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Comparing Critical Thinking Dispositions of Students Enrolled In a College Level Global Seminar Course

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Abstract

In recent years, the discussion concerning critical thinking and problem solving among college graduates and new industry hires has increased dramatically. A plethora of research has discovered that college graduates entering the workforce are lacking in their ability to problem solve and think critically. These attributes have been called some of the most necessary for an individuals' success in the 21st century. The purpose of this study was to identify the variance in critical thinking disposition of students (undergraduate and graduate) enrolled in an International course (Global Seminar) using the UF-EMI Critical Thinking Disposition Assessment. Students representing the US, Italy, and Austria participated in this study (N=43). Results indicate that the entire population fell within the typical ranges for UF-EMI scores for all three constructs (Engagement, Cognitive Maturity, and Innovativeness) but would be classified as weak overall. There was however a slight difference in mean scores when comparing the US and European students. American students scored higher than the Italian students for all three constructs and higher than the Austrian students for the Engagement and Innovativeness constructs. These results warrant further research to determine how course content, teaching methodologies, and experiential learning opportunities impact college students' critical thinking dispositions.

Keywords: leadership, critical thinking, international education, agriculture

Introduction

In recent years the discussion concerning critical thinking – a reasoned, purposive, and introspective approach to solving problems (Bisdorf-Rhoades, Ricketts, Irani, Lundy, & Telg, 2005) and agricultural education has increased (Bolton, Duncan, Fuhrman, & Flanders, 2015; Cavus & Uzunboylu, 2009; Myers & Dyer, 2006; Ricketts, Williams, & Priest, 2009; Stedman & Andenoro, 2007). Although a recent topic of discussion, the formal educational philosophy of critical thinking in the United States stems from work that John Dewey performed in 1933. Dewey believed that there were attributes necessary for an individual to experience reflective actions (critical thinking); open mindedness, responsibility, and whole heartedness. These attributes of critical thinking have been called some of the most necessary for an individuals' success in the 21st century (Huitt, 1998).

New industry hires are expected to have polished leadership and teamwork skills, initiative, interpersonal and social networking skills, and problem solving skills (Employers, 2010). These skills are often referred to in the literature as "soft skills". "Employers, colleges, and universities have become more cognizant of the role that such so-called "soft" or non-cognitive skills play in successful performance in both academic and nonacademic arenas" (Dwyer, Millett, & Payne, 2006, p. 18). According to Brungardt (2011) numerous studies between 1986 and 2006 provided evidence that soft skills would be critical to future workplace effectiveness.

A study completed in 2008 by the Center for Agribusiness and Economic Development at the University of Georgia showed that job candidates (undergraduates seeking positions) were overly focused on technical skills and not soft skills such as communication and leadership. Furthermore, the study found that job candidates needed more emphasis on critical thinking, problem solving, and analytical skills. A National Association of Public and Land-grant Universities (APLU) study of seven soft-skill clusters consisting of communication, decision-making/problem solving, self-management, teamwork, professionalism, experiences, and leadership skills was conducted to determine which soft skills employers seek in new college graduates (Crawford, Lang, Fink, Dalton, & Fielitz, 2011). Of these seven clusters, the top two ranked by employers were decision-making/problem solving and communication (Crawford et al., 2011). The decision-making/problem solving cluster included recognizing and analyzing problems, taking effective and appropriate actions, and realizing the effects of those actions (Crawford et al., 2011). As evidenced in the 2011 APLU study there are a cadre of items related to "soft-skills" that new hires should be capable of performing in the work place.

In 1988 the Committee on Agricultural Education and Secondary Schools (National Research Council, 1988) reported that reconfiguring the agricultural education program was necessary if graduates were to be effective in further schooling for the workforce. Additionally, a key point of the committee's report concerned their conclusion that adequate opportunities should be presented to students for practicing critical thinking with increasing variety and regularity, both in and outside of the classroom. Little research has been performed concerning critical thinking dispositions of higher education students – both domestic and international (Ricketts, Williams, & Priest, 2009). This study looks to predict and analyze the critical thinking dispositions of students enrolled in a higher education course in a cohort with international universities.

Based on these conclusions we look to further define critical thinking as it pertains both to agricultural education within the classroom and the objectives of this research. Critical thinking usually involves the student's ability to do a few or most of the following:

> "identify central issues and assumptions in an argument, recognize important relationships, make correct inferences from data, deduce conclusions from information or data provided, interpret whether conclusions are warranted on the basis of the data given, and evaluate evidence or authority" (Pascarella & Terenzni, 1991, p.118).

Additionally, Glaser (1941) believed critical thinking to be the "attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences; knowledge of the methods of logical inquiry and reasoning; and some skill in applying these methods" (p. 5-6). Halpern (1989) delineated this subject as 'thinking that is purposeful, reasoned, and goal directed" (p. 5). Paul (1995) defined critical thinking as

> "a unique and purposeful thinking in which the thinker systematically and habitually imposes criteria and intellectual standards upon the thinking, taking charge of the construction of thinking, guiding the construction of the thinking according to [critical thinking] standards, and assessing the effectiveness of the thinking according to the purpose, criteria, and the standards [of thinking]" (p. 21).

Although several critical thinking studies (Bolton, Duncan, Fuhrman, & Flanders, 2015; Cano, 1993; Friedel, et al., 2008; Ricketts, Williams, & Priest, 2009; Rollins, 1990; Rudd, Baker & Hoover, 2000) have been conducted in previous years, limited research regarding critical thinking and agriculture students in higher education have been identified, especially in the fields of agricultural education and leadership development. This study seeks to identify and further explain critical thinking and its related skills in students attending higher education institutions and participating in an international agriculture Global Seminar course.

The Global Seminar was developed in 1997 out of the idea that global sustainability in agriculture needs an inter-disciplinary, inter-cultural, and innovative approach. Soon the idea was to form a Global classroom using eLearning technology; to bring students from different parts of the world together as the main actors – not as passive recipients of lectures but as stakeholders of a future which will rely on their decisions. To simulate reality it was decided to use case studies and not theoretical disciplines.

One key element of the practical implementation of the Global Seminar is to understand its specific learning cycle which has its theoretical roots in Kolb's experiential learning cycle (Kolb, 1984). Figure 1 gives a practical example how the experiential learning cycle is implemented in the Global Seminar. Videoconferences are embedded into a three to four week "learning cycle" which begins when each teacher in the consortium presents the case study to their local students by a conventional face-to-face lecture.

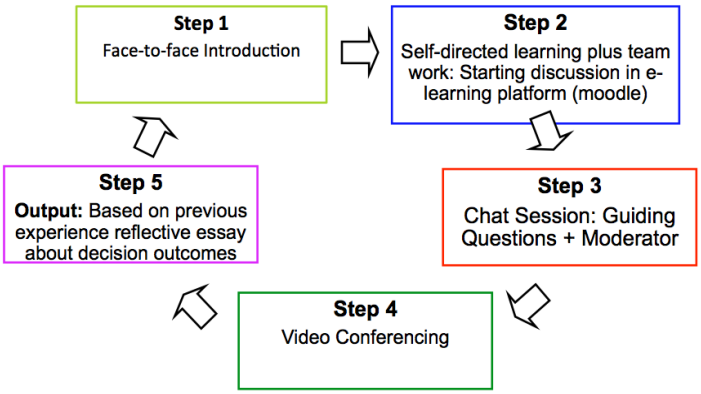

Figure 1. The blended e-learning cycle of the Global Seminar

In Step one a responsible team of students for the specific case study is defined. The team is informed about their specific roles and tasks and over the next weeks they have to do self-directed learning.

In Step two all students are engaged in self-directed learning; they gather information and share it with their local classmates in the respective e-Learning platform. Additionally, there is an opportunity for students to engage in small empirical fieldwork such as qualitative interviews with decision makers from the private sector; and develop questionnaires and/or make quantitative interviews.

In Step three students from all universities in the Global Seminar cluster discuss various aspects of the actual case study via virtual chat sessions. Due to the high number of students several chat rooms are formed with a maximum of six students per room. The discussion is moderated by providing guiding questions related to the case study. In Step 4 the synchronous videoconference takes place bringing together all students from the university cluster. Each videoconference follows a specific protocol that includes time for debriefing and reflection. Finally, Step 5 requires students to write a reflective essay about their learning experience.

Theoretical Framework

The theoretical framework of this study originates from Peter Facione (1990) and his results from conducting a national Delphi study of experts to define critical thinking. His definition concludes that "we understand critical thinking to be 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 that judgment is based" (p. 2). From this study the critical thinking skills identified was Interpretation, Explanation, Analysis, Evaluation, Inference, and Self-regulation. In addition, Facione (1990) refers to his identification of critical thinking dispositions, or approaches to life that increase an individual's likelihood to participate in critical thinking. These dispositions include analyticity, self-confidence, inquisitiveness, maturity, open mindedness, systematicity, and truth-seeking. Further characteristics are described by Facione in 1998:

> 'Inquisitiveness with regard to a wide range of ideas, concern to become and remain well-informed, alertness to opportunities to use critical thinking, trust in the process

> of reasoned inquiry, self-confidence in one's own abilities to reason, open-mindedness regarding divergent world views, flexibility in considering alternatives and opinions, understanding the opinions of other people, fair-mindedness in appraising reasoning, honesty in facing one's own biases, prejudices, stereotypes, or egocentric tendencies, prudence in suspending, making, or altering judgments, willingness to reconsider and revise views where hones reflection suggests that change is warranted" (p.8).

Dispositions develop over time, are influenced by an individual's surrounding environment, and are strong precursors of critical thinking. Even though one's disposition can be changed they often change slowly and over an extended period of time (Irani, et al., 2007).

Following factor analyses of Facione's dispositions a critical thinking research group from four universities determined that the aforementioned three factors of cognitive maturity, engagement, and innovativeness were more comprehensive and explanatory of critical thinking dispositions (Irani, et al., 2007). Thus, faculty at the University of Florida set out to develop an instrument that more accurately measured critical thinking disposition. The resulting instrument, the EMI was developed and submitted to pilot testing in 2003 (Irani, et al., 2007).

Engagement, cognitive maturity, and innovativeness are usually measured via an instrument referred to as the University of Florida Engagement, Cognitive Maturity, Innovativeness (UF-EMI): Critical Thinking Disposition Assessment (Ricketts, Williams, & Priest, 2009). According to Ricketts and Rudd (2005):

> "The Engagement disposition measured students' predisposition to look for opportunities to use reasoning; anticipating situations that require reasoning; and confidence in reasoning ability. The Innovativeness disposition measured students' predisposition to be intellectually curious and wanting to know the truth. The Cognitive Maturity (Maturity) disposition measured students' awareness of the complexity of real problems; being open to other points of view; and being aware of their own and others' biases and predispositions" (p. 33).

Purpose and Objectives

The purpose of this study was to identify the variance in critical thinking dispositions of students (undergraduate and graduate) enrolled in an international course (Global Seminar). The specific objectives guided this research project:

1. Identify specific demographic characteristics of the students enrolled in the Global Seminar;
2. Identify critical thinking dispositions of students enrolled in the Global Seminar using the UF-EMI: Critical Thinking Disposition Assessment; and
3. Compare critical thinking dispositions between US and European students enrolled in the Global Seminar using the UF-EMI: Critical Thinking Disposition Assessment.

Methods

This descriptive post-test only study was conducted with all students (N=46) enrolled in the Global Seminar Cohort 6. Students from four institutions (two USA; one Italian; one Austrian) participated in the 15 week long course that focused on four case studies that were linked to agriculture and the environment.

Each student voluntarily completed the UF-EMI that utilizes the California Critical Thinking Disposition Inventory CCTDI cutoff points developed by Facione to determine a strong, medium, and weak disposition to critical thinking along with related demographic (age, gender, area of residents, current degree program and major, and country of residency) questions on their respective campuses. Participants were contacted via email at the end of the semester and asked to complete the on-line UF-EMI instrument. Follow-up email notifications were used following Dillman's (2007) *Tailored Design Method*. A total of 43 students completed the instrument resulting in a 94% response rate.

The post-test only version of the UF-EMI contains 26 items, each relating to one of the three constructs: engagement, cognitive maturity, and innovativeness. Reliability has been calculated on each of the constructs and ranges from: ($\alpha = 0.79$ to 0.93) and validity was determined to be strong due to the historical use of this instrument with college students. The instrument asks the participant to select a level of agreement with the statement after completing the course. Level of agreement responses are as follows: SD = *strongly disagree*, D = *disagree*, U = *uncertain*, A = *agree*, SA = *strongly agree*.

Data was analyzed with Excel and SPSS. Analysis and findings will involve aggregate data which does not allow the researcher or any consumer of the research to be able to identify participants responses to any of the questions or survey items.

Results

Students represented the following majors: agricultural education, agricultural leadership, agronomy, food science, environmental resource sciences, environmental health science, agrarian sciences and technologies, International agriculture and business, agrarian biotechnology, agricultural economics, and forestry. As evidenced in Table 1 80% of the respondents fall between the ages of 21-25. Gender is nearly equally represented and 47% of the respondents reported being from rural residency. Lastly, nearly 1/3 of the respondents are from the US and another 1/3 from Italy.

Table 1.
Demographic Characteristics of Student Participants

Characteristic	*f*	%
Age		
21-25	34	79
26-30	5	12
31+	4	9
Gender		
Female	20	46
Male	23	54
Academic Level		
Undergraduate	26	60
Graduate	17	40
Area of Residence		
Urban	12	28
Suburban	11	26
Rural	20	46
Country of Residency		
USA	16	37
Italy	13	30
Austria	14	23

Note. Total *N*=45.

Objective two: Critical Thinking Disposition of All Students Enrolled in the Global Seminar.

A two-sample t-Test was conducted using the summative scores of the undergraduate (*n*=26) and graduate students (*n*=17) to determine if a significant difference existed. Results indicate there was no significant difference between undergraduate and graduate students (Table 2). Therefore, it was decided that critical thinking disposition scores would not be separated by academic level.

Table 2.
Comparison of undergraduate and graduate summative mean scores

Academic level	*N*	*M*	*SD*	*t*	*p*
Undergraduate	26	101.61	14.27	2.01	.33
Graduate	17	106.67	9.20		

For all respondents (*N*=43) the mean total score of the UF-EMI was calculated as 103. Mean scores ranged from a low of 56 to a high of 124 (Table 3). The UF-EMI utilizes the CCTDI cutoff points to determine a strong, medium, and weak disposition to critical thinking. A reported score of 136.95 or higher on the UF-EMI is considered a strong disposition while a 135.30 to a 110.55 score is moderate, and a score of 108.90 or less constitutes a weak disposition to critical thinking.

Table 3.
Critical Think Disposition of All Students

Construct	*N*	*Minimum*	*Maximum*	*M*	*SD*
Total	43	56	124	103.00	12.95
Engage	43	22	53	42.33	6.21
Maturity	43	18	40	31.07	4.05
Innovate	43	13	35	28.69	4.16

Objective three: A comparison of critical thinking dispositions between US and European students.

As presented in Table 4 the US students' critical thinking dispositions are higher than their European counterparts for the engagement and innovative constructs. More specifically, the largest gap is between US and Italian students for the engagement construct.

Table 4.
Critical Thinking Dispositions of US and European Students

Country		ESum	MSum	ISum	TSum
United States	*M*	46.00	31.73	30.93	108.20
	N	16	15	16	15
	SD	3.88	2.31	2.48	7.63
Italy	*M*	39.85	29.61	26.38	94.83
	N	14	13	13	12
	SD	5.31	3.04	2.90	9.77
Austria	*M*	43.16	32.08	28.33	103.58
	N	12	12	12	12
	SD	7.70	6.02	5.36	18.40

Note. ESum = *engage*; MSum = *maturity*; ISum = *innovative*; and TSum = *total of all respondents*.

Conclusions and Recommendations

The students in this study represented a cadre of college majors ranging from agricultural education, food science, environmental resource sciences, and environmental health science, to agrarian biotechnology and forestry. Nearly eighty-percent of the respondents fell between the ages of 21-25 and 60% reported being an undergraduate. Gender was nearly equal; 37% of the respondents were from the US and 30% from Italy. As previously mentioned a UF-EMI score of 136.95 or higher is considered a strong disposition while a score ranging from 135.30 – 110.55 is moderate. A score less than 108.9 constitutes a weak disposition to critical thinking.

With that said the entire group (*N*=45) of college students in this study would be classified as weak overall and data analysis found no significant difference between undergraduate and graduate students' summative mean scores. Previous studies discovered similar results when students' critical thinking dispositions were determined by one or more of the following assessments: California Critical Thinking Disposition Inventory (CCTDI) and the Cornell Critical Thinking Test (Baker, Hoover & Rudd, 2000; Bataineh & Zghoul, 2006). It must be noted though that a researcher in this study who has extensive

experience with critical thinking research at both secondary and post-secondary levels has never witnessed critical thinking disposition values at this low a level. This concern warrants further research to determine which factors (courses completed, majors, experiential learning opportunities, internships, etc.) enhance one's critical thinking dispositions during their tenure in college.

United States students (both undergraduate and graduate) scored higher on all three critical thinking dispositions when compared to the Italian students, and scored above the Austrian students on the Engagement and Innovativeness dispositions. According to Irani, et al., (2007) typical ranges for EMI scores fall between 28-55 (Engagement), 16-40 (Cognitive Maturity), and 15-35 (Innovativeness). Therefore, all students in this study fell within the typical EMI mean score ranges for all three dispositions, but the maximum mean scores for each population group were below the "typical" maximum score for each disposition. This is especially evident with the Italian students' Cognitive Maturity mean score of 29.61. According to Ricketts and Rudd (2005) "The Cognitive Maturity (Maturity) disposition measures students' awareness of the complexity of real problems; being open to other points of view; and being aware of their own and others' biases and predispositions" (p. 33).

The nature of this Global Seminar course challenges students to consider and understand differing positions and points of view regarding controversial topics in agriculture and the environment. Due to the size of this study the results can't be generalized beyond the population; however, the results do inform practice and warrant further inquiry to determine if specific cultures have an impact on the Cognitive Maturity disposition. Additionally, the researchers need to identify the extent to which stages two through four of Figure 1 are impacting the students' critical thinking dispositions by conducting a retrospective-post design study. Finally, the fact that the European students are not native English speakers must be considered. There could be a bias in answers to the UF-EMI statements due to possible challenges in understanding questions correctly. It is not possible at this stage of research to indicate how strong the influence of "language bias" could be, but based on the researchers' observations during the videoconference discussions the level of English from the Austrian students was better in general compared to the Italian students. The Austrian students were more fluent in expressing their thoughts in comparison to the Italian students and conducted their presentations without reading directly from their notes; Italian students follow their notes closely during video conferences and don't freely share their thoughts and observations.

In addition to the "language bias" the lower levels of critical thinking dispositions may be due to cultural differences and/or differences in the education systems between the US and Europe. One of the European researchers in this study taught courses at an American university and experienced first-hand active and vivid engagement of US students during classroom discussions. The US students seemed to be more at ease to express their opinions freely in a classroom situation as observed by the European researcher. The US students classroom engagement may be due to the way children in the US are raised – being encouraged early on by their parents to talk in front of adults and/or a reflection of the active classroom environment in US public schools – which uses less conventional one-way teaching and more didactic formats which encourage discussion

and free exchange of ideas compared to the European Union. Further investigation about the dominant didactic forms of teaching at the participating universities would be necessary to clarify these assumptions.

The Engagement disposition measures students' predisposition to look for opportunities to use reasoning; anticipating situations that require reasoning; and confidence in reasoning ability. As previously mentioned all three groups scored within the acceptable range but the Italian students mean scores were below that of the US and Austrian students. One may conclude that all students in this study lack the confidence in their reasoning ability; therefore, they may not look for opportunities to challenge or reason with students from other cultures that think differently and hold differing opinions of controversial issues such as those presented in this course. Lastly, even though the US students' disposition scores were higher than the Italian students in all three categories and higher that the Austrian students in two of the three categories their results were below the "typical" maximum score for each disposition – a somber fact that must be addressed by faculty in this Global Seminar cohort.

If university faculty is to truly train future leaders they must determine the extent at which our pedagogical processes and university experiences are preparing students to think more critically; be intellectually curious, aware of the complexity of real problems, and open to others' biases and predispositions. Furthermore, teaching faculty need to be more intentional in assisting students in strengthening their critical thinking dispositions. Research has proven that industry leaders are expecting institutions of higher education to better prepare new hires to face the many challenges of a global economy that brings forth uncertainty and change (Crawford et al., 2011).

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