

Casting the Net of Critical Thinking: A Look into the Collegiate Leadership Classroom

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Abstract

As the leadership classroom is becoming more diverse in the student demographic make-up it is important to establish what the impacts of those differences are on learning leadership. In this paper the essential element of leadership analyzed was critical thinking disposition. Participants were analyzed for differences in critical thinking disposition by the selected demographics of age, gender, GPA, honors enrollment, and major college classification. Using the EMI, it was found that there were no statistical differences in the total disposition constructs of innovativeness, cognitive maturity, or engagement. There were, however, differences in individual statements and mean scores. Considering the classroom landscape, an educator must often move beyond statistical significance to identify means which meet student needs. In essence, some of the most subtle differences in students create the biggest challenges. Research findings are used to make recommendations for increasing student capacity for critical thinking in the collegiate leadership classroom.

Introduction

The trend in leadership courses is growth. With enrollment in leadership courses increasing, the classrooms that were once small and intimate are now overflowing with students. Ten years ago Fritz and Brown (1998) declared that institutions were not offering leadership courses because of a lack of resources and student demand. Times have certainly changed and 10 years later, classes are filling to capacity faster and with a greater variety of students. Undergraduate education is changing to accommodate the growing demands of employers seeking graduates who are better prepared to deal with the complex world. The preparations include the basic development of leadership skills (Graham, 2001; McKinley, Birkenholz, & Stewart, 1993). While there has been tremendous growth in leadership

emphasis areas, majors, and minors in colleges of agriculture, there is no doubt that this trend exists in college classrooms and campuses regardless of the discipline.

One of the basic tenants of leadership is cognitive ability (Bass, 1990; Katz, 1995; Kirkpatrick & Locke, 1991; Mumford, Zaccaro, Harding, Jacobs, & Fleishman, 2000). In fact, a majority of leadership theories today support the development of cognitive abilities, knowledge, and intellectual stimulation (Northouse, 2007). In an effort to address this leadership need, many classrooms are turning to critical thinking. Critical thinking is comprised of skill and disposition. While skill is malleable, critical thinking disposition is one's naturally occurring attitude or preference for critical thinking and is not easily changed. In many instances, there is an assumption that students are different in disposition.

Many believe that the classroom landscape has changed and that critical thinking instruction is more important than ever. Critical thinking is emphasized by employers and seen as a way to increase the United State's market in a global economy (Daly as cited in, Shafersman, 1991). Wasley (2008, ¶2) quoted Derek Bok who commented that studies which document improvement in students' writing and critical thinking skills will prove to be a "powerful lever of change." Classrooms that once had a homogeneous student population are now filled with a diverse group of students with different backgrounds and from different colleges. Leadership educators must address the question, "Are the students in my class different from one another and what can I do to enhance their critical thinking?"

Theoretical and Conceptual Frameworks

Critical Thinking

In 1989, Peter Facione undertook a massive project to operationalize the concept of critical thinking. The outcome of his project was the development of critical thinking dispositions and skills. Facione (1990) defined critical thinking as, "purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations" (p. 2). This complex definition suggests that the practice of critical thinking is not entered into with ease. Facione's Delphi study approached critical thinking from the perspective that there has to be a common ground for educators to discuss critical thinking; from this, critical thinking dispositions and critical thinking skills were born.

Facione (2000) defined disposition as an individual's "habitual ways of acting" (p. 4). It is the way we act or react to situations and our environment. Coupling this with the notion of critical thinking dispositions, it becomes our attitude or

preference for thinking critically. Facione contended there are many examples of individuals who are skillful at thinking, but do not possess the correct motivation to do it. Halpern (1999) suggested that instructors are challenged to make students value “good” thinking and the amount of work necessary to make it happen. There are plenty of examples of individuals who possess the potential to think critically, but do not practice and vice versa with those who may not be that disposed to it, but can certainly demonstrate the skill set when appropriate.

Rudd, Baker, and Hoover (2000) further defined critical thinking as, “a reasoned, purposive, and introspective approach to solving problems or addressing questions with incomplete evidence and information for which an incontrovertible solution is unlikely” (p. 5). They Hoover linked critical thinking to learning style, but their research revealed no significant differences between the two concepts. Since that time, researchers have conducted a number of studies analyzing the various facets of critical thinking. Moore and Rudd (2003) discovered there were no significant differences in the relationship between bench science and social science career classifications. The researchers did identify significant differences in the relationship between gender and truth-seeking, inquisitiveness, and maturity. This finding supported those by Rudd, Baker and Hoover (2000) who found significant differences in gender between truth-seeking, maturity, and open-mindedness.

Ricketts and Rudd (2004) established new instrumentation which re-categorized Facione’s (1989) critical thinking dispositions, identifying cognitive maturity, innovativeness, and engagement. From their initial studies, they identified low positive relationships between critical thinking skill (Facione, 1990) and disposition (as defined by Ricketts and Rudd).

Stedman and Andenoro (2007) expanded the role of critical thinking, postulating a relationship with emotional intelligence, which is another essential for leaders. In their study, they identified significant relationships between students’ overall critical thinking disposition as measured by the EMI, and emotional intelligence, as defined by Weisinger (1998).

There are still numerous research studies regarding critical thinking disposition which provide a great deal of insight into many areas beyond critical thinking skill. Critical thinking itself has been studied in a variety of disciplines: management, nursing curricula, athletic training, accounting, and agricultural education. All disciplines ask the same question: where do we begin with critical thinking instruction?

Leadership Education

Leadership education courses have increasingly experienced diversified student enrollment, and now include students from colleges of business, liberal arts, and agriculture (and life sciences) respectively. Colleges of business have traditionally focused on leadership in organizational behavior courses providing the basics of leadership (Nirenberg, 1998). In colleges of liberal arts curricula, educators focused on political science thereby providing students a glimpse into political leadership and decision making.

In colleges of agriculture there is a growth of leadership programs offered in agricultural education departments. These courses have grown over the last 10 years and provide curriculum to a wide variety of students. Fritz and Brown (1998) purported that growth in leadership programs in departments of agricultural education was forthcoming and that departments must reach out to their academic peers in other departments to engage in course offerings. This foretold of the increase and encouraged educators then to consider an interdisciplinary approach to leadership education.

Today leadership classrooms are filled with students from a variety of backgrounds and experiences having varied interests and goals. The combination of increased class enrollment and more diverse perspectives with a need to enhance and develop critical thinking skills is an important consideration for the leadership educator. If the student make up is increasingly diverse and the content (critical thinking instruction) increasingly complex, how can leadership educators ensure a quality experience for all students? Swatez (1995) declared that the leadership classroom should be one where students are free to debate, discuss, and disagree with the texts' and instructors' ideas thus supporting the development of critical thinkers.

Specifically for this research project, the interest of the researcher was to establish if differences existed between students historically enrolled in the course and those enrolled for the purposes of obtaining a minor in leadership. Because of the manner in which students from different colleges experienced or came into contact with leadership concepts prior to entering the course discrepancies in beliefs about leadership were evident, especially concerning the question, "Are managers and leaders different?" Because of the varied conclusions drawn by these questions and the freedom of the students to express these differences, it was natural to ask what is causing the difference.

The purpose of this study is to determine if any differences exist among students in a large leadership theory course in their critical thinking disposition. This purpose guided the development of the following research objectives to determine:

- the demographic make-up of students participating in the study,
- the critical thinking disposition mean scores of students in the study, and
- the variance between critical thinking disposition scores of students in the study based on selected independent variables.

Methods

This study was conducted during the Fall (2007) and Spring (2008) semesters at a land grant institution. Participants were selected through their enrollment in a large leadership theory course with an average semester enrollment of 120. The course is required for students in the major, other majors within the college, and those seeking the university-wide leadership minor. There were a total of 230 students enrolled in the course during the two semesters the researcher collected data. This was a convenience sample of students representing individuals in leadership courses. Of the 230 eligible to participate, there were a total of 177 usable responses collected for a response rate of 77%.

The researcher used a causal-comparative approach to identify variances between the independent variables, gender, age, major college, grade point average (GPA), and honors enrollment. The dependent variable was critical thinking disposition. According to Gall, Gall, and Borg (2007), a causal-comparative research design is non-experimental and provides the researcher with information about a dependent variable existing within a group or groups.

In order to measure critical thinking disposition the researcher used the UF/EMI (STEP, 2006) and included a short demographic questionnaire to elicit the remaining data. The UF/EMI instrument assesses an individual's disposition toward critical thinking and includes three scales – cognitive maturity, innovativeness, and engagement. Cognitive maturity addresses an individual's personal awareness of biases and predispositions and has a typical score range of eight to 40. Innovativeness refers to the idea that individuals' are "hungry learners" and look for new knowledge with a range of seven to 35 (STEP Program, 2006). Engagement is defined as an individual's ability to anticipate situations where good reasoning is necessary and scores range from 11-55. Developers report the UF/EMI to have a reliability of .937, with the following scale Cronbach's alpha reliability coefficients for engagement, .906; cognitive maturity, .787; and innovativeness, .797.

The investigator completed data analysis using SPSS© and applied the statistical analysis of ANOVA. Gall, Gall, and Borg (2007) identified this procedure as appropriate for analyzing variance among more than two means.

Findings

The objectives of the study were guided by the research purpose, which was to determine if any differences exist among students in a large leadership theory course in their critical thinking disposition.

Objective 1: Determine the demographic make-up of students participating in the study.

The demographic make-up of the students was analyzed in order to provide a glimpse at who the participants of the study were. Four colleges were represented including agriculture (53%, n=94), business (25%, n=44), liberal arts (20%, n=35), and health and human performance (2%, n=4). The largest number of respondents specifically reported being in the family, youth and community sciences major (27%, n=48), followed by finance (8%, n=15), and dietetics (6%, n=10).

Of those respondents, the largest age range was between 19 and 22 (n=147), with 16% (n=28) 23-27 and, the remaining, 1.6% (n=3) over the age of 30. Gender was identified as well and the researcher found that 75% (n=134) of respondents were female.

Grade point average (GPA) was included, as was Honors designation. GPA scores were categorized and grouped. Of the 174 respondents, 38% (n=67) reported a GPA between 3.10 and 3.50. The second largest group were those with a GPA between 3.51 and 3.75 (25%, n=44). On the high end, 22% (n=36) reported a GPA between 3.76 and 4.00. Conversely, 10% (n=18) were between 2.76 and 3.0 while 5% (n=9) were between 2.5 and 2.75. At this institution honors enrollment is optional and reflects additional coursework and commitment to the program on part of the student. Of the 175 participants represented in the study, 12% (n=21) reported being enrolled in the honors program.

Objective 2: Determine the critical thinking disposition mean scores of students in the study.

This objective provides initial information about the general mean scores of respondents. This is to establish baseline understanding of differences existing, prior to determining any statistical significance in the variance within or between the groups.

Gender was the first independent variable analyzed and scores were consistent for both men and women; although men scored themselves higher in engagement ($M=43.81$, $sd=7.82$) and innovativeness ($M=27.65$, $sd=6.88$) as compared with

women ($M=43.46$, $sd=5.42$; $M=27.49$, $sd=3.55$). Women's self-reported scores were higher for cognitive maturity ($M=31.04$, $sd=3.58$) than men ($M=30.74$, $sd=3.37$). The total critical thinking scores were higher for men ($M=102.65$, $sd=16.13$) than women's ($M=102.30$, $sd=10.80$).

Age was categorized and grouped by range. For the disposition of engagement, the highest mean score was for those participants 19-21 ($n=107$) ($M=43.71$, $sd=5.45$); followed by respondents 22-24 ($n=63$) ($M=43.48$, $sd=7.19$), range of 25-27 ($n=4$) ($M=41.75$, $sd=5.18$) and, respondents, 28-50 ($n=3$) ($M=41.67$, $sd=2.08$). Innovativeness scored highest by those respondents 22-24 ($M=27.81$, $sd=5.98$), followed by 28-50 ($M=27.67$, $sd=1.53$), 19-21 ($M=27.43$, $sd=3.59$), and 25-27 ($M=25.75$, $sd=4.57$). Lastly, cognitive maturity was scored highest by those participants in the range of 28-50 ($M=31.33$, $sd=2.52$), followed by 19-21 ($M=31.07$, $sd=3.70$), 22-24 ($M=30.92$, $sd=3.26$), and 25-27 ($M=29.00$, $sd=3.60$).

Major college classification was analyzed for mean scores. In the area of critical thinking engagement, participants from the college of health and human performance scored highest ($M=46.75$, $SD=3.50$), followed by agriculture ($M=43.55$, $SD=6.41$), business ($M=43.43$, $SD=6.21$), and liberal arts ($M=43.31$, $SD=5.20$). Respondents from the college of health and human performance scored highest in the construct area of innovativeness ($M=29.50$, $sd=1.92$), followed by liberal arts ($M=27.69$, $sd=3.40$), agriculture ($M=27.65$, $sd=5.19$), and business ($M=26.98$, $sd=4.13$). The last construct analyzed was cognitive maturity and was scored highest again, by respondents in the college of health and human performance ($M=31.50$, $sd=1.30$), agriculture ($M=31.45$, $sd=3.46$), liberal arts ($M=30.91$, $sd=3.43$), and business ($M=29.95$, $sd=3.72$).

GPA was analyzed for category mean scores. Engagement was scored highest by those respondents self-reporting a GPA of 3.76-4.00 ($M=44.75$, $sd=4.86$), followed by 3.10-3.50 ($M=43.94$, $sd=6.92$), and the lowest scoring group was those reporting 2.50-2.75 ($M=41.22$, $sd=5.31$). Respondents self-reporting a GPA of 3.10-3.50 scored highest in innovativeness ($M=28.27$, $sd=5.60$), then those with a 3.76-4.00 ($M=27.92$, $sd=3.71$). The lowest scoring group was those in the GPA range of 2.50-2.75 ($M=26.00$, $sd=3.28$). Cognitive Maturity was scored highest by those in the range of 2.76-3.00 ($M=31.94$, $sd=3.57$), then 2.50-2.75 ($M=31.22$, $sd=2.28$) with the lowest score being in the range of 3.51-3.75 ($M=30.25$, $sd=3.84$).

Closely aligned was the independent variable of Honors enrollment. Consistently, those respondents designating an honors enrollment scored higher in each of the construct areas – engagement ($M=44.70$, $sd=3.51$), innovativeness ($M=28.35$, $sd=2.78$), and cognitive maturity ($M=31.35$, $sd=3.70$) (see Table 1).

Table 1
Summary of critical thinking disposition mean scores by selected demographics

	Gender				Major College							
	Male		Female		LA		AG		BA		HHP	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Innovativeness	27.6	6.88	27.4	3.55	27.6	3.40	27.6	5.19	26.9	4.13	29.5	1.92
Engagement	43.8	7.82	43.4	5.42	43.3	5.20	43.5	6.41	43.4	6.21	46.7	3.50
Cognitive Maturity	30.7	3.37	31.0	3.58	30.9	3.43	31.4	3.46	29.9	3.72	31.5	1.30
Total Score	102.6	16.13	102.3	10.80	102.5	9.37	103.0	13.29	100.4	12.43	107.7	4.79

Objective 3: To determine the variance between ct disposition scores of students in the study based on selected independent variables.

The intent of this objective was to provide a means for comparing the variance in critical thinking disposition scores based on selected demographic variables. As reported in Objective 1, these included gender, age, major college classification, GPA, and Honors enrollment. The researcher analyzed all data for significance with alpha set *a priori* at .05.

Gender

The first analysis determined if differences existed in the critical thinking disposition of innovativeness by gender. There were two statements showing a significant difference between groups – “I enjoy learning even when I am not in school,” ($F=5.12, p<.05$) and “I search for the truth even when it makes me uncomfortable,” ($F=5.59, p<.05$). However, further analysis of the total critical thinking disposition of innovativeness by gender showed no significant differences ($F=.04, p>.05$).

Variance between groups, critical thinking disposition of cognitive maturity by gender, revealed no significant differences. This was for both independent statements of cognitive maturity and the total construct score ($F=.24, p>.05$). The critical thinking disposition of engagement by gender did show significant differences with the “I keep on working on things until I get them right,” ($F=6.24, p<.05$); however, at the total engagement disposition score level there were no significant differences revealed ($F=.11, p>.05$).

Similarly, data analysis showed no significant differences with the total score for critical thinking disposition by gender ($F=.03, p>.05$). This completed the analysis for critical thinking disposition by gender (see Table 2).

Table 2
Analysis of Variance in Critical Thinking Disposition Scores by Gender (n=177)

Item		<i>df</i>	<i>MS</i>	<i>F</i>	<i>P</i>
I enjoy learning even when I am not in school	Between	1	2.41	5.12	.03
	Within	175	.47		
I search for the truth even if it makes me uncomfortable	Between	1	4.43	5.59	.02
	Within	175	.80		
I keep working on things until I get them right	Between	1	4.40	6.24	.01
	Within	175	.71		
Total Innovativeness Score	Between	1	.82	.04	.84
	Within	175	20.96		
Total Cognitive Maturity Score	Between	1	2.94	.24	.63
	Within	175	12.45		
Total Engagement Score	Between	1	4.02	.11	.74
	Within	175	36.96		
Total Critical Thinking Disposition Score	Between	1	4.05	.03	.87
	Within	175	151.06		

Age

The second round analysis determined differences in variances of critical thinking disposition by age. The critical thinking disposition of innovativeness revealed no significant differences at the construct statement level or total construct level ($F=.62, p>.05$).

Cognitive maturity showed significant differences in one construct statement – “I am likely to change my opinion when I am given new information that conflicts with my current opinion,” ($F=1.93, p<.05$); however revealed no significant differences at the total cognitive maturity construct level ($F=.69, p>.05$).

Engagement showed no significant differences either at the individual statement level or construct level ($F=.66, p>.05$). The ANVOA for the total critical thinking disposition score showed no significant differences by age ($F=.65, p>.05$) (see Table 3).

Table 3
Analysis of Variance in Critical Thinking Disposition Scores by Age (n=177)

Item		<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
I am likely to change my opinion when I am given new information that conflicts with my current opinion	Between	10	1.60	1.93	.04
	Within	166	.83		
Total Innovativeness Score	Between	10	13.19	.62	.80
	Within	166	21.30		
Total Cognitive Maturity Score	Between	10	8.65	.69	.74
	Within	166	12.62		
Total Engagement Score	Between	10	24.79	.66	.76
	Within	166	37.49		
Total Critical Thinking Disposition Score	Between	10	99.12	.65	.77
	Within	166	153.31		

Major College Classification

The third independent variable analyzed for variance was the college represented by the respondents major college classification. With that four colleges were identified: agriculture (n=94), business (n=44), liberal arts (n=35), and human, health and performance (n=4).

The critical thinking disposition of innovativeness was analyzed for significant differences in variance by major college. There were two independent measures of innovativeness which showed significant differences by major college – “I enjoy solving problems,” ($F=2.94, p<.05$) and “I will go out of my way to find the right answers to problems,” ($F=2.60, p<.05$). However, the total construct score for the critical thinking disposition of innovativeness showed no significant differences ($F=.50, p>.05$).

Next, cognitive maturity by major college was analyzed and found to have significant differences in five of the construct statements. These were “I listen carefully to the opinions of others even when they disagree with me,” ($F=2.73, p<.05$); “I can get along with people who do not share my opinions,” ($F=2.77, p<.05$); “I consider how my own biases affect my opinion,” ($F=3.50, p<.05$); “I try to find multiple solutions to problems,” ($F=2.64, p<.05$); and, “I ask many questions when making a decision,” ($F=2.76, p<.05$). Yet, with the number of individual constructs showing significant differences the total construct score for cognitive maturity by major college classification showed no significant differences ($F=1.86, p>.05$).

Engagement was the third disposition analyzed for variance by major college. There was one construct statement showing significant differences, “I am a good

problem solver,” ($F=2.81, p<.05$). However, again analysis revealed no significant differences at the total engagement disposition by major college ($F=.39, p>.05$).

In regard to the total critical thinking disposition score by major college, analysis revealed no significant differences ($F=.69, p>.05$) (see Table 4).

Table 4
Analysis of Variance in Critical Thinking Disposition Scores by Major College
($n=177$)

Item		<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
I enjoy solving problems	Between	3	1.68	2.94	.04
	Within	173	.57		
I will go out of my way to find the right answers to a problem	Between	3	1.63	2.60	.05
	Within	173	.63		
I listen carefully to the opinions of others even when they disagree with me	Between	3	1.73	2.73	.05
	Within	173	.63		
I can get along with people who do not share my opinions	Between	3	1.32	2.77	.04
	Within	173	.48		
I consider how my own biases affect my opinion	Between	3	2.12	3.49	.02
	Within	173	.61		
I ask many questions when making a decision	Between	3	2.20	2.76	.04
	Within	173	.80		
Total Innovativeness Score	Between	3	10.38	.50	.69
	Within	173	21.02		
Total Cognitive Maturity Score	Between	3	22.66	1.86	.14
	Within	173	12.21		
Total Engagement Score	Between	3	14.51	.39	.76
	Within	173	37.16		
Total Critical Thinking Disposition Score	Between	3	103.80	.69	.56
	Within	173	151.03		

Grade Point Average (GPA)

GPA was a self-reported demographic used for a fourth level of analysis of variance in critical thinking disposition. The first disposition analyzed by GPA was innovativeness. Across each construct statement there were no significant differences revealed, as with the total score for the disposition of innovativeness by GPA ($F=1.46, p>.05$). Similarly, the total score for critical thinking disposition by GPA showed no significant differences ($F=1.20, p>.05$).

Likewise, the disposition of cognitive maturity by GPA showed no significant differences, either by statement or total construct score ($F=.75, p>.05$).

Honors Enrollment

Honors enrollment was the last independent variable assessed for variance between the groups or categories of respondents. Innovativeness neither showed statistical significance at the construct statement or total construct level ($F=.72$, $p>.05$).

In this particular case, the construct of cognitive maturity showed one construct statement to be statistically significant, “I consider how my own biases affect my opinion” ($F=5.60$, $p<.05$). However, the total construct score was not significantly different ($F=.26$, $p>.05$).

Likewise, the disposition of engagement had one statement, “I enjoy finding answers to challenging questions” ($F=5.01$, $p<.05$), yet the total construct score for engagement was not statistically significant ($F=.81$, $p>.05$). These cumulative results failed to show any statistical difference at the total dispositional score ($F=.74$, $p>.05$) (see Table 5).

Table 5
Analysis of Variance in Critical Thinking Disposition Scores by Honors Enrollment (n=177)

Item		<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
I consider how my own biases affect my opinions	Between	1	3.46	5.60	.02
	Within	175	.62		
I enjoy finding answers to challenging questions	Between	1	3.79	5.01	.03
	Within	175	.76		
Total Innovativeness Score	Between	1	15.12	.72	.40
	Within	175	20.87		
Total Cognitive Maturity Score	Between	1	3.23	.26	.61
	Within	175	12.44		
Total Engagement Score	Between	1	29.92	.81	.37
	Within	175	36.81		
Total Critical Thinking Disposition Score	Between	1	110.71	.74	.40
	Within	175	150.45		

These findings were synthesized and analyzed for consistency or contrasts against previous works as documented in the literature review. With that conclusions and recommendations were made.

Conclusions and Recommendations

Because of the nature of this study the researcher disclaims the generalization of findings beyond this particular research group. The following conclusions and recommendations are made to address specific issues and findings of the participants of this study.

Objective one found a diversity of individuals in the large leadership theory course. One particular finding was the number of female students represented in the overall course enrollment. This is an important consideration in addressing overall classroom management and course experiences. Age of participants was found to be normal or consistent with typical college course enrollment; with the slight exception of those students over traditional age (25 to 50).

Second, was the idea of representation by major college classification; the number of students represented by four different colleges from across the institution. The majority was from the college of agriculture where the course was offered; however, other students represented by business, and liberal arts are important enrollment factors for leadership courses. GPA was important and showed a range of student achievement. With that, reported GPAs showed a high level of student performance and demonstrated that students enrolled in this course were at a moderate to high level of academic achievement. While there was not a majority of honors enrolled students, their participation in the course does influence peer-to-peer interactions.

Objective two analyzed the mean scores of the critical thinking dispositions of engagement, innovativeness and cognitive maturity against the selected demographic variables of gender, age, major college classification, GPA, and Honors enrollment. The self-reported mean scores indicated that men reported themselves as more disposed to critical thinking in the areas of innovativeness and engagement whereas women scored high in cognitive maturity. With the normal range of scores for engagement being 11 to 55; the men in this study were on the higher end ($M=43.81$). Likewise, innovativeness ranges from 7 to 35 and the men's reported means was 27.65. The women on the other hand scored higher in cognitive maturity ($M=31.04$), which has a normal range of 8-40. The scores may indicate that there is still a gap in the way men and women perceive themselves and that natural differences may cause disparity in critical thinking. This may encourage instructors to seek out different ways to encourage critical thinking whether that is through group activities pairing men and women to complement one another or to allow more time for each group to hone their particular dispositions into skills.

The mean critical thinking dispositions scores as measured by age were varied, in terms of highest and lowest scoring groups. With the highest mean scores for all three dispositions reported by different age ranges – engagement (19-21; $M=43.71$), innovativeness (22-24, $M=27.81$), and cognitive maturity (28-50, $M=31.33$) one can only surmise that each group has its strengths when considering critical thinking disposition. One consistent finding related age to cognitive maturity in that the older an individual is the more aware of personal biases and subjectivity comes into play.

An area of interest was the self-reported mean scores of participants categorized by major college. The findings showed that the college of human health and performance scored highest in each critical thinking disposition area. This could be a result of the program itself and the type of students it attracts, being the program is comprised primarily by pre-health and pre-med students. The college of agriculture showed median scores, scoring the second highest in engagement and cognitive maturity. This may be a result of the hands on applied nature of programs in the college or a result of more directed instruction in the area of critical thinking as evidenced by this institution. The college of business scored lowest in two (cognitive maturity and innovativeness) of the three dispositions. This may be a result of the program in business and the curriculum, with little emphasis in the area of personal reflection and idea development. Although the research is not fully comfortable with this claim, there appears to be a significant need for additional research in this area.

Similarly, GPA showed a large amount a variance in the groups which scored highest for each of the critical thinking dispositions. As one may have expected, engagement (anticipating situations where good reasoning is necessary) was scored highest by those in the GPA range of 3.76-4.00. The other areas did not indicate a specific group whose scores merit further discussion. This relates to earlier research indicating that because an individual is disposed to think critically does not mean they follow through with the practice and vice versa. Honors enrolled students scored higher than non-enrolled students in all three critical thinking dispositions. Understanding the decision to enter honors programs and the student make-up of those enrolled compared to non-enrolled is an area of interest and should be further explored.

Objective three analyzed the mean scores for significant differences. Although there were specific dispositions which showed significant differences in specific construct statements; all groups failed to show significant differences at the total dispositional scores. This included the total critical thinking disposition score. This is consistent with Moore and Rudd (2003) who determined there were no significant differences between bench and social science careers. However, because of subtle differences found in mean scores, as reported in objective two, and the significant differences in specific statements, the researcher fully contends

that additional research should be conducted to determine the causes of the differences and to address limitations of the study which may have caused the findings to be non-conclusive. This again is consistent with both Moore and Rudd (2003) and Rudd, Baker, and Hoover (2000) who identified significant differences in truth-seeking and inquisitiveness which are the two comparable dispositions identified by Facione (1990).

In an effort to address leadership curriculum, establishing a need for critical thinking in the classroom is not only pertinent to the student experience in the course, but in their lives as leaders after the course. It is important that the leadership classroom foster critical thinking through dispositional development and skill building. With that, educators should create a classroom environment open to students from a variety of backgrounds which allows open communication and dialogue about leadership concepts. As this study showed for this particular institution, although scores are different by mean, the significance is not and students should be developed for who the leaders they will become not their gender, age, major college classification, GPA, or Honors enrollment.

While additional research is a key recommendation of this researcher, faculty teaching leadership should emphasize the importance of critical thinking to their students. With that, reinforcing Halpern's (1999) challenge of making students value "good" thinking and the more difficult clause, that it will not be easy. Students should be taught to complement their potential to think critically as leaders and be provided frameworks for doing so. This may include providing additional provisions to groups who may not be willing to do the work – in other words, sometimes educators have to push a little to get a big result. Critical thinking does take a lot of work and students need to be kept motivated and inspired to do so.

Other research studies need to include institutions which are not actively making attempts at critical thinking instruction. By doing so, a comparative analysis can be conducted which focuses on the impact of critical thinking instruction. This study focused on students already receiving additional instruction and to fully understand the impact of the instruction, a pre-test methodology or equivalent class or institution should also be analyzed.

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Biography

Nicole Stedman is an Assistant Professor and coordinates the university-wide leadership minor at the University of Florida. She teaches courses at the undergraduate and graduate levels with an emphasis on leadership development. Her current research interests are how educators can create experiences to increase capacity for critical thinking in the leadership classroom including the use of artwork and other creative mediums.