they infuse critical thinking in Core courses. The findings reveal that participants find a number of challenges in teaching of critical thinking in college courses due to the lack of a common critical thinking definition as well as the curricula structure of the Signature courses. The fifth section describes participants' views on how to improve critical thinking in Core courses through Professional Development. A major finding from this study demonstrates that participants would like to have more professional development opportunities in order to learn about effective methods to teach and assess critical thinking skills as a curricular objective.

**Section 1: Critical thinking definitions.** The fundamental findings for this study about critical thinking are grounded in first examining how participants understand and define critical thinking from their disciplinary perspectives.

A definition tells us what thing is. Definition comes from de-fino, which means to set limits around to think. The importance of definition can hardly be overestimated. It affects the first act of the mind in telling us what a thing as. If we do not know what a thing is, we simply do not know what we are talking about. (Kreeft, 2005, p. 124)

How do participants think about defining critical thinking? This first section of findings reveals how participants define critical thinking from their disciplinary perspectives. A significant finding reveals that there is a lack of consensus on how the participants define critical thinking. The other critical finding is that the Core Curriculum

and the Critical Thinking Training Module differ in how they define critical thinking as documented on their Websites. Participants' definitions are usually based on commonly known critical thinking definitions as evidenced in the literature. These critical thinking definitions include: (a) argument, in terms of reasoning skills; (b) Bloom's Taxonomy as a set of skills, such as analysis and synthesis; and (c) metacognition, thinking about one's own thinking process, such as Lonergan's levels of experience, understanding, and judging as thinking levels. Findings also demonstrate that participants frequently combine or interchange terms from these commonly known critical thinking definitions. Inconsistencies were noted on how the Core Curriculum defines critical thinking in contrast to how the Critical Thinking Training Module Website defines critical thinking skills. For example, the University's Core Curriculum Website defines critical thinking as: "Problem solving, developing new approaches to working with information and critical analysis." The same Website lists critical thinking elements, such as identification of arguments, distinguishing good and bad reasoning, problem solving, and analyzing text and information, which professors can use as a guideline to infuse critical thinking into their courses.

The Critical Thinking Training Module Website offers another definition of critical thinking based in Bernard Lonergan's cognitive theory about thinking as metacognition and as a dynamic structure. "Critical thinking can be understood in terms of a series of stages in which questions move us from the level of **experiencing** to **understanding**, and then to the level of **judging**."

The Core Committee guideline on the University's Website provides a list of critical thinking terms and elements that professors could use to infuse into Core

approved courses. This Website lists critical thinking definitions as quoted from St. Stephens' Website as well as an explanation of the critical thinking proficiency guidelines.

“Critical thinking is an integral component of a liberal education. To think critically is to think clearly and rationally about the subject matter under consideration.” In addition to learning the material in the courses they take, students need to have the skills to understand and evaluate the material being presented. Courses infused with critical thinking will pay attention to the following sorts of elements:

- Identification of arguments
- Identifying assumptions
- Finding conclusions and premises
- Identifying kinds of reasoning (analogical, statistical, causal, scientific, etc.)
- Distinguishing good and bad reasoning
- Evaluating evidence
- Problem solving
- Analyzing text and information
- Making connections between ideas or information given
- Understanding forms of analysis in a discipline and critically evaluating ideas in terms of specific criteria.

These critical thinking definitions and components are quoted from the Website.

The Core Curriculum's Website also offers analysis and synthesis as intrinsic skills in critical thinking definitions. For example, participants frequently refer to such terms as analysis and synthesis as critical thinking definitions. I checked several sources

to find out how analysis and synthesis are defined. According to the American Heritage Dictionary, analysis is defined as the separation of a whole into constituents with a view to its examination and interpretation. The online dictionary defines critical thinking as:

a. The separation of an intellectual or material whole into its constituent parts for individual study.

b. The study of such constituent parts and their interrelationships in making up a whole.

(Pickett, 2006)

<http://www.thefreedictionary.com/analysis> retrieved 3/2/2013

The American Heritage Dictionary defines synthesis as the combining of separate elements to form a coherent whole. The online dictionary defines critical thinking as: combining of the constituent elements of separate material or abstract entities into a single or unified entity (opposed to analysis) the separating of any material or abstract entity into its constituent elements.

The participants from this study typically define critical thinking in terms of three categories, as reasoning skills as arguments, analysis and synthesis as cognitive domain skill levels in Bloom's taxonomy, and metacognition, as thinking about one's own thinking process or processes. We consider each of these definitions in turn.

**Argument.** Participants from the disciplines of philosophy and sociology define critical thinking as reasoning skills to identify, reconstruct, and evaluate arguments. An argument has two major parts, reasons and conclusions. It is an attempt to prove or establish a conclusion (Kennedy et.al, 1991 cited Ennis, p.2). Although arguments are considered a form of analysis, these participants define critical thinking as a process, which focuses upon analyzing different kinds of arguments and the reasons to support

conclusions. Professor Alex Holmes, Sociology, Professor Alfred Zoner and Professor Mike Collins, Philosophy, as participants express their critical thinking definitions as a process of analyzing different kinds of arguments.

When the sociology professor Alex Holmes was asked how he defines critical thinking, he replied by stating that defining critical thinking is a tough question.

The way I look at it I think critical thinking is just not a definition but maybe I'm going to have to get the definition at the end. I think the first part of critical thinking is to make something implicit, explicit. For example if you are trying to pick apart an author's argument, particularly if the author is trying to make an argument of some kind. Then I think it is an important part of critical thinking to try to unpack the argument, what are the assumptions, does the argument makes sense in light of those assumptions, which the author is drawing upon. I think one skill you are trying to talk about in terms of critical thinking is a skill set and that being one critical thinking skill set is to try to reconstruct an author's argument.

Then the second piece after you try to reconstruct the argument you try to understand where the author is coming from and to make that explicit. The next question then becomes to adopt a critical attitude towards the text. Did the argument make sense? The first part is what you think the author is trying to do, try to reconstruct the author's logic and then accordingly to some set of criteria that you establish, were you persuaded by the argument? It is a two-tier approach.

Also, what is critical to that is have you arrived at that criteria for evaluating that argument. Then I think if there was a third level then maybe hatches his argument in the text relate to other arguments that other people are

putting forth. I like to get the students to think about this when comparing two different arguments or two different text. For example, in my social problems course I will ask a question, should we have capital punishment? So, the first thing would be, how does the author argue that through, what are the assumptions, what are the premises that lead to certain conclusions? Then, maybe you want to juxtapose, the second question did that author's argument makes sense?

The third thing would be to juxtapose that argument against let's say another argument on the other side of the issue. I see it as a three-tier approach: can you reconstruct an argument, can you evaluate an argument and can you see how the argument relates to other arguments, which really are a high order of critical thinking.

I am not sure many of our undergraduate students are able to get all the way there, but hopefully we are setting the stage for them to be prepared to do that kind of thinking at the graduate level.

Professor Alfred Zoner, philosophy, defines “Critical thinking as the identification and reconstruction of arguments. Critical thinking is being able to come up with an ultimate way to evaluate arguments. In philosophy that means something very specific.” Philosophy as a discipline has the specific vocabulary and terms to explain critical thinking, such as inductive and deductive reasoning skills unlike other disciplines. The other participant Professor Mike Collins, who teaches philosophy courses and Signature courses, concurs that

Critical thinking, the way I understand it, speaking as a Philosopher is because we have a pretty specific way of thinking about what it means to be a critical thinker.



Critical thinking is closely associated with logic. And so, most simply put, for us critical thinking involves the construction and evaluation of arguments.

In summary, participants from the disciplines of sociology and philosophy define critical thinking as a process of reasoning skills for the purposes of analyzing the reconstruction and evaluation of arguments.

*Analysis and synthesis.* Participants representing disciplines in religious studies, history, and theology define critical thinking as thinking skills involved with analysis and synthesis. These participants define critical thinking as analysis, which is one of the higher order levels of cognitive skills as part of Bloom's taxonomy. They define critical thinking as analysis, which breaks materials down into constituent parts, such as the skills necessary to analyze major themes and concepts reflected in the readings of the Core texts. Synthesis is the fifth level skill within the cognitive domain of Bloom's taxonomy. Participants define critical thinking as synthesis as a skill, where different ideas are put together to create new meaningful ideas (Kelly, 2004). Retrieved 4/2/2013 [http: 712-educators.about.com/ad/testconstruction/p/ blooms taxonomy.htm](http://712-educators.about.com/ad/testconstruction/p/blooms_taxonomy.htm)

According to these participants, analysis and synthesis are the critical thinking skills, which require students to think about ideas, whether presented in text or through class discussions. Analysis and synthesis provide students with a critical thinking framework to analyze and or synthesize concepts across diverse disciplines. The participants from religious studies and theology define critical thinking as analysis, so as to engage students to think about the course content for the sake of asking questions.

For example, Professor Keith Cohan, religious studies, defines critical thinking as the capacity to think critically about the ideas from the text to discuss them in class.

I should add, there is often a misconception that if somehow you engage in critical thinking and that because you use critical thinking, it means essentially to take apart and be suspicious of everything you read. However, the flip side of critical thinking is constructive thinking. To be a good critical thinker is to have the capacity to read text and to study ideas closely with great attention to detail and to ask questions. Then, on this other side of critical thinking is this constructive aspect to ask yourselves questions, how you can constructively approach this material for whatever purposes. I am most interested in trying to think about the material that you are studying constructively and how it can be applied to addressing ethical questions in our society in a contemporary context.

Professor Jared Book, theology, thinks critical thinking is about the engagement of analysis.

I think that anybody can be a critical thinker and it is not necessarily dependent upon a particular type of intelligence or level of intelligence but rather it is dependent upon a particular kind of skill. If somebody can incorporate the virtues of engaging with a question and developing a way of thinking about questions, then I think they can be considered a critical thinker.

Professor Karen Stewart, who teaches history and Signature courses, thinks that critical thinking in history is about the process of synthesis.

I think critical thinking is thinking that approaches the topic or a question from more than one perspective. Then, assess those different perspectives in order to be able to ultimately revisit the original problem or question. I mean there are particular ways in which critical thinking is deployed in historical studies. I dig

first of all into the process of contextualization, so that any source from the past has to be contextualized with reference to the person or people who generated the source. The people, who receive the source, reflected upon the source, how the source is in itself a reflection of a context or that source produces so there's a very dynamic process of contextualization on the one hand. So, then history is also a course about synthesis. So you may or historians and I think students in history courses and I often ask my students to consider context and sources and then to reconsider those in relation to each other in the interest of generating a new synthesis. Or generating a more refined synthesis so it becomes a new form of historical knowledge.

In summary, participants from religious studies and theology define critical thinking as a way to think about analyzing arguments and ideas to formulate questions about the subject matter in Core texts.

Karen Stewart as a professor of history defines critical thinking as a process of synthesis to generate thoughts for forming a more refined synthesis for a new form of historical knowledge. These participants define critical thinking as analysis and synthesis based in cognitive domain of Bloom's taxonomy as higher order level thinking skills.

***Metacognition.*** Other participants who teach Core courses representing the disciplines of philosophy, psychology, classical studies, and theology, define critical thinking as metacognition. Metacognition is analysis of one's own thinking processes and is often referred to as "thinking about thinking" (Flavell, 1979).

The Core Committee refers to Jesuit theologian and philosopher Bernard Lonergan's conception about thinking, which is presented on the Critical Thinking

Training Module Website as an approach for professors to consider infusing critical thinking into Core approved courses. Lonergan's idea about human knowing focuses upon thinking about one's own thinking as a human dynamic structure. Lonergan's conception about thinking is more about understanding one's own thinking processes rather than a definition about critical thinking. Thinking about one's thinking as a cognitive process involves a series of cognitive levels in which questions at each level move us from the levels of experiencing to understanding and then to the level of judging, so as to think about asking more questions. Thinking about what questions we are asking to find answers drives the cognitive process to ask more questions. Bernard Lonergan advanced his cognitive theory as related to thinking as a human dynamic structure, based in the cognitive process itself, by which one's thinking revolves around, connects to the interaction of one's experience, understanding, and judgment as depicted in the graphic presentation.

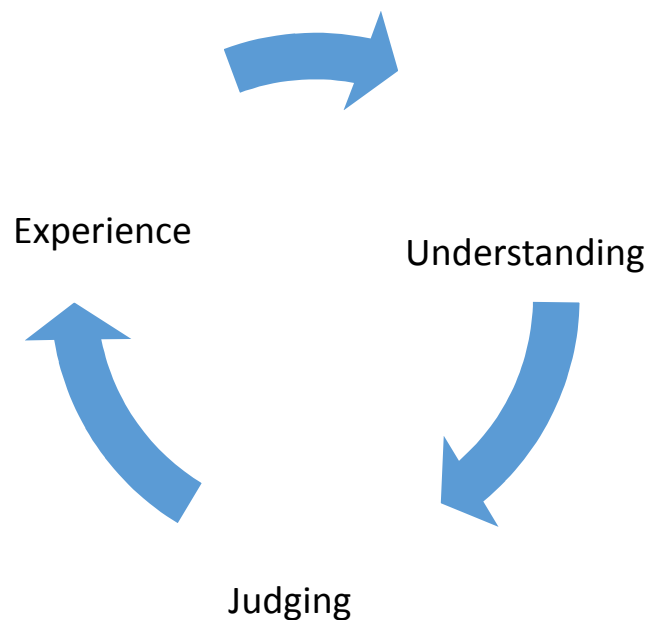


Figure 2: *Lonergan's cognitive theory about one's thinking*

Professor Sam Lock, classical studies, defines critical thinking as thinking about and making judgments.

I would like to think about the Greek root of the word critical thinking, which means making judgments. Therefore, critical thinking would be related to judgments, the ability to make decisions, the ability to make intelligent informed decisions. Critical thinking involves thinking about how to think and evaluate judgments as it related to ideas.

Professor Tony Softner, theology, similar to Professor Sam Lock defines critical thinking as judgments, but more as a thinking process to validate judgments. Critical thinking occurs when one starts to ask questions during this thinking process in order to make a judgment. The critical thinking process of taking into account all of the data involves metacognition by asking more questions to reflect on the conditions and the validity of that particular judgment. This participant as a theologian defines critical thinking as a cognitive process to understand one's metacognition by asking more questions to validate judgments.

Professor Tony Softner thinks that critical thinking is about the process of metacognition.

I think it is trying to get the students to think about the kinds of things that validate the kinds of judgments that they are making, that is one easy way to put it. Then there are the kinds of things that govern making a particular judgment, whether it is the existence of a chair, or whether a particular moral action is good or whether something is rightly called beautiful. Anything like that has to do with making an aesthetic judgment, ethical judgment simple truth judgments. There it

is always implied in that judgment, questions you are answering for yourself that you are not aware of and so you are always thinking about how you were thinking when you are making a particular judgment whether you know it or not.

Therefore, when I am doing critical thinking, I am trying to get students to think about what goes into that particular judgment that they are making, whether it is about a reading, a work of art or whatever we are dealing about at that particular moment. So, when they come to the realization that making judgments is also reflecting on what are the conditions of the validity of a particular judgment. Reflection also involves the other different kinds of thinking processes with all the other levels; one performs when thinking about making judgments. Are you taking into account all the data and all the kinds of things that make it a part of all of that? That is the basic definition of critical thinking.

Professor Gladys Trump, another participant from theology, defines critical thinking as a thinking process to arrive at a particular conclusion. This participant also finds that the thinking process involves asking questions to form a judgment, which encompasses the process of connecting it to a personal experience. According to this professor, the job of critical thinking is to make connections by examining one's own thinking as it relates to a topic or subject matter. Professor Gladys Trump describes critical thinking as a process to understand one's thoughts through the process of metacognition.

Critical thinking is a very important part of the Core and is certainly one of our objectives. To get the students to understand how to think critically I am going to provide you with some of the elements that I tried to do and present to my

students in class. I would like for them to understand the following things about critical thinking. They have to understand the critical thinking is the process, by which they arrive particular decision or conclusion. How do you come to think what it is you think? How do you come to form your opinion or judgment that you have of this particular topic or subject? I asked them about the facts that have gone into the formation of their opinion. What are your thoughts? What knowledge do you have about the particular topic? How did you acquire that knowledge? What do others say about the knowledge of your and understanding of the topic? What have other experts done on this research? What the scholars say about this topic? What does the research say about the particular topic, which we have such strong feelings for? What do the experts say in terms of supporting your particular view on your particular understanding? Are there those who disagree with your particular understanding on this topic? Has your opinion changed in any way by what the scholars or research have to say about a particular topic? This process involves asking more questions about a topic, so as to examine and understand one's own thinking process to arrive at a particular conclusion.

For example, I have a project in which I do have the students think about their own critical thinking processes. I see critical thinking as looking at a particular topic for many different perspectives from many different views that is one of the things I learned in my theological studies program. Looking at it from many different views some of which are going to be more supportive and some less so. Looking at a subject or topic to determine what features might be there or

might be disclosed by the subject itself also think critical thinking involves judgment, and perhaps reflection on connecting us to some experience of our own that might not be directly related to the subject. But the subject may remind us of something personal and or an association, a judgment, associations of other or remind us of someone or something else that we might indirectly know someone else's experience. Or that might remind us of another topic that might be very foreign to the topic at which we are looking, taking a critical view that there might be some kind of commonality, which makes it somehow connected in our minds. The job of critical thinking is then what makes them connected, where are the connections, why do they appear to be connected which brings us to a closer examination about our own thinking on a topic or subject.

Professor Nathan Hale, psychology, believes that critical thinking is also about teaching students about the thinking process. He sees the thinking process as the ability to understand different ideas as a process to evaluate all the different responses. "Critical thinking is a personal process to evaluate each of your own responses." He defines critical thinking, which allows for a wide assortment of capabilities.

I think one definition of critical thinking is being able to identify and understand the position that is being made whether it is through an essay or a statement. Another way to understand critical thinking is to be able to comprehend the statement and then its capacity to hold your immediate reaction to it and to consider all possible responses. Critical thinking is also to evaluate each of your own responses as to what is presented to you in a way that is dispassionate and yet still enthusiastic and interesting. It can be a personal process to try and



understand what deposition means for your own life and if it is true for your own experience. Then, critical thinking is to see and begin to formulate a response from all of these sources of information. Then how well reasoned that response is, how well it reflects the understanding of the original position and how that creates dialogue. I think these are the essential skills of critical thinking.

Professor Rick Levy, a Lonerganian philosopher, defines critical thinking as a vigorous kind of thinking, which aims at asking all of the relevant questions no matter what the context and moves beyond the discipline, which then becomes a philosophical question, “What is thinking and what are we doing when we are thinking critically?”

Critical thinking is exigent and vigorous thinking that aims at asking all of the relevant questions. The relevant questions are whatever the context demanded on whatever the area. You keep asking questions until they dry up and then you move on to other sets of questions. You keep asking questions to arrive at getting answers. But, then there was a question about critical thinking, what is critical thinking that moves beyond one's discipline and then it becomes a more important question philosophically. The type of question to ask is what are we doing when we are thinking critically. That is critical, once you start asking what is critical thinking, you were aiming at thinking critically about critical thinking and I think that throws people subunit the inevitable question and becomes a philosophical question: What is thinking? What does it mean to be critically thinking? Then you could list all the other kinds of thinking that are valid in the proper context.

The participants, from classical studies, psychology, theology, and philosophy define critical thinking more as a process of metacognition. They view thinking as a

process to get in touch and analyze one's own thinking processes. Lonergan's definition of thinking about thinking advances metacognition as a method of thinking about one's thinking as a cognitive process, which continuously interconnects with one's thinking process, while it continuously loops through the levels of experience, understanding, and judgment.

***Summary of critical thinking definitions findings.*** St. Stephens has developed three Signature Core courses as part of its curricular commitment to infuse critical thinking into college courses. Findings reveal that there are inconsistencies in how the Core Committee defines critical thinking as indicated on the Core Curriculum Websites.

Findings demonstrate participants' critical thinking definitions are reflected in widely known critical thinking definitions, which include analyzing arguments, in terms of reasoning skills, analysis and synthesis as cognitive domains skills listed in Bloom's taxonomy, and metacognition as thinking about one's thinking processes. Although findings reveal that there are some commonalities in how participants define critical thinking, there are more differences in how they define it. The lack of consensus within the Core Curriculum Committee and among the participants on how to define critical thinking is a significant finding, which influences other findings in this study.

**Section 2. Critical thinking teaching methods.** The second section presents the findings from this study on the particular teaching methods participants use to infuse critical thinking into the three Signature Core courses. An important finding reveals that the participants' critical thinking definitions typically influence their teaching practices. One way to understand this connection is to consider a graphic image of a Ferris wheel as an analogous link between critical thinking definitions and teaching methods.

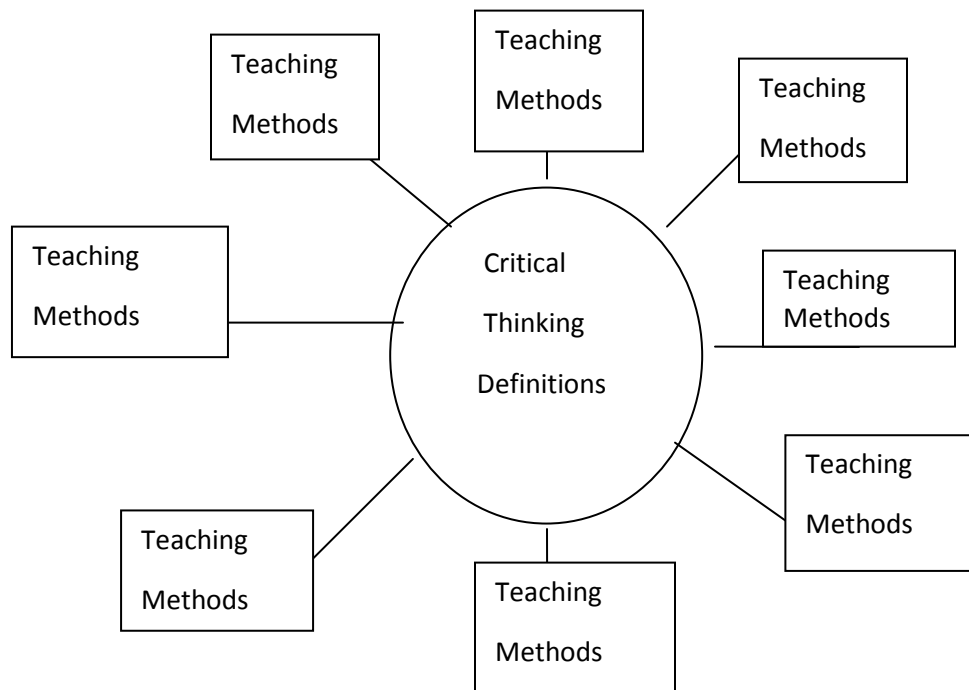


Figure 3: *Connections between critical thinking definitions and teaching methods*

The spokes of the Ferris wheel connect the center (critical thinking definitions) to the seats (critical thinking teaching methods) of the Ferris wheel. As the Ferris wheel turns the seats (critical thinking teaching methods) around in one continuous motion, the spokes keep the center (critical thinking definitions) of the Ferris wheel connected to all the seats (critical thinking teaching methods). Similar to the Ferris wheel, findings replicate that participants' critical thinking definitions are often linked to their teaching experiences and practices.

Findings in Section 2 present the methods and approaches participants use to teach critical thinking in Core courses. Participants teach critical thinking by using the following teaching methods: interpretative discussion and the Socratic method, as

methods for class discussions, lecture and the general empirical method (GEM), a teaching method rooted in Bernard Lonergan's conception of critical thinking as metacognition. A teaching method comprises principles and techniques used for instruction to infuse critical thinking into college courses.

Findings reveal that participants infuse critical thinking into their pedagogy by using the following approaches: (a) Infusion approach: critical thinking is infused into subject area content. Subject area curricula have explicit objectives in the area of critical thinking, alongside the subject area objectives. (b) Immersion approach: instruction in subject matter is thought provoking, but critical thinking elements are not made explicit. (c) Mixed approach: a combination of the general approach and either infusion or immersion. Students receive explicit instruction in critical thinking in the context of subject matter, but there is also a separate thread or course aimed at teaching general principals of critical thinking. Findings reveal that participants typically prefer the mixed approach, where professors are more explicit about infusing critical thinking skills into Signature courses as compared to the infusion approach, which is not explicit, but rather implicit fro the content of the subject matter.

The second section on teaching methods introduces interpretative discussion and the Socratic method as critical thinking pedagogy in which participants infuse critical thinking skills into Signature courses. Interpretative discussion is a method of discussion in which students seek answers to basic questions asked by professors about the meaning of passages that they read in Core texts, culminating in some possible form of synthesis of ideas. The Socratic method, named after the classical Greek philosopher, is the other discussion-based method to infuse critical thinking into Signature courses. The Socratic

method is a pedagogical method in which a professor does not give the information directly but instead asks a series of questions, with the result that the student comes either to the desired knowledge by answering the questions or a deeper awareness of the limits of knowledge (Pickett editor, 2006).

Professor Reich, critical thinking expert, further explains that the Socratic method as a pedagogy involves a shared dialogue between teacher and students. The teacher leads by posing thought-provoking questions. Students actively engage by asking questions of their own. The discussion goes back and forth. According to Reich the Socratic method “is better used to demonstrate complexity, difficulty, and uncertainty than to elicit facts about the world.” The aim of the questioning is to probe the underlying beliefs upon which each participant’s statements, arguments and assumptions are built.

One of the focal differences between interpretative discussion and the Socratic method is the reason for asking different kinds of questions during class discussions. Professors use interpretative questions to ask questions for discussing the meanings of the readings in Core texts. In Signature courses, professors use the Socratic method to stimulate students’ critical thinking skills by asking probing questions about expanding the discussion in relationship to other ideas about the texts within the passages of the text.

An interpretive question is one that does not have just one correct answer. Any answer that includes support from the text may have some degree of “correctness.” Participants in an interpretive discussion are asked to interpret various aspects of a text using text-based evidence. The basic question is, “an interpretive question that comprehensively addresses a central problem of meaning in the selection.” Resolving the

basic question typically requires investigating and examining multiple passages within a selection.

The Socratic method is known as pedagogy for asking systematic questions. Socratic questions are open ended, focusing on broad, general ideas rather than specific, factual information. The questioning technique used generally emphasizes a higher level of questioning and thinking that has no single right answer that encourages discussion.

The Socratic method of questioning is used to examine a text through questions and answers founded on the beliefs that all new knowledge is connected to prior knowledge, that all thinking comes from asking questions, and that asking one question should lead to asking further questions. The question pedagogy of Socratic questions is open ended, focusing on broad, general ideas rather than specific, factual information.

*Interpretative discussion.* Since Signature courses focus on the readings from Core texts, findings reveal that participants frequently use and prefer to teach critical thinking through interpretative discussion. Participants use a variety of strategies to teach students critical thinking skills through interpretative discussion. These strategies include teaching the importance of critical thinking, infusing critical thinking through subject matter, and reading strategies, which include group readings, questions and summarization skills.

Participants representing the disciplines from psychology and religious studies concur that it is important to teach their students about the importance of critical thinking skills through Interpretative discussion. For example, Professor Norman Hale, psychology, uses Interpretative interpretative discussion as a method to teach his students about the importance of being able to think critically inside and outside the walls of the

university. This participant thinks that part of the importance of critical thinking is being curious about learning new things about the world. Critical thinking becomes part of one's personal experience to understand different things, thoughts, and the importance of how it can enrich one's life. His definition of critical thinking and its importance is consistent with how he teaches critical thinking through Interpretative discussion in his Signature II course.

When Professor Nathan Hale first began teaching Core courses, he discovered that he had to confront the reality that his students did not understand why critical thinking was an important skill to learn. He decided that his first task was to start class conversations as to why critical thinking is important and how it is a valuable tool for enriching one's life.

The idea of being in college is not only becoming trained for a vocation, although given the economy that is very important now, but more for the ability to reflect on you and on the world as a really exciting process. So, I think the thing that I have to develop for my students is teach them to articulate the ways that critical thinking is meaningful and important to them.

In his class discussions, he stresses the importance of attending college, not only for becoming educated for future employment, but also for the capacity to reflect on oneself and the ability to reflect on the world.

This participant finds that by focusing on the importance of critical thinking through interpretative discussion, he can infuse critical thinking as an approach to have his students articulate their ideas about why critical thinking is important and personally relevant for them.

Professor Keith Cohan, theology, also finds personal relevance to be an important factor for engaging his students in class discussions. This participant's critical thinking teaching methods are consistent with his definition of critical thinking.

Professor Keith Cohan believes an important part of interpretative discussion is for his students to become personally involved with one another as well as with the professor about discussing the readings in the Core texts, "I encourage my students to do in class is to engage in whatever we are reading. I want them to participate in class discussions and to be able to develop their own ideas about the assessment of the text." This participant finds that if students can exchange their ideas with one another and ask questions during class discussions then they are beginning to critically think. When students ask questions, questions evolve into their understandings and interpretations about the readings, and even if they are having a difficult time with their assessment of the text, then he takes that as enough of an indication that they are beginning on the path of developing this critical thinking skill.

*Mixed approach.* The participants from theology support the mixed approach to teaching critical thinking skills and that is by explicit instruction of critical thinking skills via the content of subject matter. These participants concur that subject matter is the foundational basis for teaching critical thinking skills, which acts as a catalyst for discussing ideas through interpretative discussions.

Professor Keith Cohan, theology, approaches the teaching of critical thinking from the perspective that one cannot teach critical thinking without having something to critically think about and that is to teach critical thinking through the content of the subject matter. This participant explains the differences between trends in higher



education when it comes to the issues about critical thinking. “One of the trends is whether you can teach critical thinking without emphasizing content, and the other trend is whether you should emphasize content over critical thinking and then perhaps there is a third option.”

This participant emphasizes the third option, as a “mixed” approach to infuse critical thinking into his courses.

My position is crystallizing more in this fashion and that content is as important as the capacity for critical thinking. I am having harder time thinking about critical thinking without content. You have to have something to think about in order to develop that skill set. In that sense one of the things that I would like to emphasize is that these days regardless of what course you are teaching critical thinking, you have to teach something that the students actually have read.

It has become very clear to Professor Keith Cohan that subject matter content is important to teach, so students can think about content as a foundational base to discuss their ideas in class. According to this participant, critical thinking cannot be taught apart from the content of the subject matter, and students need to discuss ideas generated from the subject matter that they have read in their texts. This participant believes that critical thinking and subject matter form a very closely associated relationship to teach critical thinking as part of interpretative discussion. “It is a symbiotic relationship.”

Professor Gladys Trump, theology, defines critical thinking as a thinking process in order to arrive at a particular conclusion. This participant finds that the key element of the critical thinking process is about asking questions to form a judgment. This process of critical thinking is about examining one's own thinking as it relates to the subject

matter. Professor Gladys Trump's definition of critical thinking is commensurate with her teaching approaches. Professor Gladys Trump finds that subject matter is the central catalyst to generate ideas for creating more ideas. Similar to Professor Keith Cohan, this participant infuses critical thinking skills into the subject matter of Signature courses. Professor Gladys Trump finds that the mixed approach allows students to discuss their thoughts, reflections and experiences by keeping the topic of the subject matter at hand, while reflecting upon their ideas to discuss in class. In the Signature I class, Professor Gladys Trump keeps discussions focused on the subject matter as a foundational base.

I constantly work on loosening the foundational base of the subject around which the thinking is occurring at the time. The subject generates and acts as a mechanism for all other ideas to come about and in turn have to bend and bring more information to the subject matter. It is not starting out here and bringing it to the subject, but rather the subject releases the critical thinking skills. Critical thinking is not starting out there and bringing it back to the subject, but rather the subject releases the thinking process. The job of critical thinking is for student to generate questions for asking more questions about the subject matter.

This participant asks her students questions about the subject matter such as, "What makes them connected, where are the connections, why do they appear to be connected?"

This participant believes that the mixed approach to infusing critical thinking into Signature courses is about having students uncover ideas of the subject matter and think about how these ideas connect to one another. For this participant, the critical thinking

process is about teaching students to think about their own thinking processes in order to have class discussions as they relate to the subject matter in Core courses.

Professor Ethan Jones, theology, uses interpretative discussion as an approach to teach his students how to figure out and actually think about the subject matter. This participant tries to figure out how to actually get my students to think about something they have read and discussed in class. “One of the things I'm trying to do in my teaching is to keep myself very focused on what the students have to say in class and to listen to them as much as I can about their ideas.” Professor Ethan Jones finds that by listening to his students’ ideas through discussion of Core content within the subject matter, he can figure what they are thinking as well as their understanding about the subject matter.

*Immersion approach.* The participants from the disciplines of theology and classical studies differ from the other participants on how they approach teaching critical thinking in their Signature courses. These participants support the immersion approach as an implicit approach to teach critical thinking skills. The focus of this approach is upon teaching the content of the subject matter without an emphasis upon teaching critical thinking skills. Professor Jared Book, theology, and Professor Sam Lock, classical studies, perceive critical thinking as an outcome of teaching the content of Core subject matter in contrast to explicitly teaching critical thinking skills within the subject matter.

Professor Jared Book rarely mentions to his students “One of the things that they will be doing in class is to develop the skills of critical thinking.” This participant thinks that an explicit explanation about critical thinking seems too artificial and in some ways too abstract for his students to understand.

In terms of how I teach critical thinking, I mean I don't know that if I ever addressed the term critical thinking explicitly to the students, but I am sure that I have used the term critical thinking as part of a core proficiency, especially in the Signature II course.

Professor Jared Book thinks that just teaching the Core subject matter alone should suffice as an implicit critical thinking instruction.

Professor Sam Lock, classical studies, concurs with Professor Jared Book about infusing critical thinking into subject matter by implicit instruction through an immersion approach. This participant explains that critical thinking is not something that he specifically thinks about and it is not a particular term that he speaks about in his classes. Although it is not a word he would generate himself, he does understand the purpose of teaching critical thinking skills, and he has become more aware that critical thinking is a goal to fulfill in his courses. This participant is aware that the term *critical thinking* is out there but does not explicitly refer to the term critical thinking when he is teaching his classes.

I think it is a result of what I make the students do in class; I think I give them the tools to do critical thinking, such as the questions I give them in class forces them to do critical thinking. I think their assignments require them to do critical thinking. I don't ever put the word critical thinking on the board and teach a lesson specifically on how to critically think, but rather it is one of the outcomes of my lessons.

When infusing critical thinking into Signature courses, these participants agree that immersion, as a teaching approach, should focus on the content of the subject matter,

in contrast to the other participants, who advance the mixed approach, which supports explicit critical thinking skills instruction in conjunction and as part of Core subject matter.

*Reading strategies.* The basis of interpretative discussion as a method to teach critical thinking skills is to have students read different Core texts, and then to have them share their thoughts about the subject matter as part of a class discussion. Findings indicate that participants use the following reading strategies, which include group readings, questions and summarization skills, to encourage class discussions.

Prior to discussing the readings in class, Professor Norman Hale, psychologist, and Professor Keith Cohan, religious studies, find group readings to be an effective technique to help students understand difficult passages in Core texts.

For example, Professor Norman Hale reinforces the idea that it is important for his students to understand the value of reading Core texts. This participant explains that for class discussions to be at all meaningful to them, students need to realize that they are expected to read the assigned Core texts. He finds group readings an effective strategy for getting his students to understand difficult passages.

The way he starts group readings on more difficult passages is to read and go paragraph by paragraph with the class and say okay what does this mean? “ I mean a lot of patience is required when you read a paragraph and it is totally impenetrable, but then you realize you have to read the three paragraphs before and the four paragraphs after in the passage and all of a sudden it begins to make sometimes more sense”. Professor Hale finds that after reading the paragraphs over and over bu using the group reading approach, students begin to comprehend the meaning of the text, and he believes it is well

worth the effort. This participant thinks that this is the way to build the critical thinking proficiency in Signature II classes.

Professor Keith Cohan, theology, uses group reading as a strategy to infuse critical thinking into class discussions. This participant finds that reading together with his students helps them to understand the meaning when they read together in a group. As they read the text, this participant wants his students to ask the question, what is their assessment of the text? During class discussions this participant asks his students, “Do you agree with what is being proposed in the text or do you disagree and if so what are your reasons, and what are your substantive reasons?” This participant finds that by reading together his students can then discuss ideas within the text and offer their personal assessment of the thesis of the text. This participant finds that by asking his students about their personal assessment of the text, they become more engaged in the discipline of close reading, so as think about their thoughts regarding the themes of the text.

*Reading questions.* Participants find that by asking students questions about the Core readings, it helps to keep them focused on the class discussion. Professor Jared Book finds that an effective strategy is to give specific questions to the students prior to reading the assignment.

The way the class is structured or at least the way that I have taught the class has been for the students to read the text and then I devote the next class to the discussion of that text. Depending upon the length of the text it may take several class periods to discuss the text. I have tried a number of different approaches,

but the one that I think is the most effective is to give particular questions to the students beforehand so they can consider these questions as they read the text.

This participant is trying not so much to get his students to come up with the answers, but rather to get them to think about the kinds of questions that they ought to be asking when they read the text.

Professor Jared Book thinks, “If they can begin to do that as the semester goes on, and in some classes, then they can get at least a kind of level of critical thinking that they didn't have before they began this class.” Professor Sam Lock thinks that by asking his students questions about the readings, it forces them to do critical thinking. During class discussions, he finds that when students answer questions by giving an opinion or an interpretation, they are in the process of critical thinking.

*Summarization as a strategy.* Participants find that an important critical thinking skill to teach students is the ability to summarize a reading passage, as a strategy to help them understand the reading material to discuss it in class. Participants think that the ability to summarize an author's position is a very important critical thinking skill for understanding Core texts. According to Professor Ethan Jones,

One particular critical thinking skill that I want for my students is for them to be able to summarize someone else's position. I think that that is harder than they realize and that is just to say what somebody else said.

Professor Tony Softner focuses on having his students read the Core texts very closely, and one of the critical thinking skills that he expects from his students is to be able to breakdown and summarize the readings from the text.

For example, in the Signature II course, this participant begins by summarizing at least four of the points of the text and then opens it up for class discussion. This strategy of summarizing the points of the text helps to know whether his students understand the different sections of the readings, as well as if they captured the meaning of the text.

In Core courses there is heavy discussion during the classes and so what I will do with the students is to have a discussion of the text and the next class I will summarize the discussion of the four points, often adding a point here or there to make sure that they captured the text. Then, we go around the room and I ask the students questions, such as can you summarize all of the seven points or can you just do two points? Can you get started with it? I will then ask can somebody help them out. They will discover quickly whether they think they know or do not know what they read. I find it to be very effective.

*Summary of interpretative discussion.* Findings indicate that interpretative discussion is the most frequently used method by professors to teach critical thinking skills. An important finding reveals the participants infuse critical thinking into Signature courses by using different approaches through interpretative discussion. Participants who use the mixed approach focus explicitly on teaching critical thinking in Signature courses. Other participants find that the immersion approach is the implicit approach to teach critical thinking skills through the Signature course subject matter, which does not stress the teaching of critical thinking skills. Then there are other participants who infuse critical thinking by focusing upon the importance and value of personal relevance during class discussions.



Since students are required to read Core texts in the Signature I and Signature II courses, participants apply some of these common strategies to infuse critical thinking as part of the reading process. These strategies include group readings, summarizing, and asking students questions to encourage class discussions. Participants agree that these reading strategies provide a process for comprehending texts, to discuss content in a more reflective way. Findings indicate that participants generally use the interpretative discussion as a method to teach critical thinking in Core courses.

*Socratic method.* The Socratic method is the other discussion-based method participants use to teach critical thinking in their Signature courses. The Socratic method is known as pedagogy for asking systematic questions. The focus of the questions is to gain multiple perspectives on a given topic. This enables students to understand different points of view and to explore the topic through discussion. Socratic questions are open ended, focusing on broad, general ideas rather than specific, factual information. The questioning technique generally emphasizes a higher level of questioning and thinking that has no single right answer that encourages discussion.

The Socratic method of questioning is used to examine a text through questions and answers founded on the beliefs that all new knowledge is connected to prior knowledge, that all thinking comes from asking questions, and that asking one question should lead to asking further questions. The question pedagogy of Socratic questions is open ended, focusing on broad, general ideas rather than specific, factual information (Copeland, 2010).

The Socratic method is the other discussion-based method participants use to teach critical thinking in their Signature courses. However, findings indicate that participants refer to the Socratic method as pedagogy to infuse critical thinking into Signature courses; they tend to be vague in explaining on how they infuse it as a teaching method. Findings reveal that participants infuse critical thinking with more of an emphasis upon asking students questions to stimulate their thoughts so as to understand that there are different viewpoints about Core topics. Participants infuse critical thinking by using the Socratic method, more as a method of inquiry, by which they ask students questions about analyzing different arguments and issues as presented in Core texts. According to Kreeft and Dougherty, the Socratic method is about asking questions as it pertains to logic, “Logic specializes in questioning. The three most basic questions humans ask are What, Whether, and Why, i.e. What is it? Is it? and Why is it? These questions are dealt with in the three parts of logic” (cited in Kreeft, 2005, pp. 35, 36).

Professor Alfred Zoner, philosophy, wants his students to be able to understand different kinds of arguments as evidenced within Core texts in the Signature II course. Professor Alfred Zoner asks his students questions to find out if they understand the authors’ arguments as presented in Core texts.

There are arguments relative to the existence of God, there are arguments relative to ethics, arguments relative to what our political structure should look like, and so I want students to understand at a basic level what constitutes an argument and as simple as that may sound, it is often very difficult. I just want students to understand what an argument is in a formal sense and that there are terms for

arguments. For the most part each discussion is related to an argument. I will often begin by asking the students about a reading they have been assigned. I will ask them questions to initiate the discussion. What are the authors' conclusions? What did the author conclude? What are the premises that lead the author to that conclusion? Do you agree with these premises? What I mean is, is it an inductive or deductive argument? Is it sound? Are the premises true or false? So when we discuss critical thinking within the readings or issues, we will try to isolate and talk about the arguments that are within the reading assignments.

Professor Alfred Zoner uses the Socratic method by asking his students questions about their understandings of different authors' arguments as presented in Core texts. "The nice thing about philosophy is that logic is critical foundation for arguments and for everything to a certain extent, it tends to lend itself to various content levels in other disciplines."

Professor Mike Collins, philosophy, finds that questions are an integral part of the Socratic method for teaching his students about what constitutes an argument. For example, after the students read about a famous philosopher, this participant asks his students questions about the arguments in the reading via the Socratic method. This participant has them think about some passages they had just read. He then asks them questions related to the arguments, "What is the argument here?" Can someone identify the premise? Can someone identify the conclusion?" A technique that he finds effective for teaching the elements of an argument is to write students' responses on the blackboard as a visual outline of the argument.

Once he thinks that there is a good outline of the argument on the blackboard, this participant will stop and ask questions, “Is this a good argument, given it is a good argument, are there any mistakes in his argument, and is his reasoning good”? These participants find that the Socratic method is a method to teach critical thinking skills by asking their students questions in order to evaluate their students’ understanding about arguments within the Core text reading assignments.

Professor Alex Holmes, sociology, also uses the Socratic method as a method to ask questions about arguments in texts in the Signature II course. This participant employs the Socratic method by asking his students the following questions to spark their thinking about the three levels of arguments.

- “1. What is the author’s argument and can you summarize it?
2. Were you persuaded by the argument? What criteria did you use to make that judgment?
3. What other arguments were made by comparing and contrasting specific positions within these arguments?”

In the Signature II Core course, this participant provides an example of how the three levels of questioning work through the Socratic method. For example he asks his students these questions in order to think about Hitchens’s argument in his book, *God is not Great*. First, he asks his students questions about what was Hitchens’s argument.

Can you recapitulate his argument? The second question he asks them: Were you persuaded by Hitchens’s argument? He further questions them: What are the persuasive aspects of his argument, what were not so persuasive, and what criteria

did you use to make that judgment? Then, a third level of questions would be, how does his argument relate to other arguments in the text?”

This participant finds that these three questions, as part of the Socratic method, are an effective approach to teaching his students about how to think in terms of arguments within Core texts. This participant believes that “if his students are able to work that through these kinds of questions, then they are definitely critical thinkers.”

Professor Gladys Trump finds the Socratic method advantageous for asking her students questions about Core topics as they relate to the Signature I course. This participant asks her students questions about Core topics to ignite the critical thinking process such as,

How do you come to form your opinion or judgment that you have of this particular topic or subject?” This professor asks more questions about the facts that have gone into the formation of students’ opinions and asks them, “What are your thoughts? What knowledge do you have about the particular topic? How did you acquire that knowledge? What do others say about the knowledge of your and understanding of the topic? Did they verify it? What is the meaning of the information and how will it be used? This participant finds that these kinds of questions help her students think about where they got the information, as well as to question and reflect upon their own opinions. She thinks that questions are a means for them to think about their opinions and for them to realize that their opinions are usually based on many assumptions and that their assumptions are not necessarily the facts. Professor Ethan Jones supports this perspective, “Asking questions from different angles is part of the critical thinking process.

Professor Keith Cohan, religious studies, states that he likes the Socratic method as a method to infuse critical thinking into his Signature II course. This participant finds that the Socratic method promotes and stimulates students' critical thinking skills by asking questions to discuss in class. He often asks his students if they would be responsible for starting the conversation by developing questions about the reading material for the class.

This participant uses their questions, in turn, to ask them how they thought about which questions to ask regarding the issues in Core texts. This participant finds the Socratic method helpful because it encourages them to contribute to the exploration of whatever text that they are studying at the time, rather than having me as the professor tell them what the text is about during the class period hour of the class period. The Socratic Method is a helpful way for them to contribute to what they think about the text and this method leads to some very interesting questions and discussions about Core texts.

Even though, some of the participants are familiar with the Socratic method, they are not certain as how to infuse this method to teach critical thinking skills in Core courses. Professor Ethan Jones expressed his thoughts about the Socratic method handout from one of the professional development courses that he attended at the university.

I find the handout on the Socratic method pretty useful in terms of asking questions in my Signature class. The handout is also useful by helping me to know how to badger the class with different kinds of questions, which keeps them from not having idea settle in their minds so quickly and easily. At the faculty

seminar, we had a lecture about Dante on how to teach the information using the book. I would have preferred having a faculty seminar about the Core. What is the Core, what is the goal here, what is the critical thinking involved here? We did not discuss critical thinking, which I think would have been most useful. We really did not discuss how to infuse critical thinking into our courses. We received handouts but I do not think we discussed these goals at the seminar. If they had a lecture or a discussion about how to teach the Socratic method and how to ask questions that would have been helpful and useful. I wish we had a discussion about how to teach the Socratic method.

Professor Rick Levy, philosophy, finds that by asking many questions in his Signature III class, students are able to get in touch with their own thinking processes.

We do a lot of going around the room and do a lot of discussion. For example, I would ask them certain questions such as when do you do your best work? What is the most recent insight they had? Can they describe how they came to it? What was the problem and so forth? All of that is trying to make that concrete and to get them in touch with their own processes of thinking.

The questions that Professor Rick Levy asks in class are more about having his students understand their own thinking processes as part of class discussions, rather than the questions being part of the Socratic method. Professor Rick Levy stated that he is learning more about how to use questions as part of the Socratic method.

*Summary of Socratic method.* Participants use the Socratic method to infuse critical thinking by asking students questions about analyzing authors' arguments and issues related to Core topics. Participants find by that asking students questions, since

questions are central to critical thinking, they can then initiate and stimulate students' critical thinking during class discussions about Core topics. According Professor Ethan Jones, "Questions are part of the critical thinking process." Findings reveal that participants use the Socratic method to teach students to think about professors' questions as well as their own questions to think about multiple perspectives offered within the themes of Core texts. Participants agree that by using the Socratic method of questioning often leads to larger communal discussions in class. Although participants refer to the Socratic method as a method to infuse critical thinking, findings reveal that participants are not always clear about how to teach critical thinking skills. Participants find it helpful to ask questions through the Socratic method as an approach to stimulate students' critical thinking skills during class discussions.

**Lecture.** Findings indicate that participants typically prefer discussion as a method to infuse critical thinking into their courses, since discussions offer an exchange of dialogue and thoughts between students. Participants point out that lecturing is mainly a one-way method of communication and does not involve enough student participation. Although lectures are contrasted with discussion-based methods, findings reveal that participants often endorse the benefits of lectures as a teaching method in Core courses. For example, they find that when they are introducing topics in class, lectures are most advantageous for providing background knowledge about difficult subject matter as well as to clarify issues during the readings of challenging texts.

Professor Jared Book, theology wants his students to learn the most from his courses are probably directly applicable to the Signature II course. The critical thinking skills that he wants them to learn include the ability to analyze difficult texts. This participant



states that students are required to read everything from Plato to Nietzsche and that these texts can be difficult for students to read and understand. He adds that students often lack the background knowledge about these authors and the subject matter in the texts.

The way the class is structured or at least the way that I have taught the class has been for the students to read the text and then devote the next class to the discussion of that text. Depending upon the length of the text and students' understanding of the subject matter, it may take several class periods just to discuss sections of a text.

This participant prefers lectures

I prefer lectures when students lack the historical grounding and the students' background knowledge about what we are talking about is not just there. I would rather lecture when there is roomful of students, who are required to attend the class and do not want to participate in class discussions. Nevertheless, all things being equal, if I am going to have a classroom full of students, who are willing to discuss the material, I prefer classroom discussions.

Participants representing the disciplines of sociology and psychology find lectures are a valuable method of instruction, especially when students are struggling with reading difficult texts and need further explanations for clarify complex issues. Professor Alex Holmes, sociology, shared that his pedagogy has evolved since when he first started teaching college, from standing at the podium, while he delivered well-prepared and well-crafted lectures to a more conversational style, discussion-based approach. However, he still uses a lecture format to provide background knowledge as a method,

particularly when his students are having difficulties with understanding difficult issues related to Core topics.

Professor Nathan Hale thinks,

Lecturing in class can be a way to spark and initiate students' understanding of the subject matter. Therefore, what I find often is that when students read texts and say this is too hard, I don't understand this, they tend to shut down. So, when I lecture to introduce and clarify the material for the students, they seem to have a better understanding of what the material means to them.

In contrast to his colleagues, Professor Tony Softner, theology, finds lectures to be a respected educational model. Even though this participant realizes that lectures are no longer valued as an educational mode and that nowadays lectures have a bad name, he finds that lectures provide the kind of structure students need to learn new and challenging material. "I also realize now that they need a lot more structure, certainly more than I needed when I was in college or wanted for that matter." This participant finds that lectures provide students with the structure that helps to listen in class and focus on new subject matter while learning about Core topics.

Professor Tony Softner finds that lectures, as an educational model, provide students with the structure they need to learn about the wide range of Core topics.

I think lectures are good. Only these days, students need to understand what a lecture is supposed to accomplish and what it is not supposed to accomplish. For example, students need to understand that lectures are just one part of a four-part process of a teaching approach as an educational model. Lectures require students to read texts carefully, take copious notes, study their notes and ask

questions. Lectures are the model in which the professor is the one responsible for the professing, that is, for giving a formed, thoughtful presentation of material often providing context, contesting views of the work/period, and so forth, and the insight that comes from sweat equity expended on this material. Rhetoric is crucial to this mode of teaching. That is to say, students learn not only the material, but also a mode of discourse that asks them to stretch and reach, a mode of discourse that is foreign to them and that they cannot provide for themselves, but must learn. In addition, they learn this by hearing it and finding it (when done well) attractive, compelling, and. Lectures, as a teaching method can be intelligent, precise, articulate and broadening. Lectures remain one of the best modes of education, especially in terms of the fundamental understanding of how it is a part of a larger context a teaching method in the field of higher education.

*Summary of lecture.* Findings reveal that participants typically prefer discussion as a method to infuse critical thinking into Core courses. However, participants typically find that lectures have advantages as a method to teach about critical thinking, such as clarifying issues and for providing background knowledge about Core topics. Participants find that lectures, as an educational model, offer the structure students need to focus on in order to learn new course material, so they can then teach critical thinking skills in Core courses.

*General empirical method.* The general empirical method (GEM) is a metacognition method. Metacognition is defined as "cognition about cognition", or "knowing about knowing." It can take many forms; it includes knowledge about when and how to use particular strategies for learning or for problem solving (Metcalf &

Shimamura, 1994). This definition provides an example of thinking about knowing about one's awareness, understanding and knowing about ones' learning process.

Metacognition refers to one's knowledge concerning one's own cognitive processes or anything related to them (e.g., the learning-relevant properties of information or data). "For example, I am engaging in metacognition if I notice that I am having more trouble learning A than B; if it strikes me that I should double check C before accepting it as fact" (Flavell, 1979 p. 232).

Professor Rick Levy, philosophy, believes that infusing critical thinking into Core courses is more about asking questions about how to think about one's own thinking.

I do think that the philosophy of Bernard Lonergan, Jesuit theologian and philosopher, focuses on asking the question: What is meant to think? He does not use the term critical thinking that much, rather what he is trying to do is to ask the question what is thinking?

This participant strongly supports Bernard Lonergan's method to teach students about their own thinking processes through the general empirical method (GEM). Professor Levy poses the question:

Is there a "generalized empirical method," (GEM) a dynamic structure of the human mind that leads to one method of critical thinking in one area and critical thinking in another area-both reflection of the general structure of the human mind when it is "thinking well?" What is the general structure? Can this be taught? Can this general form of critical thinking be taught apart from the particular areas in which it is exercised?

The thinking process that Professor Levy wants his students to learn in his Signature III course is for them to realize that in any discipline, “Whether the discipline is in mathematics, the sciences or in the social sciences, they are moving from an imaginative kind of thinking to a more understanding and intellectual way of thinking about content in any discipline.”

This participant focuses on (GEM) as a method of thinking in order for his students to become conscious of the process and understand how their thinking process moves away from the imaginative kind of thinking to another intellectual level of understanding during the thinking process. The method, for this participant, is to bring his students to an understanding of their own minds and “how they arrived from an imaginative way of thinking to a more properly intellectual way of thinking is the major breakthrough of the thinking process.”

This participant explains that there are differences between the imaginative (experiential) and intellectual (understanding) activity levels of thinking based in Lonergan’s general empirical method. Experience is a Level 1 activity, identified as an *empirical* level by which we sense, perceive, imagine, feel, speak, and move (Lonergan, 1972 p. 9). Understanding is a Level 2 activity, identified as the intellectual level; understanding is the activity, in which we attempt to understand the meaning from the experience. The intellectual Level 2 is an understanding activity; it is when we make sense of our experience; we achieve an understanding of the data. We come up with a meaning to make sense of the data. What is that? Description helps us to understand the data by relating it to our senses (Fitzpatrick, 2005).

Professor Rick Levy thinks that (GEM) is the ideal kind of teaching methodology for thinking about one's own thinking processes. In the Signature III that he teaches, he provides his students with the opportunity to think about something in their own experiences to understand how their minds move from an imaginative, experiential level to another intellectual level. This participant asks his students to think about some of their own individual personal experiences, where they had a real breakthrough, while studying a particular subject, and asked them, "How were they able to move from an imaginative, experiential level to the next cognitive level"?

For example, I give the students the opportunity: Is the mind something that moves from imagination to another level? Well, let's see if you can identify some personal experiences that you would have had a real breakthrough in studying this or that subject and were able to move from imagination to another level. I tried to focus as much as possible on asking those kinds of questions in my courses.

In the Signature III course that he teaches, this participant likes to ask students different kinds of questions in order to encourage his students thinking about their own cognitive processes.

I ask such questions as: "When do you do your best work? What is the most recent insight you have had? Can you describe how you came to it? What was the problem and so forth? For example, if students are studying to become nurses and actually going to clinics, these kinds of questions allow them to get in touch with their own processes of thinking about their own experiences as nursing students.

Professor Rick Levy finds that these kinds of questions challenge students to think about their own experiences in concrete ways as a strategy to stimulate their own thinking processes inherent in the cognitive process of the general empirical method. This participant thinks that the general empirical method satisfies both philosophical and psychological approaches to infusing critical thinking into Core courses by adding that “Philosophy begins with psychology and then moves to epistemology, which asks the question, how we know anything, then moves to metaphysics, what it that we know is?” This participant further adds that the notion of method is an entire method involved in the thinking process of how to think about one’s own thinking during the process of cognition through human experience.

What is your method and thinking about critical thinking? For example in your research now, you are using a qualitative method to conduct this study. Lonergan makes a big point of the differences between method in human sciences and method in the natural sciences. In the human sciences, the researcher has to grow in order to understand what he or she is ultimately trying to understand. Ultimately, what is the growth in knowing what you know and knowing yourself? What is critical thinking in regards to all the stuff that you are doing here? That is a breakthrough inside you and how you think and that is key here.

This participant thinks that the methodology of the GEM teaches his students as much as possible about how they are thinking on different levels in his Signature III course. This participant finds that teaching students to be aware of their own thinking processes such as GEM is the most valuable method to teach students critical thinking

skills, since this method traverses all disciplines. Professor Rick Levy asks the question about critical thinking as a core proficiency, “Is critical thinking really a proficiency or is it a proficiency assumed by all the other proficiencies?”

This participant advances the GEM as a critical thinking method offers students the chance to get more in touch with their own vigorous levels of thinking processes, and, in turn, teaches them to be able to think about the content in diverse disciplines.

Professor Tony Softner further explains that St. Stephens has a handout on all of the proficiencies for professors to use in order to submit a syllabus on a particular proficiency. This proficiency handout lists critical thinking in terms of thinking as analysis and synthesis. This participant thinks that critical thinking is more than analysis and synthesis,

What I have articulated about critical thinking is that there are more underlying principles of thinking that should be included about thinking as proficiency, which is more fundamental at some level. It is more what Bernard Lonergan would call metacognition or something like that so it is thinking about thinking.

The Core Curriculum derives their conception about critical thinking from Bernard Lonergan’s cognitive theory; participants do not typically infuse critical thinking by using the GEM as a method to teach critical thinking skills in Signature Core courses. However, participants frequently refer to such terms as experience, understanding, and judgment as part of their critical thinking teaching practices.

Although participants in philosophy and sociology think that arguments are reasoning skills as the preeminent approach to infuse critical thinking into all disciplines, GEM, is offers a critical teaching method, which can be applied not only to all



disciplines, but to thinking about anything or anywhere. For example, people in China and Mexico or anywhere in the world are thinking right now about something. GEM might be considered more of a global metacognitive thinking process, whereas, arguments are just part of the thinking process pertaining more to academic disciplines. Arguments are reasoning skills, which could be considered an understanding activity, intellectual Level 2 of the thinking process of GEM.

For example, Professor Alfred Zoner, philosophy, perceives that the discipline of philosophy as argument, so everything we do is about arguments as reasoning skills.

For example, whether it is inductive reasoning, so even for philosophers, critical thinking forms the theoretical basis for specific forms of critical thinking in other disciplines. So we will do inductive analysis, which can be used in the social sciences and so will start at the foundations of inductive analysis. We will also do deductive logic and argumentation, which then might form what constitutes critical thinking in mathematics and other sorts of sciences that might use other deductive approaches. It is the nature of the discipline.

***Summary of critical thinking teaching methods.*** Findings demonstrate the participants' critical thinking teaching methods are typically reflected in how they define critical thinking. Participants use interpretive discussion and the Socratic method to infuse critical thinking skills into Signature courses. An important finding reveals that a major difference between interpretative discussion and the Socratic method is based upon the intent and kinds of questions professors ask to infuse critical thinking skills during class discussions. For example, in interpretative discussion participants ask students

questions to find out if they understand the content and meaning about the Core text readings. Participants ask questions using the Socratic Method to stimulate students' critical thinking skills to see if they understand multiple perspectives as well as authors' arguments presented in Core texts.

Findings indicate that some effective strategies for infusing critical thinking skills into interpretative discussion-based courses include stressing the importance of critical thinking as a skill, group readings, guiding questions, and summary skills. However, participants vary in how they approach infusing critical thinking in their Core courses. The most frequently used approach is the mixed approach, which uses subject matter as the foundational base to teach critical thinking skills. Other participants infuse critical thinking skills through the immersion approach in which the content of subject matter is stressed over critical thinking skills. Participants find lectures helpful for providing background information particularly when students are struggling with difficult and challenging course topics as well as an educational model to structure course material and clarify issues about Core topics. Despite the Core's conception about thinking as the general empirical method, participants do not typically infuse critical thinking using the GEM, but instead use their own metacognitive teaching conceptions to teach students critical thinking skills. Participants' metacognitive methods differ from Lonergan's GEM, in that they ask students questions to make them aware about their understanding of their thinking processes during class discussions.

The general empirical method has distinct activities to structure asking questions during one's thinking at each level of experience, understanding, judging, and deciding as a metacognitive method. GEM encompasses the entire thinking process of thinking about one's thinking by asking Lonergan's key philosophical question, "What are we doing when we are thinking?"

**Section 3: Assessment methods** The third section outlines findings on how participants assess students' critical thinking skills in Signature courses through means of informal and formal measures. Participants evaluate students' critical thinking skills by students' participation during class discussions as an informal measure. Quizzes, tests, exams, and papers are formal measures used to evaluate students' critical thinking skills. Since Signature I and Signature II have standardized syllabi, assessment methods are similar but have variations, such as participants' grading system. Signature I, Signature II, and Signature III course syllabi describe each of these measures. The Signature syllabi reflect Bloom's Taxonomy (cognitive domain) as understanding, applying, analyzing and evaluating to describe measures to evaluate students' critical thinking skills. The term *evaluating* is listed on the three Signature syllabi as a measurable outcome, based on criteria and standards.

***Class participation: Signature I.*** Professor Ethan Jones and Professor Gloria Gladys Trump, theology, typically ask students questions about assigned Core readings as part of their class discussions. This class participation measure is listed on the Journey of Transformation course syllabi as: students are expected to demonstrate that they have read and are prepared to discuss the reading material. Participants assess students' critical thinking skills through class participation to determine whether students read

the assignment and if they understood the reading material. Professor Ethan Jones assesses his students' critical thinking skill by having them summarize the readings from the assignments while discussing them in class.

I also try to give guidance on what is a good summary to teach students to speak about in class. As far as the students really getting an understanding critical thinking I learn a lot from them when they speak up and are vocal about their opinions in class.

Findings demonstrate that participants' methods to assess students' responses during class discussion are consistent with the course requirements as listed on the Signature course syllabi. Professor Ethan Jones' syllabus for the Signature I, Journey of Transformation course, documents how he evaluates student participation as a course requirement and his grading system for class participation.

#### Participation (25% of final grade)

- Each student begins the semester with 25 points for participation. Points will be deducted in the following ways:
- For each unexcused absence 3 percentage points will be deducted from the final grade.
- Unexcused tardiness may result in a partial deduction for the day.
- Students are expected to be present, on time, and attentive for every class period.
- Student will lose two points for failing to bring the reading to class.
- Every student must be prepared to give a five-minute summary of the readings and to ask three questions that stimulate discussion. Class will begin with

students being called upon at random to summarize and ask questions. Inability to perform these tasks will result in up to 3 points deducted.

-You can lose more than 25 points.

Professor Gladys Trump, who also teaches the Journey of Transformation, a Signature I course, has similar approaches to assess students' critical thinking skills in her classes but assesses different weighted measures for class participation. For example, Professor Gladys Trump assigns 20% to class participation, while Professor Ethan Jones assigns 25% to class participation as part of the final grades as indicated on their Signature I course syllabi.

Professor Gladys Trump lists student participations through class discussion as a measurable outcome as part of the course objectives on the Journey of Transformation syllabus as:

Students will be able to complete the following course objectives:

1. Identify and engage the issues and questions central to the Catholic intellectual tradition.
2. Discuss core texts of the Catholic intellectual tradition, broadly understood, and how they inform the journey of transformation.
3. Integrate new information from multiple perspectives.
4. Demonstrate Freshman level proficiency in Reading & Writing, and in Critical Thinking.

Course requirements and evaluation include reading and discussion as the primary focus of this class. In addition, the following class activities, participation: attendance, attention and contributions to discussions count for 20% of the final grade.

Professor Gladys Trump evaluates her students' critical thinking skills by asking them questions about Core topics, so they can examine their own ideas and get in touch with their own thinking processes. This participant links her assessment methods to her critical thinking pedagogy by asking her students the questions, which are listed on her Signature I syllabi as:

What is real?

What is truth? How does one differentiate the real and the true from false?

What do we know about the beautiful?

What do we know of the divine or transcendent?

Is there a meaning to suffering?

How does one endure suffering?

What is Love?

What is the meaning of freedom?

How does the human person attain transcendence?

How do we understand the just, the right, the call to do good?

How do we decide what to do?

Professor Gladys Trump, theology, also evaluates whether students understand their own opinions as a possible form of bias as part of the critical thinking process. This participant assesses her students' critical thinking skills by having them look at both sides of a topic and or issue as a method to evaluate how they think about each perspective during her class discussions.

By looking at both sides of the issues, I am able to understand how my students are able to think through the process. Students tend to have biases and so I ask

them questions to get them to think about their own biases. I want them to be able to support their positions during class discussions and to be able to support their biases and opinions. The questions I ask them in class opens students' minds to see other points of views and challenges them to critically think.

Professor Gladys Trump and Professor Ethan Jones describe student participation class discussions as a measurable outcome as part of the course objectives on the Signature I, Journey of Transformation, course syllabus. Specific criteria for measuring student participation as part of class discussions are not described on the syllabus.

*Class participation: Signature II.* Findings for assessing students' critical thinking skills in Signature II courses are consistent with how participants assess students' critical thinking skills in terms of class participation in the Signature I course. Signature II syllabi have common templates for participants who teach the Christianity and Culture in Dialogue course. Student participation is listed as an important required measurable outcome as listed on the syllabi. Similar to the Signature I course, specific criteria is not documented to measure student participation as part of class discussion. Participants who teach Signature II courses concur that student participation in class discussions is an important way to assess students' critical thinking skills and this is also listed as one of the primary modes of assessments on the syllabi.

Participants evaluate their students' critical thinking skills within the context of class discussions as they relate to Core readings during the semester in Signature II courses. Professors Tony Softner, theology, Professor Alex Homes, sociology, and Keith Cohan, religious studies, provide students with an outline of questions about Core readings prior to discussing them in class. Professor Keith Cohan evaluates his students'

critical thinking skills development by having his students ask themselves the following questions while reading Core texts:

What is your assessment of the text? Do you agree with what is being proposed in the text or do you disagree and if so what are your reasons, what are your substantive reasons? When I teach, I try to encourage critical thinking by number one, encouraging my students to focus on the text, read together and encourage them to interpret what they are reading. Secondly, to ask themselves as they are reading and learning about the text, what is their assessment of the text. Do you agree with what is being proposed in the text or do you disagree with what is being proposed in the text? What are your substantive reasons?

Since the Core courses focus on close readings from different texts, participants find that by breaking down the readings into separate sections and asking students questions throughout the class discussions, they can evaluate what they understood from reading the text. Professor Alex Holmes provides his students with questions prior to discussing the readings in class.

I have readings, which I discuss in class and I usually give the students focus questions. I also use student participation to provide students with an opportunity to give me a sense of what they have gotten out of the reading.

Participants find an outline of questions to be an effective tool to evaluate whether students understood the main points of the reading material and as a strategy to evaluate their critical thinking skills.

Professors Alfred Zoner and Mike Collins, philosophy, find that the discipline of philosophy affords very clear criteria for evaluating students' critical thinking skill during



class discussions. These philosophers believe that the first task is to evaluate whether or not students understand the basic elements of an argument. To assess this, Professor Alfred Zoner, philosophy, asks his students, “Did the person state a conclusion or a belief? And the answer to that is either they did or they didn't.” This participant is very clear about the importance of having his students understand the elements of argument in terms of critical thinking skills. Professor Alfred Zoner wants his students to first understand whether the author presented an argument, and if the author did pose one, he asks his students to evaluate whether the argument is a strong or weak one.

These participants assess their students’ critical thinking skills by asking them questions about authors’ arguments during their discussions of Core readings. For example, Professor Alfred Zoner asks his students questions about arguments as, “What is the author's conclusion? What are the premises that lead the author to that conclusion? Do you agree with these premises? Are the premises true or false? Is it a sound argument?”

Professor Mike Collins also assesses his students’ understanding of arguments by asking questions, such as, “What is the argument in this passage and is this a good or bad argument? During class discussions, this professor asks his students, “What is the difference between the premise and conclusion within an argument?”

These participants in philosophy agree that evaluating students’ critical thinking skills through forms of arguments is crucial. During class discussions, they encourage their students to articulate whatever position they are analyzing in the form of arguments. They assess students’ critical thinking skills by asking them to explain their position by how they are able to frame their own arguments. These participants concur that the

advantage about critical thinking in philosophy is that there is a very developed lexis for thinking about arguments and this language offers very clear and distinct criteria for evaluating students' critical thinking skills.

Professor Alex Zoner, sociology, describes his criteria for assessing critical thinking skills in terms of arguments. His teaching goal is for his students to understand arguments as a critical thinking skill in his classes.

The first very basic thing is there an argument. Did the person just state a conclusion or a belief? That is, either they did or they did not. I try again to be very clear about what an argument is and if there is an argument. Then, they are way to assess the argument depending on what kind of argument they make, so if it is an inductive argument, I can point to whether the argument is strong or weak. Is the argument cogent or uncogent, so there is a lot of sophisticated language there? If it is a deductive argument, can they tell the difference between a deductive and an inductive argument? What kind of argument is it? Is it sound or an unsound argument? The nice thing about critical thinking in philosophy, there is a very developed vocabulary for thinking critically about arguments. So in terms of rubrics and other forms of assessment, it is pretty easy to establish and evaluate. Did they make an argument? Great, did they define an argument? Is the argument strong or weak? Is the argument sound or unsound? Is it sophisticated or very simple?

Syllabi for Signature I and Signature II courses supports class participation as a measure to assess student critical thinking skills. The Signature II syllabus denotes how participants assess class participation as a required course objective by assigning students' class participation as 20% of the final grade.

Course objectives on the syllabi document measurable outcomes of student learning as

Students will be able to articulate the central questions included in specific encounters between Christianity and culture, faith and reason, religious belief and science, belief and unbelief.

1. Primary Mode of Assessment: In-class writing assignments and in-class discussion.
2. Students will be able to articulate differences in ideas and ideological contexts from one historical period to another.
3. Students will be able to analyze a variety of implications (e.g., political, social, personal, spiritual) of the ideas and positions they encounter in the course.

Class participation is important in this type of class, and each person's input is valuable. You should come to class prepared to discuss the readings, even if at times that means just asking relevant questions about material you did not understand. Everyone is expected to participate regularly. Students will also be required to share with the class what they have gotten out of the supplementary reading that forms the basis of their term essay. The participation grade depends on both the quality and the quantity of your participation. Regular class attendance is therefore expected. Class participation will count for 20% of the final course grade.

***Class discussion: Signature III.*** The syllabus for the Signature III course, The Philosophy/Theology of Bernard Lonergan, documents how class participation is evaluated as a course requirement.

This course will treat the life and work of the Canadian philosopher/theologian Bernard Lonergan. It will trace his biography and the development of his theological and philosophical writings from his early days to his later manuscripts on economic theory. Besides outlining the early influences on his thought – Newman, Plato, Augustine, Aquinas, the modern sciences and historical scholarship – the course will trace the 20th century ecclesiastical and historical context in which he wrote. It will present the broad outlines of his cognitional theory with an emphasis on self-appropriation.

The relevance of his thought to the fields of education, philosophy, history, economics and theology will be highlighted.

***Course requirements and guidelines.*** Class Attendance and Participation [20%]: “Ninety percent of life is showing up.” Attendance at the required lectures and site visits is required.

Participation: Participation is required. This means that, in addition to attending the lectures and site visits, you must (1) keep up with the readings; and (2) be prepared to contribute to class discussion by posing questions and making comments, etc.

Professor Rick Levy, philosophy, teaches a Signature III course regarding the works of Bernard Lonergan and thinks that among all of the Core courses, this Signature III course deals directly with critical thinking as a core proficiency. Most of the students who were in this course were students, who were studying nursing. This participant

assigned his nursing students, readings about Lonergan in conjunction with articles regarding the nursing profession. During class discussions, he evaluated his students' critical thinking skill by asking them questions about what was going on in their professional lives as nurses. These questions served as a way integrating their direct life experiences with their thoughts about the assigned course readings.

Professor Rick Levy asked his students questions as a method for them to assess their own thinking about their nursing profession.

How do you decide on how to become authentic nurses? What does it mean to use your own head, what if you feel you have a different feeling about a patient than the doctor has? Is your knowledge valid?" This participant asks many questions in the Signature course in order to evaluate his students critical thinking skills such as, "When do you do your best work? What is the most recent insight they had? Can they describe how they came to it? What was the problem and so forth? All of that is trying to make that concrete and to get them in touch with their own processes of thinking. So, they are wrapped up in being nurses and actually going to clinics and stuff like that. The goal is to get them in touch with their own thinking processes.

Professor Rick Levy finds that questions stimulate his students thinking processes, so they can evaluate their own thinking processes as a method for nurses.

*Quizzes.* Quizzes are one of the formal measures that participants use to assess students critical thinking in Signature II courses. Findings demonstrate that participants give at least one quiz to assess students' understanding of critical thinking skills vocabulary and other quizzes to assure that students are completing assignments.

Participants also administer quizzes as a measure to analyze students' responses as a method to determine if certain topics are in need of further clarification.

Professor Keith Cohan explains that there are five to seven quizzes, which all faculty members have to administer to their students as part of the Signature II course. The format of these required quizzes varies from professor to professor. Some quizzes contain multiple-choice questions, some use true or false questions, while some professors ask their students to write a paragraph or two as part of the quiz.

Professor Mike Collins states, "In my course, I use quizzes more or less as a tool to evaluate critical thinking." He specifically administers a critical thinking quiz, for the purpose of assessing only critical thinking skills. Professor Mike Collins explains the differences between assessing critical thinking skills in Core courses and in philosophy courses.

For example, Core courses are intended for infusing critical thinking as a core proficiency and an important component of the course, which deals with critical thinking issues. That is different from a philosophy course, where the major aspect of the philosophy course is to develop and reinforce students' critical thinking skills, which emphasize those skills throughout the philosophy course. In the Core courses, the kinds of skills involve being able to understand and recognize arguments and the components of an argument. For example, I want my students to be able to understand what a premise is, what is a conclusion, what is the distinction between a premise and a conclusion? What are the different types of reasoning that are involved, such as inductive reasoning, deductive reasoning, casual reasoning, various types of arguments that might be offered.

Professor Mike Collins teaches the vocabulary terms to his students so they can understand the terms of arguments as evidenced in Core texts. He teaches them about the vocabulary terms that are involved in arguments, such as premises, conclusions, reasoning, fallacies, and the differences between inductive and deductive reasoning skills. This participant then administers a 30-minute critical thinking quiz, which “I call it the critical thinking quiz. So that is how I can measure just what they recall just from the material. That provides me with a good basis for determining what they understood from teaching the vocabulary terms.”

Professor Keith Cohan’s quizzes each will consist of a few questions that can be answered briefly. These are not essay questions; rather, they are designed to determine the student’s ability to identify the essential points from the assigned readings.

Professors Tony Softner, Keith Cohen, and Mike Collins administer quizzes in their Signature II classes for the very simple reason to assure that their students have read the text. Professor Tony Softner admits the following:

Students will say to him, I read the text because we had a quiz. On the day that there is a quiz, they have to write answers on questions about the text and then we go over the quiz that gets them going in terms of focusing on a class conversation.

This way I know what they have an idea about what we are talking about in class. Quizzes are one of the tools participants use to assess whether or not their students have read the text, as well as to evaluate their critical thinking skills. Quizzes also help participants understand what their students are getting out of the Signature II course.

Professor Keith Cohan's syllabus provides an example of a common template for the Signature II, Christianity, Culture and Dialogue course, and how he uses quizzes as a method to assess students' critical thinking skills.

The Signature II course syllabi list quizzes as part of the course requirements as:

Approximately 5-7 quizzes will be given. Each will consist of a few questions that can be answered briefly. These are not essay questions - they are designed to determine your ability to identify the essential points in the assigned readings.

Quizzes constitute **30%** of the course grade.

*Final exams.* Final exams are another formal measure that participants use to assess critical thinking skills. Professor Keith Cohan's syllabus for the Signature II describes how final exams are used as a measure to assess students' knowledge.

There will be a final exam for the course. Part of this exam will be a common essay that all sections will write. The common essay will require knowledge and intelligent application of three of the readings from the class. The final exam is worth 20% of the course grade.

Participants find that final exams are an effective method for assessing students' critical thinking skills as related to the readings Core courses. According to Professor Keith Cohan, "The final exam is pretty much essays; there is a small portion where there is a variation for your own course. The midterm is optional, some faculty administer them, and some faculty members do not administer a midterm." Since only a few of the participants administer an optional midterm exam, they will not be included as part of the findings in this section. The syllabi for Signature I and Signature II courses provide descriptions of final exams as part of course requirements to evaluate students' critical



thinking abilities in Core courses. The Signature III syllabus does not include a final exam, instead, Professor Rick Levy assesses his students' critical thinking skills by having them write a final research paper.

Findings reveal that participants typically administer final exams to assess students' critical thinking skills in Signature I and Signature II courses as reflected on the course syllabi. However, participants differ in the kinds of essay questions they develop as part of the final exam. For example, Professor Jared Book describes the required essay listed on his Signature II syllabus as:

There will be a final exam for the course. Part of this exam will be a common essay that all sections of CORE will write. The common essay will require knowledge and intelligent application of three of the readings from the class. The final exam is worth 20% of the course grade.

Professor Alex Hale, sociology, states that there will be a final exam for the course, and it will consist of identification items (passages from the assigned readings) and a reflective essay. The final exam is worth 20% of the final course grade.

Professor Tony Softner prepares a rather large final exam, and one of the essays is a critical thinking essay,

Where the students have to bring together around a particular question, a number of sources that they have read. We go over in a review session just to make sure they understand the question so they can approach it and start to use the required sources.

Professor Tony Softner and Professor Ethan Jones provide the students with the essay questions in advance. Professor Ethan Jones administers a final exam with an essay on

critical thinking, where the students are required to respond to questions about the readings as they relate to the central themes of the course. This participant's syllabus lists course themes as:

- (a) The nature of philosophy; "big questions" such as "what is happiness?" "What is love?" "What is God?" "What is freedom, and what is it for?" "What is truth?"
- (b) The trans-cultural relevance of these questions
- (c) Critical thinking about how answers to these questions are presented

Professor Gladys Trump administers a final exam, which requires her student to write a 3-5 page reflective essay.

Written essays have to include two major themes, "whether it is community or truthfulness and love in the intellectual tradition. The final exam then draws questions around particular questions, such as human suffering by which they can chose two themes. They can respond to such questions by using and infusing the material from several of the books that we have read, film that we have seen and or art work or music.

Professor Gladys Trump explains these final exam themes as:

One of the major objectives of this course is to think critically about themes such as community, reality/unreality, love, sacrifice, materialism, duty, etc. Choose two of the themes listed above, or one of those themes and another of your own choosing, and answer the questions below citing at least three of the readings and one of the films that we studied. Include quotations from the reading or scenes from the films. You may also include examples from other materials we have

studied, such as images, music, etc. Spend at least one hour answering these questions.

Professor Gladys Trump expects her students to write a unified reflective essay that brings together what you learned, how you learned it, and the personal implications of your intellectual growth. Examples of Professor Gladys Trumps' essay questions are listed below:

What new knowledge have you gained, and by what means have you learned it?

What moral or religious understandings do you have that are clearer and/or fuzzier now than before, and how did this come about?

Have you learned new ways of thinking about what you know? How did you learn these ways of thinking?

What are the personal implications of your learning in this course? For example, have any of your attitudes changed, do you have new or different goals?

Professor Gladys Trump counts the final exam essay exam as 10% of the grade.

Professor Nathan Hale requires his students to write a synthetic essay by comparing four or five sources on the final exam. This participant expects his students' essay to address the following issues when they are writing essays:

Were they able to touch on the required number of readings? Were they able to respond to the prompt in a meaningful way? I want the responses to show the students' understanding and mastery of the points they are making in the essay.

He finds what really separates the top students from the other students is the ability to understand each of the individual sources and combine them in an interesting

way and to highlight their similarities or their differences in an original way. “I find that to be the foundation of critical thinking.”

Although participants’ essay questions vary on final exams, they adhere to the Signature I and Signature II syllabi in terms of the required criteria of assessing critical thinking as a measurable outcome in their courses.

*Written papers: Signature I.* Findings indicate that participants also typically evaluate students’ critical thinking skills by assigning them to write papers as a course requirement. Participants find papers to be one of the best measures for assessing critical thinking skills in Core courses. According to Professor Jared Book, “I guess the assessment on critical thinking is the two papers that they turn in during the semester, which are probably one of the best measures of their capacities to critically think.”

Professor Gladys Trump, theology, lists topic questions for papers in her Signature I, Journey of Transformation syllabus as follows:

Do you possess a particular personal characteristic, quality, or skill that is considered to be extraordinary, or, a “gift” by others and by yourself? Describe the nature your “gift” and discuss how you became aware of your “gift.” What do you think is the purpose of your “gift?” Why do you believe this? “Do you have a strongly held opinion about your knowledge of a particular subject? Discuss the process by which you arrived at your opinion on this particular subject.

In the Signature I course, Professor Gladys Trump assigns a reflection research paper to evaluate her students’ critical skills. One of the choices for this reflection research paper is to have students write about a topic discussed in class, such as Socrates’ Apology, in which Socrates speaks about the importance of self-examination. The other

choice is to have students select a topic about a particular gift that they possess and how they arrived at their understanding of having this particular gift. This participant finds that students' papers are excellent measures of students' critical thinking skills and provides the following example:

Several of the students look upon themselves as having the particular gift of cooking. How did they find out cooking was their gift? What difference does cooking make in a community? What was the feedback on that? The research component was very interesting in that they began meal communities. Family meals bring comfort and often act as healing times for people. They actually used the Bible to look at meals as community meals by looking at something familiar with a broader view. I ask them for supportive information as well as research on their particular point of view. I also ask the students questions, such as: Who are the detractors, are their detractors to your particular point of view, in addition to those who support your point of view.

This participant finds that by having her students write reflective research papers, it compels them to look at both sides of the issues as a way to critically think through the process. Although Professor Gladys Trump is aware that students usually have biases about their opinions and struggle to examine other opinions, she finds that "these assignments seem to open up students' avenues to see other points of views and challenges them to critically think."

Professor Nathan Hale assigns at least two or three of five papers as a method to assess students' critical thinking skills in his Signature I course. Since papers are part of a course requirement as listed on the common template of the Signature I syllabus, this

participant does not “have a lot of say over that assignment. However, I get to choose what the topics of the paper will be.” What he does with his assigned papers is to ask a series of short questions to have his students think about analyzing the readings as a stimulus for writing the paper.

I really tried to set aside and away from the grammar and structure and sometimes things like that since it is more difficult for some students than others. But I really try to help the students with describing what has been said and what is not really critical thinking.

Professor Nathan Hale describes a good paper as one that has a level of analysis about what is being said, and shows a deeper level of understanding and mastery. “So that is the kind of distinction that I try to drive home in the papers.”

Professor Ethan Jones assigns two short papers to assess his students’ critical thinking skills by using the medieval method. This professor differs from the other professors who teach the Signature I course in that he encourages them to select their own topics reflected Core readings.

This participant focuses on the medieval method to assess his students’ critical thinking skills on written papers. This participant assigns papers using the medieval method, based in scholasticism as a method of thought. The medieval method encompasses having students write papers by summarizing the points of the reading, criticize it, and if it is problematic reconcile the first two in terms of summary and criticism and then defend the criticism.

Scholasticism is a method of critical thought, which dominated teaching by the academics (scholastics or schoolmen) of medieval universities in Europe from about

1100–1500. The medieval method is based in scholasticism, which places a strong emphasis on dialectical reasoning to extend knowledge by inference, and to resolve contradiction. Scholastic thought is also known for rigorous conceptual analysis and the careful drawing of distinctions. In the classroom and in writing, it often takes the form of explicit disputation: a topic drawn from the tradition is broached in the form of a question, opponents' responses are given, a counterproposal is argued and opponents' arguments rebutted. Because of its emphasis on rigorous dialectical method, scholasticism was eventually applied to many other fields of study. Schoedinger (1996) <http://en.wikipedia.org/wiki/Scholasticism>

This participant finds the medieval method as a useful approach to assess students' understanding of an author's point in terms of their written papers as a written defense of a reading against that critique. Professor Ethan Jones's syllabi describes the paper requirement, as

The question therefore is, "what is the author trying to say; what is problematic; what his real point is? The purpose of the assignment is to think critically about the readings. The paper is graded on this critical thinking not on the student's personal opinion. The grade depends entirely on following the assignment.

Students may write on any passage in the course readings.

This participant provides his students with a list of possible topic ideas for their first paper as part of his documentation.

For this first short paper (as for the last paper, due on the last day of class), you can write on any topic you want, so long as you follow the assignment: two full pages of writing, with a summary of something in the readings, a critique of it,

and a defense of the reading against that critique. You do not have to use any of the following ideas, you can write on anything from the readings so far. These are just suggestions to help you get started. Here are some ideas for possible paper topics.

In *The Apology*, Socrates claims to know nothing, but he also thinks he is making people better, and is willing to die for his cause. Does that make sense? In the second section, emphasize the apparent contradiction; in the third, try to resolve it.

-In *The Apology*, Socrates argues that death shouldn't be feared. Does his argument make sense?

As part of the second paper, Professor Ethan Jones provides his students with an outline on how to write a counterpoint paper.

The assignment is straightforward. Select a passage in the readings. On the first page, explain what the author is saying. On the second page, thoughtfully criticize the author's position: explain something about it that seems unreasonable, perhaps because it is impossible, or contradictory, or just doesn't seem right. On the third page, defend the author's position against that criticism, perhaps by showing why the criticism misses the author's point, or how the author is working from a different perspective.

You must give a full page, of ordinary text, to each of these parts. The title does not count as part of your first full page. If you want to state your own opinion at the end – you are welcome to do that, but you need to first give a full



page to defending the author. You will be graded on following the assignment—essentially, reading the text thoughtfully—not on your own opinion.

You may write on any of the readings we have down for the class. The professor will suggest some topics you could write on, but you are welcome to write on whatever interests you. Feel free to contact me about paper topics.

***An approach.*** This paper requires some working backwards. You need to be able to critique, and respond to your critique, for whatever topic you pick. You might find that the passage you are most interested in is not one that you can critique. There are two ways you could approach page two. One approach is to argue from your own experience, or your own understanding of Christianity and humanity. Just argue that the text doesn't fit reality as you perceive it.

Another approach is to find ways that the author seems to contradict himself. Then page two would involve quotes from the readings that seem to contradict what you had on page one.

There are also two ways you could approach page three. You might just think alongside the other, argue that his position does make sense after all. But you might also return to the text you used in page one, and argue that the critique misses a nuance in the wording of the text—that the text isn't really vulnerable to that critique after all, because the critique is missing the point of the text. I found that one full page for each part of this exercise requires you to dig in a bit. You need to articulate a real argument. You need to have something thoughtful to say. It is very obvious to the reader when you are trying to b.s. your way through a full page.

You might find that that this exercise requires you to get your nose out of the book. Once you have a passage in mind, you might do well to go for a short walk and try to think through what a critique would like and how to respond to that critique. Pages two and three are not research assignments: you might quote from the readings, but what you really need to do is think.

Some people do this best walking, some people do it best writing. Try writing a very rough first draft, just exploring how you would critique the author's point of view and respond to that critique – then go back and write a careful paper. It is not easy to write such a paper well without first thinking it through. Finally, you might find that pages two and three dictate how you write page one. The first time you summarize a topic, you might miss the key details that are necessary for your critique. Give yourself permission to rewrite page one after you have written the other two pages.

Professor Ethan Jones provided a paper on rubrics, which shows points for assessing students' papers on critical thinking in his Signature I course.

***Disputation/Counterpoint-Paper Grading Rubric.***                      ***First Section***

Title (accurately describes the theme of the paper)                      1 point

Engagement with source material (shows you have read it)                      2 points

Stays on topic (material is useful for the rest of the paper)                      1 point

At least one whole page of writing                      1 point

***Second Section***

Critiques first section                      1 point

Stays on topic (makes a single critique)                      1 point

At least one whole page of writing	1 point
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***Third Section***

Responds to critique in second section	1 point
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Defends the point made in the first section	1 point
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At least one whole page of writing	1 point
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Writing

Proofreading (for typos, incoherent sentences, etc.)	1 point
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Good writing (according to one's abilities in English)	1 point
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Professor's Judgment of a good paper	2 points
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Total	15 points
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Findings indicate that Professor Ethan Jones' documentation is commensurate with his methods to assess his students' critical thinking skills in the Signature I course.

***Written papers: Signature II.*** Findings reveal that participants adhere to common syllabi by assigning papers to assess students' critical thinking skills in the Signature II courses. According to Professor Keith Cohan, "All the faculty have to assign two papers (length 3-5 pages), but questions are at the discretion of the faculty members."

Professors Alfred Zoner and Mike Collins, as philosophers, both assign papers as a method to assess students' abilities to evaluate arguments from the assigned readings in Signature II courses. Professor Alfred Zoner assigns papers to evaluate his students' critical thinking skills in terms of analyzing arguments. The first basic criterion is to have his students consider, "Does the author have an argument? Did the person just state a conclusion or a belief? And that is, they either did or they didn't, so when his students

write their papers, he wants his students to be very clear if the author is making a strong or weak argument. I try to be very explicit about assessment in terms of making the students do a lot of writing. I try to assess their critical thinking in terms of an argument or by their papers.” Professor Mike Collins wants his students to write in their papers, “What is the argument in this passage and is this good argument?” In the assigned papers “I always ask for the following questions to be addressed, what is the argument in this passage, and is this a good argument?” Students’ critical thinking skills are measured by what they do on their papers and are graded on how they evaluate their arguments.

In the Core courses, the kinds of skills involve being able to understand and recognize arguments and the components of an argument. For example, I want my students to be able to understand what a premise is, what is a conclusion, what is the distinction between a premise and a conclusion? What are the different types of reasoning that are involved, such as inductive reasoning, deductive reasoning, causal reasoning, various types of arguments that might be offered.

In a Core course, this is done a bit more generally than in a philosophy course; I don’t spend any explicit time in the course just focusing on specific reasoning skills, separate from the content. Rather what happens in the course readings, I will point out and stop to point out issues by asking the students about the passage they just read, such questions as, do you see this argument, what is the premise here, what is the conclusion we are being asked to accept? Then I ask the student is this really a good argument according to the premise and the conclusion? We do that throughout the semester. I use this approach to infuse the critical thinking as one of the components of the Core courses.

Professor Alfred Zoner and Professor Mike Collins, as philosophers, find that students' papers are effective measures to evaluate criterion for good arguments as reflected in Core texts.

Professor Alex Hale also assesses students' critical thinking skills by assigning papers to evaluate authors' arguments in Core texts. For example, this participant assigns a 3 to 5 page paper about a book that they selected as related to main issues from the course.

In the Signature II class, that I did last semester for the first time was to have each student select a book such as the new atheism, like Hitchens, or C.S. Lewis *Mere Christianity*, *Abolition of Man*, depending upon what the students' interest was and they had to select some book from the Christianity Culture and Dialogue course. I think the critical thinking piece there was what the book they select had to do with the issues that we spoke about all semester. For example, we had discussed science versus religion, faith versus reason, and belief versus belief. These were the main issues and so the book touch upon the issues we discussed in class and so I try to pull them back to the course issues. Also as part of that paper, the students were required to cite connections to particular text. So for example, if you were reading Hitchens, you would say well try to imagine what Aquinas, which we had spent a lot of time discussing in class, would have to say about Hitchens. What would Friedrich Nietzsche have to say about Hitchens?"

Professor Alex Hale encourages his students to think about what other theorists and philosophers would say about the book they selected when they write their papers.

Professor Sam Lock, classical studies, assigns papers to evaluate his students' abilities to synthesize ideas from the material they read in text. This participant states that by reading their papers, "I evaluate how they understand the quality of sources, opinions and conclusions they come to so as to evaluate their thinking processes." Professor Sam Lock finds that students' papers are a valuable tool to assess students' critical thinking skills.

Professor Tony Softner provides his students with options to write 3-5 page papers to assess his students' critical thinking skills by having them analyze and support their ideas as it relates back to the thesis statement.

In *CORE 2101: Christianity and Culture in Dialogue*, you will be asked to write 2 papers of 3-5 pp. each. These papers will ask you to show that you have grasped the relevant reading material and can form an argument rooted in your reading. In other words, your professors will be asking you to support what you say about an author's work with an interpretation that is warranted or justified by the texts themselves.

While an individual professor's grades will be based upon the paper as a coherent whole (grammar, logic, style, content, etc.), professors of *Christianity and Culture in Dialogue* will be especially attentive to two issues related to writing: (1) Thesis statement; (2) use of passages from the texts.

Thesis Statement: A thesis statement is essentially a claim that you make about the reading or about the ideas in the reading. The thesis statement expresses the central idea that you will write about in your paper. It provides both the writer (you) and the reader a focal point: everything else in the paper should relate, in some way, back to the thesis statement.

These paper options include:

Option 1: C.S. Lewis and Charles Darwin

Charles Darwin argues that there is a biological basis for human morality rooted in particular kinds of moral sentiments/instincts and experiences. C.S. Lewis provides an argument that this notion of moral instincts is deeply mistaken and offers a different view rooted in what he calls the natural and moral law. Your task in this essay is to take a side in this argument. Please be sure to represent both authors and their positions fairly regardless of which side you take in the argument. If you are to make a strong argument for Lewis, for instance, be sure to be fair to Darwin's position (and vice-versa).

Option 2: C.S. Lewis: This assignment asks you to work on Lewis' text alone.

*Evil and the One God:* Lewis contends that we are responsible for evil and argues that free will and God's response to evil addresses the issues from a Christian point of view. Your task: make clear that you have done justice to Lewis' position and argue whether you think he addresses the issue of God and evil in an intellectually satisfying way. You may reflect on aspects of Genesis and Paul's First Letter to the Corinthians to engage these issues as well.

Professor Tony Softner provided a rubric to document how he evaluates students' essays in his Signature II course.

Criteria /Level	Unaware	Marginally proficient	Proficient	Highly proficient
<b>Thesis items</b>				
	1	2	3	4
Embodies tension	Thesis is both unclear and has no tension	Thesis is at least clear even if there is no tension.	Thesis embodies tension.	Thesis embodies tension that impresses with knowledge of sources and style of delivery.
Reflects “digestion” of reading	Thesis reflects a misreading of the texts or is simply not grounded in the texts.	Thesis reflects shaky or simplistic understanding of texts.	Thesis reflects a generally accurate reading of the texts.	Thesis reflects a nuanced reading of the texts or particularly insightful connections.
Provides unity/focus	Essay does not stick to a focus.	Essay has a general focus but has gaps or lacks transitions.	Entire essay is well focused.	Essay has a sense of drama or movement within its unity.
<b>Passages from texts</b>				
Are relevant to thesis	Passages appear irrelevant to thesis.	Most passages are tied in to the thesis.	All passages are relevant to the thesis.	Complex or multi-perspective arguments exist within an unified whole.
Are accurate portrayals of text	Passages are generally misrepresented	Passages are occasionally misrepresented.	Passages are generally accurately represented.	Passages are represented in a nuanced way.
Are explicitly connected to argument	Passages are generally not explained in relation to the thesis.	Passages are sometimes not explained in relation to the thesis.	Passages are generally explained well in relation to the thesis.	Explanation of passages adds particular insight.

Figure 4: *Rubric for Evaluating Papers in Signature II Course*

Professor Jared Book’s Signature II syllabus describes papers as one of the assessment methods used to evaluate students’ critical thinking skills. This participant assigns two 2–3 page papers, which require students to analyze and/or react to issues discussed in class during the course of the semester. These written assignments count for 30% of the course grade and are in accordance with the Core guidelines. He asks his students to think about Core readings in terms of contrasting one of the text readings with



another text reading by having his students write about given options from their reading assignments. These options include having his students select prompts, so as to write a paper on which text presents the stronger argument or why the two texts are both equally strong or both equally weak and state the reasons why you think that in your paper.

Professor Jared Book finds that the “two papers are the best measures to his students’ critical thinking skills.” This participant included a list of prompts from his paper options for Core courses to his students as highlighted below:

Paper Option #1: Both Paul and Plato address issues of truth, reason, community roles, and power. This paper option asks you to argue that either Plato or Paul gets these issues right, or at least more nearly right, than the other. Be sure to use evidence from the texts to support your arguments. You need not address every issue, but you need to pick two of the issues to address and give your full attention to them.

Paper Option #2: This option asks that Augustine’s *City of God*, Book XIX either (a) faithfully represents Paul’s teachings on faith and reason; (b) capitulates to Augustine’s culture too easily regarding faith, reason, and the centers of power; or (c) in some ways remains faithful to Paul’s teaching, but adds important new details not found in Paul.

Paper Option #3: Similar to paper option #2, this option asks that, using Moses Maimonides’ *Guide for the Perplexed*, you argue that the author (a) faithfully represents Paul’s teachings on faith and reason; (b) capitulates to his culture too easily regarding faith, reason, and the centers of power; or (c) in some ways

remains faithful to Paul's teaching, but adds important new details not found in Paul.

Professor Jared Book explains that in the Signature II course, I have them write two papers which specifically engages them with the text and that they have to read up to the point of the assignment. The two papers generally involve taking one reading assignment and pitting against the other reading assignment. I will ask the students to argue which one is the stronger case from the first or the other is stronger than the first or find a third way between the two texts and state why they are both equally strong or they are both equally weak and give the reason for why you think that in the paper. The prompts are written for the students already, so they generally have three prompts to write about for their papers.

I tend to recycle my prompts but I have but I have not changed them so very often. On the paper they will generally prompts to choose from and they will respond to those three prompts but I always offer the caveat and that is if students do not like one, they can come up with their own prompt provided they have my approval. Perhaps 5% of all my students will come up with their own prompt. I find that the assessment on critical thinking is the two papers that they turn in during the semester are probably the best measures of their capacities to think critically.

Professor Jared Book finds that the "two papers are the best measures to evaluate his students' critical thinking skills," since papers demonstrate how student can write

about their understanding of Core issues by support their positions using evidence from Core text

***Written papers: Signature III.*** Professor Rick Levy’s syllabus documents how he uses papers as a method to assess students’ critical thinking skills in this Signature III course. The course description explains the course objectives. The philosophy/theology of Bernard Lonergan is a Signature III course developed by Professor Rick Levy. “Course objectives present the broad outlines of Bernard Lonergan’s, Jesuit theologian and philosopher, cognitive theory with emphasis on self-appropriation. The relevance of his thought to the fields of education, philosophy, history, economics and theology will be highlighted.”

Professor Rick Levy requires a research paper, which counts for 40% of the grade as a method of assessment in the Signature III course. The syllabus documents papers as a method he uses to assess students’ critical thinking skills.

A 10 to 15 page research paper on one aspect of the foundations of Christian culture in Spain – historical, philosophical, and literary – will be required for the course. The aim of the paper will be to analyze an aspect of Lonergan’s thought according to the principles covered in the course. A list of possible topics will be given. The student should choose a topic for this paper and have it approved by the professor. An outline-draft should be presented first and the final version at the end of the course.

Professor Rick Levy teaches the Signature III course on Lonergan’ self-appropriation and assesses their critical thinking skills by having them write a paper about their thoughts on their nursing experiences.

I told the nurses about Lonergan and gave them some of his readings and then I said this is going on in your life and this is also going on in your professional life as a nurse. So, I even added some articles on Lonergan and nursing. In other words, how do they decide on how to become authentic nurses? What does it mean to use your own head, what if you feel you have a different feeling about a patient and the doctor has? Is your knowledge valid?

This participant assigns his students a 10-page paper by having them apply their critical thinking skills based on Lonergan's cognitive theory by drawing upon their experiences as nurses. According to Professor Rick Levy, the goal of this Signature III course is to get students in touch with their own processes of thinking, and the paper is an excellent assessment measure.

I even had them do a 10 page paper on the application of critical thinking on the theory of critical thinking and apply it to their profession. In my experience, most of the nursing students seem to have a very positive approach. It was very good for me because I was able to see that the theory and the application came together and so the assessment did ring a bell and their experiences.

According to Professor Rick Levy, the goal of this Signature III course is to get students in touch with their own processes of thinking, and the paper is an excellent assessment measure to achieve this goal.

I actually had a very good semester with a bunch of nurses in my classes. I taught the course on Lonergan and I told him about Lonergan and gave them some of his readings and then I said this is going on in your life and this is also going on in your professional life as a nurse. So, I even added some articles on

Lonergan and nursing. In other words, how do they decide on how to become authentic nurses? What does it mean to use your own head, what if you feel you have a different feeling about a patient and the doctor has? Is your knowledge valid? So that was very interesting. I think we are chewing awful lot one we are saying that we are doing critical thinking in the core curriculum courses. I think in some ways even though this was a a third level course it was the easiest in the sense that we were dealing directly with critical thinking and we were asking for examples from the major content area and so they are wrapped up in being nurses were actually going to clinics and could apply it.

*Summary of assessment methods.* Findings reveal that participants' assessment methods are commensurate with their teaching methods to infuse critical thinking into Signature courses. Participants adhere to Signature I, Signature II, and Signature III course syllabi in terms of course requirements to evaluate students' critical thinking skills.

Since Core courses are discussion based, student participation is an important measurable outcome for evaluating students' critical thinking skills. Signature I and Signature II syllabi indicate that professors are required to administer at least five to seven quizzes during the semester; one of which is specifically pertains to students' understanding of critical thinking skills. Participants typically administer the other quizzes to evaluate whether or not the students read the Core texts. Final exams are another method participants use to assess students critical thinking skills. Participants have students write at least one essay about Core topics to evaluate their critical thinking skills as part of the final exam. Participants agree that students' written papers are among

one of the best measures for evaluating students' critical thinking skills in the Signature I, Signature II, and Signature III courses.

Participants find students' written papers on Core issues are one the best methods to evaluate students' critical thinking skills. They can evaluate students' critical thinking skills because written papers provide specific criteria, such as reasons for supporting their ideas and positions about Core issues, whether it is through arguments, the medieval method, or metacognitive approaches.

**Section 4: Challenges.** Although the participants express some degree of satisfaction with the way they infuse critical thinking in Core courses, they also find a number of challenges. Challenging factors include how critical thinking is defined, the structure and syllabi of the Core Curriculum, as well as the broad range of student college readiness among the student population. The first major problem that professors confront is grounded in how the university views critical thinking as core proficiency as a Signature course requirement.

For example, Professor Rick Levy asks the question about the importance of critical thinking as a proficiency?

How are these proficiencies related to each other? Is there some intrinsic order among them or are they just a "heap?" Are there other skills pertaining to authentic human development that are not listed here, such as artistic proficiencies, ethical, philosophical or perhaps even religious? The fact that there are other important human developments is perhaps evident from the University adding a list of "literacies specific to each college or school providing a

diversified experience of the liberal arts and sciences. So far, however, little thought has been given to how these relate to the above listed proficiencies.

Professor Mike Collins perceives this problem more as the way the university and faculty members from across disciplines conceive of critical thinking.

The basic problem is that too many faculty members across the University conceive of critical thinking in some general vague way. This leads them to believe that everybody is doing critical thinking and so everybody is sort of an expert in it. Let me give you an analogy, which the faculty members at the University learn how to write because we all had to write dissertations.

Therefore, as graduate students we had to learn how to write papers. So faculty members tend to think that we are the good writers and we all know how to write. However; there was one department at the University, which focuses on writing is the English department, which has very specific ways of thinking about the construction of articles and essays and how to be a proficient writer. So critical thinking is like that. There are many faculty members at the University that think critical thinking is something you just acquire in the course of learning how to do your various disciplines as well as the subject matter in your discipline. The faculty does not give the same attention that we do in philosophy, where philosophers focus explicitly on it such as the study of logic.

I think this is a problem because what happens when students take courses, they may come to my class and I might say okay critical thinking concerns the construction of and the evaluation of arguments. However, when they go to their history classes, and when they go to their history professor, they

might hear a different story since the history professor might have a broader concept of critical thinking or a different concept of critical thinking. Therefore, the student learns critical thinking is something else in history and something else in their chemistry class. In chemistry class the professor is worried about students learning how to analyze the structure of molecules and then they're told that that is critical thinking so then the student gets another story about what critical thinking is about in chemistry class. Then the student goes to their English class and in their English class they are trying to analyze and learn about the meaning of sentences and passages and then they are told that that is critical thinking.

Therefore, the student gets another account of critical thinking in English. And so what I think happens is that the students don't learn what I take to be the central basis of critical thinking which has to do with the construction and evaluation of arguments with reasoning is involved. I think that one of the problems is how critical thinking is taught at the University. It is too general and there is a lack of a common understanding of how to teach critical thinking among the disciplines.

Findings reveal that participants concur that the problem with critical thinking is that as a core proficiency is that it is too general. There is a lack of a common understanding as to what faculty members from diversified disciplines think about critical thinking as a curricular goal. Yet, participants agree that more professional development courses are needed to develop a common understanding about critical thinking at the University. Professional Development courses will provide professors from across disciplines a central basis and understanding of what critical thinking is in order to teach these skills to undergraduate students.



For example, Professor Mike Collins thinks that professional development courses would improve the overall conception of critical thinking at the University.

I do think that it is important to find some set of skills that faculty members from different disciplines across the University could agree upon a set of skills to focus on collectively. It is important, that if we are going to be teaching students something called critical thinking when students are taking courses in different disciplines. Students need to learn that there is a connection about critical thinking in different disciplines. They need to be taught that there is some connection among what they are learning about critical thinking in one course and about what they are learning about critical thinking in other courses. I think that whatever set of skills that are being focused upon, it has to be broad enough to find agreement among faculty members in different fields that those are the relevant skills students should be learning in courses across different disciplines. If there is an agreed upon conception of critical thinking, then faculty members will be able to have a familiar approach to teach critical thinking skills, whether it is in the disciplines of English, History, or Chemistry.

***Critical thinking definitions.*** Professor Mike Collins, philosophy, as a faculty committee member as well as other faculty members from different disciplines were instrumental in developing the initial guidelines for critical thinking as a proficiency.

So it is fair to say that the way in which faculty at the University view the subject of critical thinking is broader than the way we think of critical thinking in philosophy. I believe that we are the one department, which teaches logic, except for mathematics, which also teaches logic. We view logic as critical thinking

here. We have been teaching critical thinking and logic for a long time. To be honest we are very good at teaching critical thinking. There is a reason for the way we do it and we have had a lot of success this way.

This participant finds that the Committee guidelines developed on critical thinking for Core courses are too broad. He thinks that is unfortunate, because it has made the ideas about critical thinking often rather vague, as compared to other core proficiencies.

According to Professor Rick Levy, in addition to certain “Signature courses”, that all students are required to take — such as *Journey of Transformation* and *Christianity and Culture in Dialogue* — the new core aims at developing basic academic “proficiencies” proficiencies that should be “infused” into various University courses. These proficiencies are reading/writing, oral communication, information fluency, numeracy and critical thinking and are listed on the webpage of the university’s homepage.

When Professor Karen Stewart first learned about the critical thinking proficiency, she was puzzled because, “I couldn't conceive of a course in a university that does not demand critical thinking as a goal. To me, I think critical thinking is synonymous with what goes on at the university level.” This participant disagrees with the way St. Stephens infuses critical thinking, which might lead students to think that there are courses that are not infused with critical thinking. “I think students should enter the classroom, every classroom with sort of the idea that they will be thinking critically about whatever the subject matter is on that day or that semester.”

Professor Mike Collins provided a document from the Graduate Record Exam (GRE) to support how well philosophy professors teach critical thinking as evidenced in

the score results of intended philosophy majors. They earned the highest scores results on the Verbal and Analytic Writing sections of the GRE Exam.

Data From: Graduate Record Examination's Guide to the Use of Scores 2010-11

Produced by: Educational Testing Service

Based on the performance of all examinees who tested between July 1, 2006, and June 30, 2009, the range of scores on the Verbal Section of the GRE, philosophy ( $N = 3,870$ ) as an intended major demonstrated the highest score results with a mean score of 591 ( $SD = 101$ ) with the lowest mean scores ( $M = 416, SD = 0.84$ ) seen in early childhood intended majors ( $N = 1,480$ ). On the Analytic Writing Section of the GRE, intended philosophy majors again earned the highest score results ( $M = 4.8, SD = 0.8$ ) while intended accounting majors earned the lowest mean scores ( $M = 3.7, SD = 1.0$ ).

Although there is documentation that supports Professor Mike Collins's view that there are fairly well defined sets of skills for critical thinking, which is apparent in philosophy, it is not that easy to influence other faculty members across the university.

One of the problems is that we are trying to teach critical thinking at the university wide level and there exists a lack of agreement among the faculty in different disciplines as to what makes up critical thinking. There is no agreement among the faculty as to what skills we are trying to teach to develop students' critical thinking. Therefore, it is very hard to implement a program that is designed to teach students critical thinking skills when the faculty themselves do not agree upon what the basic skills are about critical thinking. My view as a philosopher is that this is wrong. There is a well-defined set of skills for critical thinking in philosophy; however, it is not easy to convince other faculty members.

Professor Rick Levy, philosophy, agrees that it makes it challenging to teach critical thinking skills when there is a lack of a common understanding and conception as to what is critical thinking as a core proficiency. Professors often assume that they understand the meanings of critical thinking, yet they do not have a common understanding of what critical thinking is even in terms of their own discipline.

I think it is all over the place, I think if you were to ask ten professors about critical thinking you would get ten different answers, there might be some commonalities but there are certainly more differences in how they define it.

Professor Rick Levy argues that critical thinking terms and thinking need to be defined at the university. However, “I think we are in a changing culture and fortunately St. Stephens is asking this question about critical thinking in a very concrete way.”

In the last few years, Professor Rick Levy finds that critical thinking is being repeatedly used in educational contexts. “I am always tempted to ask, what do you mean by critical thinking?” This participant wants to know the answer to that question and wants to know whether professors really have a grasp on critical thinking. If you do not know what critical thinking is, then how can you expect to teach it to your students? Professor Rick Levy emphasizes the point that

If you are really serious about critical thinking and expect that stuff from their students then they need to know what critical thinking is and what they are putting on their students. Then, be pretty sure you know what you are talking about to begin with when you use the term *critical thinking*.

As a Lonergan philosopher, this participant finds that many questions are raised about critical thinking, such as, “What is meant by what you do when you are doing critical

thinking? What are you aiming at by critical thinking?” Professor Rick Levy and Professor Tony Softner tend to concur with Lonergan’s key philosophical question, “What is thinking?” These participants find that a general approach to thinking, such as the general empirical method is probably the best way to approach the process of thinking across disciplines. According to Professor Tony Softner, theology, critical thinking is more about what Lonergan calls metacognition (i.e., thinking about thinking). This participant concurs with Lonergan’s views about thinking as metacognition, which is at a higher level of understanding about thinking compared to other views of critical thinking.

*Summary of critical thinking definitions.* Participants typically agree that the Core Curriculum Committee needs to develop a common understanding and definition of critical thinking. The philosophy participants agree that Core courses need to adopt a more rigorous definition, similar to philosophy, as reasoning skills based in logic.

However, other participants find that critical thinking needs to be defined more in terms of the thinking process as rooted in Bernard Lonergan’s general empirical method, which asks the question, “What is thinking and what are we doing when we are thinking?” Most of the participants concurred that an agreed upon critical thinking definition needs to be a major focus of the Core Curriculum Committee at St. Stephens University. Even though participants differ in their understandings of how to define critical thinking, they do agree that the way to develop a common understanding of critical thinking at the University is through more professional development courses.

*Challenges with the structure of Core courses.* Most of the participants find that one of the major challenges is that Core courses are required for undergraduate students. Participants find that students are not interested or motivated to do the assigned readings,

since many of the students do not value the importance of reading the Core texts to discuss in class.

Professor Gladys Trump finds that since the Signature I course is a discussion-based course about the Core text readings, it is difficult to initiate a class discussion if the students have not read the text.

I have to work very hard, as do all the professors, who teach that particular course that there is something concrete, something there that is engaged. I think concrete is a good word, where it is not shallow. You cannot walk into class, begin teaching, and expect that the students are going to begin talking about something that they might not have read. It becomes very tedious in that you want to impress upon them that reading is very important and then follow up with quizzes every other day.

Professor Jared Book finds that

What I mean about the way the Core classes are structured, or at least the way that I have taught the class, has been for the students to read the text and then I devote the next class to the discussion of that text. Depending upon the length of the text it may take several class periods to discuss the text and whether or not the students read the texts.

Professor Keith Cohan believes that when it comes to the core proficiencies, professors are focusing too much on the proficiencies without thinking about the actual content of the subject matter.

I am having a harder time thinking about critical thinking without considering reading the content of the subject matter. You have to have something to think

about in order to develop that skill set so in that sense one of the things that I would like to emphasize is that these days regardless of what course you are teaching critical thinking, you have to teach something that the students actually have read.

This participant adds that content needs to be taught to the students in order for them to substantively learn and develop this skill called critical thinking. “You can’t learn to critically think unless you have something to think about.” Participants find that it is difficult trying to spend time teaching the critical thinking proficiency as well as time teaching one’s subject matter. Professor Tony Softner, theology, describes the tensions between trying to teach the critical thinking proficiency and actual course content matter.

The difficulty with all of the proficiencies is always managing how much time are you going to spend on a particular proficiency and how much time can you spend on your particular subject matter. It is not always clear that we can always meet the proficiency requirements of a particular group and so tensions arise. So, if I actually want to teach reading and writing as proficiencies and I love to teach reading and writing I also have to teach theology. And that depends, if I am not spending several classes going over what a thesis statement is because we cannot presume that the students really know what a thesis statement is in theology or whatever subject for that matter. Then, a lot less of class time is being devoted to theology as the subject matter at that point. And so the tension arises between teaching the proficiency and one’s subject matter.

In trying to develop students’ critical thinking skills, Professor Keith Cohan

encourages his students to become engaged in thinking about the course content. One of the challenges he finds is that

A lot of the students have difficulty with this because a lot of them have been habituated in an education model in where they are the student and you are the professor, where everything is mapped out for them and their job is to merely memorize it and regurgitate it all back.

Professor Karen Stewart concurs that students often come into class with the expectation that they just have to memorize facts and are not motivated to learn how to think about the ideas in the texts. “I no longer assume that students will be able to critically think about the material or of my presentation of the material.” While Professor Keith Cohan attempts to dismantle that idea by encouraging his students to actually adopt a more critical thinking model. “This is very difficult. In many ways, this is not their fault; it is just the kind of educational culture they have been raised in.” Participants find that it is a challenge to develop students’ critical thinking skills when they are used to an educational model that demands memorization of material rather than the critical thinking skills necessary to think about the texts.

*Texts.* Participants find that teaching critical thinking in the Signature I and Signature II courses is challenging due to the difficult texts. Core texts are chosen by the Core Committee and not by the professors. Professors, who teach the Signature I and Signature II courses, are required to adhere to the syllabi and the assigned texts.

Participants have expressed their concerns about not having input about the selection of the assigned texts. For example, in the Signature II course, students are required to read everything from Plato to Nietzsche. Professor Jared Book wants to be fair to his students



by stating that the “texts are pretty difficult and tend to be advanced texts, but they have been chosen for the students in this course.” He finds that it is most difficult to have class discussions, when students lack historical background about the readings in Core texts.

But what I find to be the most problematic is that the students will come in wanting me to give them all the answers to the questions that I posed in the first place. So I think that this is representative of the fact that they are not really very good at this point in their student careers at thinking very critically about the texts.

Participants find that students have a different expectation of what they are supposed to learn in the Signature courses than what the professors are required to teach.

Professor Alfred Holmes finds that at times he becomes frustrated with teaching Signature II courses.

I am not going to say that Core courses are my least favorite, but there are times when you sort of feel obligated to stay with the parameters of the syllabi and there are some textbooks that I am not just comfortable with and it becomes sort of a grind. Some texts don't resonate well with me as much as others. Yet, I am obligated to teach certain texts about the Islamic philosophers. I wish I knew more about them, but I just don't get that excited about all of those texts but that is not always the case with the sociology courses.

Professor Ethan Jones concurs that it is not easy to teach Core courses, when you are not that familiar with the subject matter in Core texts, “you need mastery on some of the

subject matter to be able to lead a discussion. For example you need to know what Dante said regarding his ideas in the text, so as to lead a class discussion.”

*Student population.* Professor Alfred Zoner thinks that it is easier for philosophy students to understand critical thinking as compared to students in Core courses.

I mean in philosophy, when you think about argumentation, it is a very rigorous thinking process, while students in Core courses demonstrate resistance in terms of devoting that level of rigor, not only to other arguments but to their own beliefs and positions. And, so I will often find students will believe all sorts of things, but they don't really have very well established reasons for believing in their own positions. So, there is quite a bit of resistance from the students in devoting that level of rigor to argumentation as well as formulating their thoughts about establishing their own positions.

Participants find that students are resistant to the make-developing and learning about the kinds of reasoning skills necessary to think about on how to support their ideas.

Participants agree that up of the Core courses consists of a broad student population with a large number of students required to take the classes, and this requirement creates many challenges for teaching Core courses. For example, Professor Jared Book finds that the

Demographics of the students at St. Stephens is probably what makes it the most challenging part of the teaching here. On the one hand, we have students who are first-generation college students and therefore struggle with how to be a college student. On the other hand, we have very academically gifted students. That isn't

to say that they are all intelligent, but some have better skill set and are more prepared in terms of knowing how to study and knowing how to do college work.

Participants like Professor Tony Softner realize:

Teaching experience is complex due to the different educational backgrounds of the students. Some students could succeed anywhere whether it was University of Pennsylvania or Brown University, while others are rather unprepared for college and do not meet the requirements.

Professor Karen Stewart and Professor Sam Lock find their teaching experiences at St. Stephens to have similar challenges, because the students come with a wide range of preparation for college. For example, Professor Stewart voices this concern in the following way: “

The students’ preparation ranges from highly motivated very prepared students, who are well focused, and doing well and achieving in many ways inside and outside of the campus, while there are students, who are unprepared, unfocused and very unsure as to why they should be in college.

Professor Sam Lock articulates this challenge as, “I have found my experience teaching courses at St. Stephens to be difficult especially in the Core courses, since the students come from such a broad population.”

*Motivation.* Participants find that it is difficult to teach Core courses, especially when students are not motivated to learn the material. For example, Professor Sam Lock and other participants concur that students in general do not like taking Core courses.

I have a difficult time trying to make them like it, in any of the Core courses and in any way. It is a difficult thing to teach to a student population, who are not motivated and who do not like Core courses very much.

Professor Rick Levy finds teaching Core courses challenging since his interests are philosophical and interdisciplinary. “So dealing with undergraduate students is a challenge because their interests are usually elsewhere. Therefore, I would say it is a challenge.”

Professor Ethan Jones tries to be realistic about the student population in terms of their enthusiasm for learning Core material. He realizes that many of the students are not motivated, since they often lack the basic skills to do the assigned work. “Well, I don't know, but for me I think it is more at this point, it is more about questions than answers, that's why I probably place the Core courses as my least favorite courses to teach.”

Conversely, Professor Alex Holmes finds

...students to be very respectful for the most part; I haven't had any real problems with teaching the students at St. Stephens. There's certainly some variation with respect to preparedness and motivation and let's face it with engagement and learning, but I think that you have to live with that variation.

Although Professor Nathan Hale finds the Core subject matter interesting, he finds that since the students are resistant to taking mandated courses, this makes teaching critical thinking more difficult when students are not motivated to learn about Core course content.

Professor Nathan Hale finds that one of the reasons his students are not motivated to learn Core material is that “I had to confront the reality that students do not necessarily

believe critical thinking is important.” Since Core subject matter reading learning about medieval texts, participants find that there are challenges in trying to get students motivated about medieval authors.

Professor Nathan Hale finds that “students often say that the texts are too hard to read and say this is too hard, I don't understand this and that would shut them down.”

Professor Alex Holmes finds that

It is tough going with Islamic philosophers, I know the students aren't into it and so that is another thing. That makes it tough going. It is not even so much that it doesn't interest me, is that there are certain texts that just don't excite the students and that distracts them from the teaching and learning experience of the course.

Since the Core material is challenging to teach, participants often have to work hard at finding motivating techniques to keep students engaged when reading difficult texts.

Findings reveal that many of the students in Core courses are not prepared to meet basic college requirements. Participants find that it is challenging to infuse critical thinking especially when students in Core courses often lack the motivation as well as lack the basic reading and writing skills to do the required work. Participants agree that many of the students do not have proficient reading levels necessary to understand and discuss the assigned readings in Core texts.

Another challenge that participants find is there are large numbers of students in the Signature courses. Professor Karen Stewart expressed that having too many students in a class and having a large number of students in class makes teaching critical thinking, as a core proficiency, a challenging goal.

One of my concerns around the critical thinking proficiency is that 35 students is a lot of students to manage in the classroom, especially when you have to hold every student accountable as well as give every student opportunity to participate in class discussion. It is very difficult, because you have to deal the students, who are not engaged in the course, not keeping up with the work. Perhaps what is frustrating to me, there are students who keep on top of the material but are reluctant to speak up in class especially when there is at least 35 students in class. They are reluctant to speak until they are drawn out and drawing them out is very difficult when you have 35 students in a class.

Professor Tony Softner adds to this point by stating that the classes are too large. For example, there are 35 students in the class and that means 35 different variables to teach students and then, “I am trying to teach them critical thinking.”

Most participants prefer to teach courses in their disciplines. They do not experience as many challenges when they teach courses in their own respected disciplines as compared to Core courses. For example, Professor Alex Holmes finds “I have more latitude in selecting the texts for sociology courses and that gets my juices going so it is more dynamic than with the Core courses.” However, this participant is not as motivated when teaching Core courses,

You are more or less part of the standardized course and that does not always sit well with me. It is not so much the content of the core courses but it is a fact that is standardized and everybody has to teach the same thing more or less. Although there is some latitude, choices are limited.

*Basic learning skills.* Participants find it challenging to teach critical thinking to undergraduate students, when they frequently lack the basic reading and writing skills to do the required work in Core courses. Many of the students demonstrate limited reading proficiency and so they struggle with reading difficult Core texts. Students' limited reading skills makes it particularly complicated, when professors are required to infuse critical thinking, while spending a great deal of time on basic reading skills. Professor Sam Lock expresses his concern,

I am aware that the term critical thinking is out there and one of the things I do work on in classes out of necessity, but is more basic than critical thinking in some ways. I am at pains to teach students to be thorough, careful and to have them just complete their assignments, I mean this might seem very basic but truly basic grammar is one of the goals that I am at pains to teach them, as much as to teach them interpretation and the ability to do critical thinking.

Most participants implement effective strategies to assist those students who struggle with the reading process. For example, Professor Nathan Hale finds group readings to be an effective technique to help students read and understand difficult passages with Core texts. "So I would go paragraph by paragraph with the class and say okay what does this mean?" Professor Sam Lock has a difficult time trying to make Core courses work in any way. "It is a difficult thing to teach to a general student population, who are not motivated and who do not like Core courses in general." Participants find that trying to motivate students takes away valuable time from infusing the critical thinking proficiency.

After reading a Core text, Professor Ethan Jones finds students display a great deal of difficulty in being able to summarize an author's position. He finds this a hard skill to teach his students, since this skill entails the ability to summarize an author's positions and then to have them articulate another position, so they can discuss it class. "Another challenge for students is for them to be able to put in writing all the different positions from the summaries and sort them out and how they actually relate to one another."

Professor Tony Softner finds that many students do not know what a thesis statement is, and therefore they do not know how to write one.

So, if I'm not spending several classes going over what a thesis statement is, it is because we cannot presume that the students really know what a thesis statement is in theology or whatever subject for that matter. Then, a lot less class time is being devoted to theology and or infusing proficiencies.

Professor Karen Stewart also is challenged about her students' writing skills. There is an endless amount of time, which can be spent reading students' writing and then asking them to rewrite and rewrite and rewrite and then speak to students about their written assignments. I mean and I think that these are very important skills in which students need to cultivate, while they are in college, but it is also very labor intensive skill.

This participant finds it difficult to spend the time working on students' writing skills when there are so many other course requirements and proficiencies.

Professor Karen Stewart's other concern regarding the critical thinking proficiency is the number of students in Core courses. When there 35 students in class, it



makes it hard to teach them writing skills as well as the critical thinking proficiency. .

This participant finds:

This is a lot to manage in the classroom; especially you have to hold every student accountable as well as give every student opportunity to participate in the discussion. It is very difficult because you have to deal the students, who are not engaged in the course, and who are not keeping up with the work.

***Summary of challenges.*** Findings reveal that there a number of challenges in trying to infuse critical thinking in Core courses. First, participants are concerned that there are too many different critical thinking definitions, and without a common understanding of how to define critical thinking, it makes it difficult to teach critical thinking. Participants find that without a common critical thinking definition, it makes it difficult to teach and assess it as a core proficiency. Participants find that the lack of autonomy and motivation makes it challenging to infuse critical thinking into Core courses when they are required to adhere to standardized syllabi. Participants agree that there are too many students in the Signature courses, and many of the students often lack the basic reading and writing skills to do the required Core course work. Professor Jared Book believes that “undergraduate students are young and it is difficult to teach them critical thinking skills.” Since St. Stephens is in the very early stage of developing the critical thinking proficiency within Core courses, participants are not sure what direction the Core Curriculum is going to take with these challenges. The final section addresses participants’ views on how to improve the challenges to infuse critical thinking through professional development.

**Section V: Professional development.** Findings reported in this section address participants' views on how to improve teaching critical thinking at St. Stephens University through professional development. Participants for the most part find faculty seminars, as a university initiative, beneficial to learning about critical thinking pedagogy. The participants, who teach Core courses, are required to attend faculty seminars about Core subject matter and texts. Some of the participants expressed positive views about these faculty seminars, while other participants expressed the need for more Professional Development courses, particularly on learning about more effective strategies on how to infuse critical thinking into their teaching and assessment practices.

An overview of the purpose of Faculty Seminars is described on the university website. This is reflected in Lonergan's statement about the intellectual life of the university. Bernard Lonergan (1988) wrote an article on the Catholic university in which he wrote that the "constitutive endowment" of the university "...lies not in buildings or equipment, civil status or revenues, but in the intellectual life of its professors. Its central function is the communication of intellectual development" (p. 111).

Since 1998, the Center for Catholic Studies has sponsored the faculty summer seminars. For the last number of years many of these seminars have been co-sponsored by Center for Vocation and Servant Leadership. Broadly speaking, these seminars have been on the subject of "faith and culture" and have allowed faculty to gather, to get to know one another, and to wrestle together with the meaning of being human, the meaning of the university and the meaning of the Catholic university. The point of these

seminars is to engage the faculty in interdisciplinary dialogue on issues of humanistic and religious importance. The seminars from 1998 are listed on the Website.

Center for Catholic Studies Faculty Seminars

1998: John Haughey (Georgetown): "Wisdom and Knowledge"

1999: Jerome Miller (Salisbury): "Divine Madness: Exercises in Appreciation"

2000: Elizabeth Johns (U Penn): "Spirituality and the Academic Vocation"

2001: Michael Stebbins (Gonzaga): "The Core of the Core: Reflections on the Core Curriculum"

2002: Patrick Byrne (Boston College): "Religious Horizons and the Vocation of the University"

2003: Michael Naughton and Helen Alford (St. Thomas, MN): "Faith at Work"

2004: Paul Mariani (Boston College): "What the Wind Said: The Call of Poetry"

2005: John Cavadini (Notre Dame): "Augustine and Culture"

2006: Jeanne Heffernan (Villanova): "The Call of Two Cities: Citizenship and Christian Identity"

2007: John Haughey (Georgetown): "The Mission of the Catholic University"

2007: Thomas Guarino (SHU): "Post Modernism and Contemporary Thought"

2007: John Haughey (Georgetown): "The Mission of the University" (at Ramapo College of NJ)

2008: William Cahoy (St. John's MN): "Kierkegaard and/or Catholicism: A Matter of Conjunctions"

2008: John Haughey (Georgetown): "Inter-religious Dialogue"

2009: Anthony Ziccardi (SHU): "Strategies and Themes of Luke"

2009: Lance Grigg (Univ. of Lethbridge, Canada): “Critical Thinking and Assessment”

2010: Mark Doorley (Villanova): “Teaching as an Ethical Act”

2011: Cyril O’Regan (Notre Dame): “Newman’s Apologia”

2012: Richard Gallo (Metropolitan): “Critical Thinking”

The Critical Thinking 2012 Faculty Seminar addressed critical thinking as a core proficiency. While it is a key proficiency in and of itself, it is also crucial to an understanding of the other proficiencies as well: oral communication, reading/writing, numeracy, information fluency. These areas included:

1. the components of critical thinking: actions, events, operations
2. how these coalesce into a process
3. how these relate to teaching
4. the role of critical thinking in personal development
5. judgment and decision making
6. the role of belief
7. critical thinking in an era of assessment

Findings reveal that participants expressed the need for the University to conduct Faculty Seminars in the areas of defining critical thinking, the curriculum and curricula goals, as well as teaching and assessment techniques. Professor Rick Levy states that the “more professional development courses we have about critical thinking the better. I think we are just beginners and at the initial stage.”

Professor Karen Stewart, history, taught the Signature II, Christianity, Culture and Dialogue course and expressed how these seminars were a positive experience for her.

I did attend a semester long faculty seminar, which was about the Core texts that we used to teach in the course. Those seminars typically consisted of both a very sophisticated and engaging presentations of the texts by scholars on campus. We also had discussions with faculty members, who have taught the course and about how to engage students with the texts. In terms of the seminars on the Core courses, I loved it. I think the only drawback was that we had these sessions on Friday mornings, where we would have great conversations with each other, as well as great discussions about these texts at a very high level. After these great conversations, I would sometimes be letdown when I had to go into the classroom and I would really be excited about something when the students sort of did not feel the same way I did about being excited with the texts. The problem was not that the students did not feel the same way but rather the students had not read the assignments. That is a constant challenge in the implementation of any proficiency I think at St. Stephens not only critical thinking but also the reading, writing and information literacy proficiencies.

***Faculty seminars.*** Faculty members, who teach Core courses, are required to attend Faculty seminars, as Core training to teach Signature courses. Participants find that these Core training programs are not always helpful because of design and format. For example, since the Signature courses are interdisciplinary, training consists of inviting professors from all different disciplines to lead the seminars every other week in order to lead a 3-hour presentation seminar about Signature texts. According to Professor Jared Book, faculty members, who are attending the seminar are expected to read about the Apostle Paul's letter to the Corinthians, and so one of the professors speaks about how

he teaches Apostle Paul's letter to his class. Next, biology professors present how they teach Galileo and Darwin, and they discuss the scientific nature of these texts.

Professor Jared Book finds this kind of Core training not very helpful, because it is not what we are addressing in the Signature II course. "And so, yes that training can be helpful, because it is interdisciplinary, but it is like gathering a bunch of different people with different languages in the same room and then speaking to them in one language." Participants find that faculty seminars would be more helpful if discussions revolved around the basic ideas about the texts, then draw on those ideas and apply techniques to teach students to think critically about ideas from the texts.

Professor Jared Book thinks an improvement would be to make the Signature II course less interdisciplinary.

I just don't see much sense in bringing someone from the business school to come in and discuss Nietzsche. I do understand that we have historians, philosophers, and faculty members from the religion department teaching these courses, but I do not understand why we have faculty from the business, nursing, and English departments coming in to teach these seminars. Therefore, the professional development aspect could really be improved if faculty members, who actually are the subject matter experts, lead the sessions and keep it to the same kind of general disciplinary subject areas. And so I would keep it limited to history, philosophy, and religious studies.

***One critical thinking text.*** One way to improve the need to have a common nomenclature is to have one critical thinking textbook as a source so that interdisciplinary professors could reference as a text about teaching critical thinking

skills. Findings reveal that participants agree that they could benefit from having one critical thinking textbook as a source of reference. According to Professor Alfred Zoner, “There are books devoted to critical thinking, and I think using them would be helpful. It would be very helpful for a lot of disciplines to develop at least a common language.” Other participants think that it would be useful to have one text so that faculty members could draw upon a set of critical thinking skills for a common understanding to use when infusing it into Core course.

Professor Michael Collins thinks it would be advantageous for all of the professors to have one set of skills on critical thinking in one commonly referenced textbook. This participant provides an example about the need for one set of critical thinking skills and one text, which could be used across different disciplines.

For example, when students take a history course, they learn about one set of critical thinking skills from the history professor. Then, when students take a philosophy course and they learn one set of critical thinking skills from the philosophy professor. Then when students take a chemistry course, they learn about critical thinking skills from the chemistry professor. So, when professors are trying to teach students how to critically think, it would be helpful to refer to one text that focuses upon one set of critical thinking skills, which can be applied in different disciplines. I do think it would be useful to draw upon one set of skills that are discussed in this one particular text on critical thinking and that is something the students could return to throughout their studies in different subjects.

*Common critical thinking definitions.* Findings indicate that participants are cognizant about to having a common understanding of how critical thinking is defined and understood among professors from different disciplines. Participants typically agree that the faculty members need to have a set of general skills about critical thinking, which that they could use to infuse critical thinking into their teaching and assessment practices.

Professor Mike Collins, philosopher, thinks that the basic problem is that too many faculty members across the university conceive of critical thinking in some general vague way. There are many faculty members at the university that think critical thinking is something you just acquire in the course of learning about the subject matter in your discipline. For example, Professor Sam Lock looks at critical thinking in this way as a “fundamental thing that needs to be taught and like I said a natural result of my classes and approaches to things.” A key finding indicates that there is disagreement among the participants as to whether critical thinking is a general set of skills, which can be applied to a variety of different disciplines or whether critical thinking is something that is learned in just one disciplinary area.

Professor Mike Collins believes that defining critical thinking at the university could be improved by finding some set of general skills, which professors from different disciplines across the university could agree upon as a group. This participant finds that it is important that if professors are going to be teaching students something called critical thinking, and students are taking courses in different disciplines, they need to learn that there is agreed upon connection about critical thinking among different disciplines. In this way, they can understand that there is a basic connection between



what they are learning about critical thinking in one course and what they are learning about critical thinking in other courses.

And so, I think that whatever set of skills that are being focused upon, it has to be broad enough to find agreement among faculty members in different fields and in different disciplines. For example, the way we teach critical thinking in the philosophy department is a set of general skills, which is what I take to be the central basis of critical thinking, and has to do with the construction and evaluation of arguments involved as reasoning skills.

Professor Mike Collins thinks that “whatever set of skills is decided upon, it has to be broad enough to find agreement among professors in different disciplines as relevant skills students should be learning in college courses.”

Participants generally agree that when students learn to reason well it does not matter whether they are exercising reasoning skills in history, biology, or philosophy, since the same set of skills are being applied.

Many of the participants agree that faculty seminars need to focus on thinking as a process. Professor Rick Levy thinks the way to define critical thinking is based in philosophy and is more about asking the question, "What it is to think?" Professor Tony Softner thinks that an agreed upon definition of critical thinking would serve as a way to improve the relationship between broad notions of thinking and thinking within a particular discipline. This may involve greater specificity, such as historical thinking, philosophical thinking, or sociological thinking in different ways to think about different disciplinary subject matter. Participants agree that one common critical thinking

definition would improve the teaching of critical thinking as a core proficiency in Core courses.

*Curriculum.* Participants agree that the faculty seminars for Core training programs need to present ways to improve the curriculum for infusing critical thinking in Core courses, such as having professors, who are teaching Signature course have choices about their selection. Participants find that students are expected to read too many difficult Core texts.

Professor Jared Book thinks that the Signature II course could use a lot of revamping and improvement in respect to the choice of Core texts.

I think critical thinking can probably be better taught in that class and I think the other course objectives can be met there more efficiently, if the number of texts that the students actually read is reduced in terms of scope. It would be beneficial to just focus on a fewer number of the texts but in greater depth.

He thinks that it would be advantageous to divide the core curriculum into the following periods: Pre-Christian, Christian, Medieval, and Modern, so students could understand Core texts in reference to the historical timelines.

The medieval period is a very difficult period to teach. It is very difficult for the students to grasp it that well, however, I don't think that is a reason to do away with it, but I do think it might be a reason to reconsider what we are teaching in that time. After we get past the medieval period, the students have so many texts thrown at them in a short period of time. And so I am not really sure that they understand where they are in the timeline of history or even in the semester. Just what they are trying to accomplish and when I see the students struggling with it

tends to happen at this point of time, they just tend to give up. I have a colleague who said they have basically kind of off the record revamped the course, specifically to do what I just described and just to focus on a few texts. And I never have done that and it probably would be helpful to do that by just using a fewer number of the texts. So I have followed the curriculum most of the time.

*Liberal arts.* Professor Keith Cohan thinks that if he had to add anything about how to improve critical thinking in Core courses:

My final word would be that the most effective way and perhaps the most meaningful way of encouraging critical thinking among our college students is the advancement of a liberal arts education with an emphasis on the humanities, encouraging students to love to study history, literature, the classics, philosophy, and theology. These are the pillars of your standard classical humanistic education. And if anything, I would say that if we are really interested in teaching critical thinking that is what we should be focusing on in higher education.

Findings reveal that participants, such as Professor Rick Levy, philosophy, think that critical thinking should be thought of more in terms of how one thinks as a method of thinking about ones' thinking within and across disciplines. Professor Levy advances Bernard Lonergan's general empirical method as a method to teach critical thinking at St. Stephens University. This participant advocates for Lonergan's ideas about thinking in terms of method, so as to improve the teaching of critical thinking not only within the Signature courses but across all disciplines in the undergraduate programs.

According to Professor Rick Levy, Lonergan's general empirical method is an entire method involved in thinking about thinking, as a process of metacognition. "What

does method mean?” It means that if you are in a particular discipline, such as nursing and if you are studying nursing or doing research in nursing, then you should use the nursing method. The method becomes “What is any students or persons method about thinking about a particular discipline or research study?” For example, if a graduate student is doing research, will they use a quantitative or qualitative method to conduct the study? This participant explains that Lonergan points out that there are differences between methods in human sciences and differences in method in the natural sciences.

In the human sciences, the researcher has to grow in order to understand what he or she is ultimately trying to understand. Ultimately, what is the growth in knowing what you know and knowing yourself? What is critical thinking in regards to all the stuff that you are doing here? That is a breakthrough inside you and how you think and that is key here.

***Formal professional development.*** Participants agree that professors who teach the Core courses would like to have the university offer more formal professional development opportunities about specific and effective pedagogy to improve the teaching and assessment of critical thinking in Core courses. For example, Professor Alex Holmes would like to learn more about how to teach critical thinking as a hierarchal set of skills, ranging from lower to higher order thinking skills.

I believe that the whole sequential approach has to be brought into pedagogy and into our assessment tools. I know I have to do a better job in my courses. I think collectively as a faculty and as a community, we have to think more about how to improve developing these kinds of critical thinking skills in our students.

Participants would like to learn more about developing rubrics as an assessment method. This would provide faculty members with a measure to assess students' critical thinking skills and the content of Core subject matter. For example, Professor Gladys Trump thinks that faculty seminars could use the rubric as a tool for presenting ideas from the text and then apply the rubric as a tool for students to use to help them on how to think critically about the texts.

Participants strongly concur that faculty seminars need to focus on presenting specific critical thinking teaching methods, such as the Socratic Method. For example, Professor Ethan Jones found the Socratic method handout was very helpful on how to teach critical thinking skills but would prefer to have more faculty seminars on how to effectively teach critical thinking in Core courses.

I attended several educational conferences regarding philosophy in secondary education, which presented critical thinking teaching skills. These conferences were at least more pedagogically oriented and would present the following questions: how to teach students what philosophy is and how to get them to appreciate what philosophy is as his discipline.

Participants realize that there is more of an emphasis upon substance than method during the Core training, such as having a lecture about ideas in the text rather learning about specific critical teaching techniques. Professor Ethan Jones stated

It ended up being more like we had our own faculty seminar on the same books, rather than a faculty seminar discussion should be about what is the core, what is the goal here, what is the critical thinking involved here? We did not discuss critical thinking, which I think would have been most helpful. I wish we had.

**Assessment.** Findings reveal that participants would like for the Core Curriculum Committee to discuss how to develop rubrics for assessing critical thinking. For example, Professor Alex Holmes would like to use a rubric then as an assessment tool and thinks that rubrics would be helpful for assessing students' critical thinking skills. This participant would like to have some assurance that his students, who are graduating, are thinking on a higher level than they were as freshmen, and perhaps rubrics would be able to demonstrate and document their levels of critical thinking.

Professor Alex Holmes would like to be able to document whether students are operating at a higher level on how to think, after spending 4 years in college.

How do you document back? How do you assess that? I think as a faculty, we need to do more work in terms of documenting how students improve their critical thinking skills. I think I need to do more of that in my courses. I think collectively as a faculty and as a community, we have to think more about how to work on developing these critical thinking skills in our students.

**Smaller classes.** Participants find that smaller classes would be a way to create the necessary environment to improve the critical thinking proficiency within Core courses. Although participants recognize smaller classes are an unrealistic expectation at St. Stephens, it certainly would improve the time professors need to assist students with reading and writing skills, while managing all of the required proficiencies. For example, Professor Karen Stewart expresses the thought that smaller classes could be a way for professors to spend more time helping students with their writing skills. Since writing papers is a method for professors to evaluate students' critical thinking skills, this participant stressed the importance of spending time, which would allow professors to

read and make comments on first drafts and final papers. This participant wants her students to realize that” good writing comes after a lot of writing and rewriting, and if they do that their writing will more than likely improve after writing many drafts and many papers”. Professor Karen Stewart thinks that smaller classes would be a way to facilitate the whole critical thinking process in her classes. With a smaller student population, professors could have a broader impact on students, such as spending more time on revising students’ papers.

Participants would like to see faculty seminars address strategies for balancing the critical thinking proficiency within course content as well as with other proficiencies. Professor Karen Stewart finds it to be a constant balancing act to implement the critical thinking proficiency in addition to reading, writing, and information literacy proficiencies. “I have had this conversation with my colleagues at St. Stephens, not only critical thinking, but also the reading, writing, and information literacy proficiencies.”

Professor Tony Softner wonders about how critical thinking as a core proficiency relates to the other proficiencies.

Is critical thinking really a proficiency or is it a proficiency assumed by all the other proficiencies? For example, it is not as if you can write a good paper without having the reasons for the sort of things that you are trying to say in the paper. So, it may be that you can fold it into these other things. That you are actually learning by accident, normally through maturation and being questioned on things and working them through. So, then a particular question arises, which I do not have a particular answer to it, but I think it is an interesting question.

Participants think that faculty seminars could provide discussion groups about effective techniques on how professors would be able to manage their time and energy on a particular proficiency within the content of the subject matter. Professor Tony Softner reflects his thoughts about this prevalent concern,

The difficulty with all of the proficiencies is always managing how much time you going to spend on a particular proficiency and how much time can you spend on your particular subject matter. It is not always clear that we can always meet the proficiency requirements of a particular group and the tensions arise.

Therefore, if I'm actually, yes I mean want to teach reading and writing and I love to teach reading and writing I also have to teach theology. If I'm not spending several classes going over what a thesis statement is because we cannot presume that the students really know what a thesis statement is in theology or whatever subject for that matter. Then, a lot less class time is being devoted to theology as the subject matter at that point. And so the tension arises between teaching the proficiency and one's subject matter.

***More formal professional development training.*** Participants agree that they would like for the university to offer more formal professional training opportunities in the areas of how to define, teach, and assess critical thinking. Professor Nathan Hale finds that professional development courses would be helpful if courses presented the value of teaching critical thinking in today's society, such as "discussing particular techniques that professors could use to engage students in making the idea of what critical thinking is, a vibrant and alive topic." Other participants offered recommendations for having professional development courses, which address



discussions about the most recent research on critical thinking, expert speakers, Websites, learning communities, or perhaps developing critical thinking as a discipline.

Professor Ethan Jones suggested improving professional development in terms of finding out more about recent research on critical thinking: “

This fall we will be having post docs come in to build up the Core and that will be nice and helpful. I think it would be great, if they talked about the goals of critical thinking. It would also be helpful if they gave us research papers or whatever papers, which showed on what worked to teach critical thinking and to learn more about what is the place of critical thinking in a Catholic education.

Participants agree that expert speakers would be helpful to improve professional development by presenting the most recent research on ideas and techniques for teaching critical thinking skills. In fact, last spring, St. Stephens University held a conference on critical thinking. Dr. Richard Grallo, an expert on critical thinking, facilitated a discussion regarding research on thinking and strategies on how to infuse critical thinking into college courses. The university Website documented this well received faculty seminar, sponsored by the Center for Catholic Studies on “What is Critical Thinking?”

Other recommendations for improving critical thinking include more information on resources from within and outside of the university. Professor Karen Stewart finds that libraries, resources, and Websites are especially helpful about critical thinking in different disciplines. For example, she mentioned the American Historical Association has developed Websites, which are specifically geared toward certain topics and sources about teaching critical thinking in history. This participant uses this resource and outside libraries and finds them to be very worthwhile. “I have used these resources as a set of

documents that often include audio files; we can listen to historians talking about the documents. I mean they are just wonderful.” Professor Michael Collins stated that the “Core Committee is in the process of developing a critical thinking training module for professors, who teach Core courses, but I am not sure as to whether they finished the work on this Website.”

Participants find that learning communities and centers that advance critical thinking as an important proficiency would be helpful throughout the University. Professor Gladys Trump thinks that the faculty should have workshops available to them, to keep learning more about how to infuse critical thinking into their courses every semester. This participant thinks there needs to be a learning community or public arena for this to happen each semester. The Center for Catholic Studies at St. Stephens offers ongoing seminars and invites expert speakers to facilitate faculty discussions about how to think and teach critical thinking across academic disciplines, but this seminar is usually offered only once a year.

*Summary of professional development.* Although participants find faculty seminars helpful as a way to learn more about critical thinking, participants agreed that they would like for the university to provide more frequent and formal professional development training opportunities, such as presentations on effective methods and strategies to teach critical thinking and to assess critical thinking in the classes they teach at the university.

Participants find that an approach to improve faculty seminars is to have faculty members, who are subject matter experts in the field, actually lead the discussions. Participants find that having one critical thinking textbook that faculty members could

use, would be especially helpful for applying a common nomenclature. Participants find it a very important for the university to consider sponsoring faculty seminars programs that focus on a general working definition of critical thinking as a core proficiency in the Core Curriculum. Participants are in favor of having more professional development courses, which present specific critical thinking techniques, such as developing rubrics for teaching and assessment purposes. Professional development courses should promote formal training opportunities for professors to learn more about critical thinking in terms of the most recent research, expert speakers, outside resources, and ongoing learning communities. Participants find St. Stephens's commitment to teach critical thinking an important curricular goal. Professor Ethan Jones believes that professional development courses are important for offering faculty members unique opportunities to improve their understandings on how to teach critical thinking in a Catholic university.

I think thinking about faith and critical thinking is really a key component for our university. To be able to see both sides of this argument for critical thinking is key for people, who would see critical thinking as a weapon against faith and there are faith people who see critical thinking as a weapon against faith. I think both of these issues and arguments could use some more good discussion about this through professional development. This is part of our mission as a Catholic university, which means faith and thinking go together and we need to think about faith and critical thinking, which really is a part of a Catholic education.

**Summary of the Findings.** St. Stephens has developed Core Curriculum courses to advance the university's commitment to teach critical thinking to undergraduate

students. Even though the Core Committee has recommended a critical thinking definition, formulated in Lonergan's cognitive theory, participants typically define critical thinking from their individual perspectives.

Findings indicate that participants' critical thinking definitions typically influence their critical thinking pedagogy. For example, one of the participants, Professor Keith Cohan, religious studies, defines critical thinking as

The capacity to think critically about readings in texts, to reflect upon the ideas from the reading and to be able to present the concepts in class is all a part of critical thinking. To be a good critical thinker is to have the capacity to read text and to study ideas closely with great attention to detail and to ask questions. The constructive aspect of critical thinking is to ask yourselves questions, so you can constructively approach the material for whatever purposes.

This participant's critical teaching method is commensurate with his critical thinking definition.

Findings reveal that participants' teaching methods include the following critical thinking pedagogy: interpretative discussion, Socratic method, lecture and general empirical method. Participants typically infuse critical thinking into their teaching practices using interpretative discussion, since Core courses are designed as discussion based. The Socratic method is the other discussion-based method participants use to stimulate critical thinking during class discussions. Lectures are another method participants find helpful for structuring course material and for explicitly teaching critical thinking skills in Core courses. The general empirical method (GEM) is the method that is the most consistent with the Core's views about critical thinking.

Findings reveal that participants adhere to the requirements to assess students' critical thinking skills as documented in the three Signature course syllabi. Participants evaluate students' critical thinking skills by student participation, quizzes, final exams, and students' written papers. Participants consider students' papers as one of the best measures to assess students' critical thinking skills in Core courses.

Participants find a number of challenges when they infuse critical thinking into Core courses. One of the major challenges is the lack of agreement among the participants on how to define critical thinking, and this makes it difficult for participants to teach it as core proficiency. Participants find it demanding to teach critical thinking skills to a student population who often lack the basic reading and writing skills to do the required work. To address these challenges, participants think that formal professional development courses would improve these issues. Participants agree that faculty seminars need to begin by focusing on an agreed upon and working definition of critical thinking. Findings reveal that participants are in favor of having more professional development courses, which present specific and effective critical thinking techniques, such as developing rubrics for teaching and assessment purposes. Professional development courses should promote formal training opportunities for professors to learn more about critical thinking in terms of inviting expert speakers to present the most recent research, and for faculty members to learn about the availability of outside resources, and ongoing learning communities. Participants agree that professional development courses offer faculty members greater opportunities to learn about effective methods to improve infusing critical thinking as an important curricular goal.



## Chapter V

### Summary of Study

#### Purpose

This qualitative study explored the implementation of a new curricular component designed to promote critical thinking in one institution, where a strong institutional commitment exists to infuse critical thinking into the undergraduate liberal arts program. The focus of this ground level implementation was to understand the practices of faculty members, who are responsible for infusing critical thinking into courses designed for this innovative curriculum. Given this one institutional commitment to infuse critical thinking into the curriculum, the literature suggests, major challenges of implementation reside with a complex constellation of faculty-related factors. These factors include, but are not limited to, overcoming faculty resistance and developing faculty understandings of critical thinking pedagogical and assessment skills as they attempt to engage students in the process. This case study documents the complexity of how faculty members attempt to align all these exigent factors together in one institution committed to advancing critical thinking as a learning outcome.

#### Methods

This qualitative research study investigated the perspectives of selected professors, who taught “Signature” courses as part of the Core Curriculum to explore how they approached infusing critical thinking skills into their teaching and assessment practices. A case study is appropriate for this qualitative study, since it allows for close examination of embedded contextual factors within a particular setting (Tsui, 2007 p. 204). According to Yin (1989), “The case study approach is the ‘preferred’ strategy when ‘how’ or ‘why’

questions are being posed, when the investigation has little control over events and when the focus is on a contemporary phenomenon within some real life context” (p. 13). The phenomenon of interest for this qualitative study examined the perspectives of professors from diverse disciplines with regard to the teaching and assessment of critical thinking skills as part of the required “Signature” courses within the Core Curriculum of the undergraduate liberal arts program at St. Stephens University.

The participants in this case study included 12 full-time professors from different disciplines, who taught one or more of the three Signature courses within the Core Curriculum courses.

Signature courses are required courses for all undergraduate students as a reflection of St. Stephens’s commitment to infuse critical thinking skills as part of the Core Curriculum liberal arts program. Through explicit emphasis on multidisciplinary perspectives and interdisciplinary connections, an implicit message is conveyed about the value of critical thinking as a learning outcome. “Being exposed to the tools, assumptions, and ways of thinking that are associated with a range of disciplines enables students to overcome a sort of intellectual myopia that often impairs the views of those who are narrowly trained” (Tsui, 2007 p. 209). An interest of this case study was to examine how professors’ disciplinary affiliations influence their approaches to critical thinking teaching and assessment practices.

### **Limitations of Study**

This case study was limited to 12 selected full-time professors, since this sample population offered their interdisciplinary perspectives on how they infused critical thinking into Signature Core courses. Professors, who taught the critical thinking



approved critical thinking courses as part of the Core curriculum within their respected disciplines, were not included in the sample population. The rationale for not selecting these professors as a sample population is that these they could only offer their disciplinary perspectives on how they infuses critical thinking into their Core approved proficiency courses. Observations were not conducted as part of the data collection, since interviews were the main source of data for this case study (Bogdan & Biklen, 1992, p. 129).

During the Spring 2011 semester, there were 46 faculty members, who taught over 60 critical thinking approved courses as part of the Core Curriculum across disciplines as well as three Signature courses. Prior to selecting the 12 professors as an original sample population, I considered recruiting a possible total of 15 professors with 3 participants from the English, history, philosophy, religious studies, and classical studies departments. The rational for selecting these 15 professors as a possible sample population among these disciplines was for the purpose of obtaining a greater understanding of how these professors infuse critical thinking from their specific disciplinary perspectives across a wide range of disciplinary perspectives. The decision shifted to select 12 professors, who taught the three Signature courses as the sample population, because this pool of participants could provide rich data on how to infuse critical thinking through interdisciplinary approaches instead of only disciplinary approaches. This sample population of 12 participants was limited to representation of full-time professors from diverse disciplines, who taught three of the Signature courses during the Spring 2011 Semester. The 12 selected participants included representation from the disciplines: sociology, history, psychology, classical studies, philosophy, and

theology. The sample population represented 12 participants from seven disciplines of study in the liberal arts and humanities departments.

### **Data Collection**

The qualitative methods to collect data for this study included one-on-one in-depth interviews with the 12 selected professors and documentation. I conducted one-on-one interviews with each of the 12 professors and asked them questions by using the interview protocol about how he/she approaches the teaching of critical thinking in the Signature course that he/she taught during the Spring 2011 semester. One of the most effective methods to find out how professors infuse critical thinking in their courses is to speak with them about their ideas and approaches. After completing the interview with each professor, I asked them to provide documentation from the courses they taught, such as course syllabi, course assignments, and course exams for examining how each professor infuses critical thinking into their courses. After completing the 12 interviews, I transcribed all the interviews verbatim from a digital recorder. The interviews and documentation were then organized into electronic folders for purposes of analyzing the data.

To analyze data for this study, I developed an inductive coding system according to categorical topics and themes to gain a better understanding of professors' perspectives on how they teach critical thinking skills from their individual disciplinary perspective. A color-coding system was developed for each code, and analysis was divided into two phases. The first phase, within-case analysis, examined data gathered from each professor separately, as if it were a single case. After analyzing by coding individual professors as a single case, the second phase, cross-analysis, examined data gathered

from all selected professors within and across disciplines to seek common and different themes throughout the data.

Research questions for this case study examined professors' perspectives about teaching and assessing students' critical thinking skills in one university, where an institutional commitment exists to advance critical thinking as a curricular goal within the Core Curriculum Signature courses.

The research for this case study investigated the question: "How do professors from diverse disciplines perceive and approach the teaching and assessment of critical thinking skills in one university, where a strong commitment exists to infuse critical thinking skills into undergraduate programs?" Other subquestions listed below examined how select professors infuse critical thinking as part of the research for this qualitative study:

1. How do select professors view critical thinking from their disciplinary perspectives?
2. How do select professors define critical thinking?
3. How do select professors' definitions of critical thinking shape their teaching approaches to infuse critical thinking into their courses?
4. What kinds of pedagogy do select professors use to teach critical thinking in their courses?
5. How do select professors assess critical thinking in their courses?
6. How do select professors perceive professional development courses in order to improve their critical thinking teaching and assessment practices?

The findings from this case study explored these questions to seek an understanding of how one institution aligns all of these factors, while addressing all of

the challenges that simultaneously arise from implementing critical thinking as an important curricula goal.

### **Summary of All of the Findings**

St. Stephens has developed three required Signature courses as an integral part of the Core Curriculum to advance the University's commitment to develop students' critical thinking skills in undergraduate programs. Findings are summarized in respect to the categorical areas of critical thinking definitions, pedagogy, assessment, challenges, and professional development. The Core Committee recommends Lonergan's concept of critical thinking formulated in his cognitive theory and is available on the Critical Thinking Module for faculty members to consider for infusing into Core courses.

**Critical thinking definitions.** Findings reveal that only a few of the participants were aware of Lonergan's concept of thinking as metacognition. Participants also expressed their concerns about a lack of agreement about how to define critical thinking within the Core Curriculum as well as from their disciplinary perspective. Most of the participants concurred that an agreed upon definition would be advantageous for infusing it into Signature courses. A consistent finding revealed that participants define critical thinking from their disciplinary perspective, which, in turn, influences their critical thinking pedagogy. For example, one of the participants, Professor Keith Cohan defined critical thinking as "the capacity to think critically about readings in texts, to reflect upon the ideas from the reading, and to be able to present the concepts in class is all a part of critical thinking". According to this participant, to be a good critical thinker is to have the capacity to read text and to study ideas closely with great attention to detail for asking questions. This participant views a constructive aspect of critical thinking, which is to

ask oneself questions while reading the text, so you can critically think about the material through the reading process.

**Critical thinking pedagogy.** Findings reveal that participants' teaching methods included the following critical thinking pedagogy: interpretative discussion, Socratic method, reasoning skills through different kinds of argumentation, Bloom's taxonomy, lecture and general empirical method. Participants typically infuse critical thinking into their teaching practices using interpretative discussion, since Signature courses are designed as discussion-based courses. The Socratic method is the other discussion-based method; participants use questions to stimulate critical thinking by having the professor as well as other students ask and exchange questions during class discussions. However, participants find lectures as a useful method to structure the course, since lectures provide background material about Core topics, and deliver explicit critical thinking instruction. Some of the participants think that the best approach for infusing critical thinking into Signature courses is through explicit instruction, while other participants believe that critical thinking is an outcome of the course material. Although participants refer to metacognition as a process to infuse critical thinking, most of the participants were not familiar with the general empirical method (GEM) as metacognitive pedagogy to infuse critical thinking into Core courses. Participants, who were familiar with the GEM as a metacognitive process, find the general empirical method to be the most effective method to teach students how to think about their thinking processes. GEM as critical thinking pedagogy reflects Lonergan's conception of critical thinking, which is commensurate in terms of aligning a concept of critical thinking and pedagogy.

**Critical thinking assessment.** Findings reveal that participants generally adhere to the requirements to assess students' critical thinking skills as documented in the three Signature course syllabi. Participants evaluate students' critical thinking skills by student participation, quizzes, final exams, and papers. Participants consider students' written papers as one of the best measures to assess students' critical thinking skills in Core courses. Some of the participants discussed their interest in developing rubrics to assess critical thinking skills as part of Core course content.

**Challenges.** Participants find a number of challenges when they infuse critical thinking into Core courses. A major challenge is the lack of agreement among the participants on how to define critical thinking, which makes it difficult for participants to teach and assess it as core proficiency. Participants find it demanding to teach critical thinking skills to a student population, who are resistant to do the assigned readings in the Signature courses. Furthermore, findings reveal that participants realize that many of the students lack the basic reading and writing skills to do the required level of college work. Due to these challenges, participants discussed the need for further professional development to provide learning opportunities about effective critical thinking teaching and assessment methods.

**Professional development.** One of the most important findings from this study was the need for more professional development programs about critical thinking. One of the areas that they would like to have faculty seminars focus upon is a common operational definition of critical thinking. Participants believe that more professional development programs would improve their understanding of how to infuse it into their teaching and assessment practices.

Participants are in favor of presentations of specific critical thinking pedagogy, such as the Socratic method. They expressed that they would benefit from learning how to assess critical thinking skills within of Core course content. Findings reveal that the participants would like to see the university offer professional development courses as formal training opportunities within and outside of the university in order to learn about critical thinking in terms of the most recent research, presentations by expert speakers, using outside resources, and ongoing learning communities.

### **Implications for Institutional Policy and Practice**

The suggestions for implications for institutional practice and policy are discussed in the major areas of findings, as framed in a common critical thinking definition, pedagogies, assessment, and professional development. While the university has developed a Core Curriculum program to infuse critical thinking into Core courses, critical thinking is listed as one of the core proficiencies among reading and writing, oral communication, information fluency, and numeracy. However, the research from this study suggests that critical thinking should be considered as the underlying groundwork for all of the other proficiencies. An implication for institutional policy is for the university to evaluate the importance of critical thinking as the foundational base in order to support the connections to support all of the other proficiencies. With this foundational base, critical thinking becomes the intrinsic thread that allows the weaving of thoughts together, while simultaneously connecting more thoughts to the other proficiencies within and across academic disciplines. Therefore, the university should consider critical thinking as the “Core” of the core proficiencies.

## **Institutional Climate**

The university needs to foster an institutional climate, so critical thinking thrives at the center of the undergraduate curriculum. The literature suggests that institutional climates foster critical thinking “by creating an atmosphere that places thinking at the center of the university’s philosophy, mission and goals” (Elder, 2004, p.1) An institutional climate perpetuates the intellectual ethos necessary to begin the dialogues about how to endorse critical thinking as a primary curricular goal.

Intellectual ethos, an integral feature of an institutional climate, creates an atmosphere for nurturing one’s intellectual pursuits and habits of mind. Derived from the Greek — intellectual ethos means custom, habit, and character — it is the fundamental character or spirit of a culture, the underlying sentiment that informs the beliefs, customs, and practices of a group or society. Intellectual ethos is the distinguishing character or disposition of a group or a society (Random House Webster’s Dictionary, 1998).

The university should encourage such a mind set for developing students’ critical thinking skills as a learning outcome.

“Thinking outside of the box” is a phrase which refers to achieving greater insight on a subject by transcending traditional perspectives and approaches. This is relevant to critical thinking because the best critical thinkers tend to be individuals, who can exercise independent and innovative thinking to see more than what is ordinarily perceived. (Tsui, 2007, p. 206)

When the university encourages the promotion of this kind of “thinking outside of the box” mindset, faculty members can openly discuss their thoughts with another as well as with the administration. The institutional climate is contingent upon a setting that fostes



academic freedom, where faculty members can openly exchange ideas with students to infuse critical thinking into class discussions. With the university's support of academic freedom as a strong component of institutional climate, faculty members can discuss controversial topics without fear of reprisal. According to the American Association of University of Professors (1940), an atmosphere, where teaching and learning can flourish is vital to academic freedom, so teaching and learning can flourish for the advancement of knowledge and truth. An institutional climate of academic freedom can offer a broad range of enriching opportunities for faculty members and students to engage in thinking about and discussing different points of view about Core topics.

### **Common Definition of Critical Thinking**

An implication for policy is for the university to decide upon a common definition of critical thinking. A common definition of critical thinking can then be infused across the curriculum as the core for all of the undergraduate programs. The Core Curriculum Committee provides Lonergan's conception of critical thinking on the Critical Thinking Module Website as the recommended definition of critical thinking. The university should consider adopting Lonergan's concept of critical thinking as a common definition to be infused across the curriculum. Since Lonergan's concept of critical thinking is rooted in his cognitive theory and formulated in thinking about one's own thinking as a human dynamic structure, in which thinking revolves around the parts of the whole and through the whole to the parts as a metacognitive process, which interacts with one's experience, understanding, and judgment.

It seems fitting that the university should consider Lonergan's conception of critical thinking as a common definition, since it presents a global view of thinking, which transfers to all kinds of thinking and to all methods of thinking across disciplines. Critical thinking definitions, such as self-reflective, problem solving, and habits of mind all fall under the umbrella of Lonergan's concept of critical thinking as thinking about thinking. Metacognition is also thinking in one's subjects matter and "the only way to learn about a subject is to construct the ideas in the subject in one's thinking using one's thinking and critical thinking is foundational to the effective teaching of any subject" (Elder, 2004, p.1). Therefore, the global advantage of Lonergan's concept of critical thinking as a common definition is that it can be adapted to all kinds of thinking about thinking and critical thinking methods across and within the content of diverse disciplines across the curriculum.

A method to think about Lonergan's conception of critical thinking is analogous to the formula of a straight line,  $y = mx + b$ , where the straight-line of this formula extends thinking about thinking into infinity. The box contains straight lines to define and lengthen thinking as a process of being able to "think outside of the box." Lonergan's concept of thinking is the metacognitive link to think differently for different reasons at different times using different methods. If the university agrees on adopting Lonergan's concept of critical thinking as a common definition, I believe that the university will have a common and fundamental concept of critical thinking to support the university's commitment to infuse critical thinking as an important curricular goal.

Critical thinking becomes foundational to the effective teaching of any subject (Elder, 2004). Therefore, an implication for institutional practice is for the university to consider

Lonergan's concept of critical thinking as a common definition as the basis of an effective metacognitive method.

### **Critical Thinking Pedagogy**

Faculty members, who are currently teaching Core courses, could benefit from attending faculty seminars that provide programs, which address effective teaching approaches and methods to infuse critical thinking skills. Presentations could include separate seminars for infusing critical thinking through infusion, immersion, and mixed-model approaches. Faculty seminars could include different critical thinking pedagogy for explicitly teaching critical thinking skills through interpretative discussion, Socratic method, lecture, and general empirical method.

### **Critical Thinking Assessment**

Faculty seminars should consider offering more opportunities for faculty members to learn about critical thinking assessment methods. These seminars could offer presentations on how to assess students' critical thinking skills through the writing process. Assessment methods could also address how faculty members how to develop rubrics for assessing students' critical thinking skills as well as course content. Using Bloom's taxonomy, faculty members could learn how to develop critical thinking rubrics within their specific discipline. Through faculty seminars, the Core Curriculum Committee members could present the highlights of the most research and resources through the Critical Thinking Module Website. This Website offers faculty members such information as Lonergan's conception of critical thinking as well as various critical thinking teaching and assessment methods.

After perusing the literature on developing critical thinking professional development long-term models, I discovered that the best research on this topic was available from the Critical Thinking Foundation Website. This model based on Linda Elder's research offers an excellent framework for developing long-term professional development programs on critical thinking at St. Stephens University.

With a substantive and commonly agreed upon concept of critical thinking, the university can embark on planning a long-term professional development model. The first task should consist of establishing a university-wide forum to discuss critical thinking as a primary curricular goal at St. Stephens University. The administration should consider inviting all chairpersons and at least two faculty members from each department from all undergraduate programs. The initial forum should encourage open dialogue to discuss the strengths and weaknesses about the actual practices of critical thinking and areas in need of improvement at St. Stephens University.

As part of this forum for a professional development model, Elder (2004) suggested a list of questions for the faculty to consider asking to evaluate faculty members' needs in order to create a critical thinking professional development program. These questions serve to assess the knowledge base of the faculty members on critical thinking for the purposes of evaluating the present situation and what direction the university needs to take for designing a long-term professional development program. Some of these questions include:

What are the standard teaching practices at the college?

How did these practices aid or hinder intellectual development?

What can be done to improve infusing critical thinking?

What is actually happening and what should be happening?

What are the political realities that affect the college's ability to place critical thinking at the center of teaching? How can we best take these realities into account as we move forward the ideal?

What skills do faculty now lack (which they need if they are to foster critical thinking)?

Notwithstanding, St. Stephens University's commitment to advance critical thinking as an important curricular goal, a long-term professional development program requires strong and solid sources of funding and resources to support a critical thinking professional development program. According to Richard Paul (2005), expert on critical thinking, this commitment for developing a professional development on critical thinking should pervade as the dominant philosophy for designing the curriculum.

Critical thinking is not something to be devoured in a single sitting nor yet in a couple of workshops. It is to be savored and reflected upon. It is something to live and grow with, over years, over a lifetime. A professional development program can succeed only through a long-term commitment (Elder, 2004, p.1).

### **Advisory Team**

The Core Curriculum Committee is composed of faculty members from diverse disciplines selected from across the university. One of the roles of the Core Committee members is to approve applications for infusing core proficiencies (i.e., critical thinking) into Core courses. An advisory team should be established to guide reform efforts by consulting with the Core Curriculum Committee to infuse critical thinking as the primary curricular goal. A vital role of this advisory team is to support ground-level ideas from faculty members to prepare them for the changes on critical thinking through professional

development programs. The advisory team needs to appoint a chair to oversee the team and committees. Subcommittees can be formed into smaller groups consisting of committees on specific areas of critical thinking i.e. pedagogy, assessment, and grant research. For example, members of the grant committee could research specific funding sources, such as the Ford Foundation, as a resource provide funding for designing long-term professional development models on critical thinking.

According to Elder (2004), the initial phases of implementing a long-term professional development program are contingent upon providing resources to faculty members so they can begin to acquire an understanding of critical thinking as a foundational base. One of the best ways for launching this beginning phase is by having experts conduct these critical thinking workshops.

The best workshop design is one that begins with an introduction to the foundations of critical thinking and that is systematically followed up by contextualization of these foundations throughout curricular areas. These workshops should be systematically conducted with a clear design in mind with follow up throughout curricular areas and become incorporated into college wide policies and practices (Elder, 2004).

Findings indicate that professors would like the university to provide more workshops on specific critical thinking techniques to teach (i.e., Socratic method) and assess critical thinking (i.e., rubrics) in their courses. Elder suggests the following workshop topics (or others in keeping with the faculty /staff interests):

Socratic Questioning Through Critical Thinking

Learning How to Analyze Thinking within Any Discipline

## Learning How to Assess Thinking within Any Discipline

### How to Detect Bias and Propaganda

### How to Read Closely

### How to Write Substantively

Effective workshops require feedback from the experts as ongoing self-assessment.

Mistakes are part of learning. Routinely revisiting the concept with expert help, thereby taking one's understanding to greater depths will correct for predictable misunderstandings and misapplications. It will enable faculty to continually to up-grade their knowledge and success in the classroom (Elder, 2004, p.1).

Beside workshops led by critical thinking experts, it is important to provide faculty members with opportunities to continue sharing their ideas about what they are learning and how they are applying them in the classroom. The plan should consider the following activities:

1. a monthly newsletter inviting faculty members to share thoughts and insights about critical thinking, including ways to teach it in a variety of subject fields;
2. Web forum wherein faculty and staff can routinely engage in dialogue and colleagues in critical thinking;
3. regularly scheduled roundtable discussions that all faculty and staff can attend with ever-evolving topics on critical thinking and interrelated subjects;
4. foundational seminars for new faculty members facilitated by the leadership team;
5. faculty members access to publications and other resources in critical thinking, which consider their subjects and interests; and

6. online conferences and videotaping of faculty members teaching different critical thinking methods.

Through professional development programs, the university can offer faculty members ongoing opportunities to learn about the foundations of critical thinking so they can begin to integrate them into their teaching and assessment practices. The university can link the assessment of the faculty and the university as a whole to the fostering of critical thinking throughout the curriculum and offer incentives for faculty to foster intellectual development. This foundation is essential if thinking is to be infused and to be a primary goal of the curricula within the university.

The extent to which critical thinking is a pervasive philosophy of the university depends on many interrelated variables. Through an effective professional development program, the university can create a learning environment that fosters critical thinking and intellectual discipline. “This can be done with a well-designed plan that evolves as it is carried out, a plan that presupposes a substantive concept of critical thinking, with true and lasting administrative support, and a sufficient dose of intellectual humility” (Elder, 2004, p. 8).

### **Critical Thinking as a National Imperative**

The review of the literature reveals that critical thinking is a primary goal of American higher education (Paul, 2005; Tsui, 2002). President Barak Obama stated that one of the keys to handle 21st century problems in the workforce is the development of critical thinking skills and abilities (Halper, Jackson, as cited in Crenshaw et. al, 2011 p. 13). The American Association of University professors agree: “... critical thinking is the hallmark of American education (Arum & Roksa, 2011).” Indeed, 99% of college



faculty members say that developing students' ability to think critically is a "very important" goal of undergraduate education (p. 35). Despite the proclamation of this national imperative, little is being done to provide faculty members with professional development opportunities, so they are equipped to implement critical thinking as the primary goal of American higher education. An implication from this study supports the strong need for developing critical thinking professional development programs through a national initiative.

According to Tsui (2007), though the development of critical thinking may be a primary goal among American colleges and universities how well it is achieved seems to be limited across institutions. "This may be related in part to the fact that we know so little about how critical thinking is actually developed in students. College faculty members, who are largely charged with teaching critical thinking to students, receive little to no training and guidance in meeting this important educational objective. To enable faculty members, who teach critical thinking, they need to be better informed and equipped to develop this valued skill in students" (p. 200).

Given this national imperative, the Secretary of Education needs to begin a "national dialogue" similar to the panel Commission on the Future of Higher Education (2005) about critical thinking by planning the development of professional development programs. The first task for the Secretary of Education is to establish a professional development panel as part of the Commission on the Future of Higher Education. Margaret Spellings, the former Secretary of Education, created the Commission on the Future of Higher Education on September 19, 2005, to improve the American system of higher education. The purpose of the Commission is to consider how best to improve our

system of higher education to ensure that our graduates are well prepared to meet our future workforce needs and for students to be able to participate in a changing economy. “To accomplish this purpose, the Commission shall consider federal, state, local, and institutional roles in higher education and analyze whether the current goals of higher education are appropriate and achievable. It is time to examine how we can get the most out of our national investment in higher education. We have a responsibility to make sure our higher education system continues to meet our nation’s needs for an educated and competitive workforce in the 21st century”.

Secretary Spellings charged the Commission to be bold. “The Commission believes that America must embrace a new agenda and engage in a new dialogue that places the needs of students and the nation at its center. Moreover, this is what needs to be done to develop students’ critical thinking skills at the center of American higher education” (p.16). Despite the importance of the Commission’s goals, professional development programs for critical thinking were not addressed in the Commission’s final report *A Test of Leadership: Charting the Future of U.S. Higher Education* (US Department of Education, September, 2006). .

The implications from this study offer recommendations about planning critical thinking professional development programs based on the findings from the Spellings Report. These areas consist of learning, transparency and accountability, and innovation. Furthermore, the recommendations from the Spellings report strongly expose the need for the Commission on the Future of Higher Education to create a professional development panel to implement critical thinking as a national imperative.

The Commission reported learning among American colleges and universities as inadequate, as one of the key areas in need of improvement.

As other nations rapidly improve their higher education systems, we are disturbed by evidence that the quality of student learning at U.S. colleges and universities is inadequate and, in some cases, declining. A number of recent studies highlight the shortcomings of postsecondary institutions in everything from graduation rates and time to degree to learning outcomes and even core literacy skills. According to the most recent National Assessment of Adult Literacy (1992, 2003), for instance, the percentage of college graduates deemed proficient in prose literacy has actually declined from 40 to 31% in the past decade. These shortcomings have real-world consequences.

Employers report repeatedly that many new graduates they hire are not prepared to work, lacking the critical thinking, writing, and problem-solving skills needed in today's workplaces. In addition, business and government leaders have repeatedly and urgently called for workers at all stages of life to continually upgrade their academic and practical skills. "But both national and state policies and the practices of postsecondary institutions have not always made this easy, by failing to provide financial and logistical support for lifelong learning ...." (p. 4).

This lack of students' achievement with literacy skills in higher education affects the implementation of critical thinking skills if students are indeed struggling with the reading and writing skills to complete assigned coursework as well as with eventual problem-solving skills in the workplace. "Employers complain that many college graduates are not prepared for the workplace and lack the new set of skills necessary for

successful employment and continuous career development” ( US Department of Education, 2006, p. 12).

Since faculty members receive little to no training in critical thinking pedagogy (Tsui, 2007, the Secretary of Education needs to take on a role of national leadership with planning professional development programs on critical thinking in American colleges and universities. By providing faculty members with training, they can then be better equipped to teach students critical thinking skills and to be at the forefront of providing institutions with transforming the academic needs of a knowledge economy.

Transparency and accountability factors were also found to be inadequate for measuring institutional performance among American colleges and universities.

To meet the challenges of the 21st century, higher education must change from a system primarily based on reputation to one based on performance. We urge the creation of a robust culture of accountability and transparency throughout the system of American higher education. (US Department of Education, 2006, p. 20).

For example, the Commission recommended the Collegiate Learning Assessment (CLA), a standardized test for accountability and transparency, to measure students’ critical thinking, and analytic reasoning skills using performance tasks with written prompts instead of multiple-choice questions.

The CLA is among the most comprehensive national efforts to measure how much students actually learn at different campuses, the Collegiate Learning Assessment promotes a culture of evidence-based assessment in higher education. Since 2002, one hundred thirty-four colleges and universities have used the exam, which evaluates students’ critical thinking, analytic reasoning, and written communication using

performance tasks and writing prompts rather than multiple-choice questions.

Administered to freshmen and seniors, the CLA allows for comparability to national norms and measurement of value added between the freshman and senior years.

“Additionally, because the CLA’s unit of analysis is the institution and not the student, results are aggregated and allow for inter-institutional comparisons that show how each institution contributes to learning” (US Department of Education, 2006, p.22).

The finding reported in the national visible study *Academically Adrift* (2011), reported the results based on the Collegiate Learning Assessment (CLA) revealed little improvement in students’ critical thinking skills. The CLA reported that 45% of students in a sample of over 2300 did not demonstrate any statistically significant improvement in CLA performance during the first 2 years of college (Arum & Roksa, 2011, p. 121). Yet, Arum and Roksa stated:

Although from a sociological perspective the CLA appears quite promising and worthy of further research and development, we are simply not at a state of scientific research and development where college students’ learning outcomes can be measured with sufficient precision to justify embracing a coercive accountability system without significant reservations. (p. 141)

The Commission recommended that American institutions of higher education “should measure and report meaningful student learning outcomes. Furthermore, the faculty must be at the forefront of defining educational objectives for students and developing meaningful, evidence-based measures of their progress toward those goals” (p. 23). The question, which emerges from this study, is how can critical thinking be measured when “college faculty, who are largely charged with teaching critical thinking to students,

receive little to no training and guidance in meeting this important educational objective” (Tsui, 2007, p.200)? This academic paradox needs to be reversed, so that faculty members learn about teaching critical thinking through professional development courses before measuring critical thinking as a learning outcome on standardized tests. In other words, test what you teach.

A key finding in the report stated that what was lacking among American colleges and universities was innovation. “Reports from those working at the grassroots level in fields such as teacher preparation indicate that the results of scholarly research on teaching and learning are rarely translated into practice” ( US Department of Education, p. 14). To address innovation, recommendations included investing in such opportunities as new pedagogies, entrepreneurial opportunities, technology, and research. A national initiative of professional development programs is the most effective way to support opportunities in these areas.

Professional development is the means to embrace a culture of innovation, so that institutions develop new pedagogies, curricula, and technologies to improve learning in higher education. “At the same time, we recommend the development of a national strategy for lifelong learning designed to keep our citizens and our nation at the forefront of the knowledge revolution” (US Department of Education, 2006, p. 5). In addition to improving instructional approaches, technology could be used to provide faculty members across the nation with online access to Web-based tutorials in terms of innovative critical thinking pedagogy and assessment tools. The use of technology for professional development could be similar to inventiveness at the National Center for Academic Transformation at the Rensselaer Polytechnic Institute.

From 1999 to 2004, Carol Twigg and the National Center for Academic Transformation at the Rensselaer Polytechnic Institute worked with 30 colleges and universities to enhance quality of instruction, improve student learning, and reduce costs with the use of technology and innovative pedagogy. The participating institutions, which included Carnegie Mellon University, Northern Arizona University, and Tallahassee Community College, redesigned instructional approaches to improve some of their large, introductory courses (US Department of Education, 2006, p. 22). “Additionally, we urge institutions to explore emerging interdisciplinary fields such as services sciences, management, and engineering and to implement new models of curriculum development and delivery” (US Department of Education, 2006, p. 25).

The Commission suggested the National Forum on College-Level Learning to collect data on measuring “what the college educated know and can do across states” (US Department of Education, 2006, p. 22). Similar technology can be used to collect data across the states to identify best practices for professional development programs regarding critical thinking pedagogy and assessment methods.

The National Forum on College-Level Learning has been called “the first attempt to measure what the college educated know and can do across states” (US Department of Education, 2006, p. 22). Piloted in 2002 across Illinois, Kentucky, Nevada, Oklahoma, and South Carolina, the study collected data on student learning using multiple assessment instruments already in use or widely available such as the Collegiate Learning Assessment. Results from these assessments provide states comparable information on how their colleges and universities contribute to student learning and identify challenges such as performance gaps and inconsistent teacher preparation. Comparable assessment

also allows states to identify best practices, providing information useful in creating policy and programs that will improve the states' intellectual capital" (US Department of Education, 2006, p. 22).

The Commission encourages the creation of incentives to promote the development of information technology-based collaborative tools and capabilities at universities and colleges across the United States, enabling access, interaction, and sharing of educational materials from a variety of institutions, disciplines, and educational perspectives. Both commercial development and new collaborative paradigms such as open source, open content, and open learning will be important in building the next generation learning environments for the knowledge economy (US Department of Education, 2006, p. 25).

"Institutions should harness the power of information technology by sharing educational resources among institutions, and use distance learning" to train faculty members about critical thinking as a primary goal and meet critical workforce needs (US Department of Education, 2006, p.25). This commitment to advance innovation, such as new critical thinking pedagogies, through cutting edge technology, policymakers and educators need to seriously find the means to invest more in research funding for professional development programs. Research funding is critical to build America's capacity to compete and innovate by investing in critical skill sets and basic research.

The Commission recommended revitalizing the Fund for the Improvement of Postsecondary Education (FIPSE) for investing in research. For example, FIPSE could be used as a source of funding to implement research in developing professional development programs about critical thinking skills.



Its original mission of promoting improvement and innovation in higher education needs to be reenergized to sustain and enhance innovation in postsecondary education. The commission recommends that FIPSE prioritize, disseminate, and promote best practices in innovative teaching and learning models. (p. 15)

“More multidisciplinary research collaboration and curricula should be encouraged through existing programs at the Department of Education, the National Science Foundation, the Department of Defense, and the Department of Energy’s Office of Science” ( US Department of Education, 2006, p. 26).

Since critical thinking is a national goal of higher education and faculty members are charged with developing students’ critical thinking skills, then as a test of leadership the Department of Education needs to initiate the transformation of educational practices on critical thinking by initiating professional development programs. Professional development programs are vital to implementing critical thinking as a national imperative and for the future of a knowledge economy in American colleges and universities.

### **Contributions to a Theory of Knowledge**

This study, on “How Professors Infuse Critical Thinking into College Courses” offers significant contributions to the understanding of professors’ perspectives about teaching and assessment practices for critical thinking skills in one institution, where a strong institutional commitment exists to implement critical thinking into undergraduate programs. This study investigated the interface between professors’ views about critical thinking and institutional commitment. The research from this study enhances a greater understanding about how one university addresses critical thinking as one of the primary goals of an undergraduate education when confronted with ongoing challenges, such as

faculty members' limited training to teach critical thinking skills, faculty resistance, and students' lack of preparation, student resistance and disciplinary blinders. The research from this study explored the challenges that professors encounter when implementing critical thinking at the concrete level and how these variables were addressed in one institution so other institutions can learn from these particular challenges. One of the most significant contribution to the understandings of professors' perspectives about critical thinking in an institution committed to implementing critical thinking as a curricular goal is the need for effective critical thinking professional development programs throughout the university. This study documents and contributes to the body of knowledge about the complexity of professors' efforts to align all the various challenging factors together in one institution, where critical thinking is advanced as a curricular goal and as a student learning outcome.

### **Future Research**

The findings generated from this study revealed that the critical thinking areas in need of future research are similar to the areas that Ennis (1963) found 50 years ago. These areas include a further refinement and essential concept of critical thinking, the development of critical thinking teaching methods, the development of critical thinking assessment methods and professional development programs ( as cited in Kennedy et.al.,1991, pp.25-26). Discussion for future research is based upon these areas of findings as related to a substantive definition/concept of critical thinking, pedagogy, assessment, and professional development.

This is the first qualitative study, which examined how interdisciplinary professors infuse critical thinking into the three Signature courses as part of the new Core

curriculum at St. Stephens University. Future research would benefit from investigating how professors from distinct disciplinary perspectives infuse critical thinking into all critical thinking approved Core courses across the disciplines. Another follow-up case study would be advantageous to explore how interdisciplinary professors, who teach Signature courses, infuse critical thinking through infusion, immersion, and mixed models as teaching approaches. A broader question for further research is to find out whether professors learned to teach critical thinking in Signature courses by using different approaches and to what extent did these pedagogical influences carry over to their respective disciplines.

**Definition/Concept of critical thinking.** The research findings revealed that participants generated their own ideas related to definitions and as to what constitutes critical thinking. This finding is consistent with the research that suggests, “Just what is meant by critical thinking is not a matter of total agreement” (Kennedy et al., 1991, p. 13). The Core Curriculum Committee recommends Lonergan’s cognitive theory as a concept of critical thinking to develop students’ critical thinking abilities in the Core courses. Lonergan’s concept of critical thinking reflects a metacognitive approach to thinking about one’s own thinking as well as the “dimensions for thinking as a process for learning and action as shared behavior (thinking aloud), which includes the learners’ beliefs, judgments, attitudes, motivation, and self-concept” (p. 73). The significance of Lonergan’s concept of critical thinking is rooted in his cognitive theory about thinking as a dynamic human structure as a global metacognitive approach, which encompasses both skills and dispositions as a cognitive process. Future research would benefit from

exploring the implementation of Lonergan's concept of critical thinking as a common definition to infuse critical thinking into all Core Curriculum courses.

**Critical thinking pedagogy.** “The merit of a theory or definition is often ascertainable when it is applied in practice” (Kennedy, et.al. 1991, p. 14). Lonergan's concept of thinking (experience, understanding, and judging) is inherent in his general empirical method (GEM), (experience, understanding, judging, and decision), which functions as a method for thinking about thinking in terms of skills and dispositions within each discipline as well as across disciplines of study.

The advantage of GEM is that this method can be applied to teaching metacognition as a process of thinking across multiple disciplines. By implementing Lonergan's method of critical thinking, future research could consider investigating GEM as a method to teach critical thinking across diverse disciplines to examine common metacognitive processes. Another area in need of future research would be to explore whether different critical thinking pedagogies influence student outcomes. Student resistance is one of the many obstacles that faculty members encounter when they teach critical thinking in Signature courses; future research would benefit from exploring what kinds of supports and strategies, such as smaller classes or lighter course loads, so they could take more time to focus on teaching critical thinking skills.

The participants, who teach Signature courses, typically employ lectures, interpretative discussion, Socratic method, and general empirical method as critical thinking teaching methods. The findings from this study revealed that the participants support the view that explicit instruction in critical thinking is one the most effective approaches to teach critical thinking through the reading process and class discussion.

There has been a renewed interest in reading comprehension, as part of the reading process, stimulated by recent research. Furthermore, participants concur that by asking students questions about the course readings, they can determine how well their students comprehended the main ideas from the readings and then discuss them in class. Future research would benefit from exploring specific metacognitive strategies through reading comprehension skills by comparing same disciplinary course content with different disciplinary course content in Core Curriculum courses.

Participants find that questions act as a catalyst to stimulate students' critical thinking skills during classroom discussions. Participants frequently assign students a list of questions to think about while reading texts, as a metacognitive strategy, to ask other students about the readings to discuss in class. Participants find that by having students generate their own questions about the readings, they are teaching them how to develop critical thinking strategies to think about their own ideas and derive their own answers from those questions. Prior research suggests, "There is ample evidence to show the necessary role questioning plays as a tool for thinking critically" (Angelo, Browne & Freeman, Bughussian, Elder, Gross, Halx, Mark, & Reybuld, Nosich, Pattiz, as cited in Crenshaw, et.al, 2011, p.18).

Participants find that by asking students about the reading material, they are providing them with a metacognitive strategy to reflect upon their own biases and to broaden their thoughts for understanding different perspectives. When the participants teach students about how to think about which questions to ask questions about the reading material, they believe that they are preparing students to apply this metacognitive strategy to the reading process, which then can be carried over to other disciplines. Future

research would also benefit from investigating the role of questions as an explicit critical thinking strategy to explore the impact of questions are reflected in different critical thinking pedagogy in the courses of the Core Curriculum. Future research is needed to explore the role of questions as a metacognitive strategy as part of the reading process for evaluating students' understandings of course content in both Signature courses disciplinary courses.

**Assessment.** Participants find that students' written papers are one of the best methods to assess students' critical thinking skills. By evaluating students' abilities to analyze and synthesize their ideas about content information in written papers, participants are able to assess students' critical thinking skills. Participants find that students' written papers demonstrate students' critical thinking abilities to apply their reasoning skills to organize and synthesize their thoughts about important key concepts. Future research could benefit from examining if common critical thinking skills exist in terms of the writing process by comparing students' written papers in the Core Curriculum courses.

Standardized tests do not yield sufficient information about the thinking processes involved in metacognition, such as innovative thinking (thinking outside of the box), planning, and problem solving skills. Future research would be advantageous for developing testing instruments, which focus on specific higher order thinking skills to examine whether critical thinking skills are transferable to other disciplines.

Although not a major finding of this study, participants mentioned that they would like to learn more about how to develop rubrics as a tool to measure students' critical thinking skills in the courses they teach. For example, participants would like to

know how to develop rubrics that include questions for measuring the skills that require applying critical thinking skills to content knowledge. The Holistic Critical Thinking Rubric developed by Facione and Facione (1994) solely evaluates critical thinking skills. Scores range from a high of four to a low of one. The Holistic Critical Thinking Rubric evaluates the following critical thinking skills:

- interprets evidence, statements, graphics, questions, etc.;
- identifies the salient arguments (reasons and claims), pro and con;
- analyzes and evaluates alternate points of view;
- draws warranted non-fallacious conclusions;
- justifies key results and procedures, explains assumptions and reasons; and
- fair mindedly follows where evidence and reasons lead.

Paul & Elder (2005) provide a master rubric, which can be used as a scoring rubric to “assess student performance on outcomes within a particular standard” (p.20). The advantage of this master rubric is that it can be used to measure competencies for both critical thinking skills and content knowledge across disciplines.

Since the results generated from this study support the finding that writing is one of the best measures to assess students’ critical thinking skills, future research would benefit from having faculty members develop three-way rubrics, such as a rubric which measures writing skills, content knowledge, and critical thinking skills. Future research could benefit from using Paul & Elder (2005) and Faciones’ (1994) rubrics as models to evaluate specific critical thinking skills, writing skills and course content as an assessment measure in Core courses.

**Professional development.** Prior to designing a critical thinking professional development program, a quantitative study could be valuable for obtaining data on faculty members' actual understandings, knowledge, and practices about critical thinking. This future research would provide the university with data to assess faculty members' strengths and weaknesses about their understandings of critical thinking as a baseline to plan an effective university-wide critical thinking professional development program. The survey would be e-mailed to all faculty members requesting their participation with an introduction explaining that the purpose of this study is for improving critical thinking as a curricular goal in the undergraduate programs. The research question for this study would be "Do you teach critical thinking in your courses, and if so, what methods do you use as part of your teaching and assessment practices?" The constructs of the survey would include critical thinking definitions, critical thinking teaching methods, critical thinking assessment methods, views on professional development, and demographic information. With the results of these findings, the university would have a great source of data to design an effective critical thinking professional development program to further the university's commitment to infuse critical thinking throughout the curriculum of the undergraduate programs.

The major finding in from this qualitative case study revealed that participants agreed that it would be advantageous for them to participate in more professional development courses about critical thinking to improve their teaching and assessment practices. The research supports the quandary that faculty members are not prepared to develop students' critical thinking skills in undergraduate programs because they lack the



required training to develop undergraduate students' critical thinking skills (Tsui, 2007, p. 217).

American institutions of higher education across claim that critical thinking is a national goal, yet conflicting issues remain between the lack of higher order thinking skills among college students and the need for students to be able to think to meet the cognitive demands of a workforce in a global economy. The national visible findings of the CLA revealed, "Many students are only minimally improving in their critical thinking and complex reasoning skills during their journeys through higher education" (Arum & Ropska, 2011, p. 35). How then can students' critical thinking skills be assessed, when the research clearly demonstrates that faculty members across American higher education are not prepared to teach students critical thinking and complex reasoning skills?

It is through professional development programs that faculty members will be able to acquire foundational critical thinking skills and dispositions to teach and assess students' critical thinking skills in undergraduate education. To address critical thinking as a primary objective of American colleges and universities, faculty members need to participate in effective critical thinking professional development programs. For example, the Center for Critical Thinking has designed effective professional development programs by implementing essential components for successful staff training on critical thinking, which can be accessed from their website. The Center for Critical Thinking has designed critical thinking staff development programs and workshops for more than 60,000 college faculty from the United States and abroad. Their professional development programs focused on the insights gained from assisting colleges and universities with designing professional development programs. Future

research could use these models to examine an alignment of a substantial critical thinking definition to effective critical thinking pedagogy and assessment methods.

Since participants concur that there is a lack as to what constitutes critical thinking, they believe that a common critical thinking definition would be helpful for infusing it as a curricular goal. In higher education, faculty members are expected to infuse critical thinking in college classrooms; however, they need to understand and know what critical thinking is before they attempt to teach it or assess it in college classrooms. Richard Paul, founder of the Center of Critical Thinking, believes that a substantive concept of critical thinking is vital for implementing high quality professional development programs (Paul, 2005). Moreover, with a substantive concept of critical thinking agreed upon at the institutional level, the concept of critical thinking becomes the driving force for designing successful professional development programs. Since Lonergan's concept of thinking is rooted in his general empirical method (GEM), this substantial concept of thinking is associated with a metacognitive method to think about one's method of thinking in any subject or discipline. Future research would benefit from examining the implementation of Lonergan's concept of thinking as a substantial concept of critical thinking into the critical thinking professional development programs at St. Stephens University by comparing other professional development models with a substantial concept of critical thinking such as the ones at the Foundation for the Center of Critical Thinking. Future research would benefit from investigating how the general empirical method can be used as an approach to teach critical thinking as a method to transfer critical thinking skills across disciplines.

In an effort to plan critical thinking professional development programs, future research is fundamental for considering the transitional roles of faculty members as they adapt to the complex changes of moving away from traditional teaching methods to learning about more critical thinking teaching methods. Findings from this study reveal that participants would like to attend professional development seminars to learn about specific critical teaching methods, such as the Socratic method, in order to infuse high-level questioning skills and techniques to foster critical thinking during course content discussions. However, the question of how to prepare faculty members to acquire critical thinking abilities and dispositions to allow for these pedagogical changes has not yet been investigated. Future research would benefit from examining the critical factors that would prepare faculty members for the challenging changes to transition from traditional approaches to critical thinking approaches by studying successful transitions in universities, where a commitment exists to teach critical thinking as a curricular goal. Future research would benefit from exploring the history and policy of professional development in American higher education.

Margaret Mead, renowned contributor to qualitative research, advocated for professional development programs so teachers could learn how to become better teachers by teaching students how to think. In 1950, Margaret Mead delivered the Inglis lecture at Harvard University based on her research, *The School in American Culture*. As a pioneer for professional development programs in American education, she presented her astute thoughts about teaching thinking skills in a rapidly changing technological world as stated:

But just as surely as we have needed a teacher education which permitted the prospective teacher to spend several years learning to teach, so now we need a form of the in-service training which will permit the teacher to keep abreast of a changing world, to be what she has every right to expect to be better, not worse, teacher within the years. (p. 36)

Such a teacher, if she had the additional opportunity to keep herself eternally abreast of a changing world, with the latest and most amazing scientific discussion discovery to wonder about.... (p. 37)

We need from the teacher who has relied on teaching how a tried method can be used on a new material, a totally new kind of teaching— a teaching of a readiness to use unknown ways to solve unknown problems. (p. 40)

How shall we, who are so unfit, prepare a generation, which will begin to be fit to face the new problems, which confront mankind? What we need to teach is a technique, which can perhaps be well communicated if we ourselves fully realize our own position. We need to teach her students how to think, when you don't know what method to use about a problem which is not yet formulated. And is not that in a nutshell our actual position? So if we, who lived now, can fully realize and incorporate into their teaching word and gesture are parlous state, we will, as we transmit into our pupils and students give them just the freedom, just a sense of and on guessed at process which nevertheless must be found, which if they incorporated, should equip them as no generation has ever been equipped to make the new inventions which are necessary for a new world. (p. 41)

By implementing future research about effective critical thinking professional development programs, faculty members in American colleges and universities will be equipped with the knowledge and understanding of how to infuse critical thinking into their college courses.

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**Appendix A: Interview Guide**

Study on Professors' Views on Critical Thinking at St. Stephens University

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Place: \_\_\_\_\_

Interviewee: \_\_\_\_\_

Discipline area: \_\_\_\_\_

Demographics

What is your name? \_\_\_\_\_ M\_\_ F\_\_\_\_

What is the highest degree you have earned?

How many years have you taught college? As an Adjunct\_\_\_\_ Full Time \_\_\_\_\_

What is your present position at St. Stephens University? Instructor, Associate Professor, Assistant Professor, Professor\_\_\_\_\_?

How many years have you been teaching at St. Stephens University?

Which course/courses are you presently teaching at St. Stephens University?

How many semesters /years have you been teaching courses as part of the Core Curriculum?

How were you selected to teach course/courses in the Core Curriculum at the university?

Do you intend to remain involved with teaching Core Curriculum courses at the university?

Do you have a choice?

The purpose of this interview is to find out what your perceptions are about teaching critical thinking in college. I plan to ask you some questions about your background; how you define critical thinking and then I would like to delve into how you actually teach critical thinking in your courses at St. Stephens University?

Interview Questions:

1. How did you come to work at St. Stephens University?

PROBE AND FOLLOW –UP QUESTIONS

- a. What made you decide to teach at St. Stephens University?
- b. How long have you been teaching at St. Stephens University?
- c. What is your educational/professional background?

2. Tell me what it like is to teach at St. Stephens University.

Since you have taught\_\_\_\_\_ how does this teaching experience

- a. compare at St. Stephens University?

3. What are the courses you have taught at St. Stephens University?

4. Since you have been teaching at St. Stephens University, do you have a favorite course that you like to teach? Why is it your favorite?

5. Which is your least favorite course to teach? Why is it your least favorite?

I would like now to ask some questions about your views on critical thinking at St. Stephens University.

6. How do you define critical thinking?

7. What do you believe are some of the key influences that have contributed to your understanding of critical thinking?

PROBE

- a. Professional background
- b. Subject Matter expertise

8. Have your views changed about how you think about critical thinking?

PROBE

- a. Since you first began teaching?
- b. Since you started teaching at St. Stephens University.
- c. Since teaching critical thinking as core proficiency? How/Why?
- d. How has your participation in St. Stephens University's Professional Development courses on critical thinking contributed to your understanding of critical thinking?

8A Can you describe specific critical thinking skills that you want students to learn from your courses? Do you expect different kinds/levels of critical thinking from your students from different courses that you teach?



9. How do you teach critical thinking as proficiency into your courses?
  - a. How do you infuse it into your lectures?
  - b. How do you infuse it into your class lectures?
  - c. Is there a particular method that you prefer in how you teach critical thinking? Why?
  - d. How do you perceive your students' understanding and application of critical thinking skill in the courses you teach? To what extent do your students get it?
  - e. Could you provide some concrete examples of your students getting it?
10. Can you give me some specific examples of assignments that require students to apply critical thinking in your classes? I would appreciate if you could provide me with some copies of these assignments, syllabus, and any other documentation which supports your teaching of critical thinking in your classes?
11. How do you assess critical thinking skill in the courses you teach at St. Stephens University? Please describe specific assessment tools/ strategies?
12. Can you please provide some concrete examples?
13. Do you think the way you view and teach critical thinking is compatible with St. Stephens University's views on how to teach critical thinking? If so how and if not how?

14. Have your perceptions changed on how you teach critical thinking since you have been a St. Stephens University?

15. Have you taken Professional Development courses to learn more about how to teach and assess critical thinking skills in your discipline?

16. Which Professional development courses did you find to be most helpful? Not helpful?

17. What kinds of Professional development courses on critical thinking have you attended since being a faculty member at St. Stephens University? Did you find them helpful, if so in what ways? And if not, in what ways?

18. How do you view the way future Professional development courses should be presented in order to improve your teaching of critical thinking skills in the courses you teach at St. Stephens University?

19. Do you have any further thoughts or comments about teaching critical thinking at St. Stephens University?

## **Appendix B: Initial Letter to Director of Core Curriculum**

Dear Dr. B,

December 6, 2009

Please allow me to introduce myself. My name is Nancy Lennon and I am Doctoral candidate at St. Stephens University. My dissertation intends to focus on what faculty members think about teaching critical thinking skills at St. Stephens University. The curriculum reform movement at St. Stephens University stresses critical thinking as one of the key core proficiencies. Thus, the purpose of my study is to examine how St. Stephens's faculty members perceive critical thinking, teach critical thinking and assess critical thinking in the courses they teach.

### **RESEARCH**

The research question for this proposed study is:

**What are the views of selected faculty members on teaching critical thinking within the core curriculum at St. Stephens University?**

Subsidiary questions:

1. How do faculty members define critical thinking?
2. Do faculty members infuse critical thinking skills into their course syllabi?
3. What methods do faculty members employ to teach critical thinking?
4. How do faculty members assess students' critical thinking in their courses?
5. Do faculty members view Faculty Workshops as a way to improve their understanding and implementation of teaching and assessing critical thinking skills in their courses?

## **RESEARCH DESIGN / METHOD**

The research design for this study intends to use a case study by exploring how critical thinking skills are integrated and implemented within core courses.

The research method entails interviews, classroom observations and documentation from full-time faculty members, who core courses across broad disciplines of study.

For the purpose of conducting interviews with the faculty members, a questionnaire will be developed by focusing on the above mentioned research questions. Documentation will consist of course syllabi and samples of exams in order to determine how faculty members are assessing critical thinking skills in their classrooms. Another reason for this kind of documentation is to find out if faculty members are infusing critical thinking skills into their course syllabi.

I would like meet with you regarding the possibility of this study at St. Stephens and with your approval discuss your insights as Director of the Core Curriculum. This interview will assist me in understanding a global perspective on the extent and effectiveness of integrating critical thinking skills into the university's core curriculum at St. Stephens University.

The sample population will be selected from selected faculty members in order to conduct interviews and observations from disciplines representing the liberal arts, humanities and sciences. This sample population will include 3 faculty members from English and History, 3 faculty members from Biology and the Physical Sciences, 3 faculty members from Psychology, and 3 from Philosophy and 3 faculty members, who teach the Core Curriculum courses. These core courses are listed as: Journey of Transformation, English 1201/ English 1202 and Core 1001 University Life. Following

the interviews with these selected faculty members; classroom observations will then be scheduled as per faculty members' approval.

### **RATIONALE**

The reason for choosing the above faculty members as a sample population is to gather and analyze data on critical thinking from a broad range of disciplines.

After collecting all the data from the interviews, observations and documents, the data will be organized and coded according to categorical topics and patterns. Once this task is accomplished, findings from this study will be generated by interpreting the data into a potential theory on critical thinking at St. Stephens University.

A possible future factor to examine is whether faculty members have similar and/or different views about critical thinking among the liberal arts, humanities and the sciences. Another possible finding is to determine whether faculty members are adhering to recommended critical teaching and assessment methods as outlined in the Core Curriculum.

The reason that I am requesting this review is to inquire if you as the Director would support this study on critical thinking skills at St. Stephens University. Would this study benefit your Special Program at the university? If you are in agreement with the value and intent of this study, your support and cooperation would be greatly needed. For example, a list of faculty members would be necessary in order to contact faculty members, who would participate in this case study. I would also like to request your support for writing a letter in my behalf. This letter would express the value of this study to faculty members as part of needed research for the Core Curriculum at St. Stephens University.

I look forward to your input and comments in respect to this proposed research project on critical thinking.

Thank you in advance for your anticipated cooperation.

Nancy Lennon

Doctoral Candidate (St. Stephens University)

Educational Leadership Policy and Management in Higher Education

**Appendix C: Contact Summary Form**

Type of Contact:

Interview with Director

Contact Summary Form

Type of Contact: \_\_\_ 1st Interview \_\_\_ 2<sup>nd</sup> Interview \_\_\_ Type of documentation

Time:

Site:

Course: Instructor:

Date Coded:

Page

Important Points

Tentative Themes

### **Appendix D: Letter of Solicitation to Faculty Members**

Dear Faculty Member,

In fulfillment of the requirements for completion of the doctoral degree in Education Leadership, Policy and Management at Seton Hall University, I am conducting a research study of selected faculty members' views on the teaching of critical thinking as core proficiency. The purpose of this dissertation study is to examine how selected faculty members view the teaching of critical thinking by infusing critical thinking into their course syllabi and teaching practices as core proficiency. This research is significant because this will be the first study to be conducted to explore and describe the interface between instructors' views about the teaching of critical thinking and Seton Hall's value of teaching critical thinking as core proficiency.

I have met with Dr. M B , who encouraged and expressed an interest in this study, since Seton Hall has endorsed critical thinking as a core proficiency in the Core Curriculum. I would appreciate if you would consider taking part in this research study. Kindly inform at your earliest convenience if you would be interested in participating in this critical thinking study by emailing me at \_\_\_\_\_.

Thank you,

Nancy Lennon



## **Appendix E: Letter of Consent to Selected Professors**

### Researcher's Affiliation

Nancy Lennon, the individual conducting this research study, is a Doctoral Candidate at St. Stephens University, in the Department of Education Leadership, Management, and Policy.

### Purpose of the Research Study

The purpose of the study is to better understand how faculty members approach the teaching and assessment of critical thinking skills in approved proficiency courses in undergraduate education.

### Research Procedures

Participation in the study involves one component: Interviews: the researcher will conduct one or two 45-60 minute interviews with the instructor at the instructor's convenience. Interview questions will focus on the instructor's perspective the teaching of critical thinking in approved proficiency courses. If the participant agrees to be audio taped, the participant may review the audio recording and the transcription after the interview. This means that the participant can review the recording and/or transcript and notify the researcher in order to add to or qualify any of the interview responses.

### Voluntary Nature of Participation

Participation in this research is voluntary. Whether or not an instructor chooses to participate, the researcher will not reveal that decision to anyone else. Anyone who does choose to participate in the study may limit or end his or her participation in the research at any time.

### Storage of Data

If the participant agrees to be audio-recorded during the interview, the digital recording will be stored on a USB device, and locked in a cabinet at Nancy Lennon's home. The interview will be transcribed by the interviewer without identifying the respondent's name, and the transcript will be stored in a locked cabinet in Nancy Lennon's home. Printed notes from the interview will also be stored in the locked cabinet, and electronic versions of the notes will be stored on a USB device, which will also be stored in the locked cabinet.

### Confidentiality

Responses during the interview will remain confidential. All participants' identities will be protected in reports and published materials by using pseudonyms. After the research is completed, the interview recordings will be deleted.

### Possible Risks

There are no anticipated risks to taking part in this research. The measures that the researcher is taking to ensure everyone's confidentiality means that each individual's participation will not be revealed by the researcher. Nor will the information provided by any participant be traced to his or her participation.

Benefits

While there are no foreseeable direct benefits, it is anticipated that the results of this research will contribute to the body of research on how faculty members approach the teaching and assessment of critical thinking skills in approved proficiency courses.

Contact Information

Nancy Lennon can be contacted on her cell phone. She can be contacted at any time during the project or after the study is completed. Advisor chair can be contacted at Additionally, questions regarding participants' treatment or rights can be directed to the Office of the Institutional Research Board at St. Stephens' University

---- I agree to participate in the study

\_\_\_ I agree to be audio taped when I am interviewed

Name:

Signature:

Date:

---

## **Appendix F: Instructor Solicitation Script**

My name is Nancy Lennon I am a Doctoral Candidate in the department of Education Leadership, Management, and Policy at St. Stephens University.

I'd like to invite you to participate in a research study that I am conducting.

The purpose of the study is to better understand how faculty members approach the teaching of critical thinking in approved proficiency courses.

**The research procedures:** Participation in the study entails one component: one or two one-on-one interviews, during the spring semester 2011 consisting of approximately 45-60 minutes and conducted at your convenience. If you agree to be audio recorded during the interview(s), you may have a copy of the recording. This means that you can review the recording at any time and let me know if you would like to add to or qualify any of your interview responses.

**Participation in this research is voluntary** and can be ended at any time. If you decide to participate, you can decide to end your involvement with the project whenever they wish.

**Storage of Data:** If you agree to be audio recorded during the interview, the recording will be stored on a USB device in a locked cabinet at my home. The interview will be transcribed without identifying your name, and the transcript will be stored in a locked

cabinet in my office. Electronic versions of the transcript will also be stored on the USB device in the locked cabinet.

**Confidentiality:** Responses during the interview will remain confidential. Your identity (and your students' identities) will be protected in reports and published materials by using pseudonyms. After the research is completed, the recordings will be destroyed.

My contact information is: phone number and e-mail address

### Appendix G: DEF Coding Label

Label	Definitions
Definition	Definitions of critical thinking
General Description	Definitions of critical thinking reviewed from all sources of data, which include professors' transcripts and documents, as well as Core Curriculum documents.
Description of Inclusion	For a set of data to be included as definition code, all sources of data must make reference to a critical thinking definition.
Description of Exclusion	For a set of to be excluded form the definition code, all data sources do not mention or refer to a critical thinking definition.
Examples	"Critical thinking is about identifying, reconstructing and being able to come up with and ultimately evaluate arguments."
Subcodes	Reasoning Skills-Arguments, Bloom's Taxonomy- Analysis, Synthesis, Metacognition

### Appendix H: TEACH Coding Label

Label	TEACH
Definition	Methods to teach critical thinking
General Description	The methods professors' use to TEACH critical thinking skills in their college courses.
Description of Inclusion	For a set of data to be included in TEACH code, professors' transcripts and their documents must mention and refer to how they teach critical thinking skills in their college courses.
Description of Exclusion	For a set of to be excluded from TEACH code, professors' transcripts and their documents must not mention or refer to a critical thinking teaching method.
Examples	"I don't know if there is one particular approach that I use to teach critical thinking. I try to keep my teaching approach to critical thinking more discussion oriented."
Sub-code  Lonergan's GEM- General Empirical Method- Data that include a dynamic structure process as human knowing i.e.experience,understand and judgment- decision Metacognition	Lecture- Data that include lecture as a method to teach critical thinking skills. Discussion- Data that include Interpretative Discussion from course readings as a method to teach critical thinking skills. Bloom's Taxonomy – Data that include cognitive skills from lower to higher order as: knowledge, comprehension, application, analysis, synthesis, and evaluation as a critical thinking teaching method. Socratic Method- Data that include professors asking students a variety of questions to encourage critical thinking for class discussion.

### Appendix I: ASSESS Coding Label

Label	Assess
Definition	Methods to Assess critical thinking
General Description	Assessment methods, professors use to evaluate student's critical thinking skills.
Description of Inclusion	Inclusion- For a set of data to qualify for the ASSESS code, professors' transcripts and documents must refer how they evaluate their students' critical thinking skills in the courses they teach.
Description of Exclusion	For a set of data to be excluded from the ASSESS code, professors' transcripts and documents do not refer to any assessment method or evaluative tool to assess students' critical thinking in their college courses.
Examples of Inclusion	I even had them do a 10 page paper on the application of critical thinking on the theory of critical thinking and apply it to their profession. In my experience some of the nurses seem to have a very positive approach. It was very good for me because I was able to see that the theory and the application came together and so the assessment did ring a bell and their experiences.
Sub-Codes	Formal Methods of Assessment- Quizzes, Mid Term Exam, Final Exam Written papers Informal Methods of Assessment- Rubric Class discussion Professor asks question- student responses students' questions



### Appendix J: CHALLENGES Coding Label

Label	CHALL
Definition	Obstacles or frustrations, which make teaching or assessing critical thinking a difficult objective and task
General Description	The obstacles and frustrations a professor encounters when he or she is in the process of infusing the critical thinking proficiency into their college courses.
Description of Inclusion	For a set of data to be included in the challenge code, the professor must mention the obstacles he or she experiences, when they are teaching or assessing critical thinking in their courses.
Description of Exclusion	For a set of to be excluded from the code,
Examples	“One of my concerns around the critical thinking proficiency is that 35 students is a lot to manage in the classroom, especially when you have to hold every student accountable as well as give every student opportunity to participate in the discussion. It is very difficult because you have to deal the students, who are not engaged in the course or who are not keeping up with the work.”
Sub-codes	Student Population- too many students, a broad range of academic abilities and skills, lack of motivation, student resistance, faculty resistance Core Curriculum – difficult textbooks and too many required texts.

**Appendix K: PROFESSIONAL DEVELOPMENT Coding Label**

Label	Professional Development PDI
Definition	Courses that professors attend to learn more about on how to teach and assess critical thinking skills.
General Description	Courses that professors attend within or outside of the university setting, in order to advance their understanding about critical thinking, in respect to teaching and assessment methods.
Description of Inclusion	For a set of data to be included in the professional development code, a professor must have had attended a Professional Development course about critical thinking.
Description of Exclusion	For a set of to be excluded from the Professional Development code, a professor must not have attended a Professional Development course about critical thinking.
Examples	<p>“Yeah, I did take an introductory course on how to teach the core courses. So it was helpful on that level because when you're dealing with stuff you need to master some of the subject matter, so to be able to lead a discussion. For example, you need to know what Dante said regarding his ideas in the text. Actually it was at the professional development course where I got the handout on the Socratic Method and I found that handout to be most helpful.”</p>

## Appendix L: Researcher's Method

A Lonergan philosopher suggested that I consider my method as I thought about the research generated from my qualitative study on critical thinking. This insightful recommendation would certainly facilitate my thoughts as a method to understand Lonergan's cognitive theory, known as the General Empirical Method (GEM) and how the process works as a metacognitive method. The purpose of this part of my dissertation is to describe my thoughts and feelings as I navigated through my study on *How Professors Infuse Critical Thinking into College Courses* in search of finding my own (GEM).

I started to think about how should I begin approaching the numerous pages of data and what tactic would be most effective for organizing and analyzing the huge amounts of data. Is there a method or do I discover the method as I begin to ask questions about the research generated from my study? I found that by asking this question, more questions arose and those questions began with the interrogative pronoun "how." Since the title of this study begins with the word "how," it followed that the process of analysis should also begin with questions using the interrogative pronoun of "how".

The first question that I asked about my study was "How do I approach understanding the data as a whole?" The second question was "How do I begin organizing the overwhelming amount of data?" The third question was "How do I begin coding all of the data?" The fourth question was "How do I organize the codes?" The fifth question was "How do I apply codes to the data?" The sixth question was "How do I code the data for the purposes of cross analysis? The seventh and final question was "How do I apply the codes from the data to write up the findings from this study?" These

“how” reveal my journey to search for a method on how to think about and write about the research generated from my study *How Professors Infuse Critical Thinking into College Courses*.

As I began to think about how to approach the great amount of data generated from my study, my mind went blank, the blank slate scared me so that I could truly identify with what the term Tabula Rasa really meant. I became very overwhelmed at just the thought of how to begin on approaching the huge amount of data and yet I knew I just must “Do it,” to quote Nike. My first thought was to run out and buy NVivo, a qualitative software program, which comes up with themes and codes to analyze data, but I recalled what my professor said when I took the Advanced Qualitative Research course and that was qualitative software programs particularly about qualitative studies regarding participants’ perspectives using a small sample populations is not always appropriate, since the software analysis does not necessarily reflect the research questions and the findings. An example of this mismatch between questions and analysis is given in Qualitative Research Design as an **EXAMPLE 5.2** (p. 99):

Mike Agar (1991) once asked by a foundation to review a report on an interview study that it had commissioned, investigating how historians worked. The researcher had used the computer program The Ethnographic to segment, code the interviews by topic, and collect all the segments on the same topic: The report discussed each of these topics and provided examples how the historians talked about these. However, the foundation felt that the report had not really answered its questions, which had to do with how individual historians thought about their work, their theories about how different topics were connected, and the relationships they saw between their thinking, actions and results.

Answering the latter questions would have required an analysis that elucidated these connections in each historian’s interview. However, the categorizing analysis on which the report was based fragmented these connections, destroying the contextual unity of each historian’s views and allowing only a collective presentation of shared concerns. Agar argued that the fault was not with The Ethnographic, which is extremely useful for answering questions that require categorization, but with its misapplication. As he commented, “The ethnographic represents a part of an ethnographic research process.

When the part is taken for the whole, you get a pathological metonym they can lead you straight to the right answer to the wrong question"(Maxwell, 2005, p. 99).

This example confirmed that using a qualitative software program, such as NVivo, would not be in the best interest of my study and could invalidate study. This example made me realize that I had to go solo and to code all of the data myself. I knew that coding the data myself would ensure aligning the research questions with the professor's perspectives about critical thinking in college.

### **How Do I Approach Understanding the Data as a Whole?**

The first question that I asked myself was "How do I approach understanding the data as a whole?" To approach finding the answers to this question, I started to read all of the data, sentence by sentence, paragraph by paragraph, which encompassed professors' transcripts from the 12 interview and all of their documentation.

The purpose of this first reading was to get an understanding of how the professors thought about critical thinking and a feel of the data as a gestalt. At this stage, I struggled with understanding how the parts of the data shaped the whole. With persistence, I started to see how parts of the data emerged as a first layer and more would be revealed. The second reading involved looking for more themes and patterns. By the third reading, I decided to find themes and patterns as categories and begin thinking about patterns for codes. The more I read the data, the more I was able understand professors' perspectives about critical thinking and that the patterns as parts formed into an understanding of the data as a whole. While exploring the data for themes and patterns, codes emerged from the parts of the data for codes, and I was able to have a more clear understanding of how parts of the data connected to the whole.

By understanding the data as a whole, I was able to shift from part to whole and whole to part, so that my thinking process became on of a cyclic mode, so I was able to vacillate between deductive and inductive reasoning skills. This method of thinking about the data stimulated questions about how to organize the great amount of data.

### **How Do I Begin to Organize All of the Data?**

The second question I posed was “How do I begin organizing the overwhelming amount of data?” I visualized that my brain was analogous to that of a computer, and the more I thought about the research, my mind opened up like all of the folders on a computer with data jumping back and forth and flying into unknown folders. The more I thought about how to organize the data, the more I felt as though I was travelling through a maze of data folders with no starting point and with no way out. Finally, it occurred to me to organize the data by using electronic folders. This task involved copying and pasting each of the professors’ transcripts from their interviews and placing them into professors individual folders and labeling them by alphabetical order. The same approach was used for all of the professors’ documentation pertaining to Signature courses. This electronic filing system served as an organizational tool, so I could think about asking the next question.

### **“How do I Begin Coding the Data?”**

Prior to coding the data, I reread the data again searching for more themes and patterns. I needed to see the parts of the data to understand each one of the professor’s perspective about critical thinking within the contextual gestalt of the data.

After several days of deliberation, I began to code for of the professors’ perspectives on how they define critical thinking by categorizing critical thinking definitions. Subcodes

emerged from the data on how professors defined critical thinking such as defining critical thinking in terms of kinds of arguments as reasoning skills, analysis and synthesis as reflected as in Blooms taxonomy and Lonergan's conception of thinking, the general empirical method, which the Core Curriculum provides on the university's Website as a critical thinking definition for professors to consider for infusing critical thinking into Core courses. After reviewing all of the data, I decided to code the data on how professors define critical thinking by using DEF as the short label for professors' definitions on critical thinking. As I coded the data on how professors defined critical thinking, I began to feel very frustrated about the amount of time it took to code just one code. At this point, I kept asking myself if there an easier method existed to code the data. As much as I wanted to find a faster and easier method to code the data from this study, I was cognizant that there was no an easier way to code except to keep reading and rereading all the data for themes and patterns. Despite my feelings of frustration about exploring the data for the first code on professors' critical thinking definitions, I discovered that other themes and patterns unexpectedly emerged from the data. I mean they did not jump out at me and say here I am, but rather, the process required reading and rereading as I searched for more themes and patterns. I had to accept the reality that this was not going to be an easy task. During this phase of the coding process, distractions became a welcomed opportunity to avoid coding data, even washing windows became the preferred task of the day. After washing far too many windows, I realized my priority was to return to the coding the data and forget the windows.

To stay focused on the coding process, I developed a color coding system for the first code, the color **red** reflected professors' perspectives on critical thinking definitions.

I highlighted data for critical thinking definitions **DEF** code as noted in each of the 12 professors' transcription from their interviews and then in their documents. This strategy helped me visualize critical thinking definitions as a red code to separate from other data by having its own distinctive red color.

### **“How Do I Code All of the Other Data?”**

The next question that I asked myself was “How do I code all of the other data?”

After reading the data several times, I found that following codes emerged from the data:

1. Teaching Critical Thinking, such pedagogy as:

- A. Lecture
- B. Discussion- Interpretative
- C. Discussion- Socratic Method
- D. Bloom's Taxonomy
- E. General Empirical Method

2. Assessment of Critical Thinking:

- A. Student participation in class discussion
- B. Quizzes
- C. Exams Midterm and Final
- D. Papers

3. Challenges to teaching critical thinking

- A. Student Population, a broad range of backgrounds and skill abilities
- B. Lack of a Common Definition of Critical Thinking
- C. Difficult Texts
- D. Curriculum and Proficiencies
- E. Students' limited proficiency of basic skills

4. Professional Development

- A. Helpful
- B. Not helpful
- C. Ways to improve professional development for teaching and assessing critical thinking.



The following colors were applied to the data as part of this color-coding system for a visual analysis of codes and sub codes:

1. Definition – DEF - RED
2. Teach – GREEN
3. Assessment - YELLOW
4. Challenges - TEAL
5. Professional development helpful not helpful VIOLET VIOLET

While reflecting on the codes embedded in the data and developing a color coding system, I requested a meeting with my advisor to discuss the status of the early stages of analysis and to find out more about “How do I develop and apply codes to the data?” During our meeting, my advisor stated that I was on the right track in terms of coding the data, and recommended an additional technique to organize the data. This technique included writing my initials next to each of the interview questions and the initials of each professor next to their responses. By applying this approach, I found using hard copies also facilitated the process and was easier on my eyes than just relying on the computer screen. This approach allowed me to first read the hard copy and then highlight the each of the codes using the color color coded system and then highlight the data in the computer as

DEF Code in red, TEACH CT in bright green, ASSESS – yellow CHAI –TEAL, Professional Development- PD violet –as well as to write memos under each of the professors’ responses. Using the hard copy as a reference, I returned to the computer and typed my initials (NL) next to each interview question and typed the initials next to each of the professors’ responses on all of the 12 transcripts. For example, NL 6. How do you

define critical thinking? For the professors' responses, I typed their initials AZ 6 next to their responses on critical thinking definitions and typed memos from my notes under each of their responses. This simple numerical listing worked as an organizational strategy as I continued to code the rest of the data. For revisions, the process included reviewing the professors' transcripts for each of the codes, while writing more memos during the process. Although I found this to a very time consuming task, this method worked as an organizational strategy and helped for cross analysis.

Since I enjoyed working with colors, this color-coded system kept me motivated as a way to stay in the coding zone. I also discovered that this system kept the momentum going as a consistent rhythm similar to an art form as an approach for analyzing the data. Furthermore, this color-coded system helped me to keep an open mind during this stage of coding through inductive analysis.

### **Learning Style**

As I thought about a method about the coding process and how they connect and weave throughout the data, I found that a (VAKT) learning style, a combination of the visual, auditory, kinesthetic and tactile modalities shaped my understanding of coding the data generated from the research. This multimodal learning style that became part of my method to understand the data, which consisted of:

1. Hard copies of each the professor's original transcript with a visual color-coded system  
SEE - (VISUAL)
2. Hand write codes and memos in margins WRITE- (KINESTHETIC)

3. Use Naturally Dragon Speaking Software, as I verbally read codes and notes from hard copies from each of the professors' transcripts into newly revised documents to hear and listen to my thoughts out loud. HEAR - (AUDITORY)

4. Type codes into documents on computer. TOUCH - (TACTILE)

According to Aristotle, we learn through our senses, so this multimodal learning style, Visual, Auditory, Kinesthetic, Tactile, (VAKT), learning style helped me formulate my thoughts and understand the tasks involved during the different levels of the coding process. As I read and reread each professor's transcript and their documents, the layers of codes and sub codes revealed themselves from the data. For example, I discovered that the number of codes could vary from one to five codes within one to two paragraphs just within one professor's response. According to Miles and Huberman (1994), "Coding is analysis. To review a set of field notes, transcribed or synthesized, and to dissect them meaningful, while keeping the relations between the parts intact, is the stuff of analysis" (p. 56). After coding the data, I needed to think about "How do I code the data for the purposes of cross analysis?" I read and reread various sources on qualitative research such as *Qualitative Data Analysis: An expanded sourcebook* by Miles and Huberman and *Qualitative Research for Education* by Biklen and Bodgan to think about how to approach this task and how to approach cross-analysis as the next task.

After referencing these two books, which were used as texts in both my Qualitative Research and Advanced Qualitative research courses, I found that by reading these texts again, I had an insight about how to apply a tentative theory generated from the research.

### How Do I Code the Data for Cross Analysis?

The next task entailed a method to generate documents regarding each of the 12 professors' views on each code, views on critical thinking definitions, critical thinking teaching methods, critical thinking assessment methods, challenges and professional development, and compile each code into one document.

For example, each document had a heading for each of the codes, such as **DEF** in red, for critical thinking definitions. This task involved cutting and pasting all of the red DEF codes from each of the twelve professors' transcripts and documentation. This method was applied to all of the other codes, **TEACH**, **ASSESS**, **CHALL**, and **PROF DEVEL**, so there was one document on the professors' views on each code, according to the assigned color. This color-coded system for each of the codes facilitated the phase of organizing the data for the purpose of cross analyzing the data.

Individual documents for each code made it advantageous system for organizing the data. To create individual documents for the professors' documentation, I used the same system. For example, the summary sheet included: a heading for each code, such as DEF by listing each of the professor's discipline and initials by cutting and pasting the RED CODE DEF from their documentation as per the 12 professors' definition on critical thinking, source, and page number referencing the document.

For example **DEF** - Critical Thinking Definitions Documentation

Philosophy Professor AZ	definition on critical thinking	Document page
History Professor KS	definition on critical thinking	Document and page

This table format was used to reference professors' documentations for all of the remaining codes, TEACH, ASSESS, CHALL, PROF DEVELOPMENT.

Each individual document included all of the professors' views on a specific code by using the color-coded system. A brief summary of each professor's view on each code was included at the end of each of these documents. Documents on each code provided a comprehensive method to analyze all of the professors' perspectives by this color-coded system. This table format allowed me to see the connections between and among codes for the purposes of cross analysis. By having one document for each code, I was able consider the data by considering professors' views from similar and different perspectives. For example, the data demonstrated that a number of the professors defined critical thinking in terms of arguments, while other professors defined critical thinking in terms of analysis. It was during this phase that I began to think about how I was going to incorporate the professors' documents as an important data source.

While thinking about how the professors' documents could be incorporated into my study as a data source, I reread my textbooks from my Qualitative and Advanced Qualitative courses as well as other qualitative dissertations. These sources helped me figure out how to incorporate professors' documentation as an important source of data for my study. As I began the next phase of cross analysis, I realized that the best fit for most of the professors' documents fell under the area of assessment, particularly in terms of how professors evaluate critical thinking in Core courses. I found that Bloom's taxonomy nomenclature was more consistent with methods to evaluate critical thinking

as noted in the professors' documentation, syllabi, and exams, rather than on methods on how to teach critical thinking.

During this stage, I realized how codes can and do shift during the process of analysis, just like they say in the textbooks. Once I completed all the documents, the task of cross analysis was initiated for each code, i.e. **DEF**, **TEACH**, **ASSESS**, **CHALLENGE** and **PROFESSIONAL DEVELOPMENT**. Although this process was a very time consuming task, I kept discovering more meaningful codes and subcodes during the cross analysis process and completed all of the documents for cross analysis using the color-coded system i.e. **DEF**, **TEACH**, **ASSESS**, **SATISFACTION**, **CHALLENGE** and **PROFESSIONAL DEVELOPMENT**. This color-coding system worked as a useful visual presentation by threading the connections between and among professors' views about this critical thinking study as well as facilitated the process for analyzing the data for the purpose of cross analysis. Since I felt satisfied with this part of this color coding system for analysis, I thought it best to develop and write up Labels (see Appendices) to explain the codes and subcodes, which originated from the colorful display of data.

### **How Do I Write Up the Findings?**

The final question asked that I asked was "How do I begin the task of writing up the findings for this qualitative study?" I had some ideas and wanted to share them with my advisor for feedback. Even though I finished individual documents on all of the codes and sub-codes, I was not sure how to begin writing up the findings. However, I am not sure how to begin. I thought that I would start by re-reading the Critical thinking Definition Code document, and other data sources pertaining to DEF Code, so as to chunk similar findings and then dissimilar findings. Then write up an initial draft on

these findings. The next step would be to apply this approach to all of the other codes, one CODE at a time.

For this final phase of the dissertation, I started to read, reread and reread all DEF codes and examined the data for common definitions of critical thinking. I grouped professors' definitions of critical thinking and wrote up the professors definitions according to similar findings from cross analysis. After writing up professors' views on critical thinking definitions section as a first draft, I realized that I needed an outline to write up the other findings. I decided break up data as per codes into six sections: Section 1- professors' views on critical thinking definitions, Section 2-teaching methods, Section 3- assessment methods, Section 4- Challenges to infusing critical thinking Section 5- professional development and professors' ideas on how to improve it.

This plan provided me with an organized method on how to write up the other findings. For example, prior to writing up critical thinking teaching methods – Section 2, I found it helpful to print out the all teach codes document as a hard copy and then read for further understanding on how to think about how to write up these data. I found that by developing tables with professors' names and disciplines and listing all of their perspectives from the coded data, similar categories emerged. For example, after reviewing the professors' perspectives on critical teaching methods, common methods were found such as interpretative discussion and Socratic method. Using a table format, summaries were then written from the individual color-coded documents as an approach to think about on how to write up the findings through this approach.

When attempting to organize my thoughts for writing up the findings from my study, I found it very challenging to organize all the data and find a place to begin the

writing process. It was difficult to shift back and forth from part to whole and then back from the whole to part, since cognitive process involves shifting from inductive to deductive reasoning skills within milliseconds. Yet, I know these reasoning skills are critical for analyzing and synthesizing the data for writing purposes. After several days of pondering, I decided to begin by writing up the participants' perspectives on how they define critical thinking, using the first RED code. Three critical thinking definitions became apparent from the data, which consisted of reasoning skills in terms of different kinds of argument, Bloom's taxonomy and metacognition. After writing up all of the professors' views on how they define critical thinking from the data, I began to question how to best reflect the massive amount of documentation. I decided to adhere to using the data from all of the documentation by aligning it with the three categories of critical definitions.

The next step for writing up the findings for teaching methods was to develop another matrix in terms of each professor's description of their critical thinking teaching method. The green color coded documents on teaching facilitated this process. I was then able to write these findings on how professors teach critical thinking by categorizing pedagogy as: a lecture, interpretative discussion, Socratic method, Bloom's taxonomy, analysis of arguments as reasoning skills, and the general empirical method (GEM).

My initial attempt was to begin by writing up the findings on how the professor, who teaches sociology and Core courses, teaches critical thinking skills in his courses. Once I finished writing up his thoughts about teaching critical thinking skills, I was able to write up all of the professors' teaching methods according to the major categories of critical thinking pedagogy. This approach was then applied to the other findings from the



color-coded documents and enabled writing the findings as categories generated from the codes as critical thinking assessment methods, challenges to teaching critical thinking within Core courses, and professors' views on how to improve critical thinking for professional development.

### **Questions about Findings**

After I finished writing up the first draft of findings, I thought about some questions based on the professors' perspectives critical thinking findings with brief responses to these questions.

1. How would I define critical thinking?

I would define critical thinking in terms of Lonergan's cognitive theory as metacognition.

2. How would I teach critical thinking if I were a college professor?

I would teach critical thinking skills by making it explicit and not part of the discovery method because you can discover more after you understand what critical thinking is, and therefore apply it. I would use the general empirical method as metacognition to teach students to think about their thinking method.

3. How would I assess critical thinking?

According to Dr. Colver, who taught an assessment course at Duke University in 1972, test what you teach, so that assessment is linked to the teaching process. For example, develop a rubric, as an assessment tool, so as to assess critical thinking as a course objective as well as the content of the subject matter.

4. How would I address the challenges to teaching critical thinking in Core courses?

The first important challenge to address is to apply a common definition of critical thinking by advancing Core recommended definition and conception of critical thinking, which is based in Lonergan's cognitive theory. The other challenges would fall under the auspices of the Core Committee and Professional Development.

5. How would I want to improve professional development about critical thinking in terms of definitions, teaching methods and assessment methods at the university?  
For professional development, I would like to see the university offer and organize more professional development courses within each of the undergraduate programs through the Department Chair as well as invite more expert speakers from outside of the university.

After thinking about my responses to these questions, I developed an outline of a method, based on Lonergan's general empirical method (GEM) to consider teaching metacognition as critical thinking pedagogy in Core courses. First, a brief review of his cognitive theory advances a further understanding of the general empirical method.

Although the Core Curriculum derives their conception about critical thinking from Bernard Lonergan's cognitive theory, professors do not typically teach critical thinking using Lonergan's general empirical method. Rather, most professors teach critical thinking in Core courses through interpretative discussion and by teaching students' to analyze and understand authors's arguments from Core texts. However, the research revealed that professors frequently refer to such terms as experience, understanding and judgment, when discussing their thoughts about critical thinking as part of their teaching practices.

## **Appendix M General Empirical Method**

Although participants in philosophy and sociology think that arguments, as inductive and deductive arguments reasoning skills as an approach to infuse critical thinking into the content of disciplines, the General Empirical Method is a method, which can be applied not only to academic disciplines, but to thinking about anything or anywhere as an individual metacognitive process. For example, people in China and all over the world are thinking right now about something. The General Empirical Method might be considered more of a global thinking process, whereas, arguments are part of the thinking process in order to understand content. Arguments can fall under the understanding cognitive process of the general empirical method as a level II intellectual component of the thinking process. For example, one of the philosophy professors perceived that arguments can be applied as critical thinking across disciplines.

The discipline of philosophy is about argument, so everything we do is about critical thinking. For example, whether is inductive reasoning, so even for philosophers, critical thinking forms the theoretical basis for specific forms of critical thinking in other disciplines. So, we will do inductive analysis, which can be used in the Social Sciences and so will start at the foundations of inductive analysis. We will also do deductive logic and argumentation, which then might form what constitutes critical thinking in mathematics and other sorts of sciences that might use other deductive approaches. It is the nature of the discipline.

The Core Committee's definition on critical thinking from the critical thinking module website is derived from Bernard Lonergan's, Jesuit Theologian and Philosopher, cognitive theory, based in experience, understanding, and judgment, which interact with

the cognitive processes and levels of thinking. Lonergan advances the theory that human knowing is a dynamic structure, based in the cognitive process itself. The cognitive process of human thinking revolves around as it connects the levels of one's experience, understanding and judgment. Lonergan's general empirical method is rooted in his cognitive theory in which he asks the key philosophical question to formulate this method, "What are we doing when we are thinking?"

The purpose of this brief explanation about Lonergan's ideas about thinking is to understand the value of the general empirical method as a consistent critical teaching practice for Core courses. The activities of the human mind are distinguished in the General Empirical Method, as "a basic pattern of operations employed in every cognitional enterprise". Lonergan explains that,

A method is a normative pattern of recurrent and related operations yielding cumulative and progressive results. There is a method, where there are distinct operations, where each operation is related to the others, with a set of relations forms a pattern, where the pattern is described as a right way of doing the job, where operations in accord with the pattern may be repeated indefinitely, and where the fruits of such repetitions are, not repetitious, but cumulative and progressive (Lonergan, 1972, p. 4).

According to Lonergan, human knowing is a dynamic structure, which interacts with each and all the cognitive levels and activities of one's experience, understanding and judgment. This dynamic structure involves separate, but integrated activities. Experience, understanding, and judging are founded in one's cognitive process as sequence of cognitive acts, events and operations as intended activities that interact with

the dynamic structure. Experience, understanding, and judging are based in one's cognitive process as levels of activities, which ask questions at each level as it continuously intermingles with the dynamic structure. Lonergan's General Empirical Method is a method about thinking, which assimilates all data from experience, understanding, judging and deciding at distinct levels of activities (p. 223).

Cognitive process, as levels of experience, understanding, judgment, and decision, are terms that require further explanation in an effort to obtain a deeper understanding of Lonergan's (GEM) as a metacognitive process to teach critical thinking skills. The first question is what is a cognitive process? According to Dr. Gallo, an expert on Lonergan and psychologist, "A cognitive process can be defined as an ordered sequence of cognitive acts, events and operations guided by an intention to achieve a goal". The next question is what do the levels of experience, understanding, judging and deciding mean?

## EXPERIENCE

Experience is the data that emerges from the senses such as seeing or hearing touching tasting and smelling. We begin to ask questions about that data, such as What is that? Why is that happening? (Fitzpatrick, 1996).

Experience is level 1, and identified as an *Empirical* level by which we sense, perceive, imagine, feel, speak, and move (Lonergan, 1972, p. 9).

## UNDERSTANDING

Understanding is the activity, in which we attempt to understand the meaning from the experience. Dr. Grallo explains the level of understanding as the kind of meaning we establish will depend on the kind of data that are puzzling us, so that we ask, “What is that”? Understanding is when we make sense of our experience and arrive at an understanding of the data, so as to come up with a meaning, which makes sense of the data. Description helps us to understand the data by relating it to our senses (Fitzpatrick, 1996). Understanding is identified as: *Intellectual*, level 2 and is the level that we inquire to understand and achieve an understanding of what we understood.

## JUDGMENT

Judgment is a level 3 and identified as the *Rational* level on which we reflect, consider the evidence, and pass judgment on the certainty or probability of a statement.

Judgment is the level, where we are confirming our judgment. It means that we are affirming our understanding as it fits into the data. The question that leads to judgment and asks such questions as, “Is that so? It is probably so or probably not so. These are the questions looking for a yes or no answer. Judgment is a synthesis of the data and their meaning.

## DECISIONS

Decision is the 4<sup>th</sup> level, known as the *Responsible* level. We decide what to do and to make choices about our judgments, about right and wrong, moral choices and decisions. Lonergan says that at this fourth level, we take a stand on what we believe in. This fourth level is the level of morality, freedom and responsibility (Fitzpatrick, p.10).

We begin to ask the following questions, “What should I do?” “Is this Appropriate?” “Will I do it?” These questions move us into the level of deciding about what to do. Decision is the responsible level on which we are concerned with ourselves, our own operations, our goals, and so to deliberate about possible courses of action, evaluate them, decide and carry out our decisions. “All the operations on these four levels are intentional and conscious” (Lonergan, p.9).

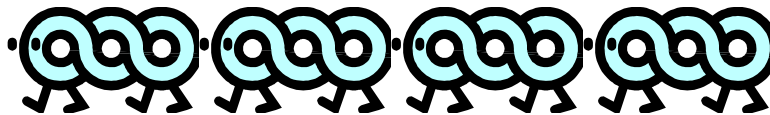
Dr. Gallo explains these activities as levels of experience, understanding, judgment and decision as:

Each activity is distinguished from the others by a specific intention related to comprehensive human learning. For example, experience is distinguished from the others as a source for the operation of all the other groups and can be more accurately identified with consciousness. Experience is identified and learning as a level I activity in the state of focused attention. With *understanding*, (level 2), a new intention emerges in consciousness – the intention to seek meaningful possibilities through answering a variety of questions. The search for possibilities ceases with the shift in intention of the judging (level 3) group-to resolve issues of fact and value. And the intention shifts again. In the decision (level 4) group with the intention to transform situations (and self) through specific actions.

At each cognitive level of experience, understanding, judgment and decision questions emerge to help us find answers and if not more questions emerge. To come to understand something new, we usually have to identify the unknown. Once we have done this, we have what Lonergan terms a “known unknown”. We still do not know but we know what it is that we do not know. Therefore, we ask questions at every level to

seek answers to “known unknown” are that we are thinking about as part of the cognitive process (Fitzpatrick, p.1). If individual learning proceeds through process of questions, questioning and insight than this process will spiral into different levels of consciousness: understanding, knowing, deciding (Fitzpatrick, 2005). And so, the cognitive levels of experience, understanding, judging and deciding do not operate in sequential order, but rather maneuver through looping patterns to provide insights and to ask questions through the thinking process. Questions stimulate thinking at each level and move one’s thoughts through each loop of the cognitive process, while looping back again. The graphic image depicts the continuing movement of the cognitive levels.

(GEM)



EXPERIENCE-- UNDERSTANDING --- JUDGING--- DECIDING

“The General Empirical Method (GEM) heightens consciousness that brings to light our conscious and intentional operations and thereby leads to the answers to three basic questions. What am I doing when I am knowing? Why is that doing it knowing? Why is doing that knowing? What do I know when I do it?” (Lonergan, 1972 p.25)

Thus, this brief description of (GEM) is to explain how the cognitive levels of the general empirical method can be used as a metacognitive approach to teach critical thinking skills. The purpose of the (GEM) matrix is to provide an outline of the cognitive levels as questions to consider as a method to infuse critical thinking in Core courses at St. Stephens University.



## (GEM) MATRIX TEACH CORE COURSES

<b>Cognitive Processes</b>	<b>Activities at Cognitive Levels</b>	<b>Cognitive Levels</b>	<b>Questions Asked at Cognitive level</b>
Experience Empirical Level I	Hearing Touch Seeing Tasting Feeling Smelling	Experience is a Level I Empirical	Being Attentive
Understanding Intellectual Level II	Imaging Posing Questions Having Insights Forming hypotheses Conceptualizing Activities associated with creative thinking 5W's Posing questions	Understanding is a Level II Intellectual	What is it? Why is that? What does it mean? Why does it mean that? How often does it occur? (statistics) Brainstorming Creative thinking
Judging Rational Level III	Weighing the evidence Reflecting Making judgments Re-visiting Hypothesis, meanings, etc. Activities associated with critical thinking	Judging is a Level III Rational	Is it so? Is it probably or absolutely so? (Questions for reflection) Critical thinking
Deciding and Acting Level IV	Ask questions Identifying possible plans of action, making decisions, taking action to do or not to do something	Deciding is a Level IV Responsible	Will I do it?

This General Empirical Method is a method to teach metacognition, which can be used not only as a method to infuse critical thinking into Core courses, but more globally as a method to think about one's thinking as a universal approach in all disciplines.

The theme of method is introduced by Lonergan as a basis of every movement, of every activity of every understanding both in the field of research and in that of education. The general empirical method is at the root of Lonergan's whole theory, but is also the fundamental basis for all human activity from the simplest to the most complex, from literary activities to scientific, from economic activities to theological, including even expressive activities. The deeply sought principle of unification resides in the method and not in the content (Triana, 2006 p. 26).

## Appendix N Core Curriculum

St. Stephens University embarked on their journey to develop students' critical thinking skills by infusing critical thinking as one of the core proficiencies into undergraduate courses. In November 2001, St. Stephens University responded to the President's request that the faculty develop a Core Curriculum, which would exemplify a "Signature University Experience."

The Faculty Senate elected the Core Curriculum Committee to focus on educational reform by the end of the Spring 2002 semester. One of the Committee's recommendations was to restructure the university's general education requirements for undergraduate studies. These restructuring changes would compel every school and college to rethink its overall curriculum and goals. Faculty members concurred, "One thing they believe students who graduate from St. Stephens should have in common is a high level of proficiency in certain key areas that would help them to make lifelong learners and make them uniquely equipped for life beyond college. These "core proficiencies" were identified as: reading, writing, oral communication, numeracy, information fluency, and **critical thinking.**" To accomplish this goal, the Core Curriculum Committee introduced critical thinking as part of the University's Curriculum

The goal is to develop undergraduate students' skills in the universal proficiencies of critical thinking, information fluency, oral and written presentation of idea in at least 50% of all their coursework. These proficiencies are to be introduced in coursework the first year, and with further development throughout the student's undergraduate years.

The Committee proposed the following requirement:

That at least half of the courses that a student takes must explicitly develop the student's critical thinking, information fluency, writing and speaking skills.

To meet this requirement, the syllabus of the course must demonstrate that some 15-20% of the course grade will consist of assessment of the student's proficiency in research, argument, writing and other presentation skills.

Critical Thinking developed from the Committee includes the following elements:

- Identification of arguments,
- Identifying assumptions of the argument
- Finding conclusions and premises,
- Identifying fallacies,
- Distinguishing between inductive and deductive arguments;
- Distinguishing between explanations and descriptions,
- Identifying analogies and conditionals;
- Types of reasoning (analogical, enumerative, statistical, causal, scientific);
- Application of forms of reasoning to various disciplines and to critical analysis of everyday arguments in terms of structure and strength.

The Committee recommends how faculty should incorporate critical thinking into a course by paying attention to the assumptions, evidence and arguments, which underlie the course material, as well as to the material itself. Research and other assignments will demand analysis and not mere repetition of facts; and it will be clear to students that the course expectations include the expectation that the student will demonstrate an ability to make appropriate analysis of the material.

To assess the effectiveness of the proposed Core Curriculum Assessment:

The Committee recommends that the Core Curriculum be an ongoing responsibility of the Core Curriculum Committee of the Faculty Senate. That Committee is to be charged with periodically reviewing the goals and objectives of the Core Curriculum, as well as with the certification of courses as meeting one or more of the Core's objectives.

In the seventh year of the Core's implementation, the Core Curriculum Committee is charged to undertake an overall assessment of the effectiveness of the Core. At that point, in time, the first three classes to enter under the new Core will have graduated, and their portfolios will provide some data to assess the degree to which the Core requirements have accomplished the goals set out as the reason for this reform. The Committee is to assess the extent to which the goals are being accomplished as well as the adequacy of **the** goals and objectives as stated, and to make to the Senate such recommendations for change as it deems warranted by the evidence. [Source: Core Curriculum Committee Draft Report, October 1, 2004]

#### **Structure for Administration and Participants of the Core Curriculum**

Organizational charts depict the structure for the administration of the Core and the faculty members, who participate in the University Core Curriculum and are available from the university's website.

### **Faculty Development: Critical Thinking**

The Core Committee proposes in-service training for faculty members so that they will be able to infuse critical thinking into their coursework. Faculty Development initiatives and training for Critical Thinking courses will take place in a series of seminars in which members of the Philosophy Department will be called upon to take a leading role.

Faculty will participate in a series of workshops that focus on identifying the kinds of argument appropriate to a particular course, the nature of evidence, the underlying assumptions of arguments in the field, and the ways in which the subject matter's perspectives influence the way the student thinks. These seminars will generally be on a departmental basis, in deference to the wide variety of ways in which different disciplines formulate their specific argumentations. Retrieved from the university Website.

After attending a seminar about teaching critical thinking skills presented by Professor Roosevelt Mont from Columbia University, a professor from the Anthropology Department states his insight as "it is essential to cultivate critical thinking in our students and that the faculty will diligently work toward making this approach central to the new "Core Curriculum."

The university's website describes how critical thinking should be assessed as core proficiency as: guidelines for establishing the assessment of course proficiencies through a set of questions for evaluating the infusion level into faculty members' coursework at a town meeting. Classroom discussions should devote time to the nature of argument implicit in the course material and should be designed to bring students to a deeper appreciation of the ways in which such argumentation forms the conclusions of

the discipline. Written work, and particularly examination questions, should be formulated in such a way as to require students to discuss the ways of thinking and argumentation that undergird the course material. Retrieved from the university Website.

In addition, faculty members can answer the following questions to determine whether and to what extent their courses are already infused with a critical thinking proficiency. A self-assessment form is made available to faculty members in respect to how faculty members incorporate critical thinking as a curriculum goal.

What are your goals for the proficiency students develop in the course?

How do you incorporate these goals into your class syllabus?

How do you articulate these goals to your students?

In general?

As part of specific assignments?

As part of the course assessment?

How do you measure the achievement of those goals?

Specific measurements: quizzes, tests, exams, exercises, assessments, presentations, etc.? General measurements: overall class performance, presentation

Faculty members, who would like to teach a Core Curriculum course, can apply through the Core Curriculum Website.

The organizational structure of the Core Curriculum is depicted as a chart on the next page.





