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REVISING GENERAL EDUCATION: ASSESSING A CRITICAL THINKING INSTRUCTIONAL MODEL IN THE BASIC COMMUNICATION COURSE

Joseph P. Mazer, Stephen K. Hunt, and Jeffrey H. Kuznekoff

Colleges and universities across the country are recognizing the need to integrate critical thinking (CT) instruction into general education programs (Halpern, 2001). Although most first-year students may have had some previous CT instruction prior to entering a university's general education program, the CT skills of these students are still in need of further development (Jacobson & Mark, 2000). Scholars agree that CT skills are necessary for everyone, not only in the classroom but also as a lifelong skill (Browne & Stuart, 2004; O'Keefe, 1986, 1995). The introductory communication course provides an ideal context for the application of CT (Hunt, Novak, Semlak, & Meyer, 2005) because speech and thought are inextricably linked (Dance, 2002; O'Keefe, 1986, 1995).

Over the last 20 years, the introductory communication course has become a crucial element of general education programs (Cutspec, McPherson, & Spiro, 1999; Hunt et al., 2005). The art of communicating, of creating and interpreting messages, is a highly complex process. Westphal-Johnson and Fitzpatrick (2002) argue that "business and academic leaders agree on the vital importance of communication in post-industrial society" (p. 79). Findings such as this send a clear message that a general education requirement in communication is essential (National Communication Association, 2005), and continuous improvement and assessment of the basic communication course are imperative.

The basic course plays a critical role in most communication departments. Dance (2002) contends:

In many ways the undergraduate course in basic public speaking is the discipline's "bread and butter" course. The course introduces

new students to the discipline, provides continuing teaching opportunities for both permanent and adjunct faculty and often supports graduate programs through its staffing by graduate assistants. This is an important course. (p. 355)

Given that the basic communication course is a key element of most general education programs across the nation, it serves as an ideal platform to implement and assess student CT skills: “As the basic course assumes greater responsibility for teaching student critical thinking skills, more research in critical thinking instruction and assessment becomes vital” (Hunt et al., 2005, p. 29). The present study examines CT instruction and assessment in the basic communication course at Illinois State University (ISU). Specifically, this study compares a current CT instructional model with a proposed, enhanced CT instructional model for the new basic communication course curriculum as part of revisions to the university’s general education program.

The General Education Program

Beginning in 1998, all first-year students at ISU were required to enroll in Foundations of Inquiry (FOI), Language and Composition (ENG 101), and Language and Communication (COM 110). These courses made up a portion of the inner core of the general education program at ISU. Until recently, the inner core of general education has remained unchanged; however, inconsistent teaching within FOI and budget pressures led the university to take action and modify the curriculum (*Recommendations to Academic Affairs*, 2004).

FOI initially served as a transition course and introduced first-year students to college-level inquiry. The evolution of FOI from 1998 to 2005 saw increased attention being placed on argumentation and CT skills as well as information literacy (IL) abilities (*Recommendations to Academic Affairs*, 2004). Both ENG 101 and COM 110 also include pedagogy designed to develop students’ CT and IL skills. This curricular overlap was intentional; it was thought that FOI would serve as the starting point for CT and IL training, with the content of ENG 101 and COM 110 designed to reinforce those skills.

Although it was innovative in its approach, many students viewed FOI as inconsistent across sections and labeled CT instruction in ENG 101 and COM 110 as repetitive (*Recommendations to Academic Affairs*, 2004). For these reasons, the last sections of FOI were offered in spring 2005. As a result, COM 110 and ENG 101 were tasked with greater responsibility for the instruction of CT and IL in the inner core of general education. As of fall 2005, FOI was replaced by “a revised English 101 and Communication 110 reconceived as a year-long sequence of courses with content coordinated over the two semesters” (*Recommendations to Academic Affairs*, 2004, p. 3). When the general education curriculum at ISU was restructured, it was noted that “critical thinking, in particular, is and must remain a key component of the curriculum” (*Recommendations to Academic Affairs*, 2004, p. 4). As a result of these program revisions, half of the first-year students take the basic communication course in the fall semester, and the other half enroll in the basic composition course. The opposite occurs in the spring semester.

ISU’s basic communication course serves approximately 3,500 students in approximately 150 stand-alone sections (23 students per section) over the course of each academic year. Tenure-track faculty, adjunct faculty, and master’s-level graduate teaching assistants teach the course within a 16-week semester.

Critical Thinking Defined

Various definitions of CT exist, with most focusing on the ability to develop and analyze arguments based on available resources and knowledge (Angelo, 1995; Williams, Oliver, & Stockdale, 2004; Williams & Worth, 2001). For example, Browne and Stuart (2004) argue that “critical thinking consists of an awareness of a set of interrelated critical questions, plus the ability and willingness to ask and answer them at appropriate times” (p. 3). Facione (1998) contends that the skills of interpretation, analysis, evaluation, inference, explanation, and self-regulation are at the core of CT. Other scholars (e.g., O’Keefe, 1986) claim that CT cannot be limited to concepts such as logic and evaluation. CT is more than just a variety of concepts; it is a set of abilities. Ennis (2003) defines CT as “reasonable reflective thinking focused on deciding what to believe or do” (p. 295). In order to be

a reasonable reflective thinker, students should be able to evaluate sources and arguments and ask informed questions, among other abilities. Though these definitions vary, they all encompass similar trends. Halpern (2001) argues that CT instruction and assessment are dependent on a clear operational definition of the construct. In the present study, we operationalize CT as the ability to construct meaning and articulate and evaluate arguments, as well as evaluate sources and support. In order to evaluate CT skills and how they are nurtured within general education courses, one must have an effective method for assessing CT skills. Recently, scholars have devoted considerable attention to the assessment of CT skills in higher education generally and within the basic communication course specifically.

Critical Thinking Assessment

With increased scholarly attention toward CT instruction, many higher education institutions have begun to assess the effectiveness of current pedagogy. However, findings from the current body of literature may be considered problematic, in that many studies have demonstrated improvement in CT skills (Bensley & Haynes, 1995; Isaacs, 1991; Reed & Kromrey, 2001; Sandor, Clark, Campbell, Rains, & Cascio, 1998; Williams, Oliver, Allin, Winn, & Booher, 2003), whereas other studies have failed to do so (Arburn, 1998; Forbes, 1997; Lierman, 1997; Lyle, 1958; Slaughter, Brown, Gardner, & Perritt, 1989). It is clear, however, that students will not improve their CT skills without specific and intentional instruction that targets higher-order reasoning (Barnes, 1983; Braxton & Nordvall, 1985; Paul, Elder, & Bartell, 1997).

Research has shown that CT instruction is most effective when housed within a content course, such as the basic communication course, and applied to specific assignments (Royalty, 1995; Williams et al., 2004). According to O'Keefe (1986),

Experts and textbook firms suggest various cure-alls: special courses in logic, prepared materials, or computer programs. Such "solutions" treat critical thinking as a separate entity. . . . It makes much more sense to instead change the *way* we teach our present content courses. (p. 2)

Research suggests that CT skills are strengthened through course content that includes both the creation and the evaluation of arguments. Courses created specifically to teach generic CT skills (such as the now abolished FOI course at ISU) are shown to be less effective (O'Keefe, 1986, 1995; Williams et al., 2004).

Moreover, course content should include instruction that is specifically designed with the intent to develop CT skills. Previous research has shown that CT skills improve as a result of this specific instruction (Halpern, 1987a, 1987b; Lochhead & Clement, 1979). Facione (1991) found that students who had completed a general education program in CT possessed better CT skills than those who had not completed such a course. Engagement in CT training has been shown to improve students' oral presentation and essay-writing skills (Herrnstein, Nickerson, de Sanchez, & Swets, 1986; Schoenfeld, 1987; Walsh, 1981). Based on CT instruction, undergraduate students are beginning to think more similarly to the experts in their fields (Glaser, 1992). For example, Schoenfeld and Herrmann (1982) found that math students substantially improve CT scores when they are required to use a general strategy approach rather than a computer-based program. Students' perceptions of their own CT skills also rise as a result of CT instruction (Block & Taylor, 1984; Dansereau et al., 1979; Wheeler, 1979).

As general education course teachers and administrators design CT instruction, it is especially important to provide students with the tools necessary to evaluate argument quality. Paul (1995) introduces the concept of pseudo-critical thinking (PCT), defined as

a form of intellectual arrogance masked in self-delusion or deception, in which thinking which is deeply flawed is not only presented as a model of excellence of thought, but is also, at the same time, sophisticated enough to take many people in. (p. 49)

Paul (1995) claims that to combat PCT in the classroom, students must have the opportunity to construct meaning from the content they learn. He further argues that not only are student constructions of meanings important but this construction must be evaluated through a set of standards for the quality of the argument. Without this construction, integration, and evaluation, students are merely memorizing, reciting, and ultimately engaging in PCT.

Research has shown that active engagement of learning leads to not only increased test performance and higher-order thinking (Garside, 1996) but also lasting learning associated with student discovery (O’Keefe, 1995). Academic courses should include instruction in ways that do not encourage PCT but, rather, engage students in the act of learning. Interactive learning asks higher-order questions, requiring students to move beyond memorization and toward construction of their own understanding.

Many scholars agree that CT skills are necessary for academic success. For instance, Williams and Stockdale (2003) argue that high-critical thinking (HCT) students are more likely to succeed academically than low-critical thinking (LCT) students. LCT students are the least likely to improve their CT skills (Williams et al., 2003; Williams, Oliver, Allin, Winn, & Booher, in press) and have a decreased chance of succeeding in courses that require CT (Bowles, 2000; Gadzella, Ginther, & Bryant, 1997; Wilson & Wagner, 1981). Those who develop CT pedagogy must be mindful of the fact that classrooms consist of both high and low critical thinkers. Additionally, instructors should make attempts to use a variety of instructional approaches that appeal to different cognitive and learning styles (Hunt, Meyer, & Lippert, 2006).

In addition to promoting academic success, CT skills are also essential if students are to become critical consumers and producers of information in a democratic society (Browne & Stuart, 2004; O’Keefe, 1995). Studies have found that CT skills taught in academia are applicable to everyday life (Lehman, Lempert, & Nisbett, 1988; Lehman & Nisbett, 1990). Tsui (2000) claims that “graduates who can think critically become more productive and successful alumni and citizens” (p. 435). Instructors can foster this type of CT by requiring students to apply CT skills to collegiate experiences outside of the classroom (Tsui, 2000).

Critical Thinking and Communication Education

As noted earlier, scholars suggest that CT instruction is most effective when taught within a content course (Royalty, 1995; Williams et al., 2004). The basic communication course provides an ideal context for

teaching these skills as CT skills are intimately tied to communication skills (O'Keefe, 1986, 1995). The basic communication course at ISU requires students to not only deliver oral presentations but also engage in classroom discussions. Speaking, whether through class discussion or public speaking opportunities, allows students to work with the knowledge they have acquired. As instructors strive to enhance students' CT skills, it is important that students question information, examine new data, and create examples. Speaking allows the student to question, examine, and create meaning through immediate interaction with others. O'Keefe (1986) contends that

oral communication improves not only students' facility with language but their facility in maneuvering ideas as well. . . . Speech allows ideas to be picked up and examined, set on shelves in categories, and eventually added to other categories, ideas, or words. (p. 6)

Several scholars have investigated the effects of communication skills on CT (Allen, Berkowitz, & Loudon, 1995; Colbert, 1995; Hill, 1993; Hurst, 1962; Johnson, 1942; Ness, 1967). Allen, Berkowitz, Hunt, and Loudon (1999) conducted a meta-analysis of research concerning the effects of public speaking experiences on CT. Their primary conclusion is that CT improved as a result of communication skills training. According to Dance (2002), the basic communication course should not focus solely on public speaking skills but should focus on improving students' CT skills by improving their public speaking abilities. He also advocates a braided approach to the basic communication course in which speech and thought are constantly intertwined.

Effective instruction and assessment of CT require a clear operational definition of the construct (Halpern, 2001). In the present study, we assess CT instruction as it relates to the construction of meaning, articulation and evaluation of arguments, and evaluation of sources and support. CT skill development is infused into the pedagogy of the basic communication course at ISU in many ways. For instance, COM 110 uses an interactive classroom environment, wherein higher-order discussion, oral presentations, and written assignments give

students the opportunity to make sense of course material and construct meaning as they compose thoughtful responses.

Importantly, the articulation and evaluation of arguments are built into the COM 110 curriculum in several ways. Both written and oral assignments require students to develop and support claims. Lesson plans teach students to identify fallacies within popular media and construct quality arguments using Toulmin's (1958) Argument Model. In addition, students are required to evaluate oral arguments in public presentations through peer and self-evaluations. Further, students learn to evaluate sources using the three main tests of evidence: bias, timeliness, and credibility. The use of library research logs allows students to prioritize a multitude of sources while learning to effectively use the information to substantiate arguments. In essence, COM 110 provides a specific context and an active learning environment that allow students an arena for developing effective CT skills that will serve them well in the future.

Primarily, this study aims to measure the effectiveness of a CT instructional model in COM 110. This study seeks to compare the current CT instructional model to a proposed instructional model for the new COM 110 curriculum as part of revisions to the university's general education program. To explore the effectiveness of the new model, we posed the following research question:

RQ: How do control and experimental groups differ in their performance on a CT test?

A paucity of research has focused specifically on students' perceptions of their own CT skills. Three studies (Block & Taylor, 1984; Dansereau et al., 1979; Wheeler, 1979) have reported, however, that students view themselves as better critical thinkers after they have received CT instruction. This study further explores the effects of enhanced CT instruction on student perceptions of their own CT abilities. To address this issue, we advanced the following hypothesis:

H: Participants in the experimental and control groups will perceive themselves as better critical thinkers following CT instruction.

Method

Participants

Eight sections of the basic communication course were randomly assigned to a control group, and eight sections were randomly assigned to an experimental group. A total of 324 participants were recruited for this study.¹ Of the 155 participants in the experimental group, 92% were first-year students, 43% were male, and 57% were female, and they ranged in age from 18 to 26. The mean self-reported grade point average was 2.93. With respect to race, 91% were Caucasian, 4% were African American, 3% were Latino/Latina, 1% were biracial, and 1% indicated other. Of the 169 participants in the control group, 96% were first-year students, 42% were male, and 58% were female, and they ranged in age from 18 to 23. The mean self-reported grade point average was 2.96. With respect to race, 90% were Caucasian, 4% were African American, 4% were Latino/Latina, 1% were biracial, and 1% indicated other.

Measurement

Critical Thinking Self-Assessment. The Critical Thinking Self-Assessment (CTSA) is a modified version of the research instrument developed by Halpern (1996) with 17 items on a five-point Likert scale (1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *frequently*, 5 = *always*). Questions on the self-assessment refer participants to a narrative at the beginning of the survey instrument and ask participants to recall whether they have seen or heard professionally produced articles, stories, videos, books, speeches, or sermons that were designed to persuade them to believe something. After reading the narrative, participants responded to the CTSA items. Statements from the measure include “I am able to follow a fairly complex line of argument, so that I can tell which things are offered in support of which other things and how it’s all supposed to fit together” and “I look for the hidden assumptions that are often present in an argument.” The alpha reliability for the CTSA was .87 for both the pretest and the posttest.

Critical Thinking Test. We developed the CT test, which is specific to content covered in the basic communication course (Royalty, 1995; Williams et al., 2004). The test includes 10 multiple-choice questions—each worth one point—designed to measure participants' recognition of arguments, evidence, and fallacies. Sample items include “‘We have to stop the tuition increase. The next thing you know, they’ll be charging \$40,000 a semester!’ What type of fallacy does the author of this argument commit?” and

Read the following excerpt and identify the test of evidence that the excerpt violates: “As Brad Pitt noted in a recent interview, the United States needs to change its foreign policy in the Middle East. Otherwise, Pitt said, it will be impossible to bring about lasting peace in the region.”

The CT test had Kuder-Richardson (KR-20) reliability estimates of .84 for the pretest and .85 for the posttest.

Procedures

All procedures were approved through the university's Institutional Review Board. Participants received an informed consent form to keep for their records. Participants completed the CTSA and the CT test during week two of the semester for the pretest. Participants were instructed to write a unique four-digit identification number on all surveys to allow the researchers to track responses from pretest to posttest.

Control Group. Through out the semester, control group participants were exposed to basic CT instruction in the current COM 110 course.² The course itself takes place within a 16-week semester and is presented in five units: immersion, message clarity, message responsiveness, persuasive communication, and synthesis. The content covered during each week and unit is listed in the Appendix. Students enrolled in the control group were first introduced to CT during the second week of the course (immersion unit). Specifically, students were placed into groups and given an ethical scenario. This scenario generally involved a hypothetical student who was caught

cheating or a political figure who must decide whether to reveal information about his or her opponent to the public. After students reached a decision as a group, each group presented its decision to the class and defended it as the “best” solution.

In the fourth week of class, students encountered CT again when they discussed speech outlining (message clarity unit). Control group participants read an outline concerning sleep deprivation. The outline itself was incomplete and only contained the main points of the outline. Students were presented with a list of 13 supporting points that must be integrated into the outline as support for the main points. This allowed students to identify ultimate conclusions, immediate conclusions, and premises. In addition, example outlines for the three required course speeches (informative, group, persuasive) were explained in this unit (Metts, Simonds, & Hunt, 2004).

Before the informative speeches (the sixth week of the semester), students viewed two example informative speech videos. The speeches were strategically designed as “A” and “C” speeches using the course grading criteria. The same person speaking on the same topic presented both speeches; however, the quality of the two speeches was vastly different. Students were instructed to critique the videos and identify the strengths and weaknesses of each presentation in terms of content, organization, and delivery.

At two points during the semester, students were required to complete peer evaluations for the informative and persuasive speeches. Students were assigned to evaluate two peers during informative and persuasive speeches. The peer evaluation forms engaged the evaluator in critical analysis of the strengths and weaknesses of a peer’s speech. In addition, students were also required to complete self-evaluations of each presentation. In the self-evaluations, speakers analyzed the strengths and weaknesses of their presentations and developed a plan for improvement.

Students next encountered CT instruction during the ninth week of class through lessons on listening (message responsiveness unit). Specifically, students discussed critical listening, which is defined in the course textbook as “a type of active listening that challenges the speaker’s message by evaluating its accuracy, meaningfulness, and utility” (Lucas, 2004, p. FF-74). In addition, the listening chapter of the textbook introduced students to inductive and deductive

arguments, enthymemes, and fallacies (e.g., false cause, begging the question, false alternatives).

From the 11th to the 14th week of classes, students were introduced to argumentation materials related to creating a persuasive speech in the persuasive communication unit. First, sections in the control group discussed how to organize a persuasive speech, followed by the introduction of *logos* (logical appeal), *pathos* (emotional appeal), and *ethos* (credibility). Students watched a video clip from an infomercial in which a celebrity attempted to persuade the audience to purchase a beauty product. The class then discussed how the celebrity used *logos*, *pathos*, and *ethos* in the presentation. Later in this class period, students were placed in groups and instructed to create their own infomercial and incorporate *logos*, *pathos*, and *ethos* to construct a persuasive presentation.

During week 12, control group participants completed an exercise in CT called “anticipating objections” (Metts et al., 2004) prior to the persuasive speech. This activity required a 50-minute class session and involved the entire class. Each student shared his or her persuasive speech thesis statement with the class. Members of the class then offered each speaker at least three objections to his or her thesis statement. For example, if the thesis statement was “The U.S. government should ban all handguns,” three common objections were (1) the right to bear arms is protected under the 2nd Amendment, (2) handguns are used for protection and personal safety, and (3) banning handguns will not solve the problem of gun deaths in the United States. The student then incorporated the objections into his or her speech and provided a proper rebuttal. Beyond incorporating opposing points of view into one’s speech, “anticipating objections” served as an activity in which students evaluated their own and others’ reasoning.

In week 15 of the course, students completed the final assignment of the semester (synthesis unit). This assignment, the portfolio and synthesis paper, asked students to encapsulate their work in COM 110 (portfolio) and identify three key improvements they made over the semester (synthesis paper). Each improvement was supported with specific evidence that was included in the portfolio for the instructor to reference. In essence, students engaged in self-reflection and CT as they developed effective arguments and supported those arguments with evidence from the portfolio.

Experimental Group. In addition to the activities and materials in the control group, additional CT instructional strategies were presented to experimental group participants throughout the semester. The instructors of record received additional training to implement the new instructional strategies. Beginning in week two of the semester, participants in the experimental group were given a standardized glossary of argumentation terms to utilize throughout the course.³ The glossary, which is also utilized in the basic composition course, includes terms relating to fallacies, reasoning, and argumentation. Instructors directed students to this glossary in future units of the course to more effectively teach course concepts. Additionally, students received Bloom's "Critical Thinking Objectives for Public Speaking" to operationalize CT in the context of ISU's basic communication course.⁴ This illustrates how course assignments are specifically designed to foster the growth of CT skills and follows long-standing scholarly claims that course content should include instruction that is specifically designed with the intent to develop CT skills. In fact, prior research suggests that students' CT skills improve as a result of this specific course instruction (Halpern, 1987a, 1987b; Lochhead & Clement, 1979).

In week four, experimental group participants were presented with the tests of evidence: bias, timeliness, and credibility. Experimental group instructors engaged students in discussion of the tests of evidence and provided sample excerpts that violated components of the tests of evidence. A sample excerpt included "According to a survey conducted for Honda Motor Co., most people prefer cars produced by Honda to that of Ford, Mazda, Toyota and even Hyundai." Clearly, this example violates "bias" as part of the tests of evidence.

During the informative speech process, students completed enhanced peer and self-evaluations. As they evaluated peers' speeches, students discussed how the speaker's topic was clarified and illustrated if the topic development was sufficient. Students also critiqued the speech to determine if the speaker's supporting material passed the three tests of evidence. After each student completed the informative speech, she or he viewed a videotape of the speech and completed a self-evaluation to critique argument development, determine if fallacies were present, and develop a strategy for improvement (see Simonds & Hunt, 2007, for peer and self-evaluation forms).

During weeks eight and nine, experimental group instructors presented additional CT instruction to supplement the textbook chapter on listening. The instructors frequently referred to the glossary of argumentation terms and placed emphasis on the importance of identifying fallacies. Instructors also discussed how to identify and evaluate both inductive and deductive arguments. Students applied their CT skills to analyze arguments presented in a video clip from the movie *Monty Python and the Holy Grail* (Goldstone, 1975). Students applied their CT skills and analyzed arguments in a clip that featured townsfolk asking a knight if they can burn a “witch.” The knight asks the group how they are able to tell that the woman is a witch. The mob attempts to explain how they ascertained that she is a witch; however, their explanation is illogical. The knight then leads them through a “logical” exercise to determine if she is a witch—quickly demonstrating the notion of pseudo-CT (Paul, 1995). The clip illustrates argument development generally and syllogisms and deductive arguments specifically. After viewing the clip, the instructors debriefed the video by leading a discussion where students analyzed the arguments present in the video. Instructors also provided students with opportunities to identify fallacies in various television commercials. Specifically, instructors utilized advertisements from the 2004 presidential campaign involving President George W. Bush and Senator John Kerry as well as political advertisements from the 2006 midterm elections. The videos allowed students to use the glossary of argumentation terms to critically evaluate the messages and identify fallacies in popular media.

During week 12, participants in the experimental group received Toulmin’s (1958) Argument Model to promote the development of inductive and deductive argumentation skills. Specifically, instructors presented the components of Toulmin’s Argument Model using PowerPoint slides and an example outline. Students identified parts of the model (e.g., claim, warrant, qualifier) through the use of various excerpts. For example, instructors presented the following qualifier: Low-carb diets should not be used—except when doctors and their patients weigh the costs and decide that the negative health concerns associated with low-carb dieting are more favorable than the side effects of obesity.

During week 14, experimental group participants were given a redesigned version of peer and self-evaluation forms for the persuasive

speech. The new peer and self-evaluation forms allowed students to apply CT and argumentation concepts to speech evaluations in terms of content, organization, argument quality, and delivery. In particular, the peer and self-evaluation forms allowed students to use their newly developed knowledge of CT to thoroughly and accurately assess the arguments presented in their own speeches and, through the use of peer evaluations, the speeches of their classmates. During week 15 of the semester, experimental group and control group participants completed the CTSA and CT test as part of the posttest.

Results

The research question asked whether control and experimental groups differed in their performance on specific CT test items. Item analysis reveals that the experimental group exhibited significant improvement in specific CT items, while the control group did not.⁵ In fact, analysis indicates that the control group actually scored lower on several CT test items at the posttest. See Table 1 for individual item means. A multivariate analysis of variance reveals a significant difference between the experimental ($M = 6.29$, $SD = 1.61$) and control ($M = 5.76$, $SD = 1.43$) groups for the CT ($F[1, 192] = 6.27$, $p < .05$, $h^2 = .03$) posttest, demonstrating a .26 change for the control group and a 1.03 change for the experimental group from pretest to posttest. See Table 2 for cell means and standard deviations.

Table 1. Descriptive Statistics for Critical Thinking Items

Critical Thinking Item	Experimental Group			Control Group		
	Pretest	Posttest	Change	Pretest	Posttest	Change
Conclusion	68	71.7	3.7	67.7	74.7	7.0
Logically correct	23	23.4	.4	33.5	27.2	-6.3
Slippery slope	48	49.3	1.3	34.3	37.3	3.0
False alternatives	27	38.4	11.4	28.9	18.7	-10.2
Straw person	48	47.6	-4	52.7	44.7	-8.0

Table 1. Descriptive Statistics for Critical Thinking Items (Continued)

Critical Thinking Item	Experimental Group			Control Group		
	Pretest	Posttest	Change	Pretest	Posttest	Change
Objections	71	93.8	22.8	78.1	82	3.9
Inductive	29	40.2	11.2	38.4	26.9	-11.5
Bias	82	94.5	12.5	75.7	91.3	15.6
Credibility	78	91.8	13.8	76.9	84.1	7.2
Backing	69	88.4	19.4	78.7	84.8	6.1

Table 2. Descriptive Statistics for Measures

Measure	Control Group				Experimental Group			
	Pretest		Posttest		Pretest		Posttest	
	M	SD	M	SD	M	SD	M	SD
Critical Thinking Self-Assessment	64.12	6.92	67.40	5.78	62.86	6.86	66.21	7.15
Critical Thinking test	5.50	1.68	5.76	1.43	5.26	1.48	6.29	1.61

The hypothesis predicted that participants in the experimental and control groups would view themselves as better critical thinkers following CT instruction. Paired-samples *t*-tests reveal that the control group demonstrated a significant improvement over time on the CTSA ($t[101] = -6.34, p < .05$) from pretest ($M = 64.12, SD = 6.92$) to posttest ($M = 67.40, SD = 5.78$). However, the control group did not improve on the actual CT test ($t[138] = -1.37, p > .05$). In contrast, the experimental group improved significantly over time on both the CT test ($t[137] = -8.15, p < .05$) and the CTSA ($t[114] = -5.82, p < .05$). See Table 2 for cell means and standard deviations.

Discussion

This study examined the effectiveness of a CT instructional model in a basic communication course as part of revisions to a university's general education program. Results reveal that a new instructional model containing enhanced instruction in CT has generated significant improvement over time in students' CT skills compared with a similar, yet less refined curriculum. The findings have important implications for teachers, scholars, and general education course and program administrators.

Our results reveal that the enhanced instructional model presented to students in the experimental group resulted in a substantive improvement in students' CT test scores. Although both the experimental and control groups demonstrated significant increases in their CTSA scores, the control group students who received the less refined model did not improve significantly in their CT test scores and actually reported a decrease in their knowledge of specific items on the CT test. This finding is somewhat alarming and emphasizes the importance of implementing the new CT instructional model across all sections of the basic communication course. Equally important, the results highlight the importance of conducting general education course assessment on a consistent basis to determine how a specific course or program is functioning in the students' best interests.

CT skills can only be enhanced when taught effectively. In order to best teach CT skills, it is essential for instructors to gain in their specific content area pedagogical content knowledge—that is, a professional understanding that teachers possess concerning “the ways of representing and formulating the subject that make it comprehensible to others” (Friedrich, 2002, p. 374). This idea is applicable to CT instruction on many levels, including course design, instruction, and assessment.

Research suggests that active engagement of learning leads to higher test performance, higher-order thinking (Garside, 1996), increased levels of CT (Angelo, 1995; Halpern, 2001; O'Keefe, 1995; Tsui, 2001), and lasting learning associated with student discovery (O'Keefe, 1995). Academic courses—such as the basic communication course and other required general education

courses—should include instruction that avoids promoting PCT (Paul, 1995) but, rather, implements instructional strategies that engage students in the act of learning. This interactive approach to learning asks higher-order questions and requires students to move beyond basic memorization toward a construction of their own understanding. By engaging students in hands-on activities (e.g., *Monty Python* clip and fallacy videos), instructors allow students to become active members in their own education.

Students must be allowed to become critical thinkers who ask questions, take risks, and learn through the process. In many cases, when students are encouraged to verbalize their thoughts, those thoughts become more organized. The process of becoming an effective communicator can allow the individual to develop a larger vocabulary and gain the abilities to organize thoughts, recognize evidence, and establish the basis for analytical and critical skills (Dance, 2002). To facilitate this interactive process, instructors may need to become better listeners in order to fully understand and respond to student questions and comments.

For optimal CT skills development, instruction must stretch beyond a single course and be infused throughout a series of courses in a general education program. Halpern (2001) argues that students must be exposed to CT instruction cumulatively and gradually. CT instruction should not be limited to a mere semester; rather, this vital instruction should expand to other courses and content areas throughout students' academic careers where future courses can effectively add to this knowledge base. This longitudinal approach can lay an important foundation so that future instruction can enhance students' CT skills throughout the academic experience.

Williams et al. (2004) argue that pre-course assessment of CT can assist instructors in determining those students who will need additional assistance with CT and those who will not. In this study, we found that the CTSA can serve as an effective means of determining which students may need extra CT instruction. However, our results reveal that some students—specifically the control group participants—may *think* they have improved as critical thinkers when, in fact, an actual CT test reveals otherwise. Instructors who implement a measure similar to the CTSA should interpret the results with caution.

Implications for General Education Course Management and Teacher Training

Following the assessment efforts described herein, ISU's basic communication course assumed greater responsibility for CT instruction within the inner core of the university's general education program. In essence, CT instruction for first-year students was reconceived as a year-long sequence of courses in communication and English with content coordinated over the fall and spring semesters (*Recommendations to Academic Affairs*, 2004). In the fall semester, half of all first-year students now take the basic communication course, while the other half enroll in the basic composition course. The opposite occurs in the spring semester. As a result of the general education program revisions, our course has been renamed Communication as Critical Inquiry to better reflect the new emphasis on CT skill development.

To implement changes to any general education curriculum, Westphal-Johnson and Fitzpatrick (2002) emphasize the much-needed "buy in" from faculty as one ingredient for success in general education program revisions. In addition, Friedrich (2002) argues for pedagogical content knowledge that emphasizes the professional understanding among teachers that must occur concerning the content they teach. To address these important issues, we conduct several comprehensive training programs for our novice and veteran instructors who teach the 150 sections we offer each academic year.

In mid-August of each year, new basic communication course instructors are required to attend a 10-day training workshop. First-year graduate teaching assistants in the master's degree program and newly hired adjunct faculty take part in this workshop. Though most of the content covered is directed toward training new teachers (e.g., lesson plan construction, classroom management, leading classroom discussions), a portion of the workshop training is reserved to teach instructors how to implement the CT activities from the first two units (immersion and message clarity) of the basic course. Specifically, second-year graduate teaching assistants develop presentations for the training workshop to demonstrate how to implement and debrief each of the CT activities in the first two units of the course.

For the fall semester, new graduate teaching assistants enroll in a weekly pedagogy seminar that serves as an important extension of the 10-day training workshop and covers CT instruction for the last three units of the course (message responsiveness, persuasive communication, and synthesis). First-year teaching assistants are afforded the opportunity to practice and discuss the CT lessons in this course before they actually have to present that material in their own classes. We have found that by dividing the CT instruction content throughout the semester, we are able to provide new teachers with a better grasp of the material and avoid overwhelming them with too much information during the mid-August training workshop. In addition, all of the new teaching assistants are assigned mentors (each mentor usually has about four first-year instructors) in their first semester of teaching. This provides new instructors with the opportunity to see how more experienced teachers lead, process, and debrief lessons before they teach material in their own classes. This three-pronged approach to training provides new communication instructors with an excellent introduction to teaching the basic course; however, efforts to enhance instructors' skills teaching CT are not limited to their first semester of their first year.

Because of the nature of the general education program, which places first-year students in a sequence of communication and English courses, each spring semester we conduct a joint training effort with all basic course instructors from the School of Communication and Department of English. This creates an environment that maintains vital relationships with individuals who teach similar content in discipline-specific ways. This workshop informs instructors of the most recent assessment efforts in each department and allows them to brainstorm effective CT instructional strategies. In this environment, teachers from both disciplines are able to discuss effective and ineffective teaching methods, network with individuals from across campus, and gain a better appreciation for the teaching methods that instructors then implement in their classrooms. This joint training program also allows teachers to hear from administrators at the college and university levels, remain informed of changes within the general education program, and receive the latest feedback from recent department-level and university-wide assessment efforts.

Limitations and Future Research

This study is not without limitations. This study examined students' growth in CT over the course of a 16-week semester. It is vital to explore the development of students' CT skills over longer periods of time. Perhaps future research can address CT skill development in the form of a general education program entrance exam and exit exam to assess students' growth in CT over the course of their time in the program. Without a doubt, it would prove challenging to compose such a measure, but the test could yield important information for teachers, scholars, and general education program administrators. General education program administrators might consider developing and implementing CT assessment measures on a consistent basis to provide evidence that curriculum changes are indeed effective. This can turn into political capital in an environment where institutions are met with accreditation standards (Middle States Commission on Higher Education, 2004) while, at the same time, academic departments can be faced with shrinking budgets (Westphal-Johnson & Fitzpatrick, 2002).

Although this study did not explore students' final course grades as measures of learning, future research might consider this measure as opposed to self-reported overall grade point average. Previous research has suggested that high-performing students tend to score higher on CT assessments than low-performing students (e.g., Williams et al., 2003, in press). Future research can address this issue to explore if students who have a high grade point average also score higher on CT tests. A study in this area can present an effective response to Williams and Stockdale's (2003) notions of high and low critical thinkers. In this vein, teachers and scholars might be well served by a standardized measure that identifies HCT and LCT students, which can, in turn, help instructors plan course objectives, activities, and general instructional practices to benefit all students.

At our university, future research should address students' growth in CT in the general education sequence. Specifically, researchers should track students' CT development simultaneously in the basic communication course and the basic composition course. If one student is enrolled in COM 110 and another student is enrolled in ENG 101, we would expect both students would exit the courses

with similar CT abilities. Research in this area can allow our course administrators to concurrently track CT instruction in both general education courses to best assess where instruction must improve.

Scholars might also consider mixed-methods approaches to CT assessment. One-on-one interviews or focus groups with students and teachers can further explore perceptions of CT instruction and student skill development in general education courses (Williams & Stockdale, 2003). Research of this nature should not replace traditional psychometric forms of course assessment; rather, interview and focus group data can act as a much-needed supplement and offer a more in-depth look into this important general education issue.

Conclusion

We urge general education course directors and program administrators to actively explore, develop, and implement assessment measures—specifically, CT assessment efforts—on a consistent basis to provide vital evidence that curriculum changes and instructional methods are indeed effective. We hope it is clear to the reader that the course described and assessed herein rests on a foundation of student-centered pedagogy. In others words, instructors are taught the strategies necessary to engage students in hands-on learning activities, thereby allowing students to become active participants in their own education.

Without question, students must be encouraged to become active critical thinkers who ask questions, take risks, critique evidence, and, most importantly, learn through the process. The process of becoming a competent communicator—which occurs in the context of the basic communication course—can allow students to develop larger vocabularies and gain the ability to organize thoughts and establish the basis for effective analytical and CT skills (Dance, 2002). To facilitate this interactive discovery, it is important for instructors and general education administrators to implement instructional models that allow students to personally assess and improve their CT skills in general education courses.

Notes

1. Participants in the experimental and control groups represented an accurate sample of the students enrolled in the basic communication course at ISU. The groups did not differ significantly in regard to race, age, year in school, or mean grade point average.
2. Although the majority of COM 110 classes follow a schedule similar to the one detailed herein, not all sections are organized exactly the same. Confounding factors (e.g., instructor teaching style) may influence the presentation of course content. It is simply not possible or reasonable to hold every section to a strict schedule. We did, however, closely monitor each participating instructor through one-on-one meetings and informal conversations during the semester.
3. For more information regarding the glossary of argumentation terms, please contact the first author.
4. This handout can be retrieved by e-mailing the second author.
5. The experimental group actually revealed a $-.4$ change from pretest to posttest on the straw person item on the critical thinking test. The term and its definition did not appear in the standard glossary of argumentation terms.

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Appendix		
Critical Thinking Objective	Control Group	Experimental Group
Outlining—Students should be able to identify ultimate conclusions, immediate conclusions, and premises	-Sleep deprivation outline activity -Outlines for all three speeches	-Sleep deprivation outline activity -Outlines for all three speeches -Toulmin's argumentation model
Defining arguments		-Glossary of argumentation terms -Bloom's taxonomy -Toulmin's argumentation model -Article/speech analysis assignment
Evaluation of reasoning (identifying loaded language, identifying contradictions, identifying examples that do not fit, identifying objections, message analysis)	-Anticipating objections activity	-Anticipating objections activity -Engagement plan -Changes in peer speech evaluations -Changes in self speech evaluations -Standardized tests of evidence -Article/speech analysis assignment
Evaluation of sources		-Three tests of evidence activities: bias, timeliness, and credibility
Distinguishing between observations and inferences		-Article/speech analysis assignment
Identifying and utilizing persuasive appeals (logos, pathos, ethos)	-Great American infomercial activity	-Great American infomercial activity
Critical listening skills		-Exercise using <i>Monty Python</i> video clip -Political advertisement exercise
Identifying fallacies in reasoning		-Glossary of argumentation terms -Political advertisement exercise
Evaluating visual argument		-Political advertisement exercise