

**AN EXPLORATORY STUDY OF EFFICACY OF COMMON BUSINESS CRITICAL
THINKING COURSE:
DO CIS MAJORS PERFORM BETTER THAN OTHER BUSINESS MAJORS?**

*Kazuo Nakatani, Florida Gulf Coast University, knakatan@fgcu.edu
Judy Wynekoop, Florida Gulf Coast University, jwynekoo@fgcu.edu*

ABSTRACT

This study describes an exploratory investigation of the effectiveness of a common business course designed to improve sophomore and junior business students' critical thinking skills using the case study method. The focus was on identifying how the CIS major students perform in the course. The impact of student academic intrinsic motivation on critical thinking skill acquisition was studied, as previous studies have shown persistence and effort are required. The results indicate that the course was effective, the control aspect of the intrinsic motivation may have positive correlation with the critical thinking acquisition, and CIS majors perform well in the critical thinking skill acquisition.

Keywords: Critical Thinking, Intrinsic Motivation, Course Effectiveness, Learning Outcome Assessment

INTRODUCTION

Critical thinking (CT) skills are among the most important soft skills employers want from college graduates (Jones, Leonard, & Lang, 2018; Wall Street Journal, 2010). Critical thinking is necessary to deal with the exponentially increasing volume of information at our fingertips (Halpern, 1998). Accrediting bodies, employers and business colleges emphasize the importance of the ability for business majors to be able to think critically. The IS 2010 Information Systems Curriculum Guidelines (Topi, et al., 2010) emphasize that critical thinking skills are fundamental to the work of an information systems (IS) professional.

Critical thinking, often referred to as higher-order thinking, can be learned (Halpern, 1998). However, persistence and effort is required to develop higher-order thinking skills, as well as apply them (Halpern, 1998). Therefore, individuals with greater motivation may be considered to learn and apply critical thinking skills better than those with lower motivation. Also, different majors have been shown to perform differently in an objective critical thinking assessment test (Brown and Bielinska-Kwapisz, 2015); however, CIS majors were not included in that study. Thus, this study investigates (1) the relationship of intrinsic motivation to the effectiveness of a common course for business majors designed to improve critical thinking skills, and (2) the effects of the course on different majors, especially CIS majors.

This report first reviews critical thinking followed by a discussion of intrinsic motivation in an academic context. Then, the critical thinking for business course developed for business sophomore and junior students. Next, the methodology of this exploratory investigation is elaborated. Finally, the results of the investigation are discussed.

LITERATURE REVIEW

Critical Thinking

There are numerous definitions of critical thinking. Critical thinkers are open minded, able to interpret and analyze information in a variety of settings, evaluate the credibility of information, infer the consequences of a decision, and justify and communicate their reasoning effectively (Halpern, 1998). In business education research, critical thinking skills have been generally defined as the ability to evaluate sources of information, challenge assumptions, understand context, analyze arguments, and use metacognition (Brown and Bielinska-Kwapisz, 2015). The following aspects of critical thinking was emphasized in this study and the critical thinking course developed, based on the preceding: the ability to examine a business problem or situation from multiple perspectives; identify, evaluate, and apply relevant

information and evidence; make a decision or develop a solution; and effectively communicate the solution and its justification.

Critical Thinking in the Business Curriculum

Business school graduates, including CIS majors, should be able to think effectively in organizational contexts. Much has been written on how to teach problem solving and critical thinking skills in business curricula. Yet, few business curricula include a course dedicated to critical thinking (Smith, 2014; Bandyopadhyay & Szostek, 2019). Such a course offers a place where assessment “loop closing” can occur – that is, when students are found to be deficient in critical thinking, or analysis skills, there is a single course where changes can be made to improve outcomes. Without such a course, debates occur as to where in the curriculum such skills should be taught, and they rarely find a home (Smith, 2014).

A study that used the Collegiate Learning Assessment (CLA) to measure critical thinking skills shows that college students only minimally improve critical thinking skills and business students, among all the majors assessed, improves the smallest amount during the first two years of college (Arum & Roksa, 2011). Yet, a newer study shows that business students exhibited improvement in some critical thinking assignments while decline in other critical thinking assignments measured at two different times (Bandyopadhyay & Szostek, 2019).

Some interventions and assessments for critical thinking include writing skills, since in order to present an analysis one must write well. For example, AACSB-International, an accrediting body for business schools, includes the following in the undergraduate business curriculum coverage: students should be able to demonstrate “higher-order cognitive skills to analyze an unstructured problem, formulate and develop a solution using appropriate technology, and effectively communicate the results to stakeholders” (AACSB, 2018, p. 35). Success at critical thinking and writing are intertwined (Bailey, Zanchetta, Velasco, & Pon, 2015). For example, writing and critical thinking were the focus of a multi-disciplinary intervention in large undergraduate classes (Bernstein & Greenhoot, 2014). AAC&U Value Rubrics were used to assess critical thinking and writing ability. Scores showed that students in the enhanced courses performed better in critical thinking and writing than did students in equivalent courses without the intervention. Additionally, improvements lasted over time (Bernstein & Greenhoot, 2014).

Others examine the total effect of business education on critical thinking (Brown & Bielinska-Kwapisz, 2015). Brown and Bielinska-Kwapisz (2015) administered the California Critical Thinking Skills Test (CCTST) to graduating seniors in the business college and found that total critical thinking scores differed by majors, with accounting majors having the highest critical thinking scores, followed by finance, marketing and management. In their study, CIS or information systems-oriented majors were not included. They also found that ACT scores (a proxy for innate cognitive ability) and GPA (a proxy for effort) were related to total critical thinking scores, as well as scores on some individual subscales. Since most of the variation in total critical thinking scores of students with high critical thinking scores was explained by GPA but not ACT scores, the authors conclude that the academic curriculum influences critical thinking scores and that students with high critical thinking scores benefitted the most from the curriculum, as the higher scores were due to something other than innate ability as measured by ACT scores (Brown & Bielinska-Kwapisz, 2015). However, some have questioned whether the business curriculum improves critical thinking or filters out students without the higher order thinking skills (Coleman, Mason, & Steagall, 2012).

There remains uncertainty about how to assess critical thinking in specific disciplines in higher education (Bandyopadhyay & Szostek, 2019). Research has indicated critical thinking may be best assessed using multiple methods in multiple settings (Halpern, 1998). Instruments that have been used include the CCTST and CLA, as noted above, as well as the Watson-Glaser a Thinking Appraisal (Watson & Glaser, 1964) and the HEIghten Critical Thinking Assessment (<https://www.ets.org>). These assessments all measure some of the various dimensions of critical thinking, such as deductive and inductive reasoning, reasoning and evaluation ability, and interpretation and inference skills. Other studies have used student self-assessment (Davis, Thomas, & Kazlaukas, 2006), instructor assessment (Pomykalski, 2006; Wang & Wang, 2011), and instructor use of AAC&U Value Rubrics (Bernstein & Greenhoot, 2014). In this exploratory study, a rubric developed for the university-wide Quality Enhancement Program based on the AAC&U Critical Thinking Value Rubric is used (Association of American Colleges and Universities, 2009).

Intrinsic Motivation

The development of critical thinking requires hard work and time. Paul and Elder (2001) wrote “no intellectual pain, no intellectual gain” as analogy to physical conditioning famous phrase of “no pain, no gain”, since critical thinking develops in stages, over time. They emphasized the importance of willingness to practice more than ordinary effort even when uncomfortable, challenging and difficult, and that critical thinking must be nurtured. While routine problems can be easily solved, critical thinking when people face the challenge of developing skills that are not naturally interesting, they are not intrinsically motivated; therefore, developing or possessing the willingness to do such activities would be valuable (Deci, Eghrari, Patrick, & Leone, 1994). Some students show persistence in learning while others do not and motivation may play a very important role. French and Oakes (2003) note that several studies show correlations between higher levels of motivation and continued work on a task even when people face difficulties on the task.

Academic motivation can be extrinsic and intrinsic. Academic extrinsic motivation is defined as learning and involvement in academic tasks to satisfy others’ expectations and academic intrinsic motivation is defined as self-motivation and enjoyment of academic learning and tasks (Richardson, Abraham, & Bond, 2012). Intrinsic motivation is classified as autonomous motivation and considered high-quality motivation, while extrinsic motivation needs to be internalized to be autonomous motivation; otherwise external motivation is classified as controlled motivation and considered low-quality motivation (Deci & Ryan, 2008).

Two examples of instruments that measure motivation are the Motivation Strategies for Learning Questionnaire (MLSQ), which measures both extrinsic and intrinsic motivation (Pintrich & DdeGroot, 1990) and the Intrinsic Motivation Inventory (IMI) originated by Ryan (1982) which measures participant’s subjective experience related to a target activity in laboratory experiments. The MLSQ uses only four questions to measure intrinsic motivation. The construct validity of IMI has not yet been confirmed (Markland & Hardy, 2013). The Academic Motivation Scale (AMS) is the English version of the Echelle de Motivation Education (EME) originally developed in the French (Vallerand & Bissonnette, 1992). It uses 28 items to assess three types of intrinsic motivation, three types of extrinsic motivation, and amotivation (Vallerand, et. al., 1992).

A study by French and Oakes (2003) reviewed the MSLQ, AMS and several other instruments to measure academic motivation and developed an instrument (the Academic Intrinsic Motivation Scale, AIMS) applicable to first year college students based on them. French and Oakes (2003) postulated that the academic intrinsic motivation of college students may depend on their perceptions of the level of challenge of their courses, their perceived control over academics, their academic curiosity, and their anticipation of successful graduation and employment. Their 25-item instrument measures perceived challenge, control, curiosity and career outlook. Overall intrinsic motivation as measured on the AIMS was related to persistence in the major among engineering students (French, Immekeus, & Oakes, 2005). The AIMS (French & Oakes, 2013) is used in this study.

CRITICAL THINKING FOR BUSINESS AS COMMON BUSINESS COURSE

A critical thinking for business course was developed to respond to the assurance of learning assessment (AOL) results at a business college at a Southwest Florida university. The college and the university-wide Quality Enhancement Program team had assessed critical thinking skills of graduating seniors using a writing assignment that involves critical thinking and writing for several years. The results consistently showed poor performance. The college faculty formed a subcommittee in 2017 to develop a critical thinking for business course targeting sophomore and junior students.

The course primarily targeted sophomore students for two reasons. First, skill acquisition, especially critical thinking skills, requires hard work and takes time (Paul and Elder, 2001). Therefore, it is important to expose the concept of critical thinking early in the undergraduate curriculum to allow sufficient time to develop the skills. Second, the course was intended to prepare students for upper division courses in their major. The course encourages students to understand the importance of numeracy, analysis, effective use of evidence and multi-functional and long-term vs short-term perspectives to benefit students in their upper-division courses. The course emphasized the following aspects of critical thinking:

1. Evidence-based reasoning
2. Application of sound logic
3. Consideration of multiple perspectives
4. Reasonable validity of assumptions
5. Interpretation and synthesis of evidence and quantitative data

The course was first offered as a special topics course in Spring 2018 and was available as a choice in the business core (either this course or Professional Writing taught by College of Arts and Sciences) in Fall 2018. The course utilizes the case study method to enhance the critical thinking skills, requiring students to write case reports and receive individual feedback about their writing and critical thinking on drafts. To provide individual feedback to each student, each section of the course was capped at 25. Students wrote six business reports in the class. They received feedback on 4 of the drafts and could resubmit them for a final grade. However, for the remaining two case reports written during the in-class midterm and final exams, no drafts were submitted and no feedback were given in order to assess the student's learning outcome of critical thinking more accurately.

METHODOLOGY

Sixty-two students in three sections of the course completed the AIMS (French and Oakes, 2003) instrument with a 5-point scale, where 5 represents "strongly agree" and 1 represents "strongly disagree" near the end of Fall 2018, resulting in an academic intrinsic motivation score measured in four aspects as shown in Figure 1. Fifty-three of these results were usable. The same survey asked students to report their major. These independent variables were then used to investigate their impacts on students' critical thinking assessment scores.

As an exploratory study, several dependent variables were studied. First, the midterm case report score and the final exam report score, which included not only critical thinking but also writing and information literacy (measured with a 5 point-scale using a rubric based on AAC&U Value Rubrics) were investigated. The study also investigated only the critical thinking aspect of the reports using only two criteria of the rubric (Content Development and Evaluation of Information). Also, midterm case report scores, indicating a starting level of critical thinking, were subtracted from final paper scores, to yield an improvement score.

Several statistical methods were applied to investigate the relationship between the independent variables and the dependent variables. Those include a paired samples t-test and partial least squares regression (PLS). A paired samples t-test was selected to test improvement between the midterm exam and final exam scores. PLS was selected to test the model shown in Figure 1 since PLS is suitable for investigating a construct, such as internal motivation, that requires latent variables to be modeled, PLS does not required a large sample size, PLS does not require normally-distributed input data, and PLS is appropriate for theory development (Urback & Ahlemann, 2010).

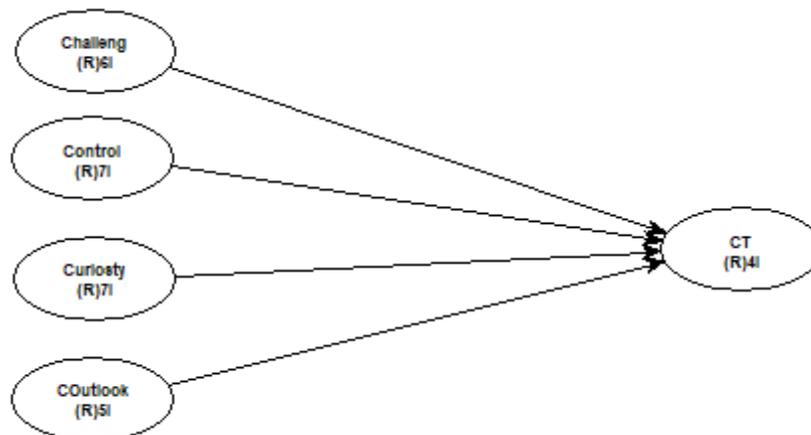


Figure 1. Conceptual Model of Effect of Intrinsic Motivation on Critical Thinking

Propositions Investigated

Several propositions were developed for this exploratory pilot study. First, based on the work of Halpern (1998) and Bernstein and Greenhoot (2014), the critical thinking course is expected to improve students' critical thinking ability. We propose:

P1: Course intervention in critical thinking will be related to improved critical thinking ability.

French and Oakes (2003) based the development of their instrument of studies using intrinsic motivation to model student success. As the acquisition of critical thinking skills may require persistence and continuous effort, intrinsic motivation may play an important role in the skill acquisition. Thus, as shown above in Figure 1, we propose:

P2: Critical thinking ability is positively related to intrinsic motivation.

Based on the findings of Brown and Bielinska-Kwapisz (2015) that critical thinking ability differs across majors and the business curriculum improves critical thinking, we propose:

P3a: Critical thinking scores will differ across majors.

P3b: Improvement in critical thinking will differ across majors.

Finally, since we have proposed that course grade and intrinsic motivation will be related to improvement in critical thinking and that critical thinking improvement will differ across majors, we also propose that:

P4: Course grades will differ across majors.

P5: Levels of intrinsic motivation will differ across majors.

RESULTS

Proposition 1 was investigated using the midterm exam score and final exam score with a paired samples t-test. Students performed significantly better on the final case (mean score 82.8%) than on the midterm case (mean score 78.9%); $t = -2.9$, $p < .01$. Thus, it is possible that the course improved student's critical thinking skills that also include writing and information literacy aspects.

Table 1. Exam Score Means

	Mean	N	Std. Deviation	Std. Error Mean
Midterm	78.9%	53	10.4%	1.4%
Final	82.8%	53	11.6%	1.6%

Proposition 2 using the conceptual model presented before was investigated using PLS. The result in Figure 2 shows only the "control" aspect of the intrinsic motivation was significantly positively correlated to the critical thinking skill measured in the two aspects (content development and evaluation of information) at $p < 0.01$. Unexpectedly, challenge, curiosity and career outlook do not show significant correlation with the critical thinking skill. Interestingly, curiosity showed negative correlation with the critical thinking skill although it is not significant. Additionally, the overall model (R^2) was not significant.

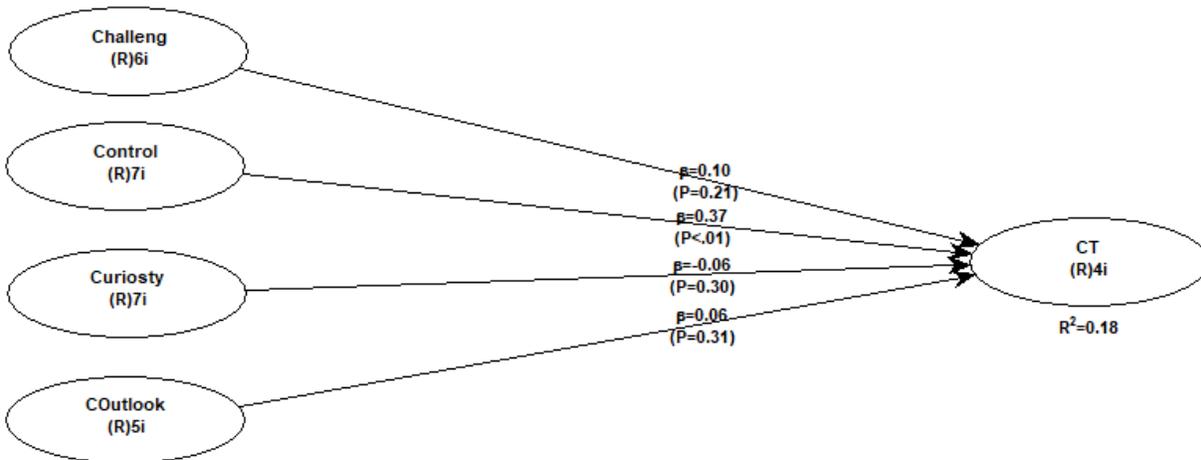


Figure 2. PLS Results of Intrinsic Motivation and Critical Thinking Skill

Table 2 shows the summary of grades and critical thinking scores for different majors and Table 3 shows the summary of intrinsic motivation scores for different majors. As there was no control over who could enroll in the course, there were only few students in certain majors including the CIS major. Therefore, statistical analysis was not conducted to test propositions 3 through 5.

Table 2. Descriptive Statistics of Course Grades, Average Critical Thinking Scores and Improvement

Major	n	Avg. Course Grade (Rank)	Avg. CT Score of Midterm (Rank)		Avg. CT Score of Final Exam (Rank)		Improvement in Avg. CT Score	
			Content ¹	Evaluation ²	Content	Evaluation	Content	Evaluation
Accounting	9	81.6 (5)	2.22 (7)	3.00 (7)	3.44 (4)	3.33 (4)	1.22	0.33
CIS	4	86.6 (3)	3.75 (2)	4.75 (1)	4.25 (1)	3.75 (3)	0.50	-1.00
Economics	2	80.1 (6)	4.00 (1)	4.00 (3)	2.50 (6)	3.00 (6)	-1.50	-1.00
Entrepreneurship	3	79.9 (7)	3.33 (5)	3.33 (6)	2.00 (7)	2.67 (7)	-1.33	-0.66
Finance	11	89.1 (1)	3.55 (4)	4.09 (2)	4.18 (2)	4.09 (1)	0.63	0.00
Management	16	86.7 (2)	3.56 (3)	4.00 (3)	4.06 (3)	3.94 (2)	0.50	-0.06
Marketing	8	83.2 (4)	2.88 (6)	3.63 (5)	3.13 (5)	3.25 (5)	0.25	-0.38
Total	53	85.2	3.25	3.81	3.68	3.64	0.43	-0.17

Note: The numbers in parentheses are ranking among the majors.

¹ Content Development criteria on the rubric

² Evaluation of Information criteria on the rubric

Accounting majors did not perform well, with the lowest average score in the critical thinking aspect on the midterm exam. However, they improved the most when their score was compared to the final exam. This conflicts with the findings of Brown and Bielinska-Kwapisz (2015). One interesting finding from conversation with an accounting major student was that he believed that he needed only analysis of financial data to make a decision. This single-factor analysis may not facilitate critical thinking, which requires analysis from multiple perspectives. He changed his view for the final exam once he recognized the single-factor analysis hurt his grade.

The CIS majors performed fairly well on the course grade, midterm exam and final exam although they showed a decline in the evaluation of information and conclusion from the midterm to the final exam. Yet, this decline was observed in many majors. The case difficulty could be attributed to the decline. The CIS majors showed the second highest scores in the content development aspect and the highest in the evaluation of information and conclusion aspect of critical thinking in the midterm. The CIS majors showed the highest scores in the content development aspect

and the third highest in the evaluation of information and conclusion aspect of critical thinking in the final exam. The CIS majors consistently performed relatively well among the business majors.

Table 3. Descriptive Statistics of Four Aspects of Intrinsic Motivation

Major	# of Subjects	Avg. Score of Challenge	Avg. Score of Control	Avg. Score of Curiosity	Avg. Score of Career Outlook	Avg. Score of Overall
Accounting	9	4.17	3.90	3.84	4.16	4.00
CIS	4	4.50	4.29	3.71	4.50	4.22
Economics	2	4.75	4.43	4.14	4.90	4.52
Entrepreneurship	3	4.67	4.10	4.10	4.60	4.33
Finance	11	4.70	4.27	3.94	4.51	4.33
Management	16	4.35	4.09	3.70	4.23	4.08
Marketing	8	4.44	4.05	3.38	4.55	4.06
Total	53	4.45	4.12	3.76	4.41	4.16

As shown in Table 3 above, most students considered themselves motivated students as the average scores show 4 or higher (out of 5) in three of the four aspects. The scores in curiosity were relatively lower than the other three aspects. The CIS major students were in the mid-range of three of the four measures of intrinsic motivation, but they were second highest in the control aspect. The accounting students showed the lowest score in the challenge, control, career outlook and overall. This may explain the lower performance in the critical thinking score but the number of subjects is too few to make any conclusion.

SUMMARY AND LIMITATIONS

This exploratory pilot study investigated the impact of a business critical thinking course designed for sophomore and junior students with case study method on the students' (especially the CIS majors) critical thinking skills. The focus was also on how the students' intrinsic motivation affects the acquisition of critical thinking skills as previous studies showed persistence and effort is required to develop higher-order thinking skills. Overall, the case study method used in the course shows the potential to improve the business students' critical thinking skills, which was measured in the quality of their case reports, not objective multiple-choice questions.

The CIS majors performed fairly well compared to other business majors. Contradicting Brown and Bielinska-Kwapisz's (2015) findings, the accounting majors did not perform well. The CIS, finance and management majors performed better compared to the other majors.

The relationship between academic intrinsic motivation and critical thinking was not clearly shown. Only the control aspect of the intrinsic motivation shows significant positive correlation. This may suggest that the control aspect of the intrinsic motivation may be more closely related to the persistence and effort required to acquire critical thinking. The accounting students had low scores in the intrinsic motivation and the lowest score in the midterm. This may indicate some possible relationship between intrinsic motivation and critical thinking skill acquisition. Further development of the conceptual model and investigation are necessary.

Since this was an exploratory study, the convenience sample was small, and some majors included only two or three students. The use of a single assessor, who worked as a feedback provider and grader, not the primary course instructor who was responsible for designing the course and teaching, may have affected the accuracy of the critical thinking skill measurement. Regarding the assessment of the intrinsic motivation, the AIMS instrument has not been widely used, so it is possible a different instrument would have yielded different results. Additionally, critical thinking ability was assessed using student work and a university-wide rubric developed based on the AAC&U VALUE Critical Thinking rubric. Further study is planned using additional motivation measures and the HEIghten Critical Thinking Assessment (<https://ets.org>) to determine whether there is a positive relationship between intrinsic motivation and improved critical thinking.

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APPENDIX

Twenty-five questions from (French & Oakes, Measuring Academic Intrinsic Motivation in the First Year of College: Reliability and Validity Evidence for a New Instrument, 2003) were used to measure intrinsic motivation.

Challenge:

- I have academic goals.
- I am confident I can complete degree.
- I determine career goals.
- I enjoy solving challenging difficult problems.
- I work on an assignment until I understand it.
- I am confident I will graduate from college.

Control:

- I determine the quality of my academic work.
- I am pursuing a college degree because I value education.
- I feel good knowing that I determine how my academic career develops.
- I have high standards for academic work.
- Staying in college is my decision.
- I study because I like to learn new things.
- I enjoy doing outside readings in connection to my course work.

Curiosity:

- I am intrigued by the different topics introduced in my courses.
- I study because I am curious.
- I look forward to going to class.
- I am excited to take more courses within my major.
- I enjoy learning more within my field of study.
- I like to find answers to questions about material I am learning.
- I enjoy studying.

Career outlook:

- I have pictured myself in a profession after college.
- I am excited about the job opportunities I will have when I graduate.
- I have pictured myself being successful in my chosen profession.

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I believe I will make a substantial contribution to my chosen profession.

I feel good knowing I will be a member of the professional community in my area of study.

A rubric developed for the university-wide Quality Enhancement Program based on the AAC&U Critical Thinking Value Rubric (Association of American Colleges and Universities, 2009) was used to measure writing, critical thinking, and information literacy.

Critical Thinking	Level 4	Level 3	Level 2	Level 1	Level 0
Content Development	Uses appropriate, relevant, and compelling content to illustrate mastery of the subject, critical analysis and synthesis skills that convey the writer's understanding.	Uses appropriate, relevant, and compelling content to explore ideas using critical thinking skills within the context of the discipline.	Uses appropriate and relevant content to develop and explore ideas through most of the work.	Uses appropriate and relevant content to develop simple ideas in some parts of the work.	Uses inappropriate and irrelevant content to develop simple ideas in many parts of the work.
Evaluation of Information: Conclusion	Skillfully analyzes and evaluates information / evidence related to thesis; conclusion is insightful, logical and justified based on a skillful evaluation of evidence.	Adequately analyzes and evaluates information / evidence related to thesis; conclusion is logical and justified based on the evaluation of evidence.	Attempts to analyze and evaluate information / evidence related to thesis and use the evidence in order to justify conclusions.	Takes information at face value (little or no attempt to evaluate quality of information / evidence, relationship to thesis, or support of conclusions).	Misinterpret information (little or no attempt to evaluate quality of information / evidence, relationship to thesis, or support of conclusions).
Writing	Level 4	Level 3	Level 2	Level 1	Level 0
Context of and Purpose for Writing [Includes considerations of audience, purpose, and the circumstances surrounding the writing task(s).]	Demonstrates a thorough understanding of context, audience, and purpose that is responsive to the assigned tasks and focuses all elements of the work.	Demonstrates adequate consideration of context, audience, and purpose and a clear focus on the assigned tasks (e.g., the task aligns with audience, purpose, and context).	Demonstrates awareness of context, audience, purpose, and to the assigned tasks (e.g., begins to show awareness of audience's perceptions and assumptions).	Demonstrates minimal attention to context, audience, purpose, and to the assigned tasks (e.g., expectation of instructor or self as audience).	Does NOT demonstrate attention to context, audience, purpose, and to the assigned tasks.
Genre and Disciplinary Conventions [Formal and informal rules inherent in the expectations for writing in particular forms.]	Demonstrates detailed attention to and successful execution of a wide range of conventions particular to business writing including organization, content, presentation, formatting, and stylistic choices.	Demonstrates consistent use of important conventions particular to business writing including organization, content, presentation, and stylistic choices.	Follows expectations appropriate to business writing for basic organization, content, and presentation.	Attempts to use a consistent business writing system for basic organization and presentation.	Does NOT attempt to use a consistent business writing system for basic organization and presentation.

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Syntax and Mechanics	Uses eloquent language that skillfully communicates meaning to readers with clarity and fluency, and is virtually error-free (no spelling, grammar and punctuation errors).	Uses straightforward language that generally conveys meaning to readers. The language in the portfolio has few errors (only few spelling, grammar and punctuation errors).	Uses language that generally conveys meaning to readers with clarity, although writing may include some errors (some spelling, grammar and punctuation errors).	Uses language that sometimes impedes meaning because of errors in usage (such as spelling, grammar and punctuation).	Uses language that significantly impedes meaning because of errors in usage (such as spelling, grammar and punctuation).
Info. Literacy	Level 4	Level 3	Level 2	Level 1	Level 0
Identification and Access of Information / Evidence	Demonstrates skillful identification and access of high-quality, credible, relevant sources to develop ideas that are appropriate for the discipline and genre of the writing.	Demonstrates consistent identification and access of credible, relevant to support ideas, that are situated within the discipline and genre of the writing.	Demonstrates an attempt to identify and access credible and/or relevant sources to support ideas that are appropriate for the discipline and genre of the writing.	Has difficulty identifying and accessing sources to support ideas in the writing.	Does NOT identify and access sources to support ideas in the writing.
Use Information Effectively to Accomplish a Specific Purpose	Skillfully communicates, organizes and synthesizes information from sources to fully achieve a specific purpose, with clarity and depth.	Communicates, organizes and synthesizes information from sources. Intended purpose is achieved.	Communicates and organizes information from sources. The information is NOT yet synthesized, so the intended purpose is NOT fully achieved.	Communicates information from sources. The information is fragmented and/or used inappropriately (misquoted, taken out of context, or incorrectly paraphrased, etc.), so the intended purpose is NOT achieved.	Does NOT communicate information from sources.