

## Using Critical Thinking Teaching Methods to Increase Student Success: An Action Research Project

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Numerous studies and United States Department of Education reports indicate that university graduates lack critical thinking and problem solving skills that are needed for success in both the classroom and the modern workplace. Success in the classroom and workplace is a function of many attributes that change with the situation, but the ability to synthesize complex relationships and identify potential solutions to problems or innovation is a core competency. In this action research project, the curriculum in three business courses were modified to include and emphasize activities that research suggests help develop critical thinking. The Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, Smith, Garcia, & McKeachie, 1991) was used to assess changes in 15 learning constructs during a class and correlated with grades. A modified MSLQ (Boyer & Usinger, 2012) was administered at the beginning and end of eight-week courses to provide insight into how students self-assess constructs for success. Results from classes over a 15-month period in 2013 and 2014 indicated improvement in 14 of 15 elements for success with three (intrinsic goal orientation, self-efficacy, and critical thinking) statistically significant.

Developing critical thinking skills needed for success beyond the classroom has been recognized as a primary goal of colleges and universities (Astin, 1993; Gellin, 2003; Stedman & Adams, 2012). In a survey of 433 institutions of higher learning 95% of the chief academic officers identified critical thinking as one of the most important skills for students and noted that 81% of employers wanted universities to place a stronger emphasis on developing critical thinking skills (AAC&U, 2011). The emergence of a knowledge-based economy over a once dominant manufacturing economy means that positive outcomes are dependent on critical thinking abilities (Abrami et al., 2008; Ahuna, Tinnesz & Keiner, 2014; Meepian & Wannapiroon, 2013).

While no universal definition of critical thinking has been identified, Liu, Frankel, and Roohr (2014) evaluated seven critical thinking frameworks to identify common elements. Critical thinking involves much more than accumulating information or processing information, rather critical thinking involves identifying, analyzing, synthesizing, and evaluating information to yield actionable knowledge to make effective decisions (Argyris, 1996; Giancarlo & Facione, 2001; Liu et al., 2011; Scriven & Paul, 2005). Alwehaibi (2012) summarized critical thinking as the ability not just to acquire knowledge but also to make sense of new information. Yet despite critical thinking being identified as an important educational objective, strong evidence exists indicating that many college graduates lack critical thinking skills needed for success in the modern workplace (Ahuna et al., 2014; Gellin, 2003; Shim & Walczak, 2012; U.S. Department of Education, 2006). Further, even though developing critical thinking is generally recognized as an important educational objective, evidence exists suggesting that

many college faculty do not fully understand how to effectively teach critical thinking or develop higher order cognitive abilities and are not able to incorporate critical thinking exercises into course curricula (Ahuna et al., 2014; Lauer, 2005; Paul, Elder & Bartell, 1997, Shim & Walczak, 2012). Many college faculty proclaim to encourage students to develop higher order cognitive skills and critical thinking yet use a lecture format and focus student assignments and efforts on memorization and lower level cognitive tasks which do not encourage critical thinking (Ahuna et al., 2014; Duron, Limback, & Waugh, 2006). A literature review by Beyer (2001) found that many high school and college students lack higher order critical thinking skills needed to be successful in postsecondary education or in chosen careers.

While general mental ability including critical thinking is one of the strongest predictors of long-term success in the workplace, many other factors determine success such as motivation, confidence, and time management skills that exist in a dynamic system that changes with every situation (Rode, Arthaud-Day, Mooney, Near & Baldwin, 2008). In the action research project being reported, methods identified in research that help develop critical thinking and higher order cognition were incorporated into business classes, and constructs identified for success in the classroom and workplace were assessed in a pre- and post-course assessment.

### **Background**

#### **Prior Research on Critical Thinking**

The pressure on educational institutions and educators at all levels to provide quantitative assessment of educational progress through

standardized testing has been building for decades (Snyder & Dillow, 2012). Compliance with the federally mandated No Child Left Behind legislation is based on the ability of educational institutions to demonstrate that all students are academically “proficient” using state-mandated standardized tests by the 2014-2015 school year (Bigham & Riney, 2014). Faculties at colleges are now being required to supply documentation demonstrating that learning is taking place. While logical on the surface, measuring and documenting learning is a difficult task, but the simplest and easiest way is to assess the accumulation of facts or figures. Whether because of pressure for quantifiable assessments, simple effort for efficiency, or a tradition of lecture, faculty at institutions of higher learning tend to use lectures as the primary means of communicating content and focus tasks on memorization and lower-order cognitive assignments (Duron et al., 2006). Many teachers claim to indirectly attempt to teach students critical thinking skills; however, most students do not master the skill (Fisher, 2007). Paul and colleagues (1997) found that many instructors in California possess only a vague understanding of what critical thinking is and, not surprisingly, little knowledge on how to develop critical thinking skills in students. The Paul, Elder, and Bartell study found that while 89% of the sampled instructors identified critical thinking as a primary objective, only 9% included tasks in class that were clearly designed to promote critical thinking on a typical day in class. More current, numerous studies have found that high school teachers and university faculty lack basic knowledge or understanding of critical thinking or how to incorporate such thinking into lesson plans so that critical thinking can be developed in students (Bataineh & Alazzi, 2009; Innabi & El Sheikh, 2007; Lauer, 2005; Stapleton, 2011; Thurman, 2009). Yet, Alwehaibi (2012) found that critical thinking and overall student success could be improved if institutions of higher learning adopt and integrate strategies and techniques that have been identified as helpful in developing critical thinking into various courses. Additionally, Abrami and colleagues (2008) found that instructors who received specific training on methods to teach critical thinking were more effective in developing critical thinking in students than instructors who had no prior training.

### The Basic Question

Boyer and Usinger (2013) administered a modified Motivated Strategies for Learning Questionnaire (MSLQ) to 1,513 first and second year students at a four-year public college in multiple subject areas with both face-to-face and online classes. The MSLQ is a self-assessment instrument aligned to a particular learning context providing insight into 15 constructs,

including critical thinking. Taken as a whole, the MSLQ constructs identify skills or attributes that are necessary for success in school and the workplace. By correlating MSLQ scores with success in school, as measured by grades, the Boyer and Usinger study offered insight into the effectiveness of college faculty in developing critical thinking and other attributes that are keys for success both in school and the workplace. Results from the Boyer and Usinger study indicated that two of the 15 MSLQ constructs have an impact on grades—self-efficacy and time/study management—with just self-efficacy emerging as a significant predictor of success i.e. grades. Further:

...[C]ritical thinking or meta-cognitive self-regulation play an insignificant or negative role in predicting course outcomes. It appears that students are producing positive course outcomes without utilizing these learning strategies for their course success. Furthermore, while this might reflect a general absence of some underlying and more advanced learning concepts, it might also indicate that faculty cultivates students who are successful as compliant learners rather than questioning “why” a concept of principle is correct (p. 18).

This condition should not be surprising considering the evidence that most college faculty lack understanding on critical thinking or how to help students develop this important ability. If one accepts the findings of Alwehaibi (2012), then the question becomes, “What practices should college faculty integrate into course tasks to help students improve in critical thinking and other key attributes for success?” The action research project described in this paper was designed to provide insight into the question of whether integrating critical thinking tasks into course designs will help students improve attributes needed for success both in the classroom and in the workforce.

### Prior Studies on the Basic Question

Multiple researchers have explored educational practices that help develop critical thinking and higher order cognitive skills. Smith (1977) identified three kinds of classroom interactions that consistently yield positive results in critical thinking: faculty members positively reinforcing students with encouragement, praise, or use of student generated ideas; student participation in class with high levels of cognitive questioning and answering; and student interaction during a course. Astin (1993) went further to identify specific assignments to be beneficial in promoting self-reported critical thinking, such as making presentations in class and providing detailed critiques and positive feedback on written assignments. Tsui (1999) offered additional insight into

self-reported growth in critical thinking. Tsui found that detailed feedback from the instructor on written assignments, conducting of independent research, work on group projects, presentations in class, and essay exams are positively related to critical promoting critical thinking, while multiple-choice exams are negatively related to critical thinking.

Ritchhart and Perkins (2008) advanced the idea of thinking routines, which are classroom tools designed to help students practice and perfect deeper thinking. Thinking routines lead students into deeper reflection on questions needing further exploration by asking how and why. Day (2011) proposed the use of progressively complex case studies as a method to help students develop critical thinking skills. Day found that working in groups with presentations to the class for further questioning to be effective in developing critical thinking skills. Shim and Walzack (2012) summarized course activities and assignments that have been identified as helping to promote critical thinking. Assignments that require introspective thinking and analysis rather than retrieving or describing information include group projects, classroom presentations, written assignments with detailed feedback from the instructor, and independent research.

The use of threaded discussion forums has become a common use of emerging technology for educational purposes. Entire course programs are now administered online, and some faculty use online discussion forums to supplement face-to-face interactions. Arend (2007) investigated the online, asynchronous classroom environment and found written assignments and papers with instructor feedback and discussions to be positively related to critical thinking while multiple choice midterm and final exams and non-graded assignments were negatively related to critical thinking. In a subsequent investigation, Arend (2009) identified methods of questioning or interacting with students in online discussions that positively influenced critical thinking. Arend reasoned that questioning and discussion in face-to-face classroom environments, while helpful, do not allow students time for reflection or research, both of which have been positively associated with critical thinking. Arend found that frequent engagement by the instructor in online threaded discussion, in which the instructor remained neutral but questioned or challenged the student's statement or offered additional viewpoints, was positively associated with critical thinking.

Many researchers have indicated that teaching techniques like writing papers and making presentations facilitate the development of critical thinking skills, but Arend (2009) demonstrated that how the instructor interacts with students is a key factor in addition to the mode of interaction. Paul and Elder (2006) found that effective critical thinkers ask crucial questions, gather

and evaluate relevant information, approach a question objectively, communicate effectively, and derive well-reasoned, logical conclusions for complex problems. It becomes apparent that type and quality of interaction from the instructor, as well as the mode of interaction, are critical parts of developing critical thinking skills in students. Alwehaibi (2012) found that structuring questioning and dialogue along the following five avenues of thinking to be effective in stimulating critical thinking:

- Compare and contrasting
- Determining parts-whole relationships
- Determining the reliability of sources
- Causal explanation
- Prediction

Examples of questions on some of these areas follows:

- Finding out what caused something is called "causal explanations" (p. 197). This involved thinking about the possible causes of a problem, for example, to find the best solution to it.
- Prediction is an important skill you need to practice in making decisions. What predictions could you make before accepting a new job offer?
- Consider your college, what smaller things make up the whole? What is the function of each part?
- How do you decide what source of information is unreliable?

Alwehaibi concluded that critical thinking programs using multiple teaching techniques, strategies, and questioning that promotes deeper thinking of cause/effect relationships, parts-whole relationships, the reliability of sources, and prediction effectively help students develop critical thinking skills.

## **Methodology**

### **Classroom Interaction**

Three courses in a Bachelor of Business Administration program at the college taught by one instructor between October 2013 and December 2014 were selected for intervention. The courses were Strategic Planning and Management, Operations Management and Decision-Making, and Business Ethics. Each course is what the institution calls "fast track," which means that the courses are accelerated and condensed from the traditional 16-week semester into eight weeks. Two of the courses (Strategic Planning and Ethics) were in a hybrid format, meaning

that odd numbered weeks consist of three hours of classroom instruction while even numbered weeks are online. The third class (Operations Management) met face-to-face every week for three hours. All of the courses have an online discussion component in each week where students are required to answer questions and respond to other students' responses or the instructor's responses. Prior to beginning the project, each course was redesigned by the instructor to incorporate methods that were identified in the literature as being effective in helping develop critical thinking skills. Specific elements that were incorporated were:

- At least two required written assignments, case studies, or papers using APA format. Detailed feedback from the instructor using MS Word track changes and comments features identified errors in formatting, tone and language, organization, logic, and substance.
  - Students' unsubstantiated claims or unfounded statements were challenged with students directed to do additional research to provide evidence and avoid bias or personal opinion.
  - From 60% to 70% of the assessment on papers was evaluated for scholarship/critical thinking, organization, readability and style, and APA format (see appendix A for a sample rubric and assignments guidelines).
  - Each paper received 30 to 60 minutes of attention from the instructor to provide detailed feedback.
- Online discussion forums and weekly written assignments – These encouraged research beyond the textbook using peer reviewed or credible online sources to support positions in both written weekly assignments and online discussion posts as suggested by Arend (2009).
  - Students were required to respond to the initial question from the instructor then respond to at least two other students' posts or to the instructor with a substantive post. With two questions, students were required to submit six posts to receive full credit.
  - Students had a window of seven days, three before the class date and four after to submit all posts.
  - Students were encouraged to draft responses to assignments and online posts in MS Word and take the time to provide evidence to support positions.
- Students were allowed to use the same substantive post more than once in the online forum if relevant.
- Instructions were for students to spend 30 minutes developing one substantive post and using it five times, if relevant, rather than spending six minutes doing five meaningless posts that do not advance the discussion or challenge thinking. Two points of extra credit were awarded for each new event that demonstrated outside research to support observations or positions. Total points for the class were 1,000.
- The instructor blocked out one to two hours daily from four to six days each week to engage with students in online forums.
- Classroom Sessions - Classroom sessions were modified to increase debate and sharing of experience using the 5-Why approach by the instructor to operationalize the thinking routines proposed by Ritchhart and Perkins (2008). The 5-Why methodology follows the theory that asking why five times will lead to the root cause of any problem or question.
- Presentations – Class presentations were mandatory in Strategic Planning with teams of 4 to 6 students presenting 5-year strategic plans to the erstwhile Board of Directors, which is similar to the process suggested by Day (2011). Opportunities for collaboration and presentations were available and encouraged in other classes but not required.

Due to differences in subject matter, the courses differed in several significant ways. Strategic planning and ethics contain multiple papers that require research and compliance with APA format standards along with required group presentations. The focus of operational decision-making is interpreting data, then synthesizing the data in order to make an informed management decision in areas such as forecasts, quality control, inventory control, productivity, and more. Operational decision making relies heavily on using Excel to organize data to assist in the decision-making process and included two written assignment in the form of a report to the boss and, thus, APA is not required. Additionally, while opportunities for presentations are offered, they are not required as in strategic planning and ethics.

### Demographics

Demographics of the student population in the Bachelor of Applied Science (BAS) program at the college are different from a traditional university. The college is a

former junior college and is part of the State College System in Florida offering baccalaureate degrees in several disciplines, including business. The non-traditional students in the bachelor programs have an average age of 33 with a range from 19 to 60. About 67% of the students in the bachelor program are female while many are veterans who have completed military service and most have jobs and families. Consequently, all classroom sessions are in the evening from 6:00pm to 9:00pm.

### Instrumentation

A modified Motivated Strategies for Learning Questionnaire (MSLQ) was chosen as the instrument to evaluate multiple dimensions of success. The original MSLQ developed by Pintrich and colleagues (1991) was designed to be modular such that researchers may choose all or some of the 15 constructs that apply to specific research questions. Consequently, the MSLQ has been widely used, modified, and adopted for many studies (Boyer & Usinger, 2012; Daura, 2015; Niroomand, Behjat & Rostampour, 2014; Opdecam, Everaert, Keer, & Buysschaert, 2014). Two primary considerations drove the decision to use the modified MSLQ: first, the belief that success both in the classroom and the workplace is driven by dynamic interactions of multiple attributes like critical thinking ability, goal orientation, self-efficacy, etc. which are components of the MSLQ; and second, the desire to build on research performed by Boyer and Usinger (2012) who found no correlation between critical thinking and success as measured by grades in a sample of lower level first and second year students at the college. The MSLQ is a self-assessment instrument originally consisting of 81 questions with 15 constructs grouped into two scales: motivation and learning strategies (Pintrich et al., 1991). Boyer and Usinger modified the original 81-question instrument by eliminating questions that were no longer relevant or not applicable in the current educational environment. For example the original MSLQ, developed before the Internet, contained questions with language assuming classroom attendance. Thus many questions did not apply to online classroom settings. The resulting 61-question instrument can be completed more quickly online than the original MSLQ, making responses more easily completed by current students (see Appendix B: MSLQ Item by Construct List). Table 1 compares the construct reliability of the original MSLQ with the modified MSLQ employed by Boyer and Usinger showing that the modified MSLQ retains construct reliability similar to the original instrument.

Pintrich and colleagues (1991) described the 15 constructs as self-assessments of the degree to which a student perceives his or her use of the attribute as follows:

- Intrinsic Goal Orientation – Provides insight into the reasons why a student is engaged in a course as a whole. Intrinsic goal orientation gauges the strength of perception that the student is participating for reasons such as challenge, curiosity, and mastery and perceives participation as an end to itself rather than a means to an end. High scores indicate that the student is internally motivated.
- Extrinsic Goal Orientation – Extrinsic goal orientation refers to the degree to which a student perceives himself or herself as participating in a course as a whole for reasons such as grades, rewards, performance, evaluation by others, and competition. High scores suggest that the student perceives the learning task as a means to an end rather than the end itself.
- Task Value – Task value refers to the student's evaluation of how interesting, how important, or how useful a task is. High task value scores suggest that students perceive course material as important, interesting, and useful.
- Control of Learning Beliefs – Control of learning beliefs scores provide insight into the strength of student's belief that effort to learn will yield positive outcomes. High scores indicate the strength in student's belief that success is contingent on their own effort rather than on external factors, like the teacher, and that the student can control academic performance.
- Self-Efficacy for Learning and Performance – Self-efficacy reflects the student's perception of their ability to master a task and in the confidence in their ability to perform assigned tasks. High scores suggest a greater level of self-confidence in their abilities.
- Test Anxiety – Test anxiety has been shown to have a negative effect on academic performance. Worry about tests introduces negative thoughts that degrade performance, while the emotional component of anxiety may trigger affective or physiological conditions that negatively affect academic performance on tests. Lower scores suggest that the student perceives less anxiety for taking tests.
- Rehearsal – Rehearsal strategies for learning refer to memorizing, reciting, or naming names from a list. Rehearsal strategies do not appear to help students identify or build connections among the multiple pieces of information or integrate and synthesize the information with prior knowledge. High scores

Table 1  
*MSLQ Item by Construct Reliability Comparison (Chronbach's Alpha)*

	Original MSLQ		Modified MSLQ	
	Items	$\alpha$	Items	$\alpha$
<b>MSLQ Motivationaal Constructs</b>				
Intrinsic Goal Orientation	4	.74	4	.75
Extrinsic Goal Orientation	4	.62	2	.63
Task Value	6	.90	2	.89
Control of Learning Beliefs	4	.68	3	.75
Self-Efficacy for Learning & Performance	8	.93	8	.96
Test Anxiety	5	.80	4	.76
<b>MSLQ Learning Strategies Constructs</b>				
Rehearsal	4	.69	2	.69
Elaboration	6	.75	2	.58
Organization	4	.64	2	.54
Critical Thinking	5	.80	5	.81
Metacognitive Self-Regulation	12	.79	10	.84
Time/Study Environmental Management	8	.76	7	.82
Effort Regulation	4	.69	4	.72
Peer Learning	3	.76	3	.78
Help Seeking	4	.52	3	.72
Total Items in Questionnaire	81		61	

indicate that students rely heavily on rehearsal strategies to complete learning tasks.

- **Elaboration** – Elaboration strategies assist students to implant information into long-term memory by constructing internal connections between multiple pieces of information. Elaboration strategies include paraphrasing, summarizing, creating analogies, and note-taking which assist the student to synthesize and integrate new information with prior knowledge. High scores indicate a perception that the student is relying more on elaboration strategies than on rehearsal strategies to learn.
- **Organization** – Organization strategies help students chose appropriate and relevant information, then identify meaningful connections between multiple pieces of information. Clustering, outlining, and identifying main ideas in passages are examples of organizing strategies. High scores suggest that students rely on organization strategies to learn.
- **Critical Thinking** – Critical thinking provides insight into the frequency and degree that students synthesize and apply prior knowledge to new situations to solve problems, make decisions, or make critical evaluations. High scores indicate greater reliance on critical thinking skills.
- **Metacognitive Self-Regulation** – Metacognitive self-regulation includes three primary learning

activities: planning, monitoring, and regulating. Planning involves goal setting and task analysis to identify relevant prior knowledge that is applicable to a current task. Monitoring involves tracking or focusing attention as a student reads, self-testing, and questioning. Regulating activities are those adjustments the student makes to check and improve performance as a task unfolds. High scores indicate greater reliance on metacognitive self-regulation skills.

- **Time and Study Environment** – Time and study environment gauges the student's perception of their time management skills, which include scheduling, planning, and managing study time effectively. High scores in time and study environment suggest that students believe they are effective in time management.
- **Effort Regulation** – Effort regulation refers to students' ability to control levels of effort and attention when confronted with distractions and uninteresting tasks. High scores indicate perceive they are able to focus attention and effort on tasks by ignoring distractions or uninteresting tasks.
- **Peer Learning** – Peer learning refers to collaboration or interaction with other students to complete assignments. High scores indicate that students engage and collaborate with other students to complete assignments.

Table 2  
*Descriptive Statistics and t-test Results*

	Mean		Diff.	Standard Deviation	t-Value	Sig
	Survey 1	Survey 2				
<b>MSLQ Motivational Constructs</b>						
Intrinsic Goal Orientation	5.039	5.183	.145	0.992	1.750	
Extrinsic Goal Orientation	5.528	5.283	-.245	1.301	-2.250	*
Task Value	4.892	5.038	.146	1.330	1.320	
Control of Learning Beliefs	5.592	5.270	.963	1.590	1.780	
Self-Efficacy for Learning & Performance	5.263	5.450	.187	0.917	2.440	*
Test Anxiety	4.666	4.645	-.021	1.384	-0.180	
<b>MSLQ Learning Strategies Constructs</b>						
Rehearsal	4.270	4.101	-.169	1.583	-1.270	
Elaboration	5.399	5.458	.059	1.529	.560	
Organization	4.773	4.734	-.039	1.333	-.440	
Critical Thinking	4.376	4.565	.189	1.036	2.180	*
Metacognitive Self-Regulation	3.773	3.812	.039	0.702	.660	
Time/Study Environmental Management	5.191	5.245	.054	0.859	.740	
Effort Regulation	5.280	5.294	.014	1.047	.160	
Peer Learning	3.123	3.238	.115	1.400	.900	
Help Seeking	3.795	3.783	-.012	1.122	-.130	

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

N=143 Students who took both surveys

- Help Seeking – Help seeking refers to the willingness of students to ask other students or instructors for help when needed. High scores indicate a greater willingness to engage with other students or instructors for help when needed.

### The Process

All of the classes were eight weeks in length. Students were asked to participate in the study during the first class session. The instructor explained that the survey was part of a process improvement project at the college, participation was voluntary, and it would not influence grades beyond 10 points of extra credit or 1% of the 1,000 points in the course. A link to the modified MSLQ was sent to each student by email from the college's Department of Institutional Research. Students clicked on the link and entered responses that were immediately transmitted to the Department of Institutional Research database. Emails were sent out in weeks one and eight, thus allowing for a comparison between the beginning and the end of the class of the MSLQ constructs, as well as a variety of correlations with grades and other variables.

### The Sample

In total, 316 students were asked to participate in the three courses over a 15-month period. All three courses are upper level for juniors or seniors, with Strategic Planning typically the last or next to last course taken before graduation. A total of 143 students (45.3% participation) completed both the beginning and end of class MSLQ (Survey 1/Survey 2). Participation by class breaks down as follows; Strategic Planning – 64, Operations Management & Decision-Making – 71, and Ethics – 8. Of the total number of students, 86 were females, and 57 were males.

It is significant to note that the average numerical grade on a 4-point scale with 4 points for an A and 0 for an F for the 173 students who did not participate was 2.63, while the average grade for the 143 participants was 3.15. An unstacked ANOVA using Minitab statistical software of these two groups revealed that the difference between the two groups is statistically significant ( $p < .001$ ). This condition should be considered when evaluating the results because the participating sample does not represent the total population, but rather is comprised by the top students who would be expected to enter the classes with higher scores on any of the MSLQ constructs than the general population.

**Results**

Paired t-tests comparing the beginning and end of term change in the self-assessed perception by students of the 15 MSLQ constructs indicate that students perceive improvement in 14 of the 15 constructs. The lone exception to improvement was organization. Change in three of the MSLQ constructs were statistically significant: extrinsic goal orientation, self-efficacy for learning and performance, and critical thinking. Table 2 contains descriptive statistics and t-test results for the beginning of class and end of class MSLQ results.

While improved perception of student’s motivational and learning strategies is good, the ultimate goal of education is to increase the probability of success. Success in the study was approximated by grades with letter grades converted to numerical values—A = 4, B = 3, C = 2, D = 1, F = 0—making a search for correlations with survey results possible. Pearson’s correlation coefficient was calculated comparing the end-of-class Survey 2 results and the amount of change that students experienced between Survey 1 and Survey 2 with grades that students earned in the respective class. Table 3, shows correlations between Survey 2 and the difference between Survey 1 and Survey 2 with grades. Results for three constructs—intrinsic goal orientation, self-efficacy for learning and performance, and time/study management—

generated statistically significant correlations for both the final survey and the change with grades. Analysis of variance (ANOVA) tests were performed to determine if there were significant differences between several meaningful groups in the study sample. ANOVA tests were performed comparing the strategic planning with operations management result both for the end of class or survey 2 results and between the change from the first to the second survey. No ANOVA was performed for the ethics class because only eight students in two classes participated; this was too small of a sample to yield valid results. Table 4 shows which course or gender recorded higher scores on survey 2, which group recorded greater change, and whether the results were statistically significant. Scores on the end of term survey for two constructs, control of learning beliefs and effort regulation, revealed significant correlation with grades while the increase in extrinsic goal orientation correlated significantly with grades.

Table 4 shows that students taking the strategic planning course recorded higher scores on all but two MSLQ constructs. Students in operations management generated statistically significant improvement from survey one to survey two in intrinsic goal orientation and time/study environmental management. Associating statistically significant improvement in intrinsic goal orientation and time/study management operations management with the strong correlation in these constructs with grades is a meaningful finding.

Table 3  
*Correlation Between Survey 2 and Change with Grades*

	Correlation with Grades			
	Survey 2	Sig	Diff	Sig
<b>MSLQ Motivational Constructs</b>				
Intrinsic Goal Orientation	0.287	***	0.228	**
Extrinsic Goal Orientation	0.066		0.228	**
Task Value	0.119		0.060	
Control of Learning Beliefs	0.331	***	0.112	
Self-Efficacy for Learning & Performance	0.484	***	0.240	**
Test Anxiety	-0.145		-0.081	
<b>MSLQ Learning Strategies Constructs</b>				
Rehearsal	-0.086		-0.094	
Elaboration	0.156		-0.014	
Organization	0.007		-0.030	
Critical Thinking	0.127		0.116	
Metacognitive Self-Regulation	0.113		0.139	
Time/Study Environmental Management	0.446	***	0.175	*
Effort Regulation	0.242	**	0.068	
Peer Learning	0.006		0.137	
Help Seeking	-0.110		-0.007	

Note. \*p<.05; \*\*p<.01; \*\*\*p<.001



Table 4  
*MSLQ Item by Construct Reliability Comparison (Chronbach's Alpha)*

	ANOVA by Course				ANOVA by Gender			
	Survey 2	Sig	Diff	Sig	Survey 2	Sig	Diff	Sig
<b>MSLQ Motivational Constructs</b>								
Intrinsic Goal Orientation	SP		OM	*	M		M	
Extrinsic Goal Orientation	SP		SP		M		M	
Task Value	SP		SP		M		M	
Control of Learning Beliefs	SP		OM		M		F	
Self-Efficacy for Learning & Performance	SP		OM		M	*	F	
Test Anxiety	OM		OM		F	*	F	
<b>MSLQ Learning Strategies Constructs</b>								
Rehearsal	SP		OM		F		F	
Elaboration	SP		OM		F		F	
Organization	SP		SP		F		F	
Critical Thinking	SP		SP		M		M	
Metacognitive Self-Regulation	SP		SP		M		F	*
Time/Study Environmental Management	OM		OM	*	F		M	
Effort Regulation	SP		SP		F		M	
Peer Learning	SP		SP		M		F	
Help Seeking	SP		SP		F		F	

### Limitations and Discussion

Any discussion or conclusions to be derived from the results must consider multiple limitations. The sample is not a typical group of traditional college students. The average age of students in the baccalaureate program at the college is 33, and nearly all students have families and jobs. All participants were juniors or seniors with many at the very end of the program, taking the last or second to last class before graduation. Additionally, the students who volunteered to participate represented the upper end of the scholastic spectrum with grades that were significantly higher than the group who did not participate. It seems logical to expect that participants were more highly motivated and possess higher levels key skills needed for academic success at the beginning of the class and dedicated more effort to improving those skills during the eight weeks than students who did not participate. Additionally, techniques were incorporated into a small number of courses (3) taught by just one instructor. All of these factors suggest caution in generalizing the results over a larger, more representative population of students and faculty.

At the outset of the action research project, some internal debate emerged at the college about whether eight weeks was adequate time to expect significant changes in any of the MSLQ constructs or whether eight weeks was adequate time to show correlations with success as measured by grades. Improvement in 14

of the 15 MSLQ constructs with three—extrinsic goal orientation, self-efficacy, and critical thinking—statistically significant indicate that progress is possible, at least with a population such as the sample.

Coursework was created to incorporate methods that a large body of research suggest have positive effects on helping students develop critical thinking skills (Alwehehaibi, 2012; Arend, 2007; Arend 2009; Beyer, 2001; Day, 2011; Ritchhart & Perkins, 2008), and statistically significant improvement in MSLQ scores provides support for the prior research. The data also suggests that other essential skills are also positively affected, particularly in the areas of extrinsic goal orientation and self-efficacy. Significant decrease in dependence on extrinsic goals orientation combined with the increase in intrinsic goal orientation suggest that students' orientation shifted from extrinsic to intrinsic goals which is particularly relevant given the strong correlation of goal orientation with grades. Students who are more internally motivated seem to be more successful, which also supports prior research (Adnan, Mohamad, Buniamin, & Mamat, 2014; O'Reilly, 2014).

Similarly, statistically significant increases in self-efficacy, along with control of learning beliefs with the strong correlation with success in both areas, suggest that methods being used helped students develop stronger self-confidence in themselves and their ability to control their own destiny. Both of these skills are essential for success both in the classroom and the

workplace (Adnan et al., 2014, de la Fuente, Justicia, Sander, & Cardelle-Elawar, 2014).

While increases in students' time and study management skills did not reach levels to be significant, the correlation with time management skills with grades is significant. Balduf (2009) found that poor time management is a major contributor to underachievement or failure for college students. The data suggests that even modest improvements in time and study management skills can yield significant improvement in success both in the classroom and the workplace. Many volumes have been published on the need for managers to be more effective in managing competing schedules and the hectic pace in the workforce (Fischer & Lehman, 2005; Mitchell, Skinner & White, 2010). Results in this study suggest that the educational methods used might benefit students in ways beyond the school environment and in successful careers in the workforce.

ANOVA analysis of results by course shows that while students recorded favorable scores on all but two constructs in Strategic Planning, students taking Operations Management showed greater improvement, with the differences between the two surveys statistically significant in intrinsic goal orientation and time and study management. Operations Management is a notoriously difficult course in many business programs because success requires strong math skills, as well as Excel familiarity to aid in organizing the data, analyzing the data, then generating logical management actions in response to the data in written form. Many students demonstrated high levels of anxiety over one or more of the components, particularly math and Excel, and they provided feedback that completing many assignments took hours. Successfully completing the assignments and the course required time rationing and internally generated perseverance, particularly with the sample of students with families and full time jobs. The strong correlation of intrinsic goal orientation and time and study management with grades suggest that methods used in operations management contribute significantly to success.

ANOVA analysis of results by gender yielded two significant results. Self-assessment of self-efficacy was significantly greater for males than females while test anxiety was significantly higher for females. Kukulcu, Korukcu, Ozdemir, Bezci, and Calik (2013) observed similar results in college nursing students while Rezaei (2012) added to a body of literature suggesting that the results observed in the study may be linked to cultural expectations for women. While not rising to significant levels, females showed greater improvement in both areas than male participants did.

### Conclusion

Given that the sample in the study is composed of higher-performing, nontraditional students being subjected

to various methods to improve critical thinking by just one instructor in a small number of courses, results indicate that it is possible to improve students' self-assessed skills in multiple key abilities that have been linked to success both in the classroom and workplace. At the outset of the study, there was some skepticism on whether eight weeks was adequate time to significantly affect any of the MSLQ constructs. Results clearly indicate that eight weeks is adequate time to positively affect both constructs and outcomes linked directly with success. Instructors desiring to have a positive influence on critical thinking skills and other key skills that are related to success should consider including multiple written assignments and emphasizing research, then providing detailed feedback on scholarship, logic, and style. Other methods to consider include using online discussion forums to extend classroom discussion to promote deeper thinking and scholarship through questioning and challenging student posts and individual or team presentations to the class.

Further research is warranted with a more representative sample of all college students in multiple subject areas using techniques in the study applied by multiple faculty. Results of the study suggest that significant improvement is possible at least with highly motivated, non-traditional, students by faculty who have been trained in the concepts of critical thinking and methods needed to develop critical thinking in classes. Extending the results of the study across a more representative sample in multiple subjects would require extensive education of faculty and commitment to making significant time and effort allocations to the project. College administrators desiring to promote critical thinking and the other related constructs should consider requiring, or at least strongly recommending, that faculty include established methods for developing critical thinking in course curricula. College administrators would necessarily have to include extensive training and education programs for faculty to fully understand the dynamics of critical thinking and how to properly develop those skills with students.

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Appendix A  
Example Guidelines and Rubric for Papers

**GEB4891 Strategic Planning & Management INTELLECTUAL ASSETS**

**INTELLECTUAL ASSETS PAPER DUE: 11 June 2015\***

***GUIDELINES:***

1. Based on Case Study 21 – Southwest Airlines (pg. C137).
2. Instructions – Analyze and summarize the key attributes of Southwest’s culture and its intellectual assets. Discuss how the Company can use these attributes to adapt, change, and continue to grow as the environment in which the Company does business changes. You may supplement your argument and add strength to it by citing other sources.
3. Length – 750 – 1,000 words (typically 3 – 4 pages of text) (standard 8.5” x 11” paper). Title page and references are not included in the word count.
4. Layout - Must include: Title page\*\*; Introduction \*\*\*; the body of work; and conclusion.
5. References - Minimum number of references: One at least, in addition to the textbook, with more as needed to support your observations. Points will be deducted if sources are not cited and referenced. You may use books, articles from periodicals or newspapers, and peer reviewed journals. Wikipedia is none of these and is not an acceptable reference.
6. Graphics - Graphics, charts, pictures, art are ok if they add to your discussion and help clarify some point. APA says black & white only but color is OK for this paper.
7. Format - Double spaced; typewritten or computer printed
8. Font – 12 pt. (Times New Roman)
9. Margins - 1” margins all around per APA
10. Citations/References – Give credit for work that is not yours by citing the source in the body of the paper and providing the complete reference in the reference section. See APA lite for guidance. The professor is available to provide additional guidance during office hours.
11. Grade/Point Value – 70 pts. (7% of total)...grading rubric on the next page

***Suggested Guide:*** (APA Lite – 2009. Located in PAL, under contents, Course Information.)

\*Late submissions will lose grade points at the rate of 10% per any portion of a day up to 3 days. After which, the paper will not be graded.

\*\* Title page must include – at minimum: Title of your work; Course number (GEB4891); Course Name (Strategic Planning and Management); Your name; Name of college (); Name of your professor (); Date of submission.

\*\*\*Your introduction will act as a lead in to the rest of the essay and provide a general statement about the case and your findings. A good introduction also contains some “hook” statement that captures the reader’s interest and encourages him or her to read on. May be typically 100-200 words in such a short essay.

<b>GEB4891 Strategic Planning &amp; Management - Intellectual Capital Paper</b>		
<b>Maximum Total Points = 70</b>		
<b>Content and Scholarship</b> 40 Points	<b>Points Earned</b>	<b>Comments:</b>
<b>Content/Subject Matter (30 Points)</b>		
<ul style="list-style-type: none"> <li>All key elements of the assignment are covered in a substantive way</li> </ul>		
<b>Instructions</b> This paper will be based in the Southwest Airlines case study number 27, pages C194 to C203 in the text. You read the case study then discuss elements of the organizational culture at Southwest answering the		
<ul style="list-style-type: none"> <li>What are the key attributes of Southwest's culture and it's intellectual assets?</li> </ul>		
<ul style="list-style-type: none"> <li>How can the Company use these attributes to adapt, change, and grow as the business environment changes?</li> </ul>		
<ul style="list-style-type: none"> <li><b>Write</b> a 750 - to 1,000-word paper in which you discuss and answer the questions above based on the case study.</li> </ul>		
<ul style="list-style-type: none"> <li>The content is comprehensive, accurate, and/or persuasive</li> </ul>		
<ul style="list-style-type: none"> <li>Displays an understanding of relevant theory</li> </ul>		
<ul style="list-style-type: none"> <li>Major points supported by specific details/examples</li> </ul>		
<b>Scholarship/Critical Thinking (10 Points)</b>		
<ul style="list-style-type: none"> <li>Writer compares/contrasts/integrates theory/subject matter with work environment/experience</li> </ul>		
<ul style="list-style-type: none"> <li>Research is adequate and timely with at least 1 reference</li> </ul>		
<ul style="list-style-type: none"> <li>Writer has gone beyond the textbook and course materials</li> </ul>		
<ul style="list-style-type: none"> <li>The writer appropriately analyzes and synthesizes theory/practice to develop new ideas, concepts, or applications</li> </ul>		
<b>Clarity of Logic and Presentation</b> 20 Points	<b>Points Earned</b>	<b>Comments:</b>
<b>Organization (10 points)</b>		
<ul style="list-style-type: none"> <li>The introduction provides a sufficient background on the topic and previews major points</li> </ul>		
<ul style="list-style-type: none"> <li>Central theme/purpose is immediately clear</li> </ul>		
<ul style="list-style-type: none"> <li>Structure is clear, logical, and easy to follow</li> </ul>		
<ul style="list-style-type: none"> <li>Subsequent sections develop/support the central theme</li> </ul>		
<ul style="list-style-type: none"> <li>Conclusion/recommendations follow logically from the body of the paper</li> </ul>		
<b>Readability and Style (10 Points)</b>		
<ul style="list-style-type: none"> <li>Paragraph transitions are present and logical and maintain the flow throughout the paper.</li> </ul>		
<ul style="list-style-type: none"> <li>The tone is appropriate to the content and assignment</li> </ul>		
<ul style="list-style-type: none"> <li>Sentences are complete, clear, and concise.</li> </ul>		
<ul style="list-style-type: none"> <li>Sentences are well-constructed, strong and varied</li> </ul>		
<ul style="list-style-type: none"> <li>Sentence transitions are present and maintain the flow of thought.</li> </ul>		
<b>Grammar and Adherence to APA Format and Guidelines</b> 10 Points	<b>Points Earned</b>	<b>Comments:</b>
<ul style="list-style-type: none"> <li>The paper, including the title page, reference page, tables, and appendices, follow APA guidelines for format.</li> </ul>		
<ul style="list-style-type: none"> <li>Citations of original works within the body of the paper follow APA guidelines.</li> </ul>		
<ul style="list-style-type: none"> <li>The paper is laid out with effective use of headings, font styles, and white space.</li> </ul>		
<ul style="list-style-type: none"> <li>Rules of grammar, usage, and punctuation are followed.</li> </ul>		
<ul style="list-style-type: none"> <li>The paper is free of spelling errors.</li> </ul>		
<ul style="list-style-type: none"> <li><b>Timeliness</b> (Penalty for being turned in late or premium for being early)</li> </ul>		
<b>Total Grade</b>	<b>0</b>	

Appendix B  
MSLQ Item by Construct List

<b>Motivational Constructs</b>
<b>Intrinsic Goal Orientation</b>
I prefer course material that really challenges me so I can learn new things.
I prefer course material that arouses my curiosity, even if it is difficult to learn.
The most satisfying thing for me in classes is trying to understand the content as thoroughly as possible.
When I have the opportunity, I choose course assignments that I can learn from even if they don't guarantee a good grade.
<b>Extrinsic Goal Orientation</b>
Getting a good grade is the most satisfying thing for me right now.
The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.
<b>Task Value</b>
I am very interested in the content area of this course.
I like the subject matter of this course.
<b>Control Beliefs about Learning</b>
If I study in appropriate ways, then I will be able to learn the material in this course.
It is my own fault if I don't learn the material in this course.
If I try hard enough, then I will understand the course material.
<b>Self-Efficacy for Learning and Performance</b>
I believe I will receive an excellent grade in this class.
I'm certain I can understand the most difficult material presented in the readings for this course.
I'm confident I can understand the basic concepts taught in this course.
I'm confident I can understand the most complex material presented by the instructor in this course.
I'm confident I can do an excellent job on the assignments and tests in this course.
I expect to do well in this class.
I'm certain I can master the skills being taught in this class.
Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.
<b>Test Anxiety</b>
When I take a test I think about items on other parts of the test I can't answer.
When I take tests I think of the consequences of failing.
I have an uneasy, upset feeling when I take an exam.
I feel my heart beating fast when I take an exam.
<b>Learning Strategies Constructs</b>
<b>Rehearsal</b>
When I study, I practice saying the material to my self over and over.
When studying for classes, I read my class notes and the course reading over and over.
<b>Elaboration</b>
When I study for this class, I pull together information from different sources, such as lectures, readings, and discussions.
When reading for classes, I try to relate the material to what I already know.
<b>Organization</b>
When I study, I go through the readings and my class notes and try to find the most important ideas.

When I study, I go over my class notes and make an outline of important concepts.
<b>Critical Thinking</b>
I often find myself questioning things I hear or read in this classes to decide if I find them convincing.
When a theory, interpretation, or conclusion is presented in class or in readings, I try to decide if there is good supporting evidence.
I treat the course material as a starting point and try to develop my own ideas about it.
I try to play around with ideas of my own related to what I am learning in a class.
Whenever I read or hear an assertion or conclusion in classes, I think about possible alternatives.
<b>Meta-cognitive Self-Regulation</b>
When reading for classes, I make up questions to help focus my reading.
When I become confused about something I'm reading, I go back and try to figure it out.
If course materials are difficult to understand, I change the way I read the material.
Before I study new material thoroughly, I often skim it to see how it is organized.
I ask myself questions to make sure I understand the material I have been studying in class.
I try to change the way I study in order to fit the course requirements and instructor's teaching style.
I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying.
When studying, I try to determine which concepts I don't understand well.
When I study, I set goals for myself in order to direct my activities in each study period.
If I get confused taking notes, I make sure I sort it out afterward.
<b>Time and Study Environmental Management</b>
I usually study in a place where I can concentrate on my course work.
I make good use of my study time.
I find it hard to stick to a study schedule.
I have a regular place set aside for studying.
I make sure I keep up with the weekly readings and assignments for my courses.
I often find that I don't spend very much time on school work because of other activities.
I rarely find time to review my notes or readings before an exam.
<b>Effort Regulation</b>
I often feel so lazy or bored when I study that I quit before I finish what I planned to do.
I work hard to do well even if I don't like what we are doing.
When course work is difficult, I give up or only study the easy parts.
Even when course materials are dull and uninteresting, I manage to keep working until I finish.
<b>Peer Learning</b>
When studying for a class, I often try to explain the material to a classmate or a friend.
I try to work with other students to complete the course assignments.
When studying for a class, I often set aside time to discuss the course material with a group of students from the class.
<b>Help Seeking</b>
I ask the instructor to clarify concepts I don't understand well.
When I can't understand the material in a course, I ask another student in this class for help.
I try to identify students in my classes whom I can ask for help if necessary.