Critical Thinking Development Through Teaching:
A Sample Project in Accounting

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ABSTRACT

Critical thinking is an important component of business education. We argue for the use of students educating others outside the academic setting as a means to develop not only content knowledge but also critical thinking skills. The paper presents a project that has been used in an internal audit class as an example of students learning through teaching others. In this project, students investigate the cash controls of non-profit organizations, prepare written materials oriented toward teaching these organizations about proper cash controls, and then use these materials to teach the leaders of the organizations about effective cash management. Learning objectives include content objectives such as developing an understanding of internal controls, risk assessment, and cash management, as well as critical thinking objectives and professional development objectives. Student survey responses indicate that the project was favorably received, enhanced critical thinking, and achieved desired learning objectives. The project differs from peer teaching in that students are teaching others outside the academic environment, which creates a different environment for learning. Likewise, the project differs from traditional service-learning where students do the work rather than teach others to do the work. Both these aspects enhance student opportunities to learn critical thinking skills.

Keywords: Accounting education, Auditing education, Critical thinking, Service-learning, Peer teaching

INTRODUCTION

Few will argue that critical thinking is not a valuable asset for business professionals and that the need for critical thinking skills is increasing as society becomes more technological. The challenge to academics, both the academy at large and academic professionals, is how to develop student critical thinking skills. It is commonly believed that critical thinking skills must be purposely taught (Nickerson, 1987; Kurfiss, 1988; Oliver and Utermohlen, 1995) and many ideas have been put forth as to how to teach critical thinking skills. *Teaching of Psychology* (Volume 22, issue 1) devoted an entire issue in 1995 to teaching strategies to help promote critical thinking. It included such pedagogical tools as: cooperative learning strategies (Cooper, 1995), case study and discussion methods (McDade, 1995), Socratic questioning (King, 1995), conference-style learning (Underwood and Wald, 1995), and writing assignments (Wade, 1995). Others have recommended the use of ambiguity (Strohm and Baukus, 1995) and dialogue methods (Robertson and Rane-Szostak, 1996). Similar strategies have been applied in accounting (Kimmel, 1995; Kern, 2000; Sullivan, 1996; Camp and Schnader, 2010). Bonner (1999) suggests that a variety of teaching methods are important and that specific teaching methods be selected based on specific learning objectives. She states, "A single teaching method typically cannot create all the conditions necessary for a given learning objective" (Bonner, 1999, p. 36).

In this paper, we argue for another method to enhance student critical-thinking skills—learning through teaching others. The concept of teaching to learn is not new. Centuries ago, Seneca the Younger wrote to Lucilius "Docendo discimus," Latin for "by teaching we learn" (Epistulae Morales ad Lucilum, 1, 7, 8). For years, medical education has used a "see one, do one, teach one" model with the goal of producing critical thinkers (Ludmerer, 1996). Recently, Law schools are considering this model as well (Coughlin, 2009). We argue learning through teaching others is also an appropriate model for use in business education.

Teaching provides students with the opportunity to learn the content more thoroughly, as well as to respond to ambiguity and uncertainty in the learning process. The traditional learning by teaching models focus on peer teaching, which is defined as students teaching other students and commonly includes: teaching assistants, tutors, counselors, partnerships or work groups (Whitman, 1988; Bargh and Schul 1980; Rubin and Herbert, 1998; Leelawong, *et al.*, 2001). This paper recommends a different kind of teaching. Rather than peer-to-peer teaching, we focus on student-to-layman teaching in a non-academic setting. The purpose of this kind of teaching is to expand the scope of benefits beyond content acquisition and into critical thinking development. Students develop

better critical thinking skills when dealing with others dissimilar from themselves in an ambiguous, unfamiliar environment.

The project presented involves educating non-profit organizations about cash controls. This is a form of service-learning because students are actively involved in the community, doing meaningful work. However, it differs from traditional service-learning where students simply do the work. In this project, we advocate teaching the non-profit organizations and enabling them to do the work themselves once the project is completed. As compared with teaching, performing (or doing) service work provides fewer opportunities to interact with the organization and to respond to feedback and criticism. By teaching, we believe students develop more critical thinking skills than if they simply did the service work for the organization.

CRITICAL THINKING FRAMEWORK

When examining the vast literature on critical thinking, various definitions of critical thinking appear. Scriven and Paul (1996) define critical thinking as " the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action". Kurfiss (1988, p. 42) defined critical thinking as "an investigation whose purpose is to explore a situation, phenomenon, question, or problem to arrive at a hypothesis or conclusion about it that integrates all available information and that can therefore be convincingly justified". "Most formal definitions characterize critical thinking as the intentional application of rational, higher-order thinking skills, such as analysis, synthesis, problem recognition and problem solving, inference, and evaluation" (Angelo, 1995, p. 6). Perhaps the simplest definition is "Critical thinking... means making reasoned judgments" (Beyer, 1995, p. 8). Beyer views critical thinking as a disciplined manner of thought that a person uses to assess the validity of something. In the paper we use the definition developed by the AICPA (1999); Critical thinking encompasses the ability to link data, knowledge, and insight together from various disciplines to provide information for decision-making.

The foundation for understanding the development of critical thinking skills is based on Bloom's taxonomy of learning (Bloom, 1956) which originally consisted of six sequential levels: (1) knowledge, (2) comprehension, (3) application, (4) analysis, (5) synthesis, and (6) evaluation. Knowledge, comprehension and application were considered lower-order thinking skills, whereas application, analysis and synthesis were considered high-order thinking skills. Bloom recognized that critical thinking was composed of more than just cognitive activities and identified three components: a cognitive component, a behavioral (or psychomotor) component, and an affective component. Ennis (1987) describes that the critical thinking process using three main components: a critical thinking disposition; the use of Bloom's (1959) higher-order thinking skills; and strategic problem solving abilities. Huffman (2012) calls these three components the ABC domain: Affective; Behavioral; and Cognitive. She further identifies critical thinking components under each domain. These are presented below. Sound critical thinking that links data, knowledge, and insights together for proper decision-making occurs at the intersection of these three components.

Affective components are the emotional foundation that either enhances or limits an individual's ability to think critically. It determines the individual's ability to approach the problem with an open mind, to seek new information, and to accept alternative solutions rather than searching for evidence in support of a perceived belief. The following are specific components of the affective domain:
- *Tolerating ambiguity:* Critical thinkers are comfortable with qualifying their response because they recognize that many issues are complex and do not have a single "right" answer.
- *Recognizing personal biases:* Critical thinkers use their intellectual skills to recognize personal biases and self-deceptive reasoning and endeavor to reduce these biases and to mitigate their effects on personal decision-making.
- *Valuing truth above self-interest:* This implies holding oneself and others to high intellectual standards and to recognize that "truth" is always in one's self-interest.
- *Empathizing:* Critical thinkers value the thoughts, feelings, and actions of others and try to fully understand others so as to reduce egocentric judgments.
- *Welcoming divergent views:* Critical thinkers understand the importance of examining issues from many points of view and value positions that are contrary to their beliefs.

- *Accepting change:* The mindset of a critical thinker is open to the need for adjustment and adaptation, even for deeply held values and beliefs.

Behavioral components are the actions or strategies necessary for critical thinking. These are necessary for a proper understanding of the problem and for creating solutions. The following are specific components of the behavioral domain:

- *Listening actively:* When gathering opinions and information from others, critical thinkers fully engage their cognitive listening and thinking skills.
- *Encouraging critical dialogue:* In addition to active listening, critical thinkers encourage dialogue through active questioning.
- *Employing precise terms:* Critical thinkers engage in clear communication by using specific, clear, well-defined terms that are known to the individuals.
- *Gathering data from a variety of sources*: Critical thinkers actively seek relevant, timely information from a variety of reliable sources.
- *Distinguishing fact from opinion:* Critical thinkers evaluate information for its veracity.
- *Delaying judgment until adequate data are available*: Critical thinkers do not jump to hasty conclusions; instead, they patiently wait until sufficient, high-quality data is gathered.
- *Modifying judgments in light of new information:* Critical thinkers modify or abandon existing ideas when new evidence or experience contradicts former opinions.
- *Applying knowledge to new situations*: Critical thinkers can discern when information is applicable to a new situation and when it is irrelevant.

Cognitive components are the thought process actually involved in critical thinking. It involves using higher-order thinking skills to reach reasonable conclusions. The following are specific components of the cognitive domain:

- *Thinking independently:* Critical thinkers do not passively accept the opinions or beliefs of others and are not easily manipulated.
- *Defining problems accurately:* In order to address the problem properly, critical thinkers will accurately define the problem using precise terms for themselves and others to understand.
- *Analyzing data for value and content:* After gathering data and establishing its veracity, critical thinkers will carefully evaluate the data to determine its value in the decision. It involves being eclectic in gathering information, welcoming divergent views, analyzing the usefulness of information and using the best.
- *Employing a variety of thinking processes:* To resolve problems, critical thinkers will use a variety of logical reasoning tools (e.g., inductive, deductive, dialogical, dialectical).
- *Synthesizing:* After taking an "eclectic" approach, critical thinkers are able to combine various elements into a meaningful composite.
- *Resisting overgeneralization:* Critical thinkers know when to generalize by applying a fact or experience to a similar situation and when not to over-generalize to superficially similar situations.
- *Employing metacognition:* Critical thinkers will reflect on their own thinking and analyze their own mental processes so as to learn to be better thinkers and decision-makers.

TEACHING OTHERS AS A MEANS TO DEVELOP CRITICAL THINKING SKILLS

In order to understand the value of teaching for the development of critical thinking skills, a detailed description of the activities of teaching is useful. Danielson (2013) presents a framework for formal classroom education that specifies teaching activities at various stages of the education process. She identifies four areas: planning and preparation, classroom environment, instruction, and professional responsibility. Within each area, she identifies specific activities.

The following are Danielson's activities of teaching that are applicable to business students teaching others. These activities are described along with the primary critical thinking skills developed through each teaching activity and are summarized in Table 1.

Table 1: Critical Thinking Components Developed through Teaching Activities

Teaching Activities

Critical Thinking Components	Preparation & Environment				Instruction		
	Define problem	Consider audience & build rapport	Consider alternatives & select method	Organize & prepare materials	Deliver instruction	Assess progress & recognize deficiencies	Consider & present alternative instruction
Affective components							
Tolerating ambiguity			++				
Recognizing personal biases		++					
Valuing truth vs. self-interest			++				
Empathizing		++					
Welcoming divergent views		++					
Accepting change						++	++
Behavioral components							
Listening actively		++			++		
Encouraging critical dialogue		++			++		
Employing precise terms	++			++	++		
Gathering data			++				
Discerning fact from opinion			++				
Delaying judgment			++				
Modifying judgments						++	
Applying to new situations							
Cognitive components							
Thinking independently			++				++
Defining problems accurately	++						
Analyzing data			++				
Employing thinking processes			++				
Synthesizing				++			
Resisting overgeneralization				++			
Employing metacognition							

Key: ++ implies the teaching activity significantly develops the component of critical thinking.

The applicable teaching activities are:
- *Define the problem:* The problem to be addressed with instruction must be clearly defined using precise terms. This requires adequate understanding of content and a limitation of scope to relevant problem. Accurate defining of the problem is a critical cognitive component at this teaching stage.
- *Consider the audience and build rapport:* In order to develop appropriate materials and use appropriate pedagogy, instructors must know their audience. Moreover, there must be a relationship of respect and trust for a culture of learning to develop. This requires an understanding of one's personal biases. Likewise, empathy and welcoming divergent views are important affective components when developing rapport. Listening actively and encouraging critical dialogue are also necessary for a good understanding of the audience and their needs.
- *Consider alternative teaching methods and select the best teaching method:* Given that there are many pedagogical choices, the most appropriate teaching method must be selected to address the problem and the

needs of the audience. At this data gathering stage, the teacher must be able to tolerate ambiguity, delay judgement, and value truth over self-interest. Data must be gathered from a variety of sources and evaluated for its veracity and usefulness. Data analysis and the use of various thinking processes, coupled with independent thinking, are critical cognitive components necessary for the next stage of preparing instructional materials.

- *Organize instructional information and prepare instructional materials:* Development of teaching materials requires a thorough understanding of the material and how it relates to the teaching method and the audience needs. It requires the use of precise terms as well as develops the cognitive skills of synthesizing and appropriate generalization.
- *Deliver the instruction:* Once the materials and preparation are complete, instruction actually occurs. At this stage, the teacher must use precise terms, listen actively and encourage critical dialogue.
- *Assess learners' progress and recognize deficiencies:* As the learning process occurs, assessment of the learners' progress can reveal deficiencies in their learning. This requires the use of many of the affective and behavioral components, with particular emphasis on being willing to modify judgements.
- *Consider alternatives and present alternative instruction:* To ensure learning in the face of deficiencies, alternative instruction may be necessary. This requires openness to alternative methods, a willingness to try, and perseverance. A willingness to accept change and an independent mindset are important foundational components for this stage.
- *Exercise metacognitive skills throughout the process:* As the teacher progresses through each stage of teaching activities, independent thinking is a necessary component. Likewise, reflection on the successes and failures of the activity, metacognition, can be a valuable tool. Although reflection is not required for good teaching, it is useful for developing teaching skills. Teaching others provides an opportunity for students to learn metacognition skills that can be applied to other areas.

In addition to these teaching specific activities, business students teaching others have the following professional responsibilities:
- *Demonstrate professional behavior:* When working with a client, business students must act in a professional manner, such as dress, speak and interact appropriately.
- *Act ethically:* Business students must act ethically, particularly in the area of confidentiality.

The specific structure of the teaching activity can affect the value for critical thinking skills development. For maximum benefit, the learning opportunity must allow students to struggle to find their own responses in an environment that is meaningful and where there is the opportunity to work with a variety of people. Overly structured problems fail to provide students with the opportunity to deal with ambiguity. Research on active-learning in accounting education suggests that when students develop their own solutions to practice problems, they are more likely to retain the knowledge and skills developed (Springer and Borthick, 2007; Hermanson, 1994; Kimmel, 1995). Additionally, the best learning experiences are those where there is a close connection between the academic subject and the service work, where students are engaged in important, meaningful work, set within the larger community (Astin *et al*., 2000). Finally, the experience is richest when there is the opportunity to work with people from other backgrounds and when students reflect on their experience (Eyler and Giles, 1999).

THE PROJECT

Assignment
The project is a teaching experience where students in small groups investigate cash controls for a non-profit organization-- specifically Parent Teacher Organizations (PTO)-- and develop instructional written materials for use in teaching the organizations about proper cash controls. After preparing the written materials, the students meet with members of the organization and deliver a short presentation using their materials about internal controls over cash assets. The experience culminates with each student writing a 1-2 page reflection on the process of preparing and teaching cash controls.

Learning Objectives
The primary purpose of the assignment is for students to develop a deep understanding of risk and controls over cash and to develop critical thinking skills through the process of education others. The specific learning objectives include auditing content objectives, as well as AICPA Core Competency objectives (AICPA, 1999), many of which relate to developing critical thinking skills.

The auditing content objectives are:
- To develop skills in identifying and obtaining information from diverse sources.
- To reinforce internal control concepts, specifically controls over cash.
- To allow students to gain and apply skills relating to internal control processes.
- To integrate and synthesize risk and internal control concepts.
- To communicate results to a specific audience.

AICPA Broad Business Core Competency objectives are:
- To develop an understanding of small non-profit organizations.
- To understand legal issues surrounding embezzlement.
- To develop skills in managing client relationships.
- To anticipate client needs and develop plans to meet those needs.
- To develop critical thinking skills.
- To manage resources to accomplish the project (human resources).

AICPA Functional Core Competency objectives are:
- To identify appropriate means of communicating information.
- To develop skills in research.
- To use technology to develop written materials.
- To demonstrate an understanding of risk.

AICPA Personal Core Competency objectives are:
- To demonstrate strong written communication skills
- To practice interpersonal communication skills.
- To develop healthy group interaction skills.
- To develop problem solving skills.
- To practice professional demeanor.
- To develop project management skills.

Implementation Guidelines
This project has been assigned regularly in an undergraduate internal audit class over the past five years at a mid-to-large size public university with a fifteen-week semester and class sizes of thirty to forty students. Typical students are 50% male and 50% female, 90% traditional students, 85% live off-campus, and most are accounting majors in their senior year. This project is also suitable for undergraduate external audit classes and can be used at the graduate level.

Cooperative learning: Students are assigned by the instructor to groups of three or four at the beginning of the semester and work on a variety of exercises together. The groups are purposely heterogeneous to provide students with the experience of cooperating with individual different from themselves. In order for students to develop group dynamics skills, we do not interfere with groups except in rare situations. Research shows that heterogeneous groups produce a more effective learning environment than student self-selected groups as measured by individual academic performance (Smith and Spindleb, 2007). Moreover, some critical thinking learning objectives are better achieved with students working in diverse groups.

Unstructured assignment: Much of the benefit of this teaching project occurs because students must wrestle with uncertainty in an ambiguous environment. Therefore, it is important to keep the project as unstructured as possible so as to develop critical thinking skills. All too often, students are in the habit of probing instructors for the 'right' answer. This is to be avoided and the scope and scale should be open-ended so students have the opportunity to respond creatively to the assignment. Students are encouraged to seek outside help. The process of identifying a need and consulting with experts is an important skill development. It is our experience that they will produce teaching materials that far exceed expectations.

Project timing and due dates: Students are informed of the project early in the semester but it is not formally assigned until the eleventh week and is due two to three weeks later. A short-project window with no interim due dates is used to mimic time pressure commonly present in auditing work. This time horizon is not critical for most

learning objectives and can be extended. However, formalizing interim due dates for stages of the project reduces the ambiguity and the opportunity for students to develop project management skills.

Prior academic learning: Prior to assigning the projects, students learn about risk and risk management, internal control, fraud risks, cash handling and cash controls. We discuss the nature of small non-profit organizations to better equip students to understand and identify the economic and financial risks of these organizations. To add richness to classroom discussion of risk and ethical considerations, students report on examples of embezzlement in small non-profit organizations.

Professionalism: In class, we directly address professionalism because often this is the first opportunities student have to work in client-like setting, doing meaningful work. Students are encouraged to dress and act like professionals, to demonstrate confidentiality, efficiency and ethical behavior, and to deliver a high-quality professional product.

Metacognition: After students complete the project, they are asked to write a 1-2 page reflection paper about what they learned from the project, how they would approach the problem differently, what they learned about group dynamics and project management, what went well and what did not. This is an area where instructor comments are extremely valuable. Often students have limited exposure to metacognition activities in business education and few are able to truly do this well. To develop student reflection skills, we demonstrate the processes using personal reflections about the process of writing research papers. Metacognition is an important component of developing critical thinking skills and thus, this part of the project is vital to student development.

Instructor feedback: The written materials developed are graded as follows: 1/3 appearance, 1/3 content, 1/3 usability for education. Appearance is important and is judged on how interesting it is and how easy it is for the reader to use? Content is graded based on the auditing learning objectives. The final third is an assessment of how would this be received by others as a learning tool. Was the word selection appropriate for the audience? Was there enough content, but not too much? Would the reader learn from this document? The individual reflection papers are separately graded based on level of effort and thoughtfulness. No attempt is made to adjust grades for dysfunctional group members. Likewise, no assessment of successful education of the PTO was attempted.

Final caution: Prior to beginning the project, students are advised not to volunteer audit service to any organization. Because the cash controls of some small non-profit organization are weak and a significant potential exists of finding evidence of irregularities, students are specifically told not to look at the books. We prefer students to learn accounting and critical thinking skills and avoid involvement in civil and criminal cases.

Outcome Assessment
After completing the project, students provided feedback by completing a questionnaire, which included assignment-related questions, competency-related questions, as well as demographic questions. Questionnaires were distributed to on the second to last day of the term after the project was due; feedback did not become available to the professor until after the term was over and grades were submitted to the university. A 7-point Likert Scale was used where strongly disagree was represented by "1" and strongly agree was represented by "7". Neither agree nor disagree was represented by "4". Table 2 contains a summary of feedback from forty-three students who completed the project this past semester.

Overall, the project was favorably received and most students (91%) thought the project was a valuable learning experience which helped them understand business better and recommended the project be used in class again. Student response to the content learning objectives was also high with over 85% of the students responding that the projected helped them better understand the course content objectives. Student understanding of financial risk for non-profit organizations was rated most poorly of all the content area objectives (mean=5.72 with 9% of the respondents believing the project did not help their understanding).

Overall, the students rated the development of their critical thinking skills above 5.5 which is half-way between neutral (4.0) and strongly agree (7.0). The most highly rated critical thinking skills included: encourage critical dialogue, think independently, gather and evaluate information and be flexible and able to modify judgments. The lowest rated critical thinking skills were: distinguishing fact from opinion, tolerating ambiguity, and delaying judgment. Although active listening was rated overall with a 5.93 mean, a surprising twelve percent of the students did not think they used active listening in the project.

Table 2: Student Feedback on Learning Outcomes

	Agree	Neutral	Disagree	Mean* (n=43)
Overview				
1. I would encourage the instructor to use this project in class again.	91%	2%	7%	5.77
2. Overall, I found this project to be a valuable learning experience.	91%	7%	2%	6.05
3. Overall, I understand business better.	91%	7%	2%	5.84
Content knowledge				
This project helped me develop a better understanding of . . .				
4. the internal control process.	95%	2%	2%	6.00
5. the relationship between risk and internal control.	91%	7%	2%	6.02
6. cash controls.	98%	0%	2%	6.02
7. how organizations implement cash controls.	86%	9%	5%	5.88
8. financial risk for a nonprofit organization.	88%	2%	9%	5.72
Critical thinking skills				
In this project, I needed to . . .				
9. tolerate ambiguity.	65%	23%	12%	5.84
10. welcome divergent views.	77%	19%	5%	6.07
11. be accepting of change.	72%	19%	9%	5.88
In this project, I needed to . . .				
12. listen actively.	70%	19%	12%	5.93
13. encourage critical dialogue.	81%	19%	0%	6.42
14. gather information and evaluate its value.	86%	9%	5%	6.16
15. distinguish fact from opinion.	81%	9%	9%	5.65
16. delay judgement until adequate information is gathered.	81%	12%	7%	5.88
17. be flexible and be able to modify judgements from new information.	84%	12%	5%	6.16
18. apply knowledge to a new situation.	88%	7%	5%	5.95
In this project, I needed to . . .				
19. think independently.	79%	19%	2%	6.28
20. define problems accurately using precise terms.	93%	2%	5%	6.00
21. synthesize information from a variety of sources.	86%	14%	0%	6.02
22. reflect on my own learning process.	88%	7%	5%	5.93

*7-point response scale: 7=strongly agree, 4=neither agree nor disagree, 1=strongly disagree.

Business Education Application

Although this project was designed for an internal auditing class, the concept of having students teach others can be applied in other business classes. Non-profit organizations, especially small ones, are rich with needs and could benefit from education in a variety of business areas because often they are managed by untrained volunteers. Marketing students, for example, could teach organizations about marketing strategy, customer awareness, sales, advertising, etc. The customer-base for non-profit organizations includes both people using the services and those supporting the charity. Non-profit organizations need to know how to develop a brand image and to advertise to both these groups. Alternatively, finance students could help educate non-profit organizations on proper budgeting techniques. Resources management is critical for many cash-starved organizations. These are two obvious examples, but many others exist.

Besides non-profit organizations, individuals can benefit from direct business education. In accounting, the VITA (Voluntary Income Tax Assistance) program can be an opportunity for students to teach others how to prepare their

own taxes. Although usually this service for the community is not part of academic coursework and may not focus on teaching (enabling) others how to prepare their own taxes, it could be developed as an educational tool. Likewise, teaching financial literacy is opportunity for finance students to educate others. The National Endowment for Financial Education has Financial Workshop Kits that provide tools and resources that allow students to share financial education to their local community.

In this paper, we advocate for these educational experiences to be incorporated into direct classroom activities. Alternatively, some of these educational service projects could also be undertaken by business student organizations. Likely, the value to the student would be less because of the lack of reflection and instructor feedback. However, both are worth considering.

CONCLUSION

Teaching others is a valuable learning tool, which develops the skills necessary to link data, knowledge, and insight together for meaningful decision-making. It is an alternative to traditional education, service-learning, and peer teaching which focuses on student-to-student education. If done right, students can more deeply develop affective, behavior, and cognitive critical thinking skills. The challenge for academics is to identify and implement directed learning activities where students reach out and teach the community some skills they are learning in the classroom. The benefits to both student and society can be great.

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